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## Article

# An analysis of research trends of the Asian Journal of Shipping and Logistics

Asian Journal of Shipping and Logistics (AJSL)

## Provided in Cooperation with:

Korean Association of Shipping and Logistics, Seoul

*Suggested Citation:* Listan Bernal, Maria; Choi, Young-Seo; Lee, Hae-Chan; Kim, Yu-Na; Yeo, Gi-Tae (2024) : An analysis of research trends of the Asian Journal of Shipping and Logistics, Asian Journal of Shipping and Logistics (AJSL), ISSN 2352-4871, Elsevier, Amsterdam, Vol. 40, Iss. 3, pp. 139-146, <https://doi.org/10.1016/j.ajsl.2024.06.002>

This Version is available at:

<https://hdl.handle.net/10419/329743>

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# The Asian Journal of Shipping and Logistics

journal homepage: [www.elsevier.com/locate/ajsl](http://www.elsevier.com/locate/ajsl)

## An analysis of research trends of the *Asian Journal of Shipping and Logistics*

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### ARTICLE INFO

#### Keywords:

AJSL  
Research trend  
SNA  
Degree centrality  
Closeness centrality  
Betweenness centrality

### ABSTRACT

The analysis of research trends in papers published in academic journals can help establish the identity of a field by discovering the research content and characteristics conducted from the past to the present. This study aimed to establish research trends among publications in the *Asian Journal of Shipping and Logistics (AJSL)*. This study implemented the social network analysis (SNA) method using three approaches (degree centrality, closeness centrality, and betweenness centrality) to highlight the connections between research keywords published from 2009 to 2022. This study divided the publications into three periods (2009–2014, 2015–2018, and 2019–2022). The degree centrality analysis of SNA for the period 2009–2014 shows that the keywords “container shipping,” “logistics,” and “port” ranked first, second, and third, respectively. The analysis for 2015–2018 shows that the keywords “analytic hierarchy process,” “China,” and “logistics” ranked first, second, and third, respectively. Finally, the analysis for 2019–2022 shows that “DEA,” “Vietnam,” and “container terminal” ranked first, second, and third, respectively. It is noteworthy that attention in the final period switched from China to Vietnam.

### 1. Introduction

The *Asian Journal of Shipping and Logistics (AJSL)* began publication in 2009, and in 2024, was publishing four issues annually. The *AJSL* covers papers on Asia’s shipping, port, transport, and logistics sectors, particularly in the fields of management, finance, accounting, insurance, international business, and marketing (Jeon et al., 2016; Maskey et al., 2018; Lee & Shin, 2019; Nguyen et al., 2021). No previous research has identified the overall research trends of studies published in the *AJSL*.

The analysis of research trends in papers published in academic journals can help establish the development of the field by exploring the research content and characteristics conducted from the past to the present. Revisiting research trends is essential because of its role in establishing a journal’s academic identity and the consequent systematic development of research topics in the field (Lee et al., 2009; Wang and Ho, 2011; Weismayer & Pezenka, 2017).

An analysis of research trends within *AJSL* publications is crucial for comprehending the nuances and patterns of academic research development in the shipping field. Therefore, an analysis was conducted on the *AJSL* papers published within the past 14 years and retrieved using ScienceDirect. The analysis is divided into three stages. The first period was 2009–2014, during which the *AJSL* published two to three issues annually. In 2009 and 2010, the *AJSL* released two issues, which

increased to three annual issues in the period 2011–2014. The publication rate during this first period was lower than the later rate of the four issues per year. With both intervals lasting 4 years, the second period was designated as 2015–2018, and the final period as 2019–2022.

In pursuit of this research goal, the social network analysis (SNA) method was introduced to understand the structure between keywords. SNA was applied to derive various measures of the centrality of the nodes within the network structure, which provides a visualization of the connections between nodes that are subject to social relations, researcher and research relations, and structural relationships. Therefore, this method allows for the deduction of the degree, closeness, and betweenness centrality measures of a determined keyword network, which are used to identify the characteristics of research trends and topics by period. For this reason, the analysis not only allows for the identification of the journal’s nature, but also facilitates a deeper understanding of the trends observed, serving the intended purpose of gaining insights into the proposed publications in the field of shipping and logistics.

