

ANALYZING THE RESEARCH TRENDS FOR LETTER OF CREDIT USING SCIENCE MAPPING

AKREDİTİF İLE İLGİLİ ARAŞTIRMA TRENDLERİNİN BİLİM HARİTALAMA KULLANILARAK ANALİZİ

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ABSTRACT

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Anahtar Kelimeler
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Bilim Haritalama

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Letter of Credit has been used in international transfer of money by exporters and importers for a long time. Thus, it is a very niche and important area in the international trade and banking. Within the scope of this study, 220 publications in the Web of Science database has been reached by using "letter of credit" keywords. There is only one bibliometric analysis on Islamic L/C in the literature but a wider overview is required to gain general perspective about L/C. This is where the originality of this research lies. Bibliometric analysis with VOSviewer and Tableau for these publications covering 1980-2024 has been conducted about citations, organizations, keywords, publication years, sources, fields and countries. As a result; almost half of the publications produced in USA, "Byrne James e" is the most productive author, "Journal of International Economics" is the most cited journal, USA is also leading country in terms of citation, and "Natl. Chung Hsing Univ." is the leading organization in terms of citation. Moreover, co-occurrence analysis on keywords show that digitalization has huge effect on L/C literature. It has also been observed that the keywords like "blockchain", "smart contracts", "ethereum", "BPO" etc. has emerged as new trend in the last decade.

ÖZ

Akreditif, ihracatçılar ve ithalatçılar tarafından uluslararası para transferinde uzun süredir kullanılmaktadır. Bu nedenle, uluslararası ticaret ve bankacılıkta çok özel ve önemli bir uzmanlık alanıdır. Bu önemi nedeniyle çalışma kapsamında Web of Science veri tabanında "letter of credit" anahtar kelimeleri kullanılarak 220 yayına ulaşılmıştır. Literatürde İslami akreditif üzerine bir bibliyometrik analiz bulunmakla birlikte akreditif konusunu daha kapsamlı değerlendirebilmek için daha geniş bir bakış açısına ihtiyaç vardır. Bu araştırmanın özgünlüğü de burada yatmaktadır. Çalışmada 1980-2024 yıllarını kapsayan bu yayınlar için VOSviewer ve Tableau ile atıflar, kuruluşlar, anahtar kelimeler, yayın yılları, kaynaklar, alanlar ve ülkeler hakkında bibliyometrik analiz yapılmıştır. Sonuç olarak; yayınların neredeyse yarısının ABD'de üretildiği, "Byrne James e"nin en üretken yazar olduğu, en çok atıf alan derginin "Journal of International Economics" olduğu, en çok atıf alan ülkenin yine ABD olduğu ve "Natl. Chung Hsing Univ."in atıf açısından lider kuruluş olduğu görülmüştür. Ayrıca, anahtar kelimeler üzerinde yapılan analize göre, dijitalleşmenin akreditif literatürü üzerinde büyük bir etkisi olduğu tespit edilmiştir. Son olarak, "blokzincir", "akıllı sözleşmeler", "ethereum", "BPO" gibi anahtar kelimelerin son on yılda yeni trend olarak ortaya çıktığı gözlenmiştir.

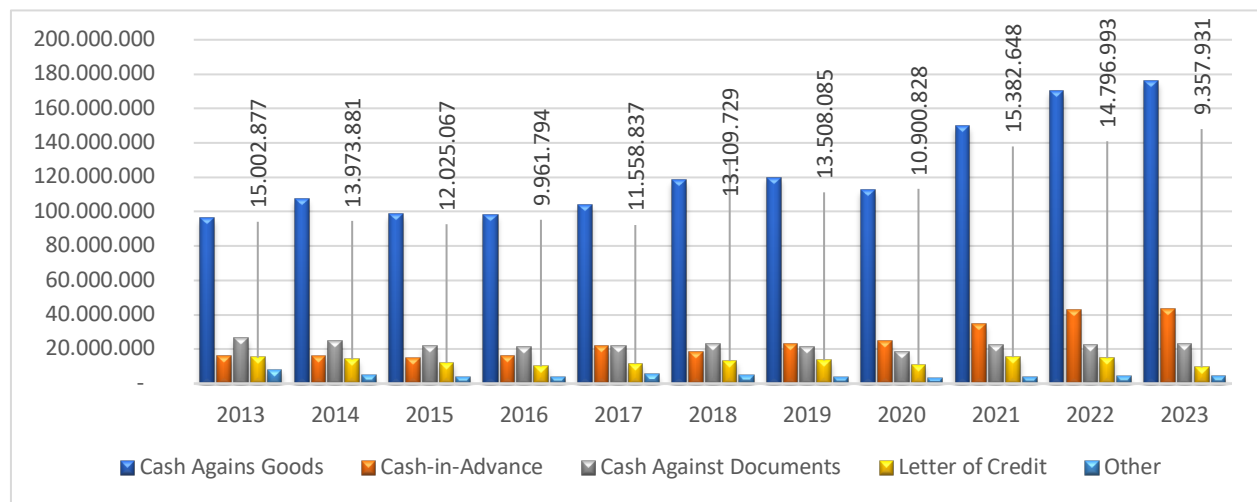
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Introduction

International trade is a very complex term since it stands at the intersection of not only national and international laws/regulations but also different disciplines such as logistics, banking, economics, marketing, management etc. When all these processes simplified it can be divided into two part; logistics (outbound or inbound) and payment (transfer of the money). Payment methods for international trade can be summarized as Cash-in-Advance, Letter of Credit (L/C), Documentary Collection or Cash Against Documents (CAD), Open Account or Cash Against Goods. Among these, L/C is one of the most secure payment methods for exporter and importer since the rules and procedures are executed by banks as equally responsible as traders and also any discrepancy will be handled according to international rules.

L/C has been used in international transfer of the money by exporters and importers for a long time. In addition to its history, L/C is also the most complex payment method. However, the share of L/C among payment methods is relatively small. Trends for the payment methods can be seen at the export of Türkiye by Type of Payment structure as demonstrated at Figure 1.



Source: TurkStat (n.d.)

Figure 1. Exports of Türkiye by Type of Payment (thousand US \$)

As it can be seen from the Figure 1, traders prefer transferring around 65% of the payment after receiving the goods. The payment method for import also has the similar structure in Türkiye according to the statistics. It can be inferred from this figure is that international traders have less tendency for paying cash in advance for mitigating the risk and also avoid payment methods that banks are the intermediary due to transaction costs. Increase in the trend for “Cash Againsts Goods” payment method can be explained by globalization and digitalization as well as tendency for avoiding the costs related to the trade finance. That is why payment methods are very important since it is international and affects all stakeholders in the economy. Especially “Letter of Credit”, which has been used for decades by exporters and importers, is very important payment method in terms of regulations, technicalities, intermediary role of the bank etc. Due to its importance, L/C has been studied at undergraduate/graduate levels and also investigated throughout thesis, conferences papers, articles, book chapters etc. in the literature.

When search conducted by typing "letter of credit" in English 38,800 results listed in the Google Scholar database in June 2024. Besides, 220 results listed by typing “letter of credit” or “letters of credit” in the Web of Science (WoS) database in June 2024. Digitalization enables academics to reach tremendous amount of studies around the world in seconds. But analyzing the trend for a specific subject manually is time consuming and inefficient. At that point it is important to use new techniques and in this circumstances science mapping is a very useful method. According to Waltman et al., (2010: 629) science mapping and bibliometric analysis involves

examining titles such as citations, journals, keywords, documents, institutions, etc. with maps, groups and network analysis in order to obtain in-depth information about a field or subject.

L/C topic is at the intersection of international trade and banking disciplines. When the literature review conducted in these fields, different studies used science mapping and bibliometric method have been reached. Some of the studies published related to international trade field can be summarized as; international trade (Lacka et al., 2020; Tian et al., 2018; Sharma et al., 2023), export performance (Aksoy et al., 2024; Calheiros-Lobo et al., 2023; Kahveci, 2023), service export (Karadayı ve Akdemir, 2020), export credit insurance (Gürbüzer and Sönmez, 2022), logistics and supply chain (Turgut, 2023), port logistics (Wang and Peng, 2023) and so on. Likewise, some of the studies published related to banking field can be summarized as; banking performance (Alam et al., 2021), corporate social responsibility in banking (Hassan et al., 2023; Zainulidin and Lui, 2022), big data in banking (Nobanee et al., 2021), FinTech (Cengiz and Oduncu, 2023; Pandey et al., 2023), Islamic letter of credit (Azzahro, 2022) and so on. The literature on bibliometric analysis at the sub section of banking and international trade fields is so extensive. But only article, which used bibliometric analysis method, related to L/C is focused solely on “Islamic Letter of Credit”.

