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SNA를 활용한 친환경 물류 연구 동향 분석*

진가영 이지원 이향숙
인천대학교 동북아물류대학원 박사과정 인천대학교 동북아물류대학원 석사과정 인천대학교 동북아물류대학원 부교수

Research Trend Analysis of Green Logistics by Using Social Network Analysis

Jiarong Chen[a], Jiwon Lee[b], Hyangsook Lee[c]
[a]Graduate school of logistics, Incheon National University, South Korea
[b]Graduate school of logistics, Incheon National University, South Korea
[a]Graduate school of logistics, Incheon National University, South Korea

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Abstract

Within the worse of the environment, Climate change caused by global warming is becoming serious around the world, and green logistics to pursue sustainable development in the logistics sector are receiving more and more attention. Along with the acceleration of the global economy, eco-friendly issues are playing an increasingly important role in the logistics industry, and various policy measures are being pursued to establish the green logistics system. This study aims to analyze research trends in eco-friendly logistics, and the SNA methodology was applied by extracting keywords from 518 domestic and foreign papers from 2013 to August 2022. The period is divided into three stages: 2013-2015, 2016-2019, and 2020-2022, and 'logistics' and 'sustainable development' were derived as top logistics eco-friendly keywords at all stages. Besides, In the first stage(2013-2015), the term ‘environmental performance’ and ‘freight transport’ attracted the attention of scholars. In the second stage(2016-2019), keywords such as ‘third-party logistics’ and ‘lean logistics’ have attracted the attention of scholars. In the third stage(2020-2022), the ‘internet of things’ and ‘circular economy’ received the attention of scholars. In line with the growth of the economy, it was confirmed that research related to eco-friendly logistics is gradually expanding to a sustainable concept. Based on this study, it is possible to grasp the research trends of the academic community to cope with recent environmental changes and provides reference materials to consider future research directions.

Keywords: Green Logistics, Keyword Analysis, Social Network Analysis, Sustainability Development
JEL Classifications:

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[a] First Author, E-mail: Jiarongchen.06@gmail.com
[b] Corresponding Author, E-mail: hslee14@inu.ac.kr

Ⅰ. Introduction

With the rapid growth of the social economy, the material civilization of human beings has advanced significantly. In the meanwhile, the resources of the earth are decreasing day by day, and the environment in which human being lives is also facing threats. Nowadays, global warming, extreme climate, and other environmental problems have become serious challenges facing the world today. According to the data of the International Energy Agency(IEA), freight transportation and logistics activities contribute 8–10% of global greenhouse gas emissions, which is one of the main factors causing global warming. At the same time, due to the promotion of commerce and the expansion of the logistics industry, the impact of logistics activities on the ecological environment is increasingly significant.

Against this background, the concept of 'green logistics' is gradually emerging in countries around the world(Tan et al, 2020; Larina et al, 2021; Agyabeng-Mensah et al, 2021). The term 'green logistics' also known as ecological logistics, is a measure and sustainable policy adopted by the logistics industry to minimize the environmental impact on transportation, warehousing, and other logistics activities(Rodrigue et al, 2017). This concept links logistics with economic and environmental efficiency by trying to reduce the impact of the industry on the environment. The operation of green logistics covers the entire cycle of the product including manufacturing, storage, transport, and so on. It's closely related to the logistical tasks of environmental issues(Wang et al., 2018).

In order to encourage rapid development and achieve sustainable growth of logistics, green logistics is mainly utilized to develop the low-carbon and environmentally friendly development of logistics(Jedliński, 2014). In general, the goal of green logistics is to employ more sustainable operations to lessen the impact of logistics on the environment. All in all, green logistics still requires a more mature theoretical framework to get stronger with huge social and economic potential. With the improvement of people's living standards, the logistics industry has developed rapidly, and the demand for green logistics has increased significantly(Karaman, 2020). Hence, how to achieve energy conservation and emission reduction in the field of green logistics has become an urgent problem.

Although green logistics plays an important role in the sustainable development of logistics, there is scant research focusing on the long-term change of green logistics trends. Therefore, this study divides the period from 2013 to 2022 (as of August 1st) into three stages, calculates the research trend on green logistics, and makes a comparative analysis of the past ten years. Based on the research results, the trend changes in green logistics in the recent ten years are proposed, and corresponding suggestions are put forward according to the trend changes. By the research results, relevant policymakers can refer to the research results when formulating strategies for the development of green logistics.