Based on the results of this study, the overall flow of research in the Asian shipping sector was revealed, as the nature of the issues during each study period could be appreciated through the top keywords ranked in each analysis. Moreover, these findings hold importance for

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<https://doi.org/10.1016/j.ajsl.2024.06.002>

Received 5 May 2024; Accepted 3 June 2024

Available online 8 June 2024

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the development of potential future research objectives regarding the ever-evolving trends within the field of shipping and logistics.

The remainder of this paper is organized as follows. Section 2 reviews existing trend-related research in academic journals. Section 3 describes the SNA method implemented in this study, and Section 4 presents the SNA results for degree centrality, closeness centrality, and betweenness centrality for each period. Section 5 concludes with an analysis of the results and discussion of the implications.

## 2. Literature review

In a study conducted by Wang and Ho (2011), an assessment regarding the global research and publication trends within the “environmental science” category of the ISI subject classification was made. Data spanning 1998–2009 were collated from the online versions of the Science Citation Index Expanded and Web of Science. Similarly, Wang et al. (2011) analyzed global scientific output within the “water resources” category of the ISI subject classification. Covering a duration of 16 years (1993–2008), their study employed the same method for data acquisition and analysis.

Alias et al. (2013) delved into research trends associated with WebQuest across seven scholarly journals spanning the period from 2005 to 2012. These journals encompassed prominent titles, such as *Computers & Education*, *Educational Technology*, and *TOJET*. A comprehensive cross-analysis approach was undertaken, segregating the studies based on publication year and further dissecting them according to categories, such as research topics, issue classification, research context and sampling methods, research design, research methodology, and data analysis methods. The scope of the selected papers was distinctly descriptive. In particular, the exploration centered on information-focused research concerning the concept and utilization of WebQuest within an educational context (Alias et al., 2013).

Leiras et al. (2014) examined research trends in humanitarian logistics and disaster management. Over the past five years, the number of papers on this topic has increased. Through analysis, the authors found that more research is needed in the disaster recovery stage, and communication between researchers and practitioners is needed for more applied research. In response, academic journals published in the past few years have mostly focused on topics related to strategic decision making. However, since it was analyzed mainly in academic journals, an additional review of working-level research is needed in the future.

Weismayer and Pezenka (2017) employed a longitudinal latent semantic analysis of keywords to investigate the dynamics within the International Marketing Review journal and proceedings of the ENTER eTourism Conference. Their methodological approach yields valuable insights into the current landscape of marketing research and e-tourism. The method utilized not only sheds light on the prevailing state of these domains but also identifies trends, underexplored areas, and emerging research topics, contributing to a comprehensive understanding of these fields. In a study focused on supply chain management, Carter et al. (2007) embarked on a comprehensive effort to uncover the sources employed by scholars in this domain for their research, published in the *Journal of Supply Chain Management*. Through the application of SNA, this study scrutinized citations over 40 years of publication. This analytical approach provides an enriched understanding of the scholarly landscape within the realm of supply chain management, offering valuable insights into interconnectedness and influential sources within the field.

A comprehensive study by Dynako et al. (2020) analyzed research trends within two major sports medicine/articular journals, the *American Journal of Sports Medicine (AJSM)* and *Arthroscopy*, over 3 decades. The investigation revealed a steady increase in both the volume of published papers and the representation of countries contributing to these journals. Furthermore, when comparing the two journals, the *AJSM* had higher counts in terms of authors, bibliography utilization, manuscript pages, and regularized citations than *Arthroscopy*.

Interestingly, despite *Arthroscopy* having a relatively smaller proportion of female first authors and corresponding authors than *AJSM*, it exhibited a faster increase in female authorship over time. In summary, the findings of this study converged to show a prevailing upward trend in the majority of the variables examined in the *AJSM* and *Arthroscopy* (Dynako et al., 2020).