Since L/C has many types, science mapping article with a wider perspective has been designed to be able to close that gap at the literature. In accordance with this goal, it is planned to contribute to the literature by assessing the L/C publications in the Web of Science (WoS) database. Furthermore, it is also expected to provide a broad perspective on the current dynamics of L/C and the suggestions related to the direction of future study.

Literature Review On Letter of Credit

L/C is specific payment method that used in international trade and it can be defined shortly as conditional bank guarantee. In a broad term L/C is a contract by which a bank provides a guarantee to make the payment in return for the submission of the documents, which prepared by the exporter in accordance with the conditions specified in the proforma invoice or contract, to the exporter's bank and the approval of the bank upon the request of the importer by applying to its own bank (Güven, 2015: 156). So this type of payment assures that the exporter will get the payment as long as they fulfill the deal according exactly with the contract/proforma invoice. Besides, it also protects importer by assuring they have the right product based on the documentary proof.

L/C has been used in international trade by traders who do not know each other for decades. Throughout these years, not only a specific terminology has been developed for L/C but also different types of L/C has been developed according to the different requirements of the traders. For example, (TEB, n.d.): 4 basic parties in L/C can be summarized as applicant (importer's bank), beneficiary (exporter's bank), issuing bank (importer's bank) and advising bank (exporter's bank); L/C types according to payment terms can be summarized as sight payment (payment is available after documents presented), deferred payment (payment awaits a due date), by acceptance and by negotiation include draft in the process. There are also different types of L/C are used in the literature such as; Red-Clause L/C, Sight L/C, Standby L/C, Back-to-back L/C, Transferable L/C, Revolving L/C, Confirmed L/C etc. (Ziraat, n.d.). Even though L/C is a payment method, some of the L/C types can also be used as trade finance instruments such as Back-to-back L/C and Transferable L/C. That's why L/C is a very important topic due to its connection with trade, law, finance and technology. So, the importance of L/C have been investigated in the literature by different papers.

UPC 600 is the latest version of governing rule for applying L/C related transactions. Kim (2020) discussed the negotiation clause under L/C transactions. The originality of the paper lies in pointing out problems such as delay in payment, in case of fraud situations and ambiguity when beneficiaries sell documents to non-nominated banks, as well as offering countermeasures for those issues. At that point it is crucial to mention Hussain et al., (2021) focused on how to be protected against L/C frauds in which businesses loses billions of dollars. In the article examples related to fraud is summarized as; paper documents can be easily forged, fraudster can run away due to geographical distance, lack of search due to containerization, abandonment prosecution etc. Fraud free trade is not possible yet but quality certifications and paperless trade technology usage can minimize the risks in terms of fraud. On the other hand, Crozet et al., (2022) argues the importance of mitigating risks in international trade especially at the time of crisis such as Covid-19 and economic crises. To be able to test their

hypotheses empirically they used EU-15 and US export data belong to Covid-19 and Financial Crisis period. It is found that L/C can be used as a very useful financial tool that provide guarantees to traders. Moreover, L/C contributes to the resilience of export products as long as stressed banks does not limit L/C supply during the time of uncertainty. Another study used econometric research method for measuring determinants of L/C is conducted by Sarihan (2024). January 2013-September 2023 period has been covered to discover determinants of export in terms of payment. The study reveals that fluctuations in inflation, exchange rates, and cash payments precede changes in L/C transactions. In contrast, variations in the foreign producer price index significantly impact cash-based exports. These findings demonstrate how economic signals, potentially posing risks for Turkish exporters, profoundly influence pivotal business decisions.

Ermakov et al., (2018) has drawn attention to L/C's risk mitigating role as a financial instrument and also seeks ways to improve L/C payment method for traders. Usage of L/C is highlighted in the study and decrease in the share of L/C is pointed out as well. The reasons for that can be mentioned as rising risks in global trade, complexity of the L/C related regulations, difficulty of SMEs to use due to financial availability and costs occurred in the process. It is also pointed out in the article that the blockchain technologies offers solutions to those problems. Irmak (2023) explored the usage possibilities and the role of blockchain technology and smart contracts in L/C. The innovation in the L/C processes through blockchain and smart contracts have been discussed in the paper and possible advantages as well as disadvantages also presented in details. Contribution of those technologies for faster, more transparent and more secure L/C transactions is emphasized. Furthermore, Rantung et al., (2024) surveyed 100 individuals who uses L/C and familiar with blockchain at Banks in DKI Jakarta. As a result, it is found that L/C can be improved into a more secure, transparent and automated version. Since it is one of the first study that highlights the potential of blockchain and smart contract from the viewpoint of the L/C customers, it makes an important contribution to the literature.

Another interesting topic for L/C is Islamic banking and participation banking. Kazancı (2023) investigated participation banking, AAOIFI standards (Islamic banks generally accepted) and UCP 600 rules in terms of L/C. AAOIFI standards and UCP 600 rules have been compared and some items as “relationship of goods and services with letter of credit”, “relationship of contracts between the parties with letter of credit”, “policy and documents negotiation” and “interest payments” in UCP 600 found incompatible for participation banks. So, still article suggest L/C should be used by participating banks accordance with UCP 600 rules only for the transactions compatible with fiqh (islamic law). Likewise, Puneri (2021) compared Islamic and conventional L/C by using secondary data and through documentary analysis. L/C is a payment method for in international trade but it is not compliant with Islamic rules called Shariah. Study describes the Islamic L/C issues separately and explores them in details. By that means, it provides insight about both Islamic and conventional L/C which is an important payment method for exporters and importers.

Above mentioned studies are just a small fraction of the literature reviewed. The number of studies related to L/C can be increased but only one bibliometric study has been conducted by Azzahro (2022) that focused on Islamic L/C. In the paper, 42 papers about Islamic L/C published between 2013 and 2020 have been investigated for determining the research trends in Islamic L/C. In the analysis process VOSviewer has been used. According to the findings Malaysia published 13 articles about Islamic L/C and Uzaimah Ibrahim is the most productive author in Islamic L/C. In addition, keyword analysis illustrates that Business Financing, Bank Regulation and Letter of Credit are the most used keywords. With this article general perspective for a very niche topic has been covered in the literature.

In sum, L/C has a very wide literature since it not only stands at the intersection of fields such as law, banking and international trade etc. but also it is affected by technological development. That causes diversity and fragmentation for the publications related to L/C. As a result, a bibliometric analysis should be conducted to be able to provide an overview about the research trends and current status of the L/C topic. To the best of author's knowledge, no bibliometric study has been published related to L/C apart from Azzahro (2022)'s article, which only covers a very niche and recent sub-topic of L/C called Islamic L/C topic. According to the sources available no bibliometric study that covers L/C topic has been found in the literature. By using science mapping method, this study aims to determine general characteristic and trends in L/C.

Methodology

Purpose and Originality of the Research

L/C is a very niche research area that has gained importance in the international trade and banking literature. There is only one bibliometric analysis on Islamic L/C in the literature but a wider overview is required to gain general perspective about L/C. This is where the originality of this research lies since it is going to be the first bibliometric article presents that overview about the details of papers such as citations, organizations, keywords, publication years, sources, fields and countries.

Data Collection and Analysis

Within the scope of this study, only Web of Science (WoS) database has been used. This can also be called as limitation of the study since other databases such as Scopus, YÖK Thesis Center, Google Scholar, TR Index etc. excluded. To be able to collect data, a search has been conducted in WoS database after using “letter of credit”, “letters of credit” keywords on 6th of June 2024. As a result, 171 articles, 20 proceeding papers, 11 book review, 10 editorial materials, 7 book chapters, 8 other types of publications from different disciplines were reached. Total of 220 results have been analyzed by using VOSviewer and Taleau programs and findings are presented within tables and figures. Since secondary data have been used no ethics committee permission was required.

Findings

The data obtained on L/C were analyzed with the VOSviewer and Taleau programs. The findings are presented in detail at the tables and figures in the following paragraphs.