The study's remaining sections are structured as follows. The literature about green logistics is reviewed in section 2. Section 3 describes the method used to evaluate the papers gathered. The data are summarized in Section 4, together with the empirical findings and the implications. Section 5 concludes with the research trend of green logistics in the recent 10 years.

Ⅱ. Literature Review

Green logistics was first proposed by Murphy and Poist in 2003, it has been shown that environmental issues would widen the scope of logistics and have an impact on how logistics managers perform their duties. Nowadays, with the concern of global warming, there are many researchers had already focused on green logistics until now. Some researchers have focused on the efficiency evaluation of green logistics, some focused on the improvement of the pattern of green logistics.

After Murphy and Poist first proposed their opinions about the term 'green logistics' in 2003, Geroliminis and Daganzo(2005) presented several examples of 'green logistics' schemes. And it was found that the structure of green logistics was tried in a number of forward-looking cities around the world. The review of the research highlighted the basic qualitative ideas of these schemes and the results of field tests. According to Harris et al.(2007), environmental considerations must be incorporated into the logistics design in order to produce a fair and sustainable evaluation of supply chain infrastructure performance.

Beškovnik and Jakomin(2010) described the trends toward green logistics in a global aspect and the challenges of adopting green logistics in the region of Southeast Europe. By analyzing the case of Southeast Europe, the development model for green logistics implementation was proposed. It was determined that the logistics industry in this area still faces a plethora of unique difficulties.

Dekker et al.(2012) emphasized the important role of operational research in green logistics and proposed that environmental factors should be included in logistics efficiency evaluation. Zhang et al.(2015) analyzed the performance of green logistics. In order to study the combinatorial optimization problem of green logistics, the study conducted research through a swarm intelligent algorithm and also provided suggestions for algorithm customization to solve the air pollution problem.

Albekov(2017) analyzed the possibility of implementing environmental security mechanisms and applying global ecological standards to industries in Russia. The author highlighted the necessity of green logistics and concluded that the development of green logistics has a significant impact on promoting the economic growth of enterprises. Wang et al. proposed a two-phase optimization approach for the pickup and distribution of green eco-packages in 2019. This method was created based on the Lagrangian relaxation to solve the green logistics model. Dzwigol et al.(2021) analyzed the preconditions for shaping and developing the concept of a green economy. Based on the result of the analysis, the author found that the evolutionary development stage of the circular economy is closely related to the environmental performance strategy.

In general, there are many researchers who have studied green logistics from different perspectives. However, due to the outbreak of COVID-19 pandemic happened in the end of 2019, the operation mode of the logistics industry has undergone tremendous changes. Based on this situation, few scholars have comprehensively analyzed the development trend of green logistics from the perspective of current economic development.

Therefore, this study fills the research gap by collecting research from the past 10 years based on the keyword 'green logistics', and

analyzing the trend of green logistics by using social network analysis(SNA). Furthermore, this paper presents related findings regarding the results of the analysis with a view to providing more reliable data and as a reference for continuing research.

Ⅲ. Methodology

This section describes the methods used to achieve the aforementioned goals. For the research trend changes in green logistics, the keyword network analysis was selected to utilize in this paper. A description of the selected method and the reasons for the selection are discussed in the following sections.