Investigating neurosurgery research trends over a decade, Garg et al. (2022) analyzed scholarly output from six academic journals spanning 2011 to 2020. A total of 39,239 papers were included in the examination, with a peak recorded in 2019 at 6811 papers. The research revealed heightened activity from nations including the United States, China, Japan, Western Europe, and Turkey. Additionally, the study revealed a proportional correlation between the number of published papers and national indicators, such as population size, illiteracy rate, GDP per capita, and surge in the number of neurosurgeons.

In a recent study by Gallagher et al. (2023), 2738 papers published in seven major writing research journals between 2000 and 2019 were analyzed. The data extraction encompassed seven academic journals, including notable titles, such as *College Composition and Communication* and *College English*. Notably, this study revealed that the highest number of research publications occurred in 2019. During this period, the volume of references used in these papers increased concurrently with the incorporation of new papers as reference sources. Moreover, an interesting observation emerged: a decline in the diversity of words was discernible across two distinct periods: the initial 2000s and subsequently, the 2010s.

However, it is noteworthy that while the studies mentioned earlier focused on using the SNA method or examining trends across publications, recent literature does not specifically address the segmentation of research trends over distinct periods. This study identified this gap and endeavored to bridge it. In response, our study segments the analysis into three well-defined periods: 2009–2014, 2015–2018, and 2019–2022. Through this segmentation, we aim to comprehensively explore the research dynamics within each interval. By conducting a keyword analysis of papers published within these defined periods, our study seeks to contribute both quantitatively and visually to the clarification of the interrelationships and interactions among keywords. This endeavor is significant, as it promises to offer a holistic understanding of the evolving research landscape.

## 3. Methodology

The SNA method is based on Euler's graph theory (1741) with quantitative characteristics. The SNA method was introduced to understand and interpret the structure of individuals and the joint affiliation relationships formed around social relationships composed of individuals and organizations (Lim & Jeon, 2011). Therefore, SNA has the advantage of grasping connections by deriving the centrality of the relationship between each node (organization, society, and class) of the network.

According to Freeman (1979), SNA analysis can be largely divided into degree centrality, betweenness centrality, and closeness centrality; each centrality is divided into absolute and relative degree centrality. Absolute degree centrality measures the number of other nodes connected to each node, whereas relative degree centrality derives values by considering the size of the network.

Degree centrality denotes a quantitative assessment of the extent to which each node within the network is linked to other nodes (Freeman, 1979). In essence, connections between nodes are established via links that interconnect each node within the network, and the greater the number of connections between a given node and other nodes, the higher is the degree centrality (Lee et al., 2022). Eq. (1) shows the derivation of degree centrality.

$$C_D(i) = \frac{\sum_{j=1}^n w_{ij}}{(n-1)} \tag{1}$$

Second, closeness centrality measures whether a node is located at the center of a network. Thus, a node with shorter access to other nodes in the network is deemed to be more centrally located, and the more centered its location within the network, the greater its connectivity and influence on other nodes. Therefore, a high closeness centrality translates into higher information-delivery capacity and influences other nodes (Lee et al., 2022). Eq. (2) represents closeness centrality.

$$C_c(i) = \frac{n-1}{\sum_j dist(i,j)} \tag{2}$$

Third, betweenness centrality quantifies the importance of a node within a network based on its role as a bridge. Node serves as a bridge, denoting the shortest path between nodes j and k, which are otherwise not directly connected, with node i acting as an intermediary (Lee et al., 2022). Eq. (3) represents the betweenness centrality expression:

$$C_B(i) = \left( \sum_{j<k} \frac{g_{jk}(i)}{g_{jk}} \right) \left( \frac{2}{(n-1)(n-2)} \right) \tag{3}$$

#### 4. Empirical analysis

The research keywords for the *AJSL* were selected through a systematic collection of available literature in this journal between 2009 and 2022. A total of 331 academic publications were retrieved from the online source Science Direct, and each research keyword used by the authors was included in the database. For this study, publications were divided into three periods (2009–2014, 2015–2018, and 2019–2022) to assess trends and provide an in-depth analysis of the journal’s views on the evolution of the sector.

##### 4.1. First period (2009–2014)

###### 4.1.1. Degree centrality analysis

Degree centrality measures the number of links to which a node is connected to the remainder of the network. In other words, it shows the interactions a keyword has in a social network, which translates to a higher use of that keyword in research papers. The scores obtained from the degree centrality analysis for this period are listed in Table 1.

