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Historical Analysis of Studies Published on Transportation Management of Enterprises in the Web of Science Database

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Abstract

The purpose of this article is to examine the studies published on transportation management in the Web of Science (WOS) database. In this study, as a result of the search made with the word 'transportation management' in the WOS database, 2113 articles published in the field of social sciences covering the years 1982-2023, in English, were analyzed with HistCite 12.3 software. Although the year with the most publications is 2023 Recs (279), TLCS has a citation value of (3). The most commonly used word in the titles, "problem (242)", has the highest TGCS value (9245). Laporte, G., has a strong influence on the literature with the number of publications Recs (26) and TGCS value (637). The U.S. is the leader in terms of both the number of publications Recs (575) and the number of citations. Transportation Research Part E-Logistics and Transportation Review has the highest Recs (327) and TGCS (13887). Delft University of Technology, Recs (119) is at the forefront with the publication. In this study, it is thought that the study is original in order to determine the deficiencies in the literature, since the studies published on transportation management in the WOS database are comprehensively handled with a historical perspective.

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1.Introduction

Transportation management is a broad area of research that attracts researchers from different disciplines. Studies with goals such as increasing the efficiency of transportation, reducing costs and minimizing environmental impacts contribute to both the practical and theoretical aspects of transportation management. The scope and diversity of research in this field also reveals the importance of interdisciplinary cooperation. In recent years, new technologies and digitalization trends in the field of transportation management have changed the direction of research in the literature. In particular, technologies such as big data analytics, the internet of things (IoT) and artificial intelligence allow transportation processes to be managed more effectively, which adds new dimensions to research in the field. The proliferation of digital transformation challenges the main raison of companies; It pushes executives to reconsider their business strategies and operations, and academics to re-evaluate relevant theories (Plekhanov et al., 2023: 821). This shift shows that the transportation management literature is constantly evolving and innovative research is contributing to this evolution. In this context, there is a need for in-depth and comprehensive analysis in the field of transportation management in the literature. Analyses from a historical perspective highlight the critical importance of identifying research gaps in this area and understanding their development process. Not only does this study show how past research and practices have evolved, but it also helps to determine future research directions. Filling these gaps in the literature will enable transportation management research to progress more comprehensively and effectively. In this study, the historical perspective, which has not been adequately examined in the transportation management literature, was analyzed using HistCite 12.3 software. The analyzes reveal how scientific studies in this field have developed and which research areas are at the forefront. This comprehensive assessment allows for an in-depth understanding of the existing literature in the field of transportation management and strategic directions for future research.

2. Literature Review

2.1.Transportation Management

Transportation management is a vital part of modern supply chain processes that involve planning, implementing, and optimizing the transportation of goods and materials from one place to another. Effective transportation management in the age of globalization; It is increasingly critical for companies looking to reduce costs, increase efficiency, and maintain a competitive advantage (Dan, 2022: 1). Businesses are planning to deliver the products from the production centers to the user with the lowest transportation cost. This process is known as the "transportation problem", which analyzes and minimizes transportation costs. The problem of transportation is widely addressed in operation research (Ahmed et al., 2016: 236). The "Transportation Problem Optimization Technique" developed by Dantzig (1951) is used to increase the cost-effectiveness of transportation networks and helps to develop logistics and transportation strategies by ensuring the efficient

distribution of resources. Determining the criteria for the planning and management of transportation services is important to increase the efficiency of logistics and transportation systems. These criteria include factors such as estimation and planning of correspondence of cargo flows, distribution of resources, efficiency and customer satisfaction (Sirina and Zubkov, 2021: 263). Since transportation management is a management area that aims to ensure the effective and efficient transportation of goods and services, especially passengers and cargo, one of the basic components of transportation management is route planning. Ferguson and Dantzig (1956) used complex scheduling techniques to optimize the assignment of aircraft to routes to ensure that flights were operated efficiently and effectively, increasing the efficiency of airline operations and contributing to the reduction of costs. Arabeyre et al. (1969) focused on crew planning in airline operations. In the study, mathematical programming models were used for crew planning. As a result of the study, they contributed to increasing efficiency in assigning crews to flights and ensuring operational cohesion. As can be seen, transportation management stands out as a complex field that requires various techniques and strategies to ensure operational efficiency and cost-effectiveness.

2.2.Business Strategies and Transportation Planning

Developing an operation plan in line with business strategies in the modern business world; Ensuring the strategic alignment of transportation planning has become a vital element for optimizing organizations' operations, increasing efficiency, and maintaining competitive advantage (Schniederjans and Cao, 2009: 2535). The integration of business strategy and transportation planning is a complex process that requires a thorough understanding of the interdependence between corporate strategy and information technology capabilities. There is an increasing need for transportation management models that contribute to the continuous improvement of company processes; These models are critical to accelerating digital transformation, increasing competitive advantage, and preparing for future challenges (Drohomeretski et al., 2013: 804). The strategic alignment framework discussed by Luftman et al. (1993) emphasizes the need to go beyond just looking at technology from a narrow perspective, and also states that identifying slowdowns in the internal structure of transportation companies and constantly updating processes in line with the strategic plan and company goals will reduce the problem.

2.3. Histcite

HistCite, as a bibliometric software, was developed by Garfield in 2007. This software offers the advantage of accurately identifying the research focuses, historical evolution, development process, and future trends of a particular discipline from a wide range of literature (Liu et al., 2000). Recs, one of the indicators of HistCite, refers to the number of published articles, while GCS (Global Cited Score) indicates the number of global citations, that is, the total number of citations received by the literature compared to other documents in the WOS database. LCS (Local Cited Score) refers to the number of local citations, that is, it shows the number of citations of literature in the citations

received. The higher the LCS value, the greater its importance in this area of research. LCR (Local Cited References) refers to the number of local references. In other words, it shows the number of other literature within the literature references themselves. CR (Cited References) refers to the total number of references in the WOS database (Liu et al., 2000).

3.Methodology

In this study, it was seen that the first study in the Web of Science (WOS) database was conducted in 1982 according to the search criteria on July 7, 2024. For this reason, in the period covering the years 1982-2023, the focus is on determining the historical development of publications containing the concept of "transportation management", the most used keywords, citation networks, the most cited authors, institutions, journals and countries. The aim of the analysis is to include 2113 articles published in the field of social sciences with open access, English language. It is very important to choose appropriate data sources in terms of the reliability and quality of research. Since it is a comprehensive database of scientific literature, WOS database was used in this study (Sipahi Döngül, 2023: 249). HistCite 12.3 software was chosen because it is a powerful tool for understanding the historical context of the literature related to the field in academic research processes, as well as to measure how often a study is cited and its impact on the scientific community.