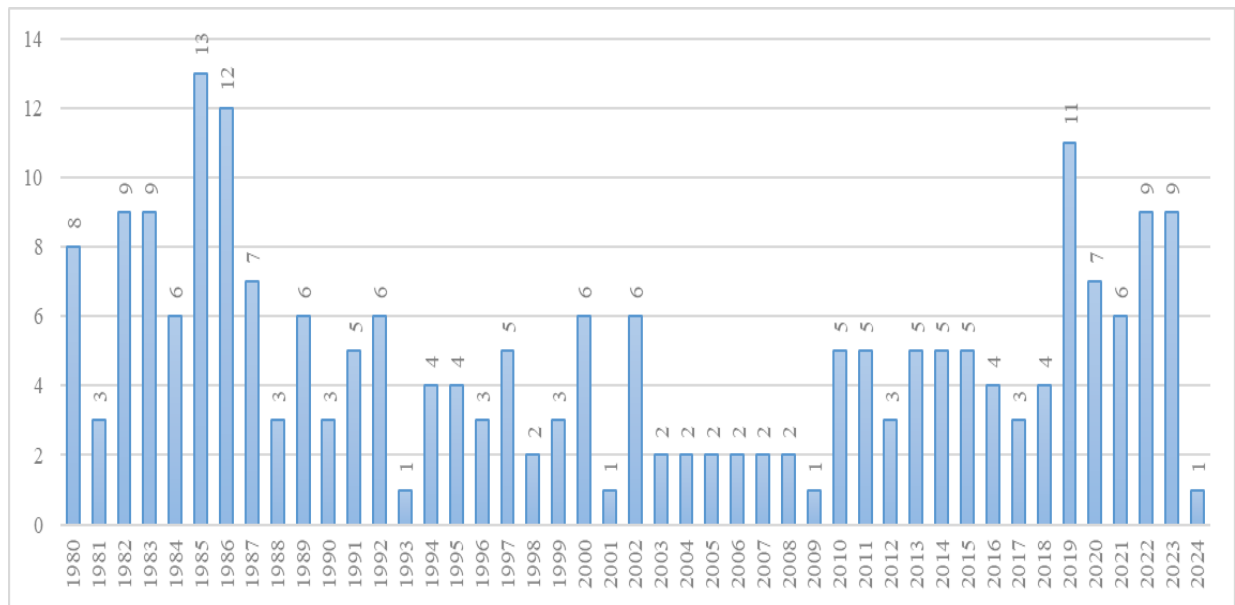


Figure 2. Distribution of Studies by Publication Year

L/C have been getting the attention of researchers for years. The distribution of studies from 1980 till 2024 can be seen from the Figure 2 above. As it can be seen from the figure, the year with the highest number of publications is 1985 with 13. Then, almost three decades, number of studies have been steady between 1 to 6. However, numbers of studies on L/C have been increasing in the last 5 years. When the studies have been examined, it can be seen that application of digital technologies on L/C and its processes have caused that result.

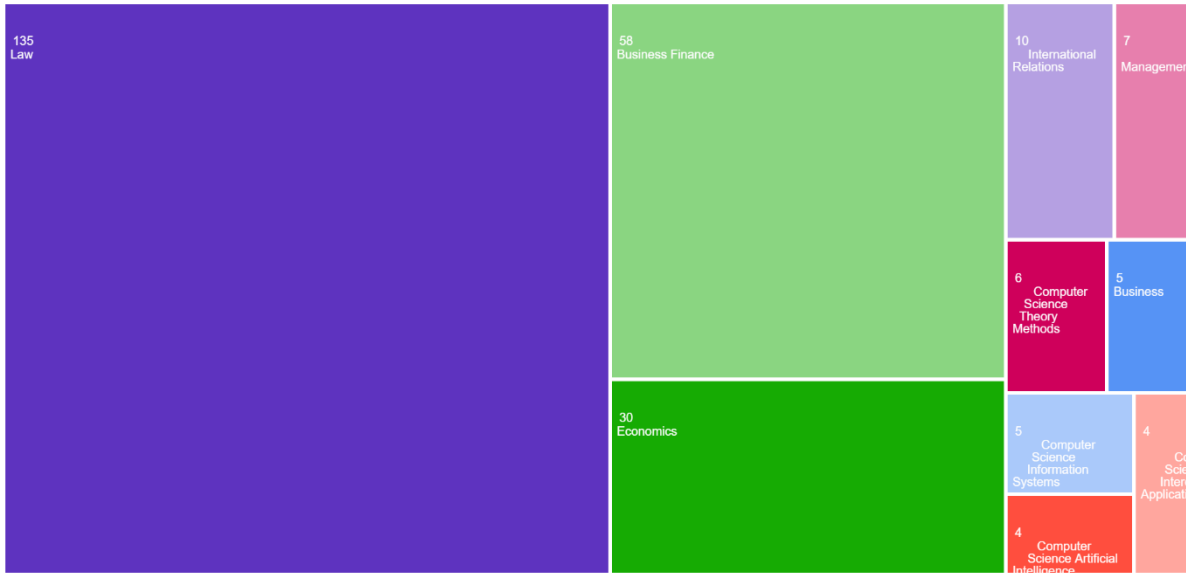


Figure 3. Treemap for the top 10 WoS Categories of the Publications

Figure 3 shows in which fields the studies are located according to their categorical classification in the WoS database. In this context, studies have been conducted in 41 different fields. When the studies in the top 10 are analyzed, it is determined that the majority of the studies were conducted in the fields of Law (135 studies), Business Finance (58 studies) and Economics (30 studies). From this point of view, it can be said that studies on L/C are mainly conducted in the fields of Law and Business Finance. Another interesting point is that computer science and artificial intelligence is also gaining importance in the publications related to the L/C.

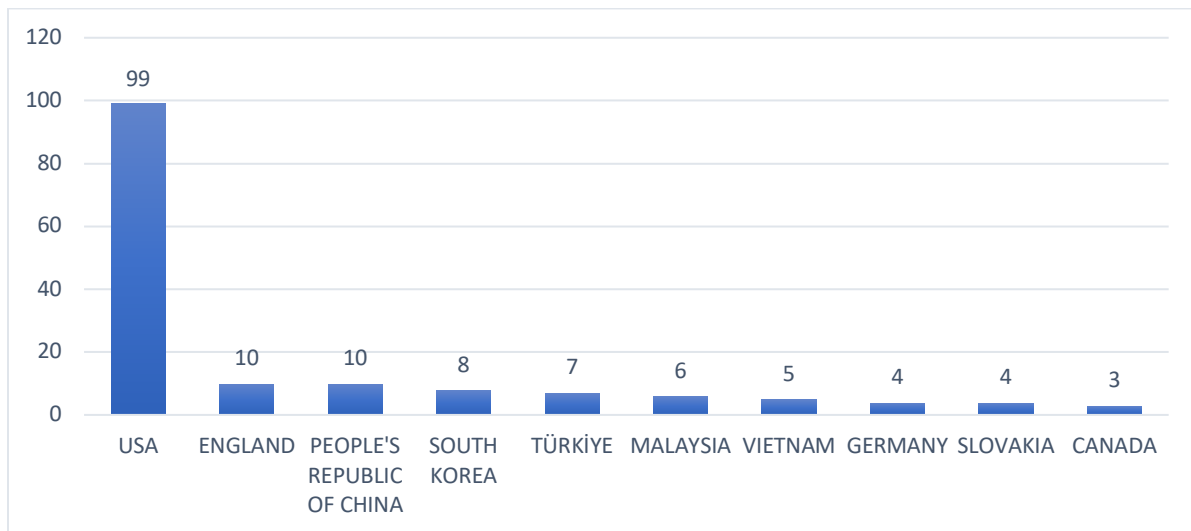


Figure 4. Distribution of Studies by Countries

Figure 4 shows the ranking and number of the top 10 countries according to the distribution of studies in the WoS database by country. The country with the highest number of publication is the United States of America (USA) with 99 publications, followed by England and China with 10 publications and then South Korea with 8 publications. Türkiye is the fourth most important country in terms of publication numbers by 7 publications.