Following the analysis results, the keywords “container shipping,” “logistics,” and “port” lead the ranking with the same value (0.044). A

**Table 1**  
Degree Centrality (2009–2014).

No	Degree centrality	Score
1	Container Shipping	0.044
2	Logistics	0.044
3	Port	0.044
4	Korea	0.034
5	Shipping Industry	0.034
6	Seaport	0.032
7	Resource-Based View	0.029
8	Shipping	0.029
9	3PL Provider	0.027
10	Air transportation	0.027
11	Asian economy	0.027
12	Container Throughput	0.027
13	Flying Geese Model	0.027
14	Global Economy	0.027
15	Integrator	0.027
16	Lifecycle	0.027
17	Mega carrier	0.027
18	Product Cycle	0.027
19	Supply Chain Management	0.027
20	Institutional Theory	0.025

visual representation of this process is shown in Fig. 1. These studies appeared following efforts to recover from the 2008 financial crisis, which led to an increase in global demand and posed a challenge to the existing economic model of international containerization. Researchers using the “container shipping” keyword covered topics related to shipping costs (Chow & Chang, 2011), international policies and constraints on shipping liner operations (Nair, 2012), and overall transportation industry assessment under different methodologies (Miyashita, 2009).

A broader spectrum of studies included the keyword “logistics,” with research on logistics managers’ competency profile (Thai et al., 2021), logistics competency levels from the manufacturer’s perspective (Lu & Lin, 2012), the effects of port logistics firm market orientation (Bae, 2012a), measuring environmental logistics practices (Kim & Han, 2011), introduction to advanced support systems (Wu et al., 2011), procurement of automotive parts (Hayashi & Nemoto, 2010), service provision in the shipping industry (Koo et al., 2009), effects of logistics costs in container ports (Cho, 2014), market structure comparison on subsidiary and third-party logistics (Ahn et al., 2013), influencing factors of logistics integration and customer service (Bae, 2012b), DEA performance analysis (Jiang & Li, 2009), analysis of free trade zone policies (Yang, 2009), strategic type of business in air-logistics cluster (Chung, 2009), and structural changes in international logistics (Miyashita, 2009). In summary, these studies depict the context of international economic growth and competitiveness that pays special attention to cost-related performance levels, from manufacturers to service providers.

Likewise, a wide range of literature related to the keyword “port” was identified in publications with topics on a decision-making model for seaport selection (Sayareh & Alizmini, 2014), port-related supply chain disruptions management (Loh & Van Thai, 2014), economic contribution of ports (Jung, 2011), geographical issues related to bulk ports (Lee, Yeo, Thai, 2014), evaluation formula of berth capacity for general cargo in port (Park et al., 2014), port competitiveness (Yeo, 2010; Kim, 2011; Chung & Han, 2013; Ahn et al., 2014), success factors for port infrastructure public–private partnership (Aerts et al., 2014), uncertainties in decision-making process for future port infrastructure investments (Lagoudis et al., 2014), analysis of port brand equity (Lee, Yeo, Thai, 2014b) and brand value (Chung & Jang, & Han, 2013), cities and transport networks in shipping and logistics (Ducruet & Lugo, 2013), port pricing (Acciaro, 2013; Bandara et al., 2013), green logistics (Esmemr et al., 2010; Li et al., 2011; Park & Yeo, 2012), market orientation (Bae & Ha, 2014), port management (Tran et al., 2011), container development strategies (Lu et al., 2010), and free trade zone policy analysis (Chiu et al., 2011). Following the same economic-centered interests, papers related to green port logistics have emerged.

The equal presence of the three keywords indicates a simmering interest in maritime logistics, a trend that particularly seemed to tackle the Korean shipping industry, as revealed by the following keywords in the rank, “Korea” (0.034) and “shipping industry” (0.034). In summary, between 2009 and 2014, Asian and global container shipping industries experienced a dynamic period marked by economy-related publications targeting managerial challenges, competitiveness, race, infrastructure, and technological and environmental advancements. The industry’s response to these developments laid the foundation for subsequent changes and adaptations in the years that followed.