4. Findings

In this part of the study, the findings of the analysis are included. Table 1 shows the yearly distribution of published works.

Table 1 Yearly distribution of published works

Year	Number of publications	Year	Number of publications	Year	Number of publications
1982	1	1997	5	2010	27
1983	0	1998	4	2011	28
1984	1	1999	4	2012	36
1985	0	2000	10	2013	58
1986	1	2001	5	2014	52
1987	1	2002	7	2015	74
1988	0	2003	12	2016	106
1989	0	2004	11	2017	118
1990	2	2005	11	2018	207
1991	2	2006	17	2019	184
1992	0	2007	15	2020	250
1993	3	2008	21	2021	256
1994	4	2009	20	2022	269
1995	6	2010	27	2023	279
1996	6	2011	28		
Total	2113				

Source: Table 1 was created by the authors using the Web of Science database (2024).

Looking at the year-based distribution, the year with the highest number of publications is 2023 with 279 works. In 1983, 1985, 1988, 1989 and 1992, there were no publications on Transportation Management. Especially after the 2000s, there is a significant upward trend. This increase shows that academic and practical studies on transportation management are intensifying.

Table 2 is listed based on the TGCS value.

Table 2 Word citation analysis

N	The Word in the Article Title	Recs	TLCS	TGCS
1	Problem	242	306	9245
2	Supply	182	83	7411
3	Vehicle	145	135	6800
4	Routing	145	182	5549
5	Management	194	119	5483
6	Network	156	179	5430
7	Based	146	113	5137
8	Transportation	231	151	5121
9	Chain	131	69	5003
10	Model	178	144	4813
11	Time	136	159	4796
12	Analysis	160	58	4761
13	Logistics	138	102	4478
14	Transport	204	79	4292
15	Approach	154	121	4283

Source: Table 2 was created by the authors (2024)

Table 2 shows how often the words in the titles of the articles published in the field of transportation management are used and the effects of these words on the number of citations.

When we look at the word distribution and citation analysis, the word "problem" is the most common word in the titles, but it has the highest TGCS (9245) value. This shows that the word "problem" refers to important problems and research in the field of transportation management, and that such articles are frequently cited. The fact that the word "routing" is used 145 times in the titles shows that it has an important place in the field of transportation. In addition, the fact that TLCS (182) and TGCS (5549) values are quite high indicates that route planning and optimization issues are frequently researched in transportation management and these researches are highly cited. The total number of local citations (TLCS) to the word "transportation" is 151, and the total number of global citations (TGCS) is 5121. These data show that work on transport has had a broad impact on both local and global levels. This situation once again emphasizes how critical transportation management is in today's globalizing world.

In Table 3, the top 10 authors with the highest TGCS value to understand the impact of the researcher are given.

Table 3 Author citation analysis

N	Author	Recs	TLCS	TGCS	TLCR
1	Laporte, G.	26	47	1637	40
2	Agatz, N.	9	44	1244	8
3	Imai, A.	7	41	1201	6
4	Nishimura, E.	6	37	1094	5
5	Papadimitriou, S.	7	37	1094	6
6	Kroon, L.	12	71	1078	17
7	Ivanov, D.	3	2	1068	3
8	Choi, TM.	6	2	970	8
9	Goldfarb, A.	2	4	961	1
10	McGahan, A.M.	1	0	817	0

Source: Table 3 was created by the authors (2024)

When Table 3 is examined, the author with the highest number of Recs (number of articles) is Laporte, G. (26). In terms of TGCS value (1637), the author is at the forefront. Looking at the lowest values, McGahan, A.M. Recs (1) are represented by a study. There is also no TLCS value (0). This shows that the author has less influence than other authors.

Table 4 shows the results of the citation analysis of the countries.

Table 4 Country citation analysis

N	Country	Recs	TLCS	TGCS
1	USA	575	395	20394
2	China	505	341	16243
3	UK	460	326	14615
4	Netherlands	358	425	11797
5	Canada	171	165	6583
6	Denmark	134	153	4861
7	Germany	158	106	4376
8	Australia	142	86	4356
9	France	144	77	3851
10	Sweden	116	99	3579
11	Italy	129	124	3350
12	Singapore	91	92	3251
13	Belgium	92	97	3100
14	Switzerland	63	77	2776
15	Norway	88	100	2438
16	Japan	53	66	2405
17	Spain	100	30	2201
18	India	70	37	2111
19	Greece	29	69	2084
20	Türkiye	41	21	1412
21	Taiwan	44	10	1401
22	Iran	45	13	1388
23	Portugal	49	29	1073

24	Austria	38	20	1005
25	South Korea	37	15	810
26	Lithuania	22	2	740
27	South Africa	55	4	570
28	New Zealand	21	7	549
29	Israel	22	14	528
30	Brazil	56	9	465
31	U Arab Emirates	25	11	465
32	Chile	17	13	442
33	Finland	26	9	414
34	Pakistan	17	8	375
35	Poland	43	1	353
36	Indonesia	27	6	338
37	Saudi Arabia	11	4	327
38	Malaysia	21	1	265
39	Hungary	14	2	259
40	Slovenia	4	12	253
41	Luxembourg	9	1	245
42	Ireland	16	5	244
43	Colombia	14	1	242
44	Serbia	10	2	222
45	Nigeria	10	4	201
46	Russia	14	2	184
47	Tunisia	6	4	164
48	Vietnam	10	1	152
49	Czech Republic	19	0	131
50	Cyprus	2	5	126

Source: Table 4 was created by the authors (2024)

Table 4 lists the top 50 countries listed from high to low according to TGCS values published in the field of transportation management. USA has Recs (575) publications and a TGCS value of (20394). This shows that the USA has contributed more to the scientific literature than other countries and that its work has had a wide impact. Turkey has 41 publications, but the TLCS value (21) indicates that it attracts less attention in the local arena. Cyprus has Recs (2) publications. This shows that Cyprus has made a limited contribution to the scientific literature. Accordingly, it can be said that the differences between the number of citations are an important indicator for understanding the national and international impact of countries in scientific publications.

Table 5 shows the citation analysis results of the journals. The journal ranking is from high to low according to the TGCS value.