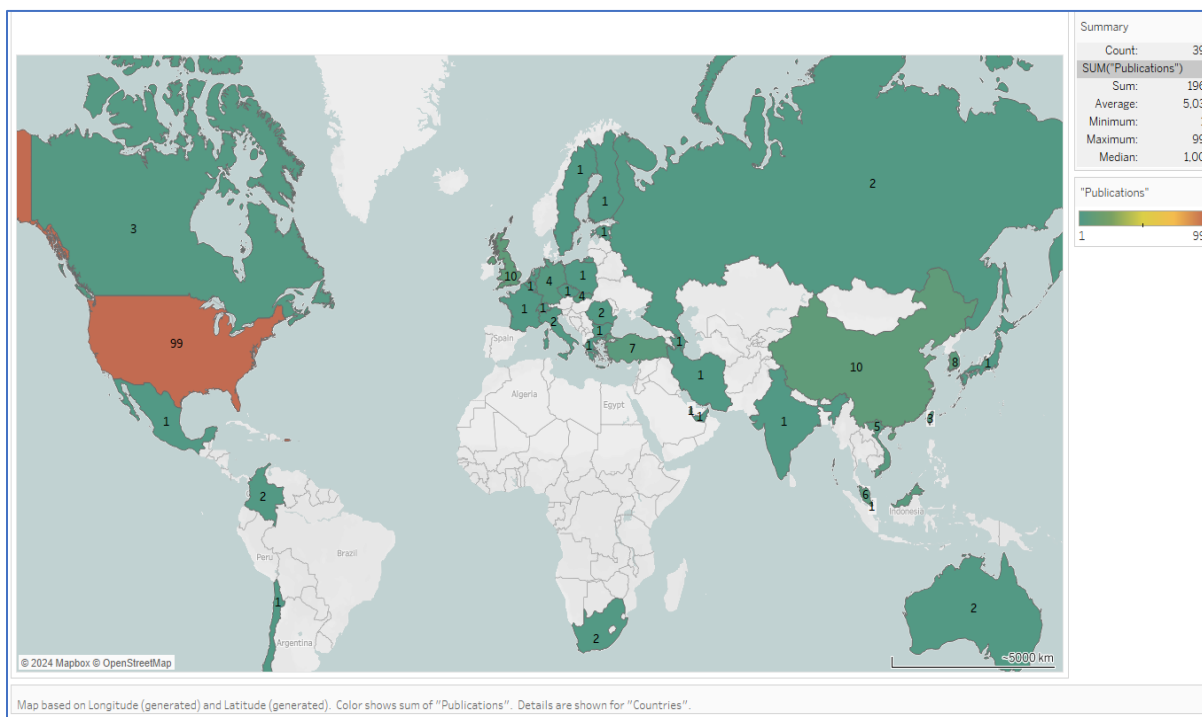


Figure 5. Mapping of Studies by Countries

As indicated at the Figure 5, Tableau program has been used to be able to demonstrate the more comprehensive outlook of publication distribution by countries. According to the indicator in the upper right part of the figure, color array of the country on the map changes from dark green to red. USA is by far is the most important country in terms of publication related to the L/C. In addition to that, it is noteworthy that there are no publications in the countries in the Middle East, Africa (except South Africa) and South America (Except Chile and Colombia) as shown in white.

Table 1. First 10 Author According to the Co-authorship Analysis by Authors

Author	Documents	Citation	Total Link Strength
Huong, luong hoang	3	0	41
Vo, hong khanh	3	0	41
Doan, hieu m.	2	0	30
Tran, bao q.	2	0	30
Dang, khoa tran	2	0	25
Gia, khiem huynh	2	0	25
Le khanh, bang	2	0	25
Le tuan, kiet	2	0	25
Le van, hieu	2	0	25
Nghia, huynh trong	2	0	25

Results of the Co-authorship analysis shown at the Table 1 have been sorted according to the total link strength (TLS), which have been calculated by the program automatically. Table shows the number of publication, citation and TLS of the co-authors. First 10 authors can be sorted as: huong, luong hoang (TLS: 41), vo, hong khanh (TLS:41), doan, hieu m. (TLS:30), tran, bao q. (TLS: 30), dang, khoa tran (TLS: 25), gia, khiem huynh

(TLS: 25), le khanh, bang (TLS: 25), le tuan, kiet (TLS: 25), le van, hieu (TLS: 25) and nghia, huynh trong (TLS: 25) respectively.

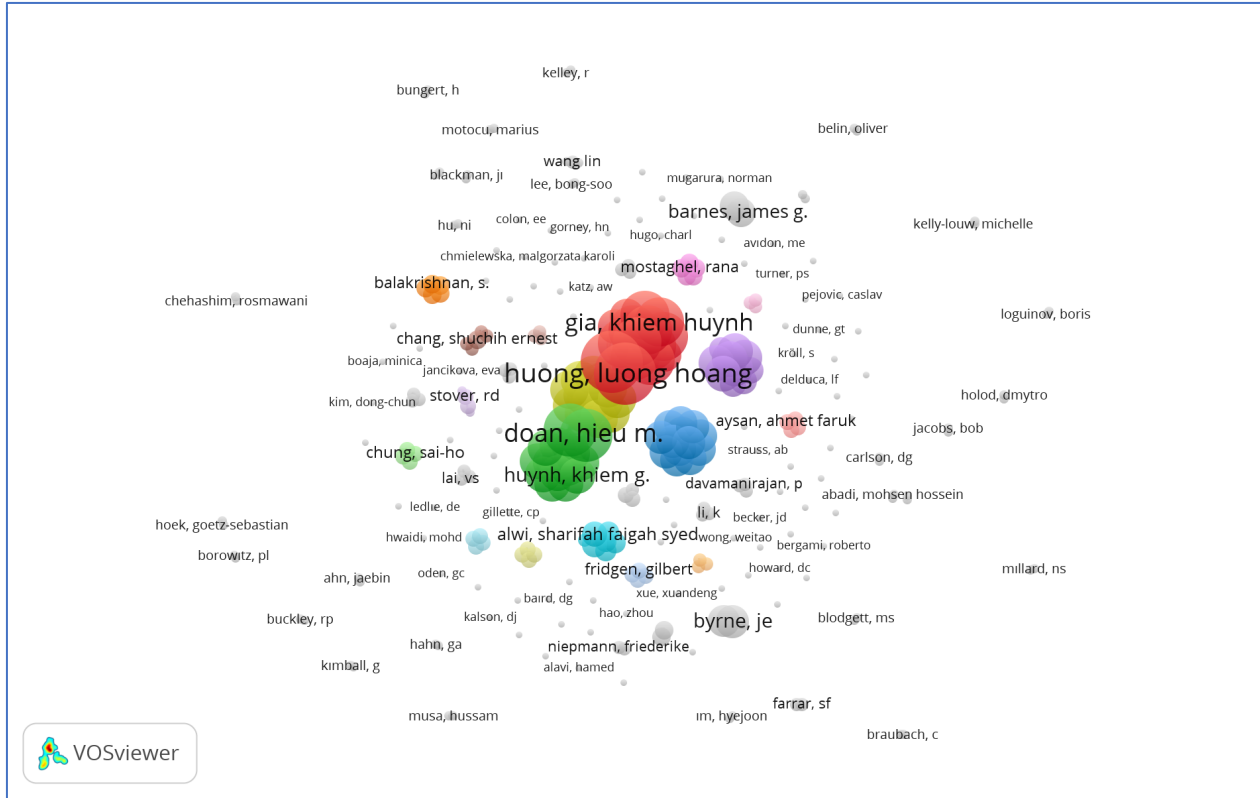


Figure 6. Network Visualization of Co-Authorship Analysis by Authors

Figure 6 demonstrates the network of the 306 co-authors. Inclusion criteria for authors have been limited to at least one publication. Results have been sorted according to the total link strength (TLS), which have been calculated by the program automatically. First 3 authors can be sorted as: huong, luong hoang (TLS: 41), vo, hong khanh (TLS:41) and doan, hieu m. (TLS:30) respectively. Another interesting point for the figure is that the size of the bubbles is directly proportional to the number of publications. As it can be seen, bubbles have been scattered around without linkages between groups. However, some of the colors that are red, yellow, blue, purple etc. seems more interlinked among the groups. The reason behind that might be corporation only within the field during publication, even though L/C has been studied at many fields.

Author citation metrics have been determined by using VOSviewer program. To be able to conduct the analysis a limit for authors to have at least one citation and one article has been set. Afterwards, the results generated by the VOSviewer program are presented in Table 2 and Figure 7.

Table 2. First 10 Author According to the Author Citation Analysis

Author	Documents	Citation	Total Link Strength
Byrne, james e.	22*	54	114
Barnes, james g.	20*	49	104
Givray, aj	4	10	39
Niepmann, friederike	2	83	33
Schmidt-eisenlohr, tim	2	83	33
Chapman, cj	2	2	18
Doub, jc	2	2	18

Gabriel, hd	2	2	18
Hisert, ga	2	2	18
Wunnicke, b	2	2	18

*Since authors have been misnamed, similar results of the authors have been combined.

