

A bibliometric analysis of the supply chain finance research



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ABSTRACT

The purpose of the article is to use biometric methods to perform a high-level analysis of research trend analysis on supply chain finance through 305 studies in the field of Business-Economics and Social Sciences published on the Scopus database for the period 2006-2021. The findings provide an overview of worldwide publication trends on the topic of supply chain finance, specifically: (i) the most cited studies; (ii) the most cited authors; (iii) the most influential journals; (iv) the main research keywords among which the network links; (v) leading research institutions and (vi) research collaboration trends among countries on supply chain finance. The study provides more scientific evidence about the current big picture of publication trends in the world, thereby suggesting and recommending future research directions on supply chain finance.

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1. Introduction

Supply chain finance constitutes a critical part of supply chain management that connects buyers, sellers, and financial institutions. Supply chain finance helps businesses reduce financial costs and improve business performance (Hofmann and Zumsteg, 2015). More importantly, supply chain finance helps to release working capital that is “stuck” in the supply chain. Supply chain finance is a solution to optimize working capital, and the development of the supply chain finance market needs to take into account its characteristics and diversity so that all market participants can fully support the economy and small and medium enterprises.

Given such an important role and the recent expansion of the supply chain finance market, interest in supply chain finance is also growing among academia. The number of studies focusing on the topic of supply chain finance has increased in recent years, helping to form a more accurate and diverse conceptual framework to describe supply chain finance. The purpose of this study is to provide an overview of the current status and publication trends worldwide on the topic of supply chain finance.

The remaining sections of the article are organized as follows: Section 2 describes the theoretical overview and bibliometric methods used in this study; Section 3 presents the research results and discusses key findings; Section 4 presents the conclusions and suggests potential future research directions in the field of supply chain finance.

2. An overview of the theory and research methodologies

Supply chain finance is an effective facility to reduce financing costs and improve financial efficiency and effectiveness (Camerinelli, 2009), supply chain finance does not have a unified concept and is viewed differently by the authors depending on the research approaches. Through the literature review, the author found that there are two main directions in research on supply chain finance: (i) financial-oriented perspective and (ii) supply chain-oriented perspective.

Under the first approach, Camerinelli's (2009) supply chain finance research focuses on financial aspects and supply chain finance as a set of solutions, products, and services provided by financial institutions. Under the latter, the supply chain finance approach is oriented towards improving cash flow management from the supply chain to help supply chain agents reduce costs and working capital in the supply chain. Cost-saving possibilities are created through improved trust, commitment to compliance, thereby increasing benefits for all stakeholders in the entire supply chain (Pfohl and Gomm, 2009; Wuttke et al., 2013). This perspective

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emphasizes the role of cooperation among supply chain agents and pushes the boundaries of supply chain finance beyond merely financial solutions to cover all stages in the entire supply chain.

Because of the differences in approaches, research methodologies and the general concept of supply chain finance varies significantly across research approaches.

Bibliometric analysis was first introduced by Pritchard (1969), bibliometric analysis refers to the application of statistical methods to analyze and determine publication trends over time of research products. Bibliometric analysis helps to generalize comprehensive knowledge of a research area, establish links between research studies, the most influential authors, and cooperation between countries in the field of research, suggesting new research directions in the future.

Currently, there are many tools to support bibliometric analysis such as Bibexcel, CiteSpace, Gephi, GraphPad Prism, Netdraw, Pajek, Sci2, SciMAT, SITKIS, VOSviewer®, UCInet. For the purpose of this study, VOSviewer® (Godzien et al., 2018) is used for bibliometric analysis on supply chain finance.

Xu et al. (2018) used bibliometric methods to perform a high-level analysis of 348 studies and discovered 4 main research directions across all studies on supply chain finance. The study suggested 7 future research directions and provided a possible roadmap to further research on supply chain finance.

Tseng et al. (2021) also used bibliometric methods to perform a high-level analysis of 296 studies on supply chain finance on the Scopus database. The research findings clearly indicate research gaps in the field and suggest further research directions on supply chain finance.