Table 5 Journal citation analysis

Journal	Recs	%	TLCS	TGCS	TLCR
Transportation Research Part E-Logistics and Transportation Review	327	15.48	299	13887	352
Transportation Research Part B-Methodological	243	11.50	360	11743	360
Transportation Research Part A-Policy and Practice	284	13.44	201	8695	182
Transportation Science	180	8.52	326	7149	222
European Journal of Operational Research	167	7.90	172	5552	153
Research in Transportation Business and Management	276	13.06	99	4659	143
Transport Policy	63	2.98	45	1727	39
Management Science	19	0.90	15	1354	1
Operations Research	19	0.90	34	1167	5
Tourism Management	10	0.47	1	929	1
Journal of Transport Geography	26	1.23	18	924	7
Energy Policy	21	0.99	6	892	3
Strategic Management Journal	1	0.05	0	817	0
Journal of Environmental Economics and Management	14	0.66	8	798	4
Research in Transportation Economics	68	3.22	19	761	37
M&Som-Manufacturing & Service Operations Management	13	0.62	16	687	6
Journal of Economic Literature	1	0.05	3	680	1
Accident Analysis and Prevention	33	1.56	4	650	2
International Transactions in Operational Research	24	1.14	18	616	28
Omega-International Journal of Management Science	29	1.37	9	605	34
Journal of the Operational Research Society	16	0.76	12	598	5
International Journal of Physical Distribution & Logistics Management	12	0.57	9	466	4
Journal of Operations Management	4	0.19	6	438	3
Management Decision	1	0.05	2	401	0
IEEE Transactions on Engineering Management	16	0.76	8	334	12
Logistics-Basel	31	1.47	0	333	12
Interfaces	11	0.52	15	299	2
Internatıonal Journal of Project Management	7	0.33	2	284	3
Information & Management	4	0.19	0	222	5
Food Policy	3	0.14	1	211	0
Journal of Business Economics and Management	10	0.47	0	211	3
Economic Research-Ekonomska Istrazivanja	10	0.47	1	208	6
International Journal of Logistics-Research and Applications	12	0.57	2	182	7
Economics of Transportation	9	0.43	7	181	4
Maritime Business Review	14	0.66	1	178	2
Polish Journal of Management Studies	12	0.57	2	159	1
Energy Economics	5	0.24	5	152	0
Journal of Transport and Supply Chain Management	40	1.89	0	142	6
Journal of Humanitarian Logistics and Supply Chain Management	14	0.66	5	140	10
International Journal of Operations & Production Management	5	0.24	1	137	0
Journal of Banking & Finance	1	0.05	0	133	0
Pharmacoeconomics	2	0.09	0	128	0
Journal of Innovation & Knowledge	6	0.28	0	122	0
Journal of Hospitality and Tourism Management	3	0.14	0	120	0

Journal of Management Science and Engineering	9	0.43	1	114	9
International Journal of Strategic Property Management	10	0.47	0	113	1
Technological and Economic Development of Economy	10	0.47	0	113	2
Decision Sciences	5	0.24	0	109	2
Papers in Regional Science	6	0.28	3	104	0
Business Strategy and the Environment	7	0.33	1	103	2
Total	2113	100			

Source: Table 5 was created by the authors (2024)

Table 5 shows that the journal "Transportation Research Part E-Logistics and Transportation Review" publishes the most articles Recs (327) with a rate of 15, 48%. The fact that the TGCS value (13887) is higher than other journals indicates that the articles published in this journal reach a wide audience at the international level and are frequently cited. A high TLCR (352) value indicates that the journal has a strong resource network and has made significant contributions to the literature. "Strategic Management Journal (0.05%)", "Management Decision (0.05%)", "Journal of Banking & Finance (0.05%) and Pharmacoeconomics (0.09%)", which have Recs ratios, indicate that they appeal to a more limited readership. This analysis; It can be said that it will help in understanding the academic impact levels of journals.

Table 6 shows the results of institution citation analysis. The institution ranking is based on the Recs value.

Table 6 Institution citation analysis

N	Institution	Recs	%	TLCS	TGCS
1	Erasmus Univ.	114	5.40	237	5232
2	Hong Kong Polytech Univ.	101	4.78	89	3997
3	MIT	55	2.60	62	2984
4	Tech. Univ. Denmark	92	4.35	122	2954
5	Delft Univ. Technology	119	5.63	78	2615
6	Eindhoven Univ. Technol.	57	2.70	95	1901
7	HEC Montreal	41	1.94	60	1804
8	Univ. Calif. Berkeley	39	1.85	31	1557
9	Arizona State Univ.	18	0.85	27	1536
10	Ecole Polytech Fed Lausanne	18	0.85	52	1498
11	Beijing Jiaotong Univ.	50	2.37	41	1493
12	Univ. Leeds	43	2.04	30	1391
13	Natl Univ. Singapore	39	1.85	36	1385
14	Univ. Antwerp	39	1.85	46	1239
15	Georgia Inst. Technology	18	0.85	37	1214
16	Univ. Toronto	11	0.52	6	1157
17	Chalmers Univ. Technology	38	1.80	22	1150
18	NBER	9	0.43	9	1117
19	Univ Piraeus	9	0.43	37	1095
20	Berlin Sch. Econ. & Law	3	0.14	2	1068
21	Shanghai Jiao Tong Univ.	24	1.14	28	1048

22	Harvard Univ.	5	0.24	2	1045
23	Univ. Southampton	24	1.14	25	1045
24	Northwestern Univ.	25	1.18	16	1021
25	Kobe Univ.	7	0.33	35	1020
26	Singapore Management Univ.	30	1.42	32	1017
27	Univ. Lancaster	37	1.75	47	1001
28	Shanghai Maritime Univ.	16	0.76	11	995
29	Hong Kong Univ. Sci. & Technology	24	1.14	37	972
30	Univ. Southern Denmark	11	0.52	13	971
31	Netherlands Railways	21	0.99	75	945
32	Univ. Calif Davis		0.99	15	921
33	World Maritim		0.43	45	920
34	Cardiff Univ.	20	0.95	20	837
35	Univ. Tehran	12	0.57	7	821
36	Ecole Polytech	12	0.57	24	818
37	Univ Hong Kong	25	1.18	25	816
38	CIRRELT	15	0.71	15	800
39	Norwegian Univ. Sci. & Technology	29	1.37	43	766
40	Beihang Univ.	25	1.18	41	754
41	Southwest Jiaotong Univ.	19	0.90	19	746
42	Tongji Univ.	21	0.99	16	744
43	Nanyang Technol. Univ.	17	0.80	21	701
44	Univ. Calif. Irvine	7	0.33	8	700
45	Univ. Texas Austin	12	0.57	11	695
46	Monash Univ.	11	0.52	8	690
47	Vilnius Gediminas Tech. Univ.	15	0.71	2	681
48	Univ. Minnesota	14	0.66	9	674
49	Univ. Michigan	11	0.52	12	671
50	Vrije Univ. Amsterdam	29	1.37	24	664
51	Shanghai Univ.	19	0.90	23	662
52	Indian Inst. Technology	8	0.38	3	659
53	Cornell Univ.	26	1.23	16	657
54	Wageningen Univ.	5	0.24	14	657
55	Kyoto Univ.	14	0.66	15	643
56	Univ. Illinois	16	0.76	9	627
57	Univ. Montreal	16	0.76	17	627
58	UCL	28	1.33	4	619
59	Univ. Bologna	10	0.47	27	614
60	Univ. Twente	26	1.23	16	613
61	Tsinghua Univ.	25	1.18	9	612
62	Katholieke Univ. Leuven	22	1.04	19	608
63	Univ. Quebec	5	0.24	15	604
64	Univ. S. Florida	7	0.33	12	602
65	Univ. Ghent	21	0.99	9	596
66	Univ. Oxford	12	0.57	10	592
67	KTH Royal Inst. Technology	10	0.47	6	567
68	Univ. Aberdeen	11	0.52	9	559