###### 4.1.2. Closeness centrality analysis (2009–2014)

Closeness centrality analysis indicates the shortest path, and therefore, the fastest keyword that influences the network. Table 2 presents the results of closeness centrality analysis.

Closeness centrality scores were led by the keywords “container throughput” and “free trade zone” with equal values (0.090), inferring that these two keywords occupied a central position in terms of accessibility on the network.

Container throughput refers to the measurement, in TEUs, of container handling activity. Given the current role of containerization,



indicated that these two keywords were the most cited “bridge nodes” in the research articles of this period, as Table 3 shows.

“Container throughput”, depicted in Fig. 2, appeared frequently enough as a medium to connect different academic research. Again, its top position in the ranking is derived from the rampant attention that container throughput has been receiving both as the main target and as an auxiliary indicator of container port performance, which corresponds with the third keyword in the ranking (0.058).

4.2. Second period (2015–2018)

The degree centrality analysis results for the period 2015–2018 ranked the keyword “analytic hierarchy process” (0.060) first, closely followed by “China”, “logistics,” and “SNA” with an equal score (0.047). Scores for this period are shown in Table 4.

The analytical hierarchy process (AHP) method decomposes complex decision-making problems to simplify the cognitive burden of decision-makers (Bulut & Duru, 2018). This method has been extensively applied in the field of logistics. Seo et al. (2018) identified ship management firms’ selection criteria by ship owners; Lirn et al. (2018) addressed the factors considered to control the quality of grain cargoes shipped in containers in Asia; Ha et al. (2017) proposed a decision-making framework for prioritizing port performance improvement strategies; and Roh et al. (2018) studied pre-positioned warehouse locations for international humanitarian relief organizations. The top-ranking position for this period can be explained by the versatility of this approach.

Following the ranking in descending order, “China”, “logistics,” and “SNA” entail the higher number of links with the other keywords present in the journal for this period.

It is natural for a journal specializing in Asian shipping and logistics to produce a high number of keywords from Asian countries. However, the centrality of the keyword “China” consolidates the notion of this country as one of the strongest competitors in the international transportation and logistics area, as opposed to the previous prevalence of Korea in logistic studies for the previous period. This keyword is included in domestic studies targeting the market structure and shift effects in north China ports (Liu et al., 2016), China’s automotive exports (Wang et al., 2015), analysis of airport network characteristics (Song & Yeo, 2017) or multimodal transportation analysis (Seo et al., 2017) to name but a few. In this period, publications on “logistics”

ranged from the depiction of the relationship between the default risk, and firm value in Korean shipping and logistics firms (Nam & An, 2017), to the logistics performance in international trade (Gani, 2017) or the role and value of collaboration in the Australian logistics industry (Pateman et al., 2016). Following the same pattern, “SNA” joined the triad through publications such as the analysis of international port competition (Jeon et al., 2016).

Closeness centrality records were topped by the keywords “China” (0.141), “analytic hierarchy process” (0.140), and “ASEAN” (0.140). The influential role of China was located near the core of the analysis, strengthening the notion of the keyword’s good connectivity with other papers in the journal. “AHP” method reappears in the second position. The Association of Southeast Asian Nations (ASEAN) is an intergovernmental organization that promotes cooperation in security, political, and economic matters concerning its ten member countries (Putra, 2019).

Research published during this period included studies on the sustainability of ASEAN ports, with a focus on Vietnamese ports (Roh et al., 2016), DEA analysis on the relative efficiency of ASEAN container ports (Kutin et al., 2017), and competitiveness analysis of the strategic position of Southeast Asian preeminent ports (Dang & Yeo, 2017). Attending to these results it is difficult to ignore the influence of the keyword “container port” (0.140) on ASEAN-related publications. With the same score, “Korea” and “logistics” dominated the ranking up to the sixth position. These nodes also represent Korea’s influence as a target country for diverse studies. The connection between “Korea” and “China” is highlighted through papers such as the analysis of environmental uncertainty, supply chain integration, and operational performance of Korean firms in China (Bae, 2017). A shift in the preceding study period was observed as the focus of the publications drifted away from an economic point of view and approached a logistics decision-making analysis scenario.