VOSviewer program automatically calculates the author citation analysis after setting the parameters. The results have been sorted according to the total link strength that has been calculated by VOSviewer. Although all of the authors in the table have more than one citations, the most cited author is “Byrne, james e.” with 22 documents and 54 citations, while the second most cited author is “Barnes, james g.” with 20 documents and 49 citations. One interesting fact from the table is that “Niepmann, friederike” and “Schmidt-eisenlohr, tim” has listed fourth and fifth respectively due to their weak TLS (33) even though they have 83 citations.

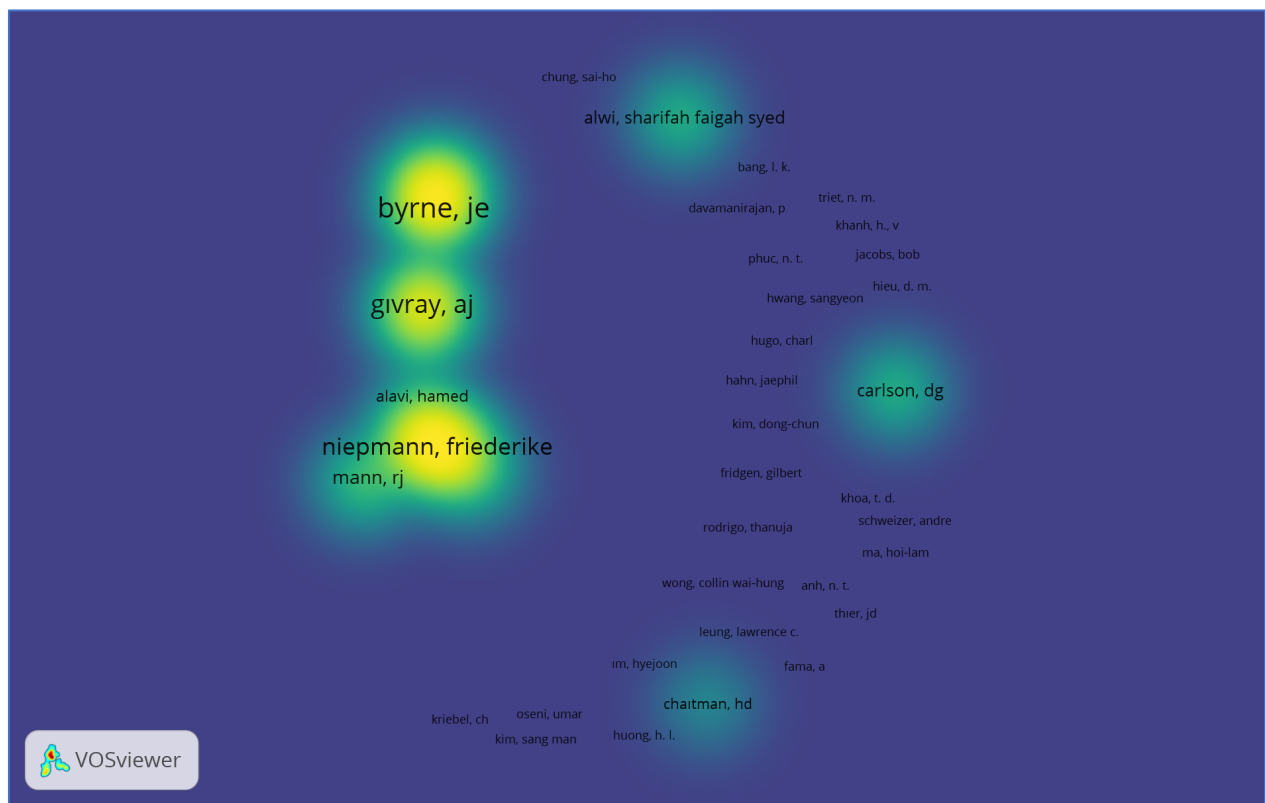


Figure 7. Density Visualization of Author Citation Analysis

Density map visualize the citations of the authors as it can be seen from the Figure 7 above. Brightness and the size of the name is relevant with the VOSviewer analysis based on the citation, document number and TLS. This map provides wider perspective about authors related to the citations. So, as it can be seen from the Figure 7, “Byrne, james e.” is the most cited author. Details for the citations of first 10 authors have been mentioned at the Table 2.

Table 3. First 10 Journal According to the Source Citation Analysis

Source	Documents	Citations	Total Link Strength
Journal of International Economics	2	83	11
Business Lawyer	41	82	13
Journal of Monetary Economics	1	63	2
Industrial Management & Data Systems	1	52	2
Michigan Law Review	4	36	5
Sustainability	1	35	1
Journal of Banking & Finance	4	26	4
Journal of Management in Engineering	1	21	0
Banking Law Journal	27	18	8
Journal of International Trade Law and Policy	2	15	0

A limit of at least one citation and one article in the VOSviewer program for determining the sources or journals where the studies are published have been set. Then, the results generated by the program are presented in Table 3 and Figure 8. As can be seen from the Table 3, the most cited source on L/C is the "Journal of International Economics" with 2 documents, 83 citations and 11 TLS. In addition to that, "Business Lawyer" is also getting attention in terms of 41 documents, 82 citations and 13 TLS.

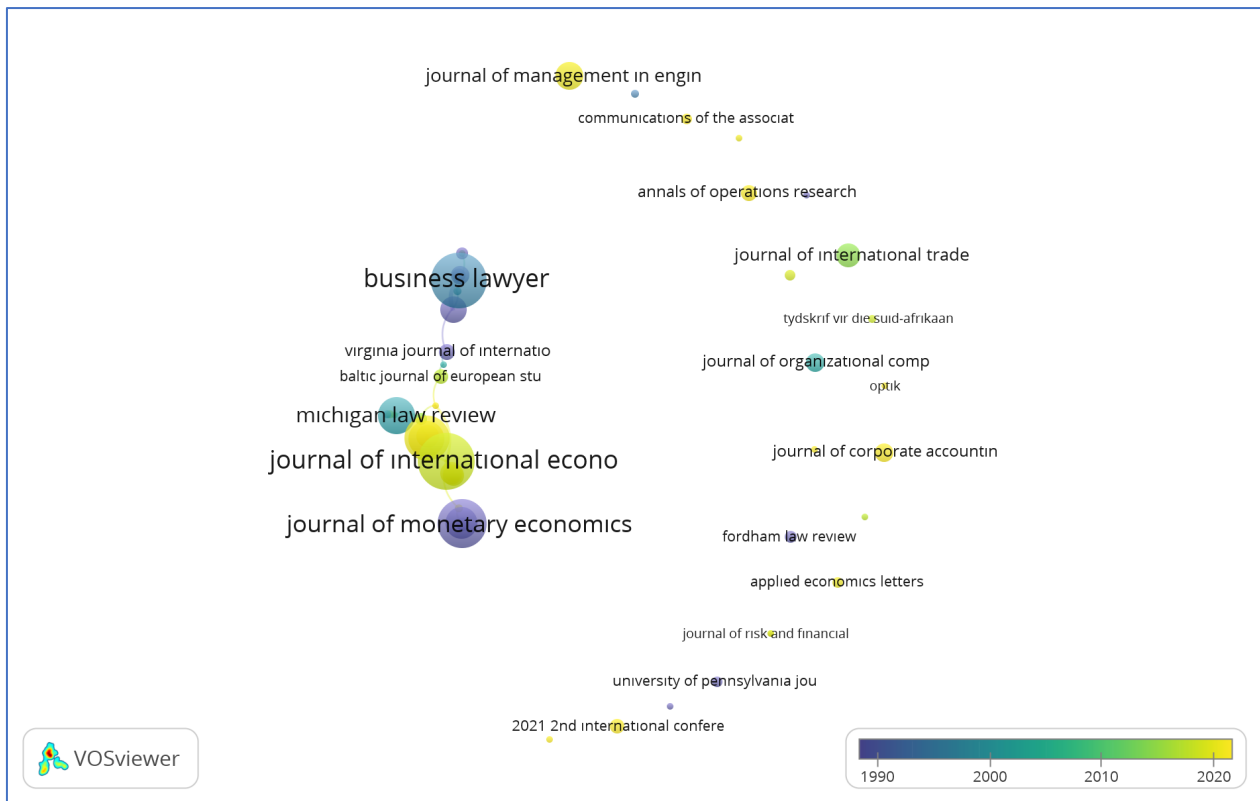


Figure 8. Overlay Visualization of Source Citation Analysis

Figure 8 shows the overlay visualization map of the number of citations received by the studies on L/C in terms of the sources or journals where they were published. Besides, the colors on the figure have been arranged according to the citation years. Although the top 10 sources or places of publication are shown in Table 3, it is necessary to examine the overlay map in order to have a more comprehensive glance at these sources. Scale at

the bottom right side of the figure demonstrates that year density of the citations. As it can be seen from Figure 8, journals such as “Industrial Management & Data Systems” with more citations in 2020 are colored yellow. Moreover, journals such as “Journal of Monetary Economics” represented by the darker color have been cited mostly in 1990s.