69	Carnegie Mellon Univ.	10	0.47	19	550
70	Newcastle Univ	19	0.90	12	545
71	Aristotle Univ Thessaloniki	1	0.05	11	542
72	Ohio State Univ.	12	0.57	13	538
73	Bogazici Univ.	4	0.19	9	526
74	NYU	11	0.52	3	526
75	Univ. Virginia	3	0.14	7	520
76	Univ. Groningen	26	1.23	6	517
77	Dalian Maritime Univ.	18	0.85	16	516
78	Aarhus Univ.	13	0.62	9	514
79	Politecn. Torino	7	0.33	21	514
80	Univ. Sheffield	10	0.47	8	513
81	Univ. Maryland	18	0.85	19	510
82	Purdue Univ.	16	0.76	5	503
83	Univ. Sydney	19	0.90	16	495
84	Univ. Manchester	10	0.47	15	489
85	Loughborough Univ.	17	0.80	12	463
86	Politecn. Milan	17	0.80	15	460
87	Univ. British Columbia	17	0.80	14	460
88	Univ. Wollongong	7	0.33	12	455
89	Univ. Utrecht	18	0.85	13	445
90	Univ. Laval	14	0.66	13	442
91	Zhejiang Univ.	11	0.52	7	434
92	Univ. Sussex	12	0.57	11	433
93	Liverpool John Moores Univ.	10	0.47	11	431
94	University Lowa	6	0.28	16	419
95	Swiss Fed. Inst. Technology	15	0.71	14	413
96	University Hull	6	0.28	12	413
97	Tianjin University	17	0.80	2	406
98	IRIT	1	0.05	2	401
99	Loyola University Andalusia	1	0.05	2	401
100	Feng Chia University	5	0.24	3	398
	Total	2113	100		

Source: Table 6 was created by the authors (2024)

In Table 6, "Delft University of Technology" is in the leading position compared to other institutions with Recs (119) publications (5.63%). The fact that the TGCS value (2615) is higher than other institutions reveals that the institution has a significant impact in the international arena.

Although Harvard University has Recs (5) publications (0.24%), the fact that it ranks twenty-second with TGCS (1045) shows that it is internationally influential in the studies published by Harvard University. Aristotle Univ Thessaloniki, IRIT (Computer Science Research Institute of Toulouse) and Univ. Loyola Andalucia have the lowest number of Recs (1) publications (0.05 %).

Table 7 shows data on year-based academic nodes and citation numbers. Table 7 is sorted by node number and year.

Table 7 Yearly Based Academic Nodes and Citation Numbers (1997-2021)

N	Node Number	Author(s)	Year	Article Name	Journal Information	LCS	GCS
1	30	Kroon, L.G., Romeijn, H.E., Zwaneveld, P.J.	1997	Routing trains through railway stations: Complexity issues	European Journal of Operational Research, *98*(3), 485-498	6	74
2	56	Armacost, A.P., Barnhart, C., Ware, K.A.	2002	Composite variable formulations for express shipment service network design	Transportation Science, *36*(1), 1-20	4	106
3	70	Imai, A., Nishimura, E., Papadimitriou, S.	2003	Berth allocation with service priority	Transportation Research Part B-Methodological, *37*(5), 437-457	6	205
4	77	Abbink, E., van den Berg, B., Kroon, L., Salomon, M.	2004	Allocation of railway rolling stock for passenger trains	Transportation Science, *38*(1), 33-41	4	57
5	83	Goossens, J.W., van Hoesel, S., Kroon, L.	2004	A branch-and-cut approach for solving railway line-planning problems	Transportation Science, *38*(3), 379-393	6	94
6	91	Imai, A., Sun, X., Nishimura, E., Papadimitriou, S.	2005	Berth allocation in a container port: using a continuous location space approach	Transportation Research Part B-Methodological, *39*(3), 199-221	9	237
7	101	Goossens, J.W., van Hoesel, S., Kroon, L.	2006	On solving multi-type railway line planning problems	European Journal of Operational Research, *168*(2), 403-424	4	106
8	109	Alfieri, A., Groot, R., Kroon, L., Schrijver, A.	2006	Efficient circulation of railway rolling stock	Transportation Science, *40*(3), 378-391	5	96
9	121	Shintani, K., Imai, A., Nishimura, E., Papadimitriou, S.	2007	The container shipping network design problem with empty container repositioning	Transportation Research Part E-Logistics and Transportation Review, *43*(1), 39-59	7	246
10	150	Imai, A., Chen, H.C., Nishimura, E., Papadimitriou, S.	2008	The simultaneous berth and quay crane allocation problem	Transportation Research Part E-Logistics and Transportation Review, *44*(5), 900-920	10	180
11	162	Kroon, L., Huisman, D., Abbink, E., Fioole, P.J., Fischetti, M., et al.	2009	The New Dutch Timetable: The OR Revolution	Interfaces, *39*(1), 6-17	10	103
12	189	Giallombardo, G., Moccia, L., Salani, M., Vacca, I.	2010	Modeling and solving the Tactical Berth Allocation Problem	Transportation Research Part B-Methodological, *44*(2), 232-245	9	169
13	206	Frisk, M., Göthe-Lundgren, M., Jörnsten, K., Rönnqvist, M.	2010	Cost allocation in collaborative forest transportation	European Journal of Operational Research, *205*(2), 448-458	12	285