The study used advanced search to find all scientific publications in the Scopus database with

the keyword “supply chain finance” across 3 fields: (i) Economics, Econometrics, and Finance, (ii) Business, Management, and Accounting, and (iii) Social Sciences. The search results collected 305 studies on the topic of supply chain finance (details in Table 1), including 217 articles, 64 conference papers, 7 book chapters, etc. All raw data were processed, refined, and used for further analysis with the help of VOSviewer® software version 1.6.16.

Table 1: Detailed classification of research on supply chain finance on Scopus database

ID	Document type	Documents
1	Article	217
2	Conference Paper	64
3	Book Chapter	7
4	Editorial	7
5	Review	6
6	Book	1
7	Conference Review	1
8	Erratum	1
9	Retracted	1

3. Research findings and discussions

The analysis results with VOSviewer® software provide a systematic overview of the supply chain finance topic around the world. This covers 305 works written by 615 authors from 46 countries published on 133 source titles.

Data as of July 2021 shows that research on supply chain finance increased strongly in the period of 2018-2021, at the time of 2018 there were only 26 studies on supply chain finance per year, and in 2020 it reached 77 studies/year. In the first 7 months of 2021, the number of research on supply chain finance has reached 57 on the Scopus database. Details of the number of studies on supply chain finance by year for the period 2006-2021 are detailed in Fig. 1.

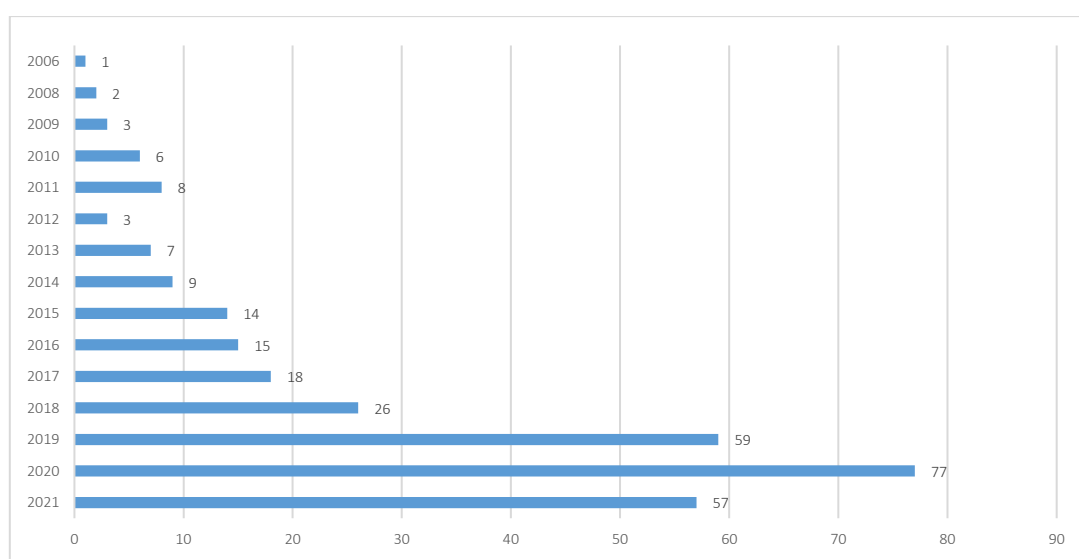


Fig. 1: Number of studies on supply chain finance by year on Scopus database

The number of citations is an important criterion used to assess the quality of an article. Table 2 presents the 20 most cited research papers on

supply chain finance on the Scopus database with a total of 1637 citations. Between 2006 and 2010, one study in this list made its way to the TOP 20 most

cited studies on supply chain finance; during the 2010-2015 period, there were 5 studies and during 2016-2021, there were 14 studies. Research by [Pfohl and Gomm \(2009\)](#) posted on Logistics Research has the highest number of citations with 177 citations, followed by research by [Gelsomino et al. \(2016\)](#) with

144 citations. Research by [Yan and Sun \(2015\)](#) took third place with 117 citations.

The article by [Wandfluh et al. \(2016\)](#) published in the International Journal of Logistics Research and Applications was ranked at the bottom with 41 citations.