In the betweenness centrality analysis, similarly, the keywords “logistics” (0.065), closely followed by “analytic hierarchy process” (0.062), and “China” (0.042) ranked at the top for the betweenness centrality analysis during 2015–2018.

4.3. Third period (2019–2022)

The scores obtained from the degree centrality analysis are displayed

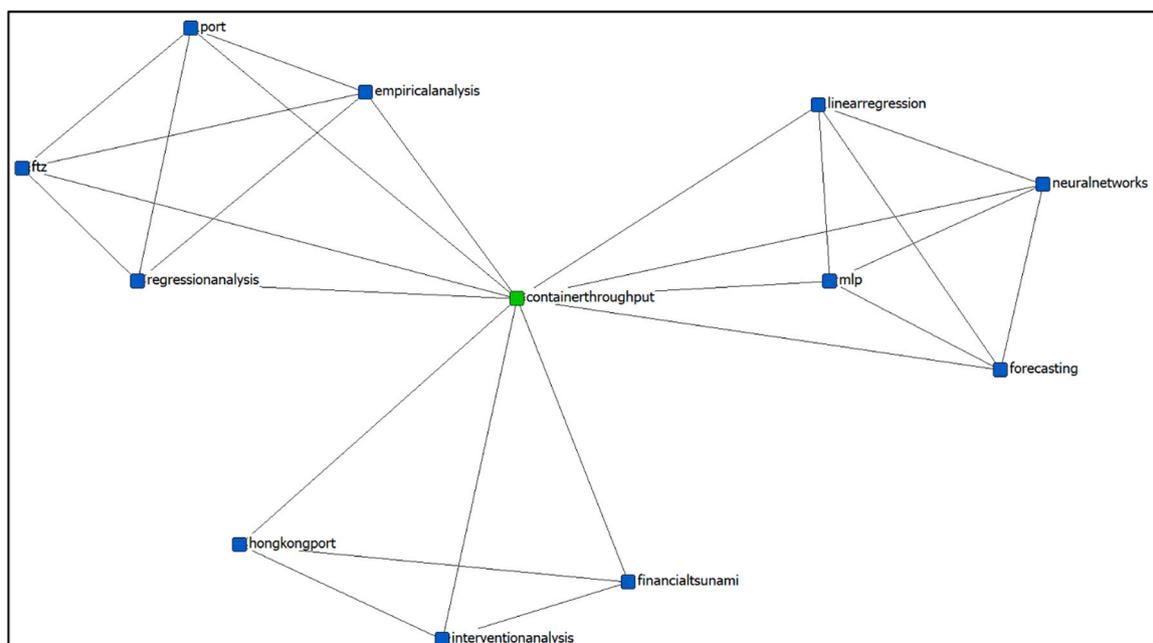


Fig. 2. Closeness Centrality “Container Throughput” Ego Visualization (2009–2014).

**Table 4**  
Degree Centrality (2015–2018).

N°	Degree centrality	Score	Closeness Centrality	Score	Betweenness Centrality	Score
1	Analytic Hierarchy Process	0.060	China	0.141	Logistics	0.065
2	China	0.047	Analytic Hierarchy Process	0.140	Analytic Hierarchy Process	0.062
3	Logistics	0.047	ASEAN	0.140	China	0.042
4	Social Network Analysis	0.047	Container Port	0.140	Fuzzy Topsis	0.040
5	ASEAN	0.036	Korea	0.140	Topsis	0.036
6	Data Envelopment Analysis	0.036	Logistics	0.140	Container Port	0.035
7	Topsis	0.036	Fuzzy Topsis	0.139	Data Envelopment Analysis	0.032
8	Port Competitiveness	0.032	Resource-Based View	0.139	Port Competitiveness	0.032
9	Containerport	0.030	Social Network Analysis	0.139	Social Network Analysis	0.032
10	Container Terminal	0.030	Port Service Quality	0.138	ASEAN	0.031
11	Fuzzy Topsis	0.030	Seaport	0.138	Container	0.030
12	Resource-Based View	0.030	Competitiveness	0.137	Container Terminal	0.027
13	Seaport	0.030	Container	0.137	Simulation	0.025
14	Intermodal Transport	0.028	Data Envelopment Analysis	0.137	Competitiveness	0.024
15	Competitiveness	0.026	Decision Making	0.137	Korea	0.020
16	Korea	0.026	Topsis	0.137	Resource-Based View	0.018
17	Factor Analysis	0.023	Institutional Theory	0.136	Decision Making	0.017
18	Container	0.021	Laptop Transport	0.136	Seaport	0.017
19	Institutional Theory	0.021	Liner Shipping	0.136	Intermodal Transport	0.016
20	Vietnam	0.021	Multimodal Transport	0.136	Risk Management	0.012