14	208	Gelareh, S., Nickel, S., Pisinger, D.	2010	Liner shipping hub network design in a competitive environment	Transportation Research Part E-Logistıcs and Transportation Review, *46*(6), 991-1004	9	151
15	223	Buhrkal, K., Zuglian, S., Ropke, S., Larsen, J., Lusby, R.	2011	Models for the discrete berth allocation problem: A computational comparison	Transportation Research Part E-Logistics and Transportation Review, *47*(4), 461-473	5	114
16	254	Corman, F., D'Ariano, A., Pacciarelli, D., Pranzo, M.	2012	Optimal inter-area coordination of train rescheduling decisions	Transportation Research Part E-Logistics and Transportation Review, *48*(1), 71-88	5	86
17	257	Dollevoet, T., Huisman, D., Schmidt, M., Schöbel, A.	2012	Delay Management with Rerouting of Passengers	Transportation Science, *46*(1), 74-89	13	95
18	264	Cacchiani, V., Caprara, A., Galli, L., Kroon, L., Maróti, G., et al.	2012	Railway Rolling Stock Planning: Robustness Against Large Disruptions	Transportation Science, *46*(2), 217-232	9	56
19	267	Dekker, R., Bloemhof, J., Mallidis, I.	2012	Operations Research for green logistics - An overview of aspects, issues, contributions and challenges	European Journal of Operational Research, *219*(3), 671-679	11	542
20	288	Lai, K.H., Lun, Y.H.V., Wong, C.W.Y., Cheng, T.C.E.	2013	Measures for evaluating green shipping practices implementation	International Journal of Shipping and Transport Logistics, *5*(2), 217-235	5	38
21	314	Vacca, I., Salani, M., Bierlaire, M.	2013	An Exact Algorithm for the Integrated Planning of Berth Allocation and Quay Crane Assignment	Transportation Science, *47*(2), 148-161	8	80
22	326	Cadarso, L., Marín, A., Maróti, G.	2013	Recovery of disruptions in rapid transit networks	Transportation Research Part E-Logistics and Transportation Review, 53, 15-33	8	142
23	334	Liao, F.X., Arentze, T., Timmermans, H.	2013	Incorporating space-time constraints and activity-travel time profilesin a multi-state supernetwork approach to individual activity-travel scheduling	Transportation Research Part B-Methodological, 55, 41-58	8	95
24	353	Yang, H., Liu, W., Wang, X.L., Zhang, X.N.	2013	On the morning commute problem with bottleneck congestion and parking space constraints	Transportation Research Part B-Methodological, 58, 106-118	7	141

25	354	Wang, T.S., Meng, Q., Wang, S.I., Tan, Z.J.	2013	Risk management in liner ship fleet deployment: A joint chance constrained programming model	Transportation Research Part E-Logistics and Transportation Review, 60, 1-12	5	45
26	366	Pellegrini, P., Marlière, G., Rodriguez, J.	2014	Optimal train routing and scheduling for managing traffic perturbationsin complex junctions	Transportation Research Part B-Methodological, 59, 58-80	6	132
27	374	Bai, R.B., Wallace, S.W., Li, J.P., Chong, A.Y.L.	2014	Stochastic service network design with rerouting	Transportation Research Part B-Methodological, 60, 50-65	7	58
28	379	Zhu, E.D., Crainic, T.G., Gendreau, M.	2014	Scheduled Service Network Design for Freight Rail Transportation	Operations Research, *62*(2), 383-400	6	84
29	389	Brouer, B.D., Alvarez, J.F., Plum, C.E.M., Pisinger, D., Sigurd, M.M.	2014	A Base Integer Programming Model and Benchmark Suite for Liner-Shipping Network Design	Transportation Science, *48*(2), 281-312	21	169
30	394	Louwerse, I., Huisman, D.	2014	Adjusting a railway timetable in case of partial or complete blockades	European Journal of Operational Research, *235*(3), 583-593	7	104
31	415	Li, Z.C., Lam, W.H.K., Wong, S.C.	2014	Bottleneck model revisited: An activity-based perspective	Transportation Research Part B-Methodological, 68, 262-287	5	61
32	426	Caris, A., Limbourg, S., Macharis, C., van Lier, T., Cools, M.	2014	Integration of inland waterway transport in the intermodal supply chain: a taxonomy of research challenges	Journal of Transport Geography, 41, 126-136	6	80
33	438	Brouer, B.D., Desaulniers, G., Pisinger, D.	2014	A matheuristic for the liner shipping network design problem	Transportation Research Part E-Logistics and Transportation Review, 72, 42-59	6	52
34	481	Karsten, C.V., Pisinger, D., Ropke, S., Brouer, B.D.	2015	The time constrained multi-commodity network flow problem and its application to liner shipping network design	Transportation Research Part E-Logistics and Transportation Review, 76, 122-138	8	72
35	490	Kroon, L., Maróti, G., Nielsen, L.	2015	Rescheduling of Railway Rolling Stock with Dynamic Passenger Flows	Transportation Science, *49*(2), 165-184	13	75
36	525	Iris, C., Pacino, D., Ropke, S., Larsen, A.	2015	Integrated Berth Allocation and Quay Crane Assignment Problem: Set partitioning models and computational results	Transportation Research Part E-Logistics and Transportation Review, 81, 75-97	7	131
37	535	Liu, P., Liao, F.X., Huang, H.J., Timmermans, H.	2015	Dynamic activity-travel assignment in multi-state supernetworks	Transportation Research Part B-Methodological, 81, 656-671	8	25