Table 2: Top 20 most cited studies on supply chain finance on Scopus database

Rank	Document	Citations	Total Link Strength
1	Pfohl and Gomm (2009)	177	65
2	Gelsomino et al. (2016)	144	72
3	Yan and Sun (2015)	117	32
4	Xu et al. (2018)	112	41
5	Wuttke et al. (2013)	99	55
6	More and Basu (2013)	94	46
7	Gomm (2010)	94	42
8	Caniato et al. (2016)	87	62
9	Wuttke et al. (2016)	83	51
10	Lekkakos and Serrano (2016)	76	37
11	Tang et al. (2018)	75	12
12	Van Der Vliet et al. (2015)	66	30
13	Tunca and Zhu (2018)	65	5
14	Chen et al. (2017)	59	6
15	Sanders and Wagner (2011)	56	2
16	Liebl et al. (2016)	51	32
17	Tseng et al. (2018)	49	14
18	Gao et al. (2018)	47	14
19	Zhu et al. (2019)	45	21
20	Wandfluh et al. (2016)	41	11

Out of 615 authors, Gelsomino LM, Yan N., Perego A., Blome C., and Wuttke DA are the 5 most influential authors in research on supply chain finance when it comes to the number of citations, with 257, 256, 245, 216, and 209 citations, respectively. Putting it all together, the top 20 most-cited authors in research on supply chain finance

have a total number of up to 3,384 citations, accounting for 31.23% of the total 10,835 citations from 615 authors on supply chain finance (detailed in [Table 3](#)). Yan N. is the author with the highest number of research papers on supply chain finance with 10 studies published in the Scopus database.

Table 3: Top 20 most cited studies on supply chain finance on Scopus database

Rank	Author	Documents	Citations	Total Link Strength
1	Gelsomino L.M.	7	257	621
2	Yan N.	10	256	252
3	Perego A.	4	245	521
4	Blome C.	3	216	438
5	Wuttke D.A.	4	209	377
6	Gomm M.	1	177	219
7	Pfohl H.-C.	1	177	219
8	Sun B.	4	177	179
9	Jia F.	5	173	368
10	Chen X.	7	161	353
11	Xu X.	4	161	246
12	Liu C.	4	146	160
13	Mangiaracina R.	2	144	246
14	Tumino A.	2	144	246
15	Hofmann E.	6	132	270
16	Caniato F.	7	131	488
17	Gong Y.	2	125	140
18	Basu P.	2	120	170
19	Zhang H.	2	117	124
20	Henke M.	2	116	207

[Table 4](#) shows the 20 most influential source titles in publications on supply chain finance, whereby the International Journal of Production Economics is the most influential journal with 24 studies and 993 citations on supply chain finance topics. This was followed by the International Journal of Physical Distribution and Logistics Management, Journal of Purchasing and Supply Management, Logistics Research, and Journal of Business Logistics with 366, 196, 177, and 172

citations, respectively. The International Journal of Production Economics is also among the top publishers of journal articles on supply chain finance with 24 articles, accounting for 7.87% of 305 studies on supply chain finance.

The results in [Table 5](#) show 20 affiliations with the highest number of studies on supply chain finance including (i) Central University of Finance and Economics with 14 studies; (ii) Politecnico di Milano with 13 studies; (iii) University of Science

and Technology of China with 12 studies; (iv) the South China University of Technology with 10

studies and (v) Hong Kong Polytechnic University with 9 studies on supply chain finance topic.

Table 4: Top 20 most cited source titles

Rank	Source title	Documents	Citations	Total Link Strength
1	International Journal of Production Economics	24	693	354
2	International Journal of Physical Distribution and Logistics Management	9	366	198
3	Journal of Purchasing and Supply Management	13	196	159
4	Logistics Research	1	177	66
5	Journal of Business Logistics	3	172	57
6	International Journal of Logistics Research and Applications	6	163	77
7	European Journal of Operational Research	3	136	47
8	Business Process Management Journal	3	115	58
9	International Journal of Production Research	12	105	49
10	Sustainability (Switzerland)	11	105	62
11	Manufacturing and Service Operations Management	2	102	20
12	Management Science	2	93	10
13	Supply Chain Management	4	87	77
14	Journal of Cleaner Production	3	70	25
15	International Transactions In Operational Research	8	63	34
16	Omega (United Kingdom)	3	58	14
17	International Journal of Services and Operations Management	2	55	10
18	Industrial Management and Data Systems	8	44	79
19	Uncertain Supply Chain Management	6	40	34
20	Applied Stochastic Models in Business and Industry	2	39	13