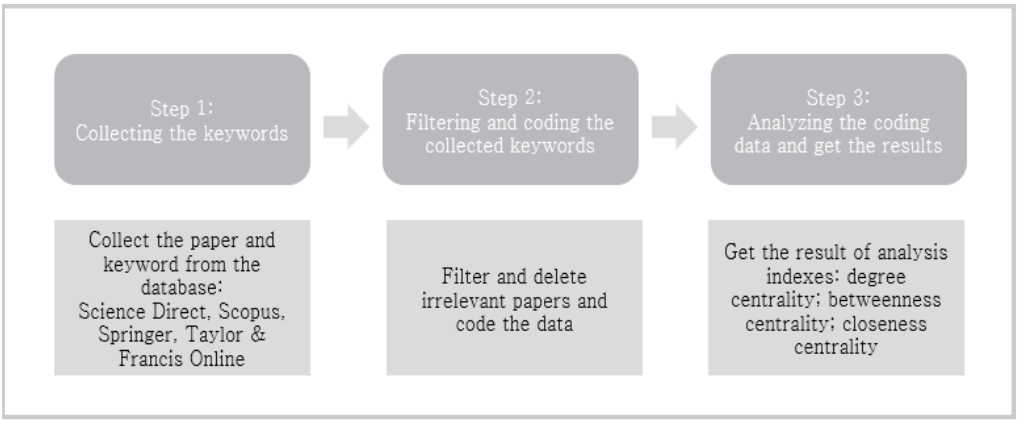
The keyword network analysis is usually known as the social network analysis(SNA) method, and it mainly focuses on the relationships between nodes through the use of networks and graph theory(Zhang, 2010). In the keywords analysis process, the keywords of research are usually viewed as nodes. If there is a relationship between two keywords, the keywords will be described as link nodes. Meanwhile, the centrality of each node can be determined by examining its connections.

In order to utilize the SNA method to assess the relationship between the research keywords associated with green logistics, this paper will analyze the keyword network through data generation firstly. After confirming the collected keywords information of the paper, it's essential to modify the analysis through necessary modifications. This is primarily due to the fact that a large number of researchers put forward keywords with the same meaning in papers published in academic journals but usually conveyed by combining words with different expressions or other keywords. Once the keywords have been modified, the analysis phase may proceed, which consists of connecting the keyword pairings that were concurrently offered in various articles.

Degree refers to the indicator of the number of other nodes connected by a specific node. Nodes with a high degree of connectivity are concerned with the whole network and have a great impact on other nodes. The keywords related to specific research in this study have a high degree of connection, which means that researchers who publish research results in general information research are very interested in this topic or methodology, which can be seen as a guide for other studies. In order to reflect the degree of connectivity, centrality is usually used for evaluation combined with a degree. The centrality indicator is one of the most commonly used indicators in the SNA method. It can be defined as an indicator showing the centrality of a specific node in the whole network. In other words, what nodes play an important role in the whole network can be known through centrality analysis. The schematic diagram of the research flow is constructed as Figure 1. The first step is to gather academic papers published related to green logistics, and the second step is to extract the keywords of papers and code the related keywords. And lastly, the step is to analyze the coded data and get the analyzed result by using social network analysis. Because for the keyword analysis, the most representative centrality indicators utilized in the network are degree centrality, closeness centrality and betweenness centrality. Based on the aim of the research, this study concentrated on these three centralities to find the keyword connection.

Firstly, the degree centrality is based on

Fig. 1. Schematic Diagram of the Research Flow



the connections between each node. This degree determines how many linkages there are between each node. The higher the value of centrality nodes, the higher the direct linkage between the nodes. The formula for calculating the degree centrality is shown as follows:

$$C_D(i) = \sum_{j=1}^{n} a_{ij}/(n-1) \quad (1)$$

n is the number of nodes existing in the keyword network. In this formule, if $a_{ij} = 1$, it means that the specific node i and specific node j are connected with each other closely. If $a_{ij} = 0$, it means the specific node i is not connected to specific node j.

Secondly, the betweenness centrality is a measure that evaluates the node's performance in the network's broker role. When a node is situated between the main network and other nodes, the connection of the nodes can be calculated by this degree. A node is considered to have a high betweenness centrality when it is situated between other nodes. The equation of the betweenness centrality is composed as follows:

$$C_B(i) = (\sum_{j<k}^{n} \frac{g_{jk}(i)}{g_{jk}})(\frac{2}{(n-1)(n-2)}) \quad (2)$$

g_{jk} is the number of the shortest paths when specific node j is connected to specific node k or specific node k is connected to specific node j. $g_{jk}(i)$ is the number of times specific node i is included in the link when specific nodes j and k are connected to each other.

Thirdly, the value of closeness centrality indicates how nodes play a central role in the entire network. If a node has shorter links with other nodes, the node has a higher value of closeness centrality. The formula used to calculate the closeness centrality is demonstrated as below:

$$C_c(i) = \frac{n-1}{\sum_j dist(i,j)} \quad (3)$$

n is the number of nodes in the network, and $dist(i,j)$ is the number of links needed for the connection when specific node i is

Table 1. Research scope of the research

No	Year	Stage	No of papers extracted	No of keywords used
1	2013			
2	2014	2013~2015	103	323
3	2015			
4	2016			
5	2017	2016~2019	194	536
6	2018			
7	2019			
8	2020			
9	2021	2020~2022	221	639
10	2022.08			

connected to specific node j or specific node j is connected to specific node i.