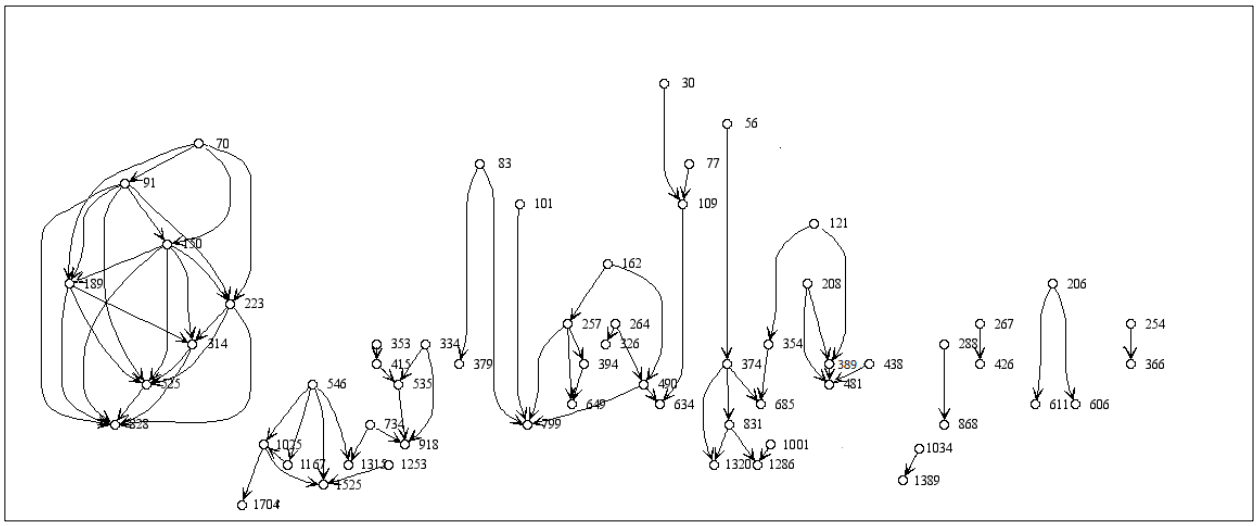
38	546	Stiglic, M., Agatz, N., Savelsbergh, M., Gradisar, M.	2015	The benefits of meeting points in ride-sharing systems	Transportation Research Part B-Methodological, 82, 36-53	11	205
39	606	Defryn, C., Sörensen, K., Cornelissens, T.	2016	The selective vehicle routing problem in a collaborative environment	European Journal of Operational Research, *250*(2), 400-411	5	51
40	611	Guajardo, M., Rönnqvist, M.	2016	A review on cost allocation methods in collaborative transportation	International Transactions in Operational Research, *23*(3), 371-392	9	171
41	634	Haahr, J.T., Wagenaar, J.C., Veelenturf, L.P., Kroon, L.G.	2016	A comparison of two exact methods for passenger railway rolling stock(re)scheduling	Transportation Research Part E-Logistics and Transportation Review, 91, 15-32	5	42
42	649	Veelenturf, L.P., Kidd, M.P., Cacchiani, V., Kroon, L.G., Toth, P.	2016	A Railway Timetable Rescheduling Approach for Handling Large-Scale Disruptions	Transportation Science, *50*(3), 841-862	9	123
43	685	Demir, E., Burgholzer, W., Hrusovsky, M., Arikan, E., Jammernegg, W., et al.	2016	A green intermodal service network design problem with travel time uncertainty	Transportation Research Part B-Methodological, 93, 789-807	5	137
44	734	Boyaci, B., Zografos, K.G., Geroliminis, N.	2017	An integrated optimization-simulation framework for vehicle and personnel relocations of electric carsharing systems with reservations	Transportation Research Part B-Methodological, 95, 214-237	8	160
45	799	Bueno, P.C., Gomez, J., Peters, J.R., Vassallo, J.M.	2017	Understanding the effects of transit benefits on employees' travel behavior: Evidence from the New York-New Jersey region	Transportation Research Part A-Policy and Practice, 99, 1-13	5	44
46	828	Iris, C., Pacino, D., Ropke, S.	2017	Improved formulations and an Adaptive Large Neighborhood Search heuristic for the integrated berth allocation and quay crane assignment problem	Transportation Research Part E-Logistics and Transportation Review, 105, 123-147	5	96
47	831	Rivera, A.E.P., Mes, M.R.K.	2017	Anticipatory freight selection in intermodal long-haul round-trips	Transportation Research Part E-Logistics and Transportation Review, 105, 176-194	7	44
48	868	Yuen, K.F., Wang, X.Q., Wong, Y.D., Zhou, Q.J.	2017	Antecedents and outcomes of sustainable shipping practices: The integration of stakeholder and behavioural theories	Transportation Research Part E-Logistics and Transportation Review, 108, 18-35	5	101
49	918	Li, Q., Liao, F.X., Timmermans, H.J.P., Huang, H.J., Zhou, J.	2018	Incorporating free-floating car-sharing into an activity-based dynamic user equilibrium model: A demand-side model	Transportation Research Part B-Methodological, 107, 102-123	5	66

50	1001	Govindan, K., Cheng, T.C.E., Mishra, N., Shukla, N.	2018	Big data analytics and application for logistics and supply chain management	Transportation Research Part E-Logistics and Transportation Review, 114, 343-349	6	145
51	1025	Wang, X., Agatz, N., Erera, A.	2018	Stable Matching for Dynamic Ride-Sharing Systems	Transportation Science, *52*(4), 850-867	8	149
52	1034	Zografos, K.G., Androutsopoulos, K.N., Madas, M.A.	2018	Minding the gap: Optimizing airport schedule displacement and acceptability	Transportation Research Part A-Policy and Practice, 114, 203-221	5	27
53	1167	Arslan, A.M., Agatz, N., Kroon, L., Zuidwijk, R.	2019	Crowdsourced Delivery-A Dynamic Pickup and Delivery Problem with Ad Hoc drivers	Transportation Science, *53*(1), 222-235	12	240
54	1253	Sun, H., Wang, H., Wan, Z.X.	2019	Model and analysis of labor supply for ride-sharing platforms in the presence of sample self-selection and endogeneity	Transportation Research Part B-Methodological, 125, 76-93	5	80
55	1286	Giusti, R., Manerba, D., Bruno, G., Tadei, R.	2019	Synchromodal logistics: An overview of critical success factors, enabling technologies, and open research issues	Transportation Research Part E-Logistics and Transportation Review, 129, 92-110	9	103
56	1315	Boyac, B., Zografos, K.G.	2019	Investigating the effect of temporal and spatial flexibility on the performance of one-way electric carsharing systems	Transportation Research Part B-Methodological, 129, 244-272	5	51
57	1320	Qu, W.H., Rezaei, J., Maknoon, Y., Tavasszy, L.	2019	Hinterland freight transportation replanning model under the frameworkof synchromodality	Transportation Research Part E-Logistics and Transportation Review, 131, 308-328	5	40
58	1389	Fairbrother, J., Zografos, K.G., Glazebrook, K.D.	2020	A Slot-Scheduling Mechanism at Congested Airports that Incorporates Efficiency, Fairness, and Airline Preferences	Transportation Science, *54*(1) 115-138	5	31
59	1525	Ke, J.T., Yang, H., Li, X.W., Wang, H., Ye, J.P.	2020	Pricing and equilibrium in on-demand ride-pooling markets	Transportation Research Part B-Methodological, 139, 411-431	5	109
60	1704	Alisoltani, N., Leclercq, L., Zargayouna, M.	2021	Can dynamic ride-sharing reduce traffic congestion?	Transportation Research Part B-Methodological, 145, 212-246	5	45

Source: Table 7 was created by the authors (2024)

In Table 7, it is seen that the LCS value is a minimum of 4 and a maximum of 21. When 2113 data sets were analyzed, the most cited nodes were determined according to LCS and GCS values. In this context, these publications could not enter the list of the most cited nodes due to the fact that the LCS values of Recs (27) in total, Recs (319) in 2022 and Recs (329) in 2023, belonging to the years 1996 (6), 1995 (6), 1994 (4), 1993 (3), 1991 (2), 1990 (2), 1987 (1), 1986 (1), 1984 (1), 1982 (1), remained between (0-3). This situation shows that there are significant differences in the number of publications and citation intensity of academic studies. In this context, according to Table 7, node 389 is the highest LCS value (21). Brouer et al. (2014: 281) examined the design problem of liner transport network. This problem involves a given fleet of container ships creating cyclical sailing routes to carry multiple goods at the same time. The goal is to maximize revenue from cargo transportation while minimizing operational costs. As can be seen, the study, which focuses on a problem, has received high citations. The ones with the lowest LCS value (4) are nodes 56, 77, and 101. The highest GCS value is node 262 with a value of 542. The node with the lowest GCS value is node 535 with a value of 25.