Table 5: Top 20 affiliations with the highest number of studies

Rank	Affiliation	Documents
1	Central University of Finance and Economics	14
2	Politecnico di Milano	13
3	University of Science and Technology of China	12
4	South China University of Technology	10
5	Hong Kong Polytechnic University	9
6	Sichuan University	7
7	University of St. Gallen	7
8	Renmin University of China	6
9	University of York	6
10	Zhejiang University	5
11	Washington University in St. Louis	5
12	ETH Zürich	5
13	Xi'an Jiaotong-Liverpool University	5
14	Industrial University of Ho Chi Minh City	5
15	Windesheim University of Applied Sciences	5
16	Olin Business School	5
17	School of Management Fudan University	5
18	Dongbei University of Finance and Economics	4
19	Tianjin University	4
20	Beijing Jiaotong University	4

Research affiliation among different countries on supply chain finance is presented in Fig. 2 and Table 6. Accordingly, China is the country with the highest number of citations and studies with 1,380 citations and 174 studies on supply chain finance topics. United States, Germany, the United Kingdom, and Italy are the next most-cited countries with 653, 608, 519, and 331 citations, respectively. China is also the country establishing the largest number of research links with other countries with a total link strength of up to 961.

Fig. 3 and Table 7 detail 1506 main research keywords, the affiliation networks between keywords, and the development trends of main research keywords over time in the period of 2006-2021.

The results show that the top 5 research keywords include: "Supply chain finance" appears 200 times; "Supply chain" appears 117 times;

"Finance" appears 103 times; "Supply chain finance" appears 102 times and "Supply chain management" appears 62 times.

Regarding the development trends of research keywords on supply chain finance, in the period before 2014, the studies shown by the keyword phrases in dark blue in Fig. 3 focused on the following main research keywords: Development potential, batch ordering, customer demands, cost information, cost and benefits, small and medium-sized enterprises, logistics and supply, logistics and supply chain finance. The research directions on supply chain finance for the period of 2015-2018 are shown by the link cluster shifting towards green color in Fig. 3 which focuses on key research keywords: Financial system, collaborative supply chains, trade credit, financing methods, financial support, sustainable development, financial risk, delivery management.

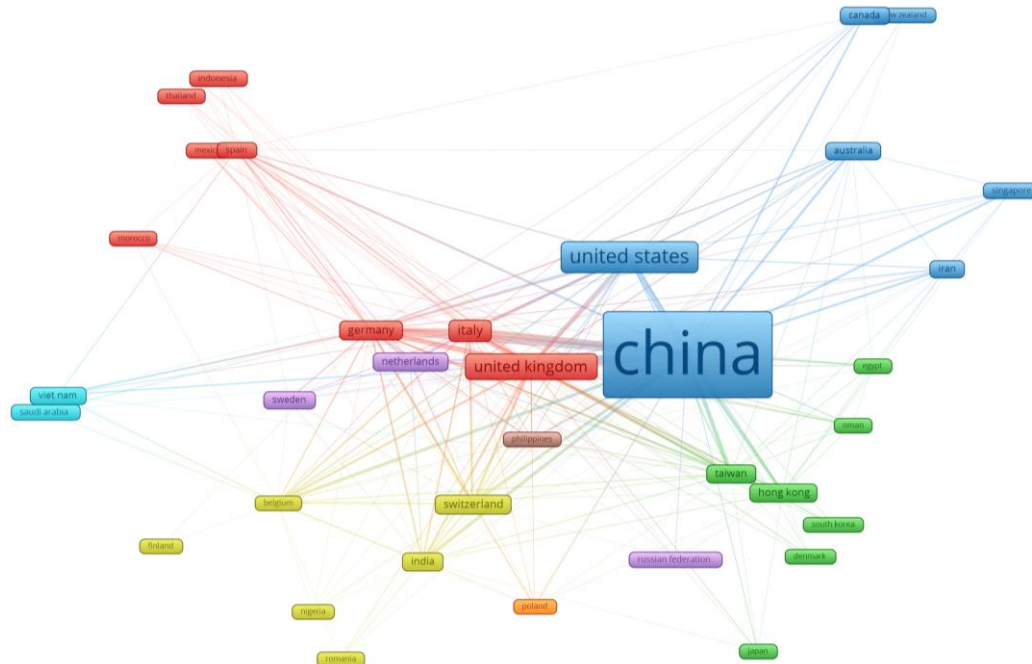


Fig. 2: International research affiliation network; Source: Scopus data visualized through VOSviewer®