In general, the degree centrality is utilized to measure how connected each node in the keyword network is. The frequency of a node along the shortest path linking two other nodes in the network is calculated by betweenness centrality. Additionally, closeness centrality is utilized to calculate how close or far a node is to other nodes in the network.

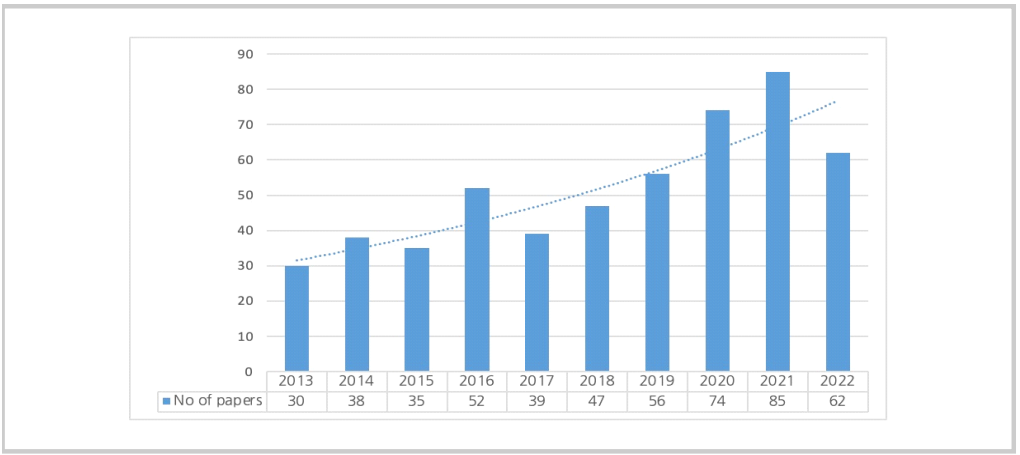
Ⅳ. Findings

As mentioned previously, to analyze the development trend of green logistics in the recent 10 years, the first step is to search for relevant papers based on academic databases. In this research, the papers presented originated from Science Direct, Scopus, Springer, Taylor & Francis Online. After collecting the academic research based on the keyword 'green logistics', the data were evaluated, and the keywords were identified by the SNA method.

In addition, the information on the collected paper used is illustrated in table 1. According to the search results, there is a total of 518 papers published from 2013 to 2022.08. Through the collected statistics, it can drawn the frequency of papers by the keyword shown in the figure 2. As can be seen from this figure that the papers are mainly concentrated in 2016, 2020 and 2021. This is mainly because in the year of 2016, most of the countries began to emphasize the importance of green logistics development through joint meetings and began to propose corresponding policies and measures. Since 2020, the countries have started to put forward the concept of carbon neutrality, strengthening the concept of green development. This also emphasizes that it is very necessary to study the trend of green logistics through the network analysis to get the research trend.

Furthermore, Based on the global policy-making trend, the strengthened policy made related to green logistics are mainly focused on the years 2016 and 2020(The World Bank, 2022). Therefore, in order to analyze the paper more comprehensively, this paper divided the analysis into 3 stages(2013~2015, 2016~2019, 2020~2022) based on the different development policies in the

Fig. 2. Frequency of Papers by the Keywords



different time spans.

1. First stage(2013~2015)

As illustrated in table 2, keywords and relationships closely related to green logistics from 2013 to 2015 are listed. By comparing the value of the degree centrality at this time span, it can be found that the keywords most closely related to green logistics are 'logistics'(0.146), 'sustainability'(0.121), and 'reverse logistics'(0.102). Obviously, the development of green logistics cannot be separated from the combined development of logistics and sustainable development. In order to better improve the efficiency of green logistics, the concept of reverse logistics was put forward by the American logistics management association in 1992. Reverse logistics is mainly used to reduce waste by reducing the use of resources. Numerous academics have been interested in this concept, and the majority of them have combined reverse logistics with green logistics to encourage further environmentally friendly development of logistics.