Table 4. First 10 Journal According to the Country Citation Analysis

Country	Documents	Citations	Total Link Strength
USA	60	304	50
Taiwan	3	87	3
People’s Republic of China	10	35	4
England	10	24	17
Türkiye*	7	23	15
South Korea	8	21	18
Malaysia	6	20	5
Netherlands	2	14	15
Finland	1	14	4
Sweden	1	14	4

*Results for Turkey and Türkiye have been combined.

Country citation metrics have been calculated for 39 countries by using VOSviewer program. To be able to conduct the analysis a limit for authors to have at least one citation and one document has been set. Results of the analysis shown at the Table 4 have been sorted according to the citations. It is also seen that the USA is a leading country in terms of citation of publications on L/C with 60 documents, 304 citations and 50 TLS among 39 countries. Taiwan (3 publications, 87 citations) is the second and China (10 publications, 35 citations) is the third respectively. It is noteworthy that Türkiye is the fifth most important country about L/C subject with 7 publications, 23 citations and 15 TLS.

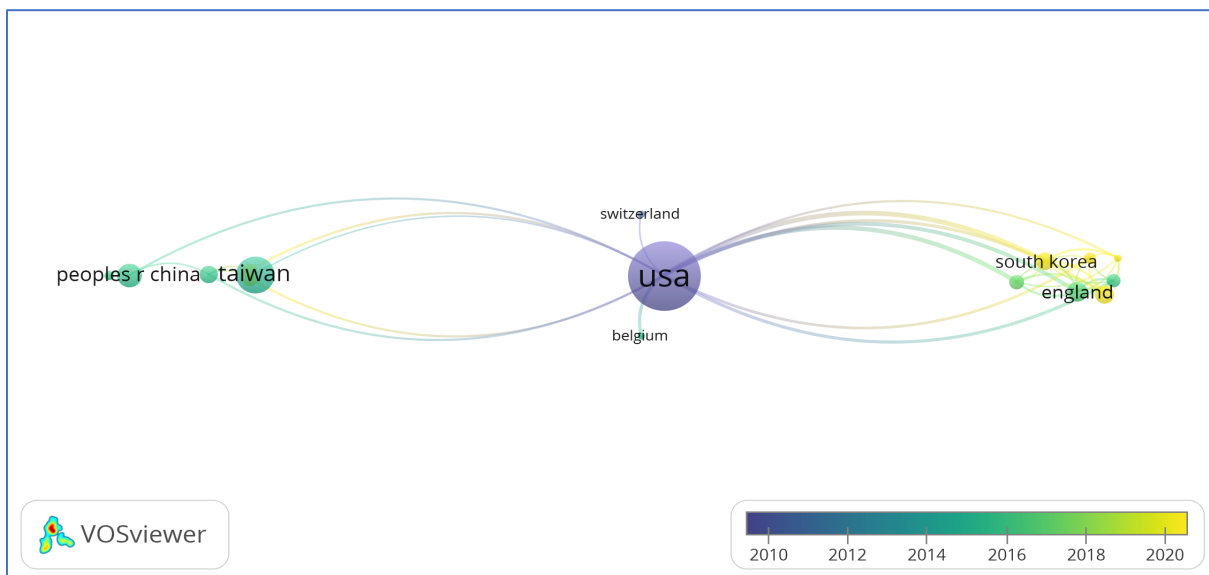


Figure 9. Overlay Visualization of Country Citation Analysis

Overlay map for the countries citation analysis has been shown at the Figure 9. Average publication year has been set to be able to demonstrate yearly country performances. Scale at the bottom right side of the figure demonstrates the density of the citations by color and years. Besides, size of the bubbles at the figure is related

with the citation number of the tagged country. USA has been getting cited mostly around 2010. Furthermore, Taiwan has been getting cited mostly around 2016 while France, South Korea, Greece and Türkiye have been getting cited mostly around 2020 and afterwards. Scientific improvement and visibility of the developing countries about L/C is another interesting point inferred from the analysis.

Table 5. First 10 Organization According to the Organization Citation Analysis

Organization	Documents	Citations	Total Link Strength
Natl. Chung Hsing Univ.	2	87	5
Fed Reserve Bank San Francisco	1	63	2
Board Governors Fed Reserve Syst.	2	57	29
George Mason Univ.	15	34	70
Fed Reserve Syt.	1	27	17
Baker & Mckenzie Llp.	10	25	59
Univ. Michigan	1	24	9
Bilkent Univ.	2	22	15
Univ. Oxford	2	22	15
Hong Kong Univ. Sci. & Technol.	1	21	0

After setting a limit of at least one citation and one article in the VOSviewer program for organization citation analysis, the results generated by the program are ranked according to the number of citations and presented in Table 5 and Figure 10. As seen in the Table, " Natl. Chung Hsing Univ." is the most cited organization with 87 citations about L/C subject and " Fed Reserve Bank San Francisco" is in the second place with 63 citations. When the first 10 organizations checked Fed Reserve Bank is mentioned 3 different places. This correlation is expected to be seen, since L/C is a payment method within banking system. Another interesting point is that Bilkent University, which is located in Türkiye, ranks at 8th among these organizations.

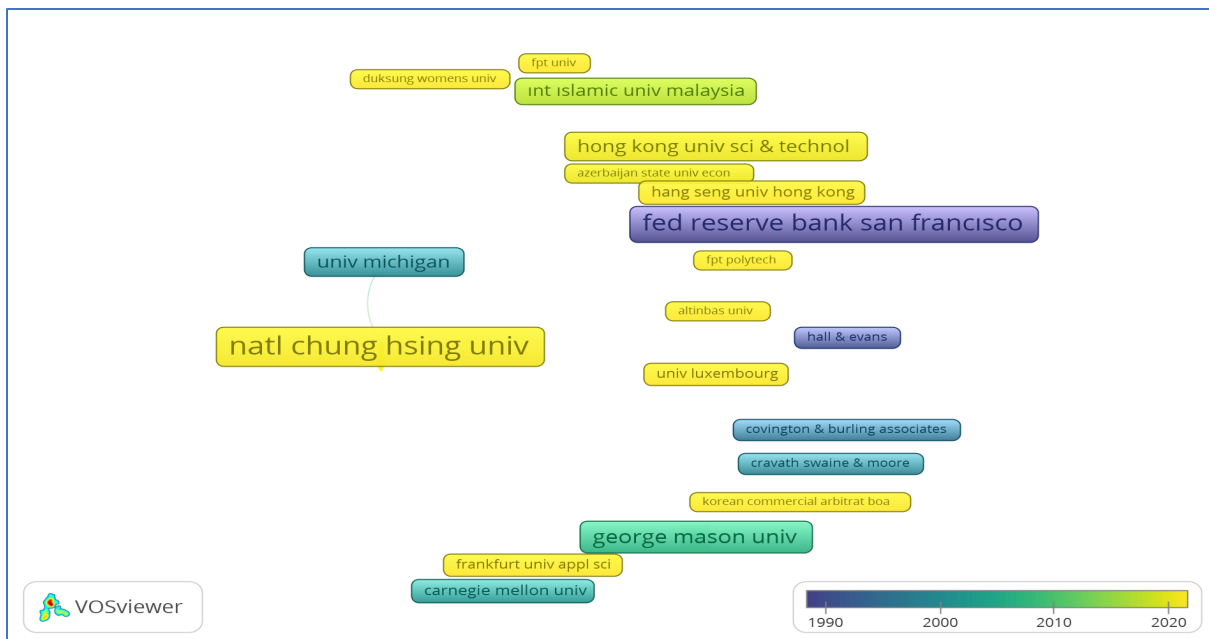


Figure 10. Overlay Visualization of Organization Citation Analysis

Overlay map for the organizations citation analysis has been shown at the Figure 10. Average publication year has been set to be able to demonstrate the performances of organization throughout years. Scale at the bottom

right side of the figure demonstrates the density of the citations by color and years, whereas size of the boxes is also related with the citations. Organizations within the yellow box is getting the most recent citations at the average like “Nat. Chung Hsing Univ”, “Board Governors Fed Reserve Syst.”, “Altınbaş Univ”, “Bilkent Univ” etc. Another interesting point is that, citation year average of “Bilkent Univ” is dated around 2020, “George Mason Univ” is dated around 2010 and “Fed Reserve Bank San Francisco” is around 1990.