In Figure 1, 60 nodes with a minimum number of LCS citations of 4 and a maximum of 21 are visualized in order to determine how the transportation management literature is shaped and which studies have more impact on others. Each node and link shows which node the researchers focused on and how they built a network of interactions over time.



Note: Nodes:60, Links:73, LCS, top 60; Min: 4, Max: 21 (LCS scaled)

Figure 1 Citation network between nodes (1997-2021)

Source: Figure 1 was created by the authors (2024)

In Figure 1, there are a total of 60 nodes and 73 connections (arrows). Each node represents a study. Each link indicates that one study is used as a source in another study. For example, node 366 cited node 254 as the source. The highest LCS value is node 389 (21). It can be said that the knots, which are centrally located and connected by multiple arrows, inspired other works. The highest GCS is node 262 with a value of 542. In this study, Dekker et al. (2012:671) summarized current and potential developments by focusing on design, planning and control in supply chain components such as transportation management, product inventory and facility decisions, and stated how environmental factors can be integrated into QR models for transportation management and logistics.

In 2022, there are Recs (269), and in 2023, there are Recs (2799). The LCS value of these years remained between (0-3). Remarkably, this shows that most of the articles on the list have not yet made a major impact. In this context, the GCS values of the academic nodes for 2022-2023 are shown in Table 8 to determine the 30 most influential nodes globally in these years. Table 8 is sorted by node number on a yearly basis.

Table 8 Yearly Based Academic Nodes and Citation Numbers (2022-2023)

N	Node Number	Author(s)	Year	Article Name	Journal Information	LCS	GCS
1	6	Sahoo, S., Kumar, S., Sivarajah, U., Lim, W.M., Westland, J.C., et al.	2022	Blockchain for sustainable supply chain management: trends and waysforward	Electronic Commerce Research, 1-56.	0	31
2	37	Wang, W., Miao, W., Liu, Y.D., Deng, Y.T., Cao, Y.F.	2022	The impact of COVID-19 on the ride-sharing industry and its recovery: Causal evidence from China	Transportation Research Part A-Policy and Practice, 155, 128-141	0	28
3	42	Zhang, Y.X., Peng, Q.Y., Lu, G.Y., Zhong, Q.W., Yan, X., et al.	2022	Integrated line planning and train timetabling through price-based cross-resolution feedback mechanism	Transportation Research Part B-Methodological, 155, 240-277	1	32
4	45	Basso, R., Kulcsár, B., Sanchez, Diaz. I., Qu, X.B.	2022	Dynamic stochastic electric vehicle routing with safe reinforcement learning	Transportation Research Part E-Logistics and Transportation Review, 157,102496	0	61
5	46	Lin, Y.H., Wang, Y., Lee, L.H., Chew, E.P.	2022	Profit-maximizing parcel locker location problem under threshold Luce model	Transportation Research Part E-Logistics and Transportation Review, 157,102541	0	28
6	51	Farooque, M., Zhang, ABH., Liu, Y.P., Hartley, J.L.	2022	Circular supply chain management: Performance outcomes and the role of eco-industrial parks in China	Transportation Research Part E-Logistics and Transportation Review, 157,102596	0	55
7	56	Yazdi AK, Wanke PF, Hanne T, Abdi F, Sarfaraz AH	2022	Supplier selection in the oil & gas industry: A comprehensive approachfor Multi-Criteria Decision Analysis	Socio-Economic Planning Sciences, 79,101142	0	37
8	65	Bai, X.W., Cheng, L.Q., Iris, Ç.	2022	Data-driven financial and operational risk management: Empirical evidence from the global tramp shipping industry	Transportation Research Part E-Logistics and Transportation Review, 158, 102617	0	30
9	72	Wang, Y.L., Cao, M.Q., Liu, Y.Q., Ye, R.N., Gao, X., et al.	2022	Public transport equity in Shenyang: Using structural equation modelling	Research in Transportation Business and Management, 42, 100555	0	25
10	93	Beck, M.J., Hensher, D.A.	2022	Working from home in Australia in 2020: Positives, negatives and the potential for future benefits to transport and society	Transportation Research Part A-Policy and Practice, 158, 271-284	1	31

11	105	Gijsbrechts, J., Boute, R.N., Van Mieghem, J.A., Zhang, D.J.	2022	Can Deep Reinforcement Learning Improve Inventory Management? Performance on Lost Sales, Dual-Sourcing, and Multi-Echelon Problems	M&Som-Manufacturing & Service Operations Management, 24(3), 1349-1368	0	32
12	109	Zhou, Y.Q., Yang, H., Ke, J.T., Wang, H., Li, X.W.	2022	Competition and third-party platform-integration in ride-sourcing markets	Transportation Research Part B-Methodological, 159, 76-103	0	35
13	110	Fadaki, M., Abareshi, A., Far, S.M., Lee, P.T.W.	2022	Multi-period vaccine allocation model in a pandemic: A case study of COVID-19 in Australia	Transportation Research Part E-Logistics and Transportation Review, 161, 102689	0	28
14	115	Fu, C.Y., Zhu, N., Ma, S.F., Liu, R.H.	2022	A two-stage robust approach to integrated station location and rebalancing vehicle service design in bike-sharing systems	European Journal of Operational Research, *298*(3), 915-938	0	36
15	116	Chen, X.W., Ulmer, M.W., Thomas, B.W.	2022	Deep Q-learning for same-day delivery with vehicles and drones	European Journal of Operational Research, *298*(3), 939-952	1	47
16	154	Jin, L.J., Chen, J,, Chen, .ZL., Sun, X.J., Yu, B.	2022	Impact of COVID-19 on China's international liner shipping network basedon AIS data	Transport Policy, 121, 90-99	0	25
17	156	He, S.Y., Kuo, Y.H., Sun, K.K.	2022	The spatial planning of public electric vehicle charging infrastructurein a high-density city using a contextualised location-allocation model	Transportation Research Part A-Policy and Practice, 160, 21-44	0	27
18	160	Luo, N., Olsen, T., Liu, Y.P., Zhang, A.B.H.	2022	Reducing food loss and waste in supply chain operations	Transportation Research Part E-Logistics and Transportation Review, 162, 102730	0	25
19	165	Naz, F., Agrawal, R., Kumar, A., Gunasekaran, A., Majumdar, A., et al.	2022	Reviewing the applications of artificial intelligence in sustainable supply chains: Exploring research propositions for future directions	Business Strategy and the Environment, *31*(5), 2400-2423	0	26
20	167	Dlugosch, O., Brandt, T., Neumann, D.	2022	Combining analytics and simulation methods to assess the impact of shared, autonomous electric vehicles on sustainable urban mobility	Information & Management, *59*(5), 103285	0	37