Additionally, by comparing the betweenness centrality, it's possible to determine that the keyword with the highest frequency throughout this period is almost similar to the degree centrality. Through the table, it can be found that 'reverse logistics' ranked first in this time range, reaching the value of 0.111. This is mostly due to the urgency with which people notice green growth in the logistics sector and their growing commitment to energy efficiency and environmental preservation. As mentioned before, the ultimate purpose of reverse logistics is to reduce waste by using fewer resources. As a result, the researchers in this stage are more commonly associated this term with green logistics to analyze the efficiency of recycling logistics. 'Logistics' and 'Sustainability' which likewise had a high frequency during this time period came in second and third with a value of 0.073 and 0.065. Besides, by comparing the betweenness centrality value of other terms, it's easy to conclude that most papers have mainly emphasized the emission of pollutants such as the term 'environment' (0.027), 'environmental performance'(0.024), and so on.

Table 2. Keyword sequencing of the three centralities, 2013~2015

No	Keyword	Degree centrality	Keyword	Betweeness centrality	Keyword	Closeness centrality
1	Green logistics	0.410	Green logistics	0.459	Green logistics	0.372
2	Logistics	0.146	Reverse logistics	0.111	Logistics	0.319
3	Sustainability	0.121	Logistics	0.079	Environmental performance	0.316
4	Reverse logistics	0.102	Sustainability	0.065	Sustainability	0.314
5	Carbon emissions	0.096	Carbon emissions	0.047	Carbon emissions	0.314
6	Supply chain	0.081	Supply chain	0.031	Supply chain	0.313
7	Greenhouse gas	0.078	Environment	0.027	Reverse logistics	0.311
8	Sustainable development	0.065	Environmental performance	0.024	Environment	0.310
9	Environmental performance	0.062	Sustainable development	0.016	Carbon footprint	0.310
10	Environment	0.062	Greenhouse gas	0.013	Transportation	0.307
11	Carbon footprint	0.062	Transportation	0.012	Freight transport	0.306
12	Freight transport	0.062	Carbon footprint	0.008	Sustainable development	0.296
13	Eco efficiency	0.062	Freight transport	0.007	Greenhouse gas	0.289
14	Real estate	0.062	Eco efficiency	0.002	Eco efficiency	0.279
15	Transportation	0.056	Real estate	0.002	Real estate	0.279

Lastly, in the background of the closeness centrality is a measure of the typical shortest distance between each node. This means the higher the closeness centrality value is, the more desirable the score could get. Therefore, in the network of this stage, by comparing the value of closeness centrality, it's demonstrated that the terms with higher values are 'logistics'(0.319), 'environmental performance'(0.316), 'sustainability'(0.314), 'carbon emissions'(0.314), 'supply chain'(0.313). And this result means that these keywords are the closest keywords connected to the green logistics keyword node.

All in all, it can be seen from a comparison of the literature on green logistics at this stage that much research has been focused on environmental concerns and freight transportation. This is mainly because many countries started to promote green policies in the period from 2013 to 2015. By the collection of keywords, it's easy to conclude that people are becoming more and more concerned with the environment and seeking the development of green logistics.

2. Second stage(2016~2019)

Table 3 displays the keyword connectivity and relationship of green logistics from 2016 to 2019. According to the comparison of degree centrality, the terms most closely associated with green logistics from 2016 to 2019 include 'logistics'(0.108), 'carbon