**Table 5**  
Degree Centrality (2019–2022).

N°	Degree centrality	Score	Closeness Centrality	Score	Betweenness Centrality	Score
1	Data Envelopment Analysis	0.061	Vietnam	0.110	Vietnam	0.112
2	Vietnam	0.054	Logistics	0.109	Data Envelopment Analysis	0.096
3	Container Terminal	0.052	Transportation	0.109	Logistics	0.087
4	Logistics	0.048	Additive Manufacturing	0.108	Transportation	0.084
5	Customer Satisfaction	0.041	Data Envelopment Analysis	0.108	Freight Rate	0.077
6	Liner Shipping	0.035	3D Printing	0.107	Shipping	0.074
7	AHP	0.033	Economic Growth	0.107	Seafarer	0.062
8	Korea	0.033	Emerging Market	0.107	Korea	0.057
9	Transportation	0.033	Smart City	0.107	Fuzzy AHP	0.052
10	Efficiency	0.031	Supply Chain Management	0.107	Container Terminal	0.047
11	Fuzzy AHP	0.028	Attractiveness	0.106	Corporate Social Responsibility	0.040
12	Dry Port	0.026	Forecasting	0.106	Customer Satisfaction	0.033
13	Forecasting	0.026	Freight Rate	0.106	Logistics Center	0.030
14	Hub and Spoke Network	0.026	Fuzzy AHP	0.106	Malaysian Port	0.028
15	Shipping	0.026	Maritime	0.106	Efficiency	0.024
16	Supply Chain	0.026	Port	0.106	AHP	0.022
17	Additive Manufacturing	0.024	Port Industry	0.106	Hub and Spoke Network	0.016
18	Social Network Analysis	0.024	Progress	0.106	Forecasting	0.014
19	Corporate Social Responsibility	0.022	Supply Chain	0.106	CFPR	0.010
20	Port	0.022	Automotive	0.105	Port Operation	0.010

in Table 5. Following the analysis results, “DEA” (0.061) topped the ranking, followed by “Vietnam” (0.054) and “container terminal” (0.052). DEA is a data-oriented method used to estimate relative efficiency. This analysis identifies the differences among decision-making units (DMU) through the modification of their inputs or outputs. In the logistics field, this method has been extensively used for the efficiency analysis of a wide range of study interests. Liu et al. (2022) evaluated the efficiency of container terminals located in three main cities in the Pearl River Delta region using different types of DEA. L.C. Nguyen, Park, and Yeo (2021); T.L.H. Nguyen, Park, and Yeo (2021) focused on container terminals in Southern Vietnam, whereas Zarbi et al. (2019) used DEA method to assess the influence of international sanctions imposed on Iranian container ports on efficiency.

For this period, the attention switches from China to “Vietnam.” L.C. Nguyen et al. (2021) and T.L.H. Nguyen et al. (2021) developed a conceptual framework for Vietnamese port hinterland settings and the potentially relevant role of dry ports. Kuo et al. (2020) conducted a performance and competitiveness analysis of Vietnamese ports by implementing DEA. Pham and Lee (2019) also studied Vietnam’s territory by developing a green route model for dry port selection.