21	195	Cheng, L., Wang, K.L., De Vos, J., Huang, J., Witlox, F.	2022	Exploring non-linear built environment effects on the integration of free-floating bike-share and urban rail transport: A quantile regression approach	Transportation Research Part A-Policy and Practice, 162, 175-187	0	51
22	203	Masmoudi, M.A., Mancini, S., Baldacci, R., Kuo, Y.H.	2022	Vehicle routing problems with drones equipped with multi-package payload compartments	Transportation Research Part E-Logistics and Transportation Review, 164, 102757	0	31
23	311	Reddy, K.N., Kumar, A., Choudhary, A., Cheng, T.C.E.	2022	Multi-period green reverse logistics network design: An improved Benders-decomposition-based heuristic approach	European Journal of Operational Research, *303*(2), 735-752	0	33
24	316	Ma, Q., Khan, Z., Tariq, M., Isik, H., Rjoub, H.	2022	Sustainable digital economy and trade adjusted carbon emissions: Evidence from China's provincial data	Economic Research-Ekonomska Istrazivanja, *35* (1), 5469-5485	0	39
25	317	Liu, L., Anwar, A., Irmak, E., Pelit, I.	2022	Asymmetric linkages between public-private partnership, environmental innovation, and transport emissions	Economic Research-Ekonomska Istrazivanja, *35*(1), 6519-6540	0	28
26	358	Sadiq, M., Moslehpour, M., Qiu, R.F., Hieu, V.M., Duong, K.D., et al.	2023	Sharing economy benefits and sustainable development goals: Empirical evidence from the transportation industry of Vietnam	Journal of Innovation & Knowledge, *8*(1), 100290, 1-13	0	56
27	359	Luo, J., Wang, Y.H., Li, G.Q.	2023	The innovation effect of administrative hierarchy on intercity connection: The machine learning of twin cities	Journal of Innovation & Knowledge, *8*(1), 100293	0	57
28	409	Li, K.P., Wang, L.	2023	Optimal electric vehicle subsidy and pricing decisions with consideration of EV anxiety and EV preference in green and non-green consumers	Transportation Research Part E-Logistics and Transportation Review, 170, 103010	0	28
29	410	Tiwari, S., Sharma, P., Choi, T.M., Lim, A.	2023	Blockchain and third-party logistics for global supply chain operations: Stakeholders? perspectives and decision roadmap	Transportation Research Part E-Logistics and Transportation Review, 170, 103012	0	39

30	506	Deveci, M., Gokasar, I., Pamucar, D., Zaidan, A.A., Wen, X., et al.	2023	Evaluation of Cooperative Intelligent Transportation System scenariosfor resilience in transportation using type-2 neutrosophic fuzzy VIKOR	Transportation Research Part A-Policy and Practice, 172, 103666	0	27

Source: Table 8 was created by the authors (2024)

When Table 8 is examined, the study with the highest GCS value (61) in 2022 is node number 45. This study, by Basso et al. (2022:1), focuses on the dynamic routing of electric vehicles. The study with the highest GCS value (57) in 2023 is node 359. However, the LCS value of the studies of these years remained between (0-3). Since transportation management also involves the effective and efficient management of intercity connections, Zhu et al. (2018: 263), authors of node 359 Luo et al. (2023) provide a theoretical framework for analyzing the innovation impact of administrative hierarchy on intercity connections. The articles published in 2022-2023 cover various topics such as electronic commerce, sustainable supply chain management, the effects of COVID-19 on the transportation sector, electric vehicles, blockchain technology, and sustainable development, showing that the academic community is investigating current developments in different fields.

5.Results and Discussion

In this study, the general trends and effects of academic research in the field of transportation management were examined, and the dynamics in the logistics management literature were revealed. "Problem", which is the most used word in article titles, has the highest TLCS and TGCS values. Words such as "Management" and "Transport" appear frequently in titles, but the TLCS value is relatively low. These data help to understand which words are more effective in titles in research in the field of logistics management. Looking at the influential authors in the field, it was determined that the author named Laporte, G. had a strong impact on the literature with both local and global citation numbers with Recs (26), TLCS (47) and TGCS (637) values. The USA is the leader in both the number of publications (575) and citations in its research on logistics management. China (505) and England (460) draw attention with their number of publications and citations. Türkiye ranks twentieth in the list according to the TGCS (41) value with Recs (1412) publication. This result reveals the necessity of more recognition of logistics management research in Turkey in the international arena. It is noteworthy that Boğaziçi University is ranked seventy-third with [Recs (4) publications, TGCS value (526)], and this may serve as an encouraging example for other universities in Turkey to increase their efforts in this field. Transportation Research Part E-Logistics and Transportation Review has the highest number of Recs (327). The fact that the TGCS (13887) value is higher than other journals indicates that the articles published in this journal are cited internationally and host a significant part of the research in the field. In this context, it can be said that it is a journal that can be published for researchers and is valuable in terms of literature research.

"Delft University of Technology" Recs (119) is the leader compared to other institutions with publications. The fact that the TGCS value (2615) is higher than other institutions reveals that the institution has a significant impact in the international arena. Although Harvard University has Recs (5) publications, the fact that it ranks twenty-second with TGCS (1045) shows that the university is internationally influential in studies. Aristotle Univ Thessaloniki, IRIT (Computer Science Research

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Institute of Toulouse) and Loyola University Andalusia are the institutions with the lowest number of Recs (1) publications.

Researchers can use this information to decide which institutions to collaborate with or which institutions to follow. For future studies, it can be recommended to further research new technologies such as digitalization, artificial intelligence and big data analytics in transportation processes and to carry out problem-solving oriented studies. Defining a problem, investigating various options and implementing the determined strategy are important steps of planning in transportation management (Rodrique et al., 2013). AI can improve operational efficiency, reduce costs, and support environmental sustainability in transportation management (Akter, 2024: 40). In-depth studies can be carried out on the effects of these technologies on operational efficiency, cost optimization and environmental sustainability in business management. It is thought that the researches to be carried out in these areas will both increase the theoretical knowledge and make important contributions to practical applications.

Author Contributions

Since the study was single-authored, Literature Review, Methodology, Data Curation, Analysis, Original draft writing, review and editing were done by the author herself.

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethical Approval

In this study, he worked with secondary data. It was not done with participants. For this reason, it is among the studies that do not require ethical approval. It was declared by the author that the tools and methods used in the study do not require the permission of the Ethics Committee. It was declared by the author that scientific and ethical principles have been followed in this study and all the sources used have been properly cited.

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