Table 3. Keyword sequencing of the three centralities, 2016~2019

No	Keyword	Degree centrality	Keyword	Betweeness centrality	Keyword	Closeness centrality
1	Green logistics	0.409	Green logistics	0.552	Green logistics	0.399
2	Logistics	0.108	Green economy	0.315	Logistics	0.342
3	Carbon emissions	0.095	Carbon emissions	0.111	Sustainability	0.330
4	Sustainability	0.082	Logistics	0.095	Carbon emissions	0.328
5	Sustainable development	0.082	Sustainability	0.064	Sustainable development	0.325
6	Reverse logistics	0.056	Reverse logistics	0.061	Green supply chain	0.322
7	Vehicle routing	0.056	Vehicle routing	0.051	Reverse logistics	0.317
8	Third-party logistics	0.050	Green supply chain	0.049	Vehicle routing	0.316
9	Green supply chain	0.047	Sustainable development	0.047	Third-party logistics	0.314
10	Green economy	0.043	Third-party logistics	0.024	Green economy	0.148
11	Logistics service providers	0.043	Analytic hierarchy process	0.023	China	0.015
12	Analytic hierarchy process	0.041	Logistics service providers	0.020	Environmental performance	0.013
13	Environmental performance	0.039	Lean logistics	0.010	Logistics service providers	0.011
14	Lean logistics	0.039	China	0.008	Lean logistics	0.011
15	China	0.037	Environmental performance	0.004	Analytic hierarchy process	0.009

emissions'(0.095), 'sustainability'(0.082), and 'sustainable development'(0.082), which are nearly identical to the first stage(2013-2015). The development trend of green logistics is similar to the first stage.

By comparing the betweenness centrality, it can be found that the keyword with high connectivity and the highest frequency is 'green economy', with the highest value of 0.315. This is mainly because the researchers focus on the development of a green environment while paying greater attention to improving economic benefits at this stage. The term 'carbon emissions' is the second-highest frequency keyword, which has a frequency of 0.111, This is due to the fact that carbon dioxide emissions from human activities are quite high compared to other greenhouse gases. Additionally, it is considerably simpler to control through various forms of human engagement.

Correspondingly, when comparing the value of closeness centrality, it is evident that the keywords with higher scores are

'logistics'(0.342), 'sustainability'(0.330), 'carbon emissions'(0.328), 'sustainable development' (0.325), 'green supply chain'(0.322), 'reverse logistics'(0.317), 'vehicle routing'(0.316), 'third-party logistics'(0.314), and so on. These keywords are the closest keywords in terms of the network structure with green logistics. And it indicates these keywords have a more desirable centrality score which has a shorter average distance to the node 'green logistics' in the network. Specifically, people are more focused on the multi-optimation of transporting and sustainable development in this stage. Therefore, in this network of this stage, these words are the closest keywords connected to green logistics.

Generally speaking, by comparing these three degrees, it can be easily concluded that at this stage, scholars have studied green logistics more practically. Research on vehicle routing, environmental performance, and transportation optimization is expanding at this time. Besides, the concept of lean logistics was also emphasized from 2016 to 2019. The primary goal of lean logistics is to cut down on material waste and boost the effectiveness of the logistics model. As a result, this term has been thoroughly researched in a wide range of literature in order to get more practical in the advancement of green logistics.

3. Third stage(2020~2022)

Table 4 lists the top 15 keywords closely related to green logistics from 2020 to 2022. By examining the degree centrality, it can be concluded that the keyword most closely associated with green logistics from 2020 to 2022 is sustainability. Sustainability has the highest score of 0.101 in the logistics keyword network, indicating that research on green logistics is still steadily focused on sustainable development. Green supply chain management(0.093) is the second closely connected keyword at the same time because supply chain management is always strongly tied to logistics and is a component of logistics management. The next keywords tightly connected to green logistics are environmental sustainability(0.070), reverse logistics(0.066), carbon emission(0.066), and so on.

In accordance with a comparison of betweenness centrality, the terms with the highest frequency are totally the same with the degree centrality, which is sustainable(0.102), logistics industry(0.083) and green supply chain management(0.068). By comparing the value of other keywords, it can be concluded that the researchers are focused more on the implication of eco-technologies such as the internet of things(0.027), circular economy(0.026) and transportation(0.018). In recent years, people are paying more attention to the reality that not only could decrease pollution but also increase the economic efficiency of logistics. Futhermore, the logistics industry has experienced digital transformation, which has contributed significantly to market growth.

Additionally, by comparing the closeness centrality, it can be verified that the distance between each keyword node in the green logistics keyword network structure is comparable, and the value is almost 0.258~ 0.295. This indicates that the researchers' study areas are rather broad and the keywords during this period are widespread.