In terms of closeness centrality analysis, the keywords “Vietnam” (0.110), “logistics” (0.109), and “transportation” (0.109) ranked the

highest for the 2019–2022 period. “Vietnam,” following the same trend as “China” a period prior, topped the ranking of closeness centrality. The blooming development of the “Vietnam” keyword for this period was already assessed previously. Furthermore, the “logistics” keyword increased its ranking position compared to its previous one. Van Hong and Nguyen (2020) examined the factors that impact Vietnamese logistics businesses’ marketing strategies. Vu et al. (2020) weighted stakeholder perceptions of logistics service quality in Vietnam. Bey-senbaev and Dus (2020) introduced improved benchmark suggestions for a logistics performance index. For the betweenness centrality analysis, in light of the topic interconnection among research publications, the keywords “Vietnam” (0.112), “data envelopment analysis” (0.096), and “logistics” (0.087) again ranked top.

### 5. Conclusion

In the context of the Asian logistics academic scene and its constant economic, legal, and infrastructural shifts, this study aims to discern research trends in the publications of the *AJSL*. This study implemented the SNA method using three approaches (degree centrality, closeness centrality, and betweenness centrality) to highlight the connections between research keywords published from 2009 to 2022.

Consequently, the keywords identified in each of the measures of degree centrality, closeness, and betweenness provide detailed insights into the prevailing approaches and key connections in scholarly discussions on logistics in Asia during the three periods.

For the scientific publications in the *AJSL* during the period 2009 to 2014, degree centrality was adopted and keywords such as “container shipping,” “logistics,” and “port” ranked at the top position. As for closeness centrality scores, the keywords “container throughput,” “free trade zone,” and “empirical analysis” occupied a central position in terms of accessibility on the network. Lastly, the keywords “container throughput,” “linear regression,” and “container port” ranked first, second, and third, respectively, in terms of betweenness centrality scores. From these results, it can be inferred that the studies followed the efforts of recovery from the 2008 financial crisis, which led to an increase in global demand and posed a challenge to the existing economic model of international containerization. Regarding the primary subjects covered in the publications, those discussing the Korean shipping industry were prevalent.

Over the second period of 2015 to 2018, research trends in the *AJSL* revealed that the use of AHP for decision-making became more popular given the leading position achieved by the keyword “AHP” in the degree centrality analysis. Moreover, the increasing importance of China in global trade is brought to the forefront by the keyword “China,” which scored the highest for closeness centrality. These trends reflect a shift in the evolution of the logistics field toward decision-making-oriented considerations in the context of increasing complexity and globalization.

Throughout the third period of 2019 to 2022, a change of the supply chain focus from East Asia to Southeast Asia is recorded, as inferred by the top keywords derived from each of the three analyses, namely, the keywords “Vietnam,” “container terminal” (degree centrality), “Vietnam,” “logistics,” “transportation” (closeness centrality), and “Vietnam,” “DEA,” “logistics” (betweenness centrality). In Vietnam, logistics continues to be an area of growing importance owing to globalization of trade and technological evolution. As the nation gained recognition as a leader in manufacturing, its attractiveness as an alternative trade center to China emerged. This shift has attracted the attention of the international logistics community. These trends reflect the evolution of the logistics field in an environment characterized by the constant and rapid updating of technological innovations and globalization.

This study has the following academic implication: research trends featuring the *AJSL* publication history were examined using an SNA keyword network. It also has the following practical implication: the pertinent results provide an insightful understanding of the evolution of logistics trends through an expert lens. Consequently, this analysis contributes not only to the world of academia but also to states, policymakers, and private firms. In this study, only keywords were used for the SNA analysis. For wider and more precise results, the implementation of text-based analysis is encouraged for future research.

#### CRedit authorship contribution statement

**Yu-Na Kim:** Data curation, Investigation, Software. **Hae-Chan Lee:** Data curation, Methodology, Visualization. **Young-Seo Choi:** Conceptualization, Data curation, Methodology. **Maria Listan Bernal:** Formal analysis, Validation, Visualization, Writing – original draft. **Gi Tae Yeo:** Formal analysis, Funding acquisition, Methodology, Supervision, Validation.

#### Acknowledgments

This research was supported by the 4th Educational Training Program for the Shipping, Port and Logistics from the Ministry of Oceans and Fisheries of South Korea.

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