Table 6. First 10 Keywords According to the Co-occurrence Analysis

Keyword	Occurrence	Total Link Strength
Letter of Credit	36	144
Blockchain	13	75
Letters of Credit	12	52
Smart Contract	9	54
Trade Finance	9	38
Ethereum	6	43
International Trade	6	33
Fantom	5	38
Binance Smart Chain	5	38
Fraud	5	16

Co-occurrence analysis is used for occurrence frequency of the keywords used at the publications. At the beginning of the analysis inclusion criteria has been set as at least one citation and one article. The results generated by the VOSviewer program is presented in Table 6 and Figure 11. When the science mapping technique has been used for L/C, co-occurrence frequency of author keywords is demonstrated at the Table 6 above. The most used keywords are "Letter of Credit" with 36, "Blockchain" with 13, "Letters of Credit" with 12, "Smart Contract" with 9, followed by "Trade Finance", "Ethereum", "International Trade", "Phantom", "Binance Smart Chain" and "Fraud".

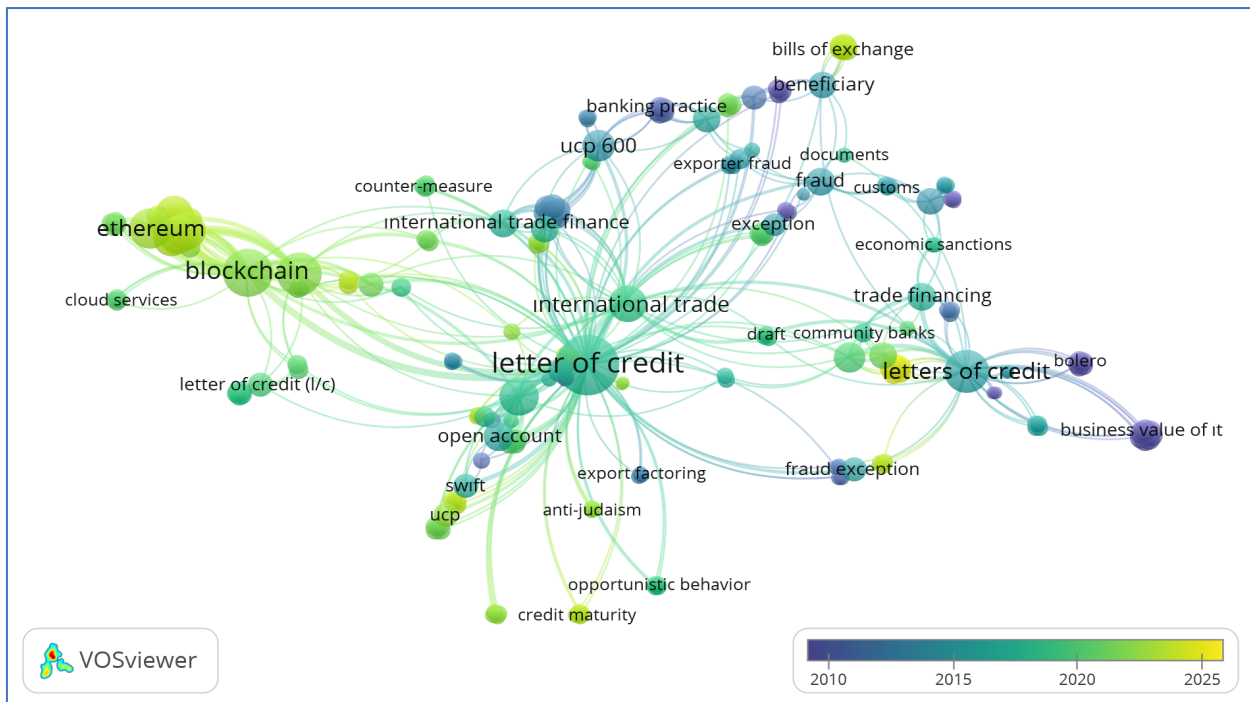


Figure 11. Co-occurrence Analysis of Keywords

Overlay visualization map of the keywords co-occurrence analysis is seen at the Figure 11 above. Scale at the bottom right side of the figure demonstrates the occurrence frequency of the keyword by color and years. In addition to that size of the bubbles is also related with the keywords occurrence frequency and lines between them related to the total link strength. According to the keywords with dark blue color such as “economic analysis”, “financial services” and “Rotterdam rules” were used around 2010. Besides, the keywords colored with green such as “trade finance”, “open account” and “UCP 600” were used mostly around 2018. Finally, the keywords colored with yellow such as “BPO”, “NFT”, “smart contracts” and “bank guarantee” etc. are the ones used at the most recent publications. One of the important point that can be inferred from the Table 6 and Figure 11 is the importance of L/C for international trade (or vice-versa) that can be seen in the ranking and frequency of common keywords. In addition, it also can be said that digitalization has huge effect on L/C literature since almost half of the keywords related directly with the sub-categories of the distributed ledger technology. That shows the importance of the science mapping analysis shed a light on the direction and transformation of the research trends in L/C.

Conclusion and Suggestions

L/C, which is a very complex payment in terms of procedures and intermediaries involved, has been used in international transfer of the money by exporters and importers for decades. In addition to its importance for multinational companies, exporters and importers, it is still one of the most essential payment method for banks in international transactions. That’s why, the subject of L/C has been investigated in the WoS database in terms of details such as citations, publication years, authors, organizations, sources etc. within the scope of this research. To be able to collect the data, “letter of credit” and “letters of credit” keywords have been used on 6th of June 2024. As a result, 171 articles, 20 proceeding papers, 11 book review, 10 editorial materials, 7 book chapters, 8 other types of publications from different disciplines were reached. Total of 220 results have been reached by using “letter of credit” and “letters of credit” keywords and the data was analyzed by using VOSviewer and Taleau programs.

The studies published from 1980 till 2024 and the majority of the studies were conducted in the fields of Law and Business Finance. However, computer science and artificial intelligence is also gaining importance in the publications related to the L/C. When the subject is investigated from the viewpoint of contribution of countries to L/C topic, USA ranks first by far. In addition to that, it is noteworthy that there are no publications in the countries in the Middle East, Africa (except South Africa) and South America (except Chile and Colombia). This might be related to the international trade culture and competitiveness of these regions.

Another important point is that “huong, luong hoang” and “vo, hong khanh” ranked best according to co-authorship analysis. When the citation analysis is conducted, “Byrne, james e.” and “Byrne, james e.” ranks best respectively. When the sources analyzed, it has been found that “Journal of International Economics” and “Business Lawyer” are the journals where L/C related documents have been published. Besides, it is also found that “Natl. Chung Hsing Univ.” and “Fed Reserve Bank San Francisco” are the most cited organization with about L/C subject. Another interesting point is that Bilkent University, which is located in Türkiye, ranks at 8th among these organizations. These authors, institutions and journals are at great importance for the academics and practitioners who are actively using L/C.

For predicting the future direction of L/C topic trends, it is essential to see the publications from a wider perspective. Co-occurrence analysis has been conducted to be able to see the change in the selection of keywords in the publication throughout selected time. The most used keywords are “Letter of Credit” with 36, “Blockchain” with 13, “Letters of Credit” with 12 and “Smart Contract” with 9. Also overlay visualization map displays the same trend such as “BPO”, “NFT”, “smart contracts” and “bank guarantee” etc. are the ones used at the most recent publications.

One of the most important output of this science mapping research is visualizing the metrics of publications in L/C topic. The findings of the study demonstrate not only those facts but also the effect of digitalization. The disrupting nature of digitalization in the way of doing business can be seen in the keywords usage of publications in the last decade. So, new publications can be focused on investigating the effect of industry 4.0 components

on L/C separately. On the other hand, expanding the used databases (such as SCOPUS, Google Scholar etc.) to be able to include more publication or using different analysis programs (such as R, SciMAT etc.) can be suggested for future researches to be able to have a better understanding about L/C subject.