By comparing these keywords, it can be illustrated that at this stage how closely human activities and green logistics are connected at this time. These three degrees show that humans have joined logistics technology, sustainable development, and green logistics to develop logistics more

Table 4. Keyword sequencing of the three centralities, 2020~2022

No	Keyword	Degree centrality	Keyword	Betweeness centrality	Keyword	Closeness centrality
1	Green logistics	0.313	Green logistics	0.430	Green logistics	0.325
2	Sustainability	0.101	Sustainability	0.102	Sustainability	0.295
3	Green supply chain management	0.093	Logistics industry	0.083	Green supply chain management	0.286
4	Environmental sustainability	0.070	Green supply chain management	0.068	Reverse logistics	0.283
5	Reverse logistics	0.066	Logistics	0.060	Carbon emissions	0.281
6	Carbon emissions	0.066	Green supply chain	0.059	Green supply chain	0.281
7	Green supply chain	0.065	Carbon emissions	0.054	Sustainable development	0.280
8	Logistics	0.063	Reverse logistics	0.048	Logistics	0.279
9	Sustainable development	0.062	Sustainable development	0.041	Internet of things	0.279
10	Internet of things	0.047	Environmental sustainability	0.033	Circular economy	0.274
11	Transportation	0.047	Internet of things	0.027	Environmental sustainability	0.272
12	Circular economy	0.041	Circular economy	0.026	Environment	0.271
13	Environment	0.039	Transportation	0.018	Logistics industry	0.270
14	Supply chain management	0.039	Environment	0.018	Transportation	0.269
15	Logistics industry	0.035	Supply chain management	0.013	Supply chain management	0.258

environmentally at this stage.

Ⅴ. Conclusion

To sum up, this paper collected the literature from the recent 10 years(2013~2022), comprehensively analyzed and compared the development trend of green logistics. By dividing the time span from 2013 to 2022 into three different stages(2013~2015, 2016~2019, 2020~2022), the SNA method is applied in this paper to analyze the research trend of green logistics specifically. Through the result of the analysis, it's clear that the research trend of green logistics is directly tied to the development of logistics and economics. According to the ranking of keywords in the three stages, it can be found out that the development of green logistics is getting more and more intended to the intelligent technologies combine with the logistics industry.

According to the ranking of keywords in the first stage(2013~2015), the keywords with

high comprehensive significance are logistics, sustainability, reverse logistics, and carbon emissions. By examining the relevant literature in this stage, it can be found that the majority of the researchers have focused on the evaluation of green logistics emissions and footprint of carbon emissions. This proves that during this period, academics began to attach importance to the environmental performance of green logistics and the development of green logistics was still in the stage of infancy from 2013 to 2015.

In the second stage(2016~2019), although sustainable development still attracts the attention of researchers, more concerns about environmental pollution had risen up. The keywords in this period mainly focused on vehicle routing and green economy. As a means of logistics distribution optimization method, vehicle routing has been widely used to improve the logistics model in several studies. In this way, logistics companies could find more economical ways to send cargo more efficiently and protect the ecological environment. This demonstrates that efficiency was the main emphasis of study during this time, which also highlights the influence of economic reasons on the development of green logistics.

In the last stage(2020-2022), the term sustainability continues to dominate the literature in recent years. However, the concentration of the keywords has gradually turned to terms like green supply chain management, environmental sustainability, internet of things, and so on. By examining the research in this stage, it can be found that many scholars had studied the joint development of green logistics with smart logistics technology, and the studies mainly focused on the construction and application of logistics environmental technologies.

On the whole, this paper systematically reviewed the relevant literature on the research related to green logistics from 2013 to 2022. The findings of this paper have effects on the academic side. By dividing the research years into 3 stages, it can be concluded that there is closeness connection between logistics development, green economics, and sustainable development. Besides, the betweenness centrality is a frequently used indicator of a node's contribution to facilitating the transmission of information from one region of the network to another. Therefore, the node with strong betweenness is therefore more likely to be aware of events happening in the social networks. Under this base, the results of betweenness centrality have been used to estimate the direction of future studies. According to the top tier of betweenness centrality from 2013 to 2022, it could be aware that the analysis for the green supply chain and logistics industries will be popular in the near future.

It is worth noting that the research collection is limited by the time of this year, and the collection and analysis of papers are mainly concentrated before August 2022. As a result, it's anticipated that more countries might engage more in policies and provide encouragement for the development of green logistics. There will be further studies on green logistics in the future. Under this background, scholars could continue conducting studies and update the findings of the analyses current.

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