Table 6: Top 20 most cited countries

Rank	Country	Documents	Citations	Total Link Strength
1	China	174	1380	961
2	United States	42	653	300
3	Germany	13	608	473
4	United Kingdom	28	519	597
5	Italy	17	331	394
6	Switzerland	12	268	164
7	India	10	158	123
8	Spain	5	158	81
9	Netherlands	10	155	151
10	Hong Kong	11	149	90
11	Belgium	2	133	130
12	Taiwan	10	118	149
13	Singapore	4	89	39
14	Canada	6	51	33
15	Viet Nam	7	41	44
16	Austria	1	30	0
17	Egypt	1	26	22
18	Romania	2	23	7
19	Russian Federation	5	21	9
20	Saudi Arabia	4	21	13

Table 7: 20 keywords with the highest frequency of occurrences

Rank	Keyword	Occurrences	Total Link Strength
1	Supply chain finance	200	1584
2	Supply chains	117	1601
3	Finance	103	1373
4	Supply chain finances	102	1310
5	Supply chain management	62	608
6	Sales	38	529
7	Risk assessment	25	374
8	Decision making	24	321
9	Commerce	22	304
10	Blockchain	20	188
11	Reverse factoring	20	105
12	Electronic commerce	19	263
13	Risk management	19	240
14	Trade credit	18	146
15	Manufacture	16	259
16	Costs	15	214
17	Profitability	14	204
18	Supply chain	14	90
19	Supply chain financials	14	211
20	Capital constraints	13	162



Fig. 3: Network system linking keywords; Source: Scopus data visualized through VOSviewer®

Supply chain finance studies from 2019 onward are shown by the cluster shifting towards red color in Fig. 3. The research focuses on technological applications to promote and improve supply chain finance such as data-driven analysis, text mining, digital storage, artificial intelligence, digital supply chain, e-commerce platform, internet of things, big data analytic capability, the blockchain.

4. Conclusion

The article used bibliometric methods with a data source of 305 studies on supply chain finance on the Scopus database. Several findings have been explored and discussed in this study that help draw some key findings:

- First, the topic of supply chain finance is attracting greater interest and increasing publication trends, especially in the period of 2018-2021.
- Second, the study "Supply chain finance: Optimizing financial flows in supply chains" published in the journal Logistics Research by Pfohl, H.-C is currently the most cited work in all research on supply chain finance with 177 citations.
- Third, Gelsomino LM is the most influential author on the topic of supply chain finance with 257 citations from 7 studies.
- Fourth, the International Journal of Production Economics is the most prestigious and most cited journal for research on supply chain finance.
- Fifth, the Central University of Finance and Economics is the research institution with the

largest number of publications on supply chain finance with 24 studies.

- Sixth, China is the leading country in terms of citations and the number of studies on supply chain finance. Research findings also show that the trend of cooperation among countries is particularly remarkable. Many of the top papers are made through collaborations across authors from more than one country. Such countries include China, the United States, Germany, the United Kingdom, and Italy. In addition, the trend of collaboration among many authors in the field of supply chain finance research is becoming more popular.
- Finally, the analysis of research keywords indicates that the development of science and technology is the main research trend on supply chain finance in the future. Research in the coming period on supply chain finance also focuses on key fintech topics such as data-driven analysis, text mining, digital storage, artificial intelligence, digital supply, big data, blockchain, etc.

Although the research has produced some interesting findings through bibliometric analysis of publications related to supply chain finance for the period of 2006-2021, some limitations still remain in this study. 305 publications in the database retrieved from Scopus are all in English. As a result, popular and influential articles in other languages were not taken into account, which may mean that our conclusions about research trends are incomplete and somewhat misleading. Future studies may apply other data sources or combine different sources to improve the generalizability of the findings.

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Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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