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GENİŞLETİLMİŞ ÖZET

Akreditif ihracatçı ve ithalatçı için en güvenli ödeme yöntemlerinden biridir. Bunun en önemli nedenlerinden birisi akreditife ilişkin tüm süreçlerin ihracatçı ile ithalatçı arasında aracı görevi yürütmekle birlikte taraflara karşı sorumlulukları da bulunan bankalar tarafından yürütülmesine ek olarak herhangi bir uyuşmazlığın uluslararası kurallara göre ele alınmasıdır. Bu özgün yapısı nedeniyle, prosedürler ve araçlar açısından oldukça karmaşık bir ödeme olan akreditif, uzun yıllardır ihracatçılar ve ithalatçılar tarafından uluslararası para transferinde kullanılmaktadır. Akreditifli ödemelerde görünen yüzdesel düşüş trendine rağmen çok uluslu şirketler, ihracatçılar ve ithalatçılar açısından büyük önem arz etmesinin yanı sıra, bankalar için de uluslararası ödemelerde kullanılan en temel ödeme yöntemlerinden biridir.

Bu özellikleri nedeniyle literatürde bankacılık, hukuk, finans, uluslararası ticaret gibi birçok bilim dalı ile ilişki için bulunmaktadır. Örneğin; Haziran 2024'te Google Scholar veri tabanında İngilizce akreditif ifadesinin karşılığı olan "letter of credit" yazılarak arama yapıldığında 38.800 sonuca ulaşılmıştır. Küreselleşmenin sonuçlarından biri olan dijitalleşme, akademisyenlerin ve araştırmacıların dünyada üretilen tüm yayınlara çok kısa bir zaman diliminde ulaşmalarını sağlamaktadır. Ancak bilginin kapsamı arttıkça ilgili konudaki verilerin tasnifi, sınıflandırılması ve analiz edilmesinin manuel olarak yapılması zaman alıcı ve verimsiz hale gelmektedir. Bu nedenle yayınlara ilişkin genel bir bakış açısı sunmak ve araştırma eğilimleri gibi analizler yapmak için bibliyometrik analizler kullanılmaktadır.

Yapılan literatür incelemesinde akreditif konusunda bu yönde genel bir perspektif sunan bibliyometrik bir çalışma tespit edilememiştir. Benzer bir çalışma olan Azzahro'nun (2022) makalesi ise yalnızca İslami akreditif konusu olarak adlandırılan akreditifin çok niş ve yeni bir alt başlığını kapsamaktadır. Bu nedenle çalışma kapsamında akreditif konusundaki genel karakteristiklerin (atıflar, organizasyonlar, anahtar kelimeler, yayın yılları, kaynaklar, bilim dalı ve ülkeler gibi) ve eğilimlerin belirlenmesi amaçlanmaktadır. Bilim haritalama yöntemi kullanılarak genel bir bakış sunan ilk bibliyometrik makale olması açısından araştırmanın özgün olduğu ve literatüre katkı sunacağı düşünülmektedir. Bu kapsamda, akreditifle ilgili çalışmalara ulaşabilmek için WoS veri tabanında 6 Haziran 2024 tarihinde "letter of credit" ve "letters of credit" anahtar kelimeleri kullanılarak inceleme gerçekleştirilmiştir. Araştırmanın sınırlılıkları kapsamında farklı veri formatı ve dublikasyondan kaçınmak için diğer veri tabanlarının kullanılmamıştır. Arama sonucunda farklı disiplinlerden 171 makale, 20 bildiri, 11 kitap incelemesi, 10 editöryal materyal, 7 kitap bölümü ve 8 adet diğer türlerde yayına ulaşılmıştır. Ulaşılan 220 adet sonuca ait veriler VOSviewer ve Taleu programları kullanılarak analiz edilmiştir.

Analiz sonuçlarına göre akreditif ile ilgili çalışmaların yayın aralığının 1980 yılı ile 2024 yılları arasında kapsadığı görülmekle birlikte bilim alanı açısından bakıldığında yayınların büyük çoğunluğunun Hukuk, Finans ve İktisat alanında yayınlandığı tespit edilmiştir. Bilim alanı ile ilgili görülen önemli tespitlerden biri ise bilgisayar ve yapay zeka bilim alanlarının her konuda olduğu gibi akreditifler hususunda önem kazanmaya başlamasıdır. Bilim dünyasına akreditif konusuna katkıda bulunan ülkeler açısından yapılan incelemede ABD'nin diğer ülkelere göre açık ara ilk sırada yer aldığı görülmektedir. Bu sonuca ek olarak, harita üzerinde yayınların ülkelere göre dağılımı incelendiğinde Orta Doğu, Afrika (Güney Afrika hariç) ve Güney Amerika (Şili ve Kolombiya hariç) ülkelerinde hiç yayın olmaması dikkat çekicidir. Bu durumun, ilgili bölgelerin uluslararası ticaret kültürü ve rekabetçiliğinin alanyazına yansması ile ilgili olduğu düşünülmektedir.

Araştırma bulgularına yönelik bir diğer önemli nokta ortak yazarlık analizine göre "huong, luong hoang" ve "vo, hong khang"ın en iyi sırada yer almasıdır. Atıf analizi yapıldığında ise sırasıyla "Byrne, james e." ve "Byrne, james e."nin ilk iki sırada yer aldığı görülmektedir. Ayrıca, kurum analizine göre yapılan incelemede akreditif ile ilgili en çok yayın yapılan yerlerin "Journal of International Economics" ve "Business Lawyer" dergileri olduğu tespit edilmiştir. Buna ek olarak, akreditif konusunda en çok atıf alan kuruluşların ise "Natl. Chung Hsing Univ." ve "Fed Reserve Bank San Francisco" kurumları olduğu tespit edilmiştir. Türkiye'de bulunan Bilkent Üniversitesi'nin bu kuruluşlar arasında 8. sırada yer alması kurumlar analizinde tespit edilen bir diğer ilginç husustur. Bu noktadan hareketle, akreditif konusunda çalışma yapmak isteyen akademisyenler ve uygulayıcıların belirtilen yazarlar, kurumlar ve dergileri incelemelerinin büyük önem taşıdığı söylenebilir.

Bibliyometrik analizlerde bir konuyu daha geniş bir perspektiften görmek ve yönünü tayin etmek için en önemli analizlerden biri olan anahtar kelime analizi kullanılmaktadır. Akreditif konusunun gelecekteki yönünü tahmin etmek için seçilen zaman aralığında yayınlardaki anahtar kelimelerin seçimindeki değişimi görselleştirildiğinde en

çok kullanılan anahtar kelimelerin "Letter of Credit" (36 adet), "Blockchain" (13 adet), "Letters of Credit" (12 adet) ve "Smart Contract" (9 adet) olduđu tespit edilmiştir. Benzer şekilde, katman haritası incelendiğinde de "BPO", "NFT", "akıllı sözleşmeler" ve "banka garantisi" gibi anahtar kelimelerin son yayınlarda yoğunlukla kullanıldığı ve eğilimin bu yönde olduđu tespit edilmiştir.

Bilim haritalama yöntemi kullanılarak gerçekleştirilen araştırmasının en önemli çıktılarından biri, akreditif konusundaki yayınların metriklerini detaylı olarak vermekle birlikte aynı zamanda görselleştirmesidir. Çalışmanın bulguları araştırma konuları kapsamında da sadece bu gerçekleri göstermekle kalmamakta, aynı zamanda dijitalleşmenin etkisini de ortaya koymaktadır. Dijitalleşmenin iş yapma biçimindeki yaratıcı yıkım etkisi, son on yılda yayınların anahtar kelime kullanımında görülmektedir. Dolayısıyla, araştırmacılar yeni yapılacak yayınlarda Endüstri 4.0 bileşenlerinin akreditif üzerindeki etkisini alt bileşenler kapsamında ayrı ayrı araştırmaya odaklanabilirler. Bunun yanı sıra yapılacak yayınlarda kullanılan veri tabanlarının (SCOPUS, Google Akademik vb.) daha fazla yayını kapsayacak şekilde genişletilmesi araştırma sonuçlarının daha kapsamlı olmasına katkı sağlayacaktır. Son olarak, gelecekte yapılacak çalışmalarda akreditif konusunun daha iyi anlaşılabilmesi için aynı zamanda verilerin farklı analiz programları (R, SciMAT vb.) kullanılarak incelenmesi önerilebilir.