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LOGISTICS COOPERATION IN THE FAR-EAST: PRIORITIZING SUPPLY CHAIN REQUIREMENTS TO STRENGTHEN INTRA-REGIONAL INTEGRATION OF MARITIME TRANSPORT NETWORKS

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Efficient logistics process and supply chain networks have been r**ecognized as core enablers of competitiveness** and **economic growth** long back (Arvis et al., 2012; Ekici et al., 2016).

Policy makers and regulators are well aware that that the **successful implementation of policies on transport infrastructure**, free trade areas, regulatory trade framework and governance (private-public partnership in ports particularly) **can lead to enhanced logistics performances** (Arvis et al., 2018).

New logistical issues such as **technological changes** (Jo & D'agostini, 2020; Jo et al., 2020; D'agostini, 2017), **sustainability and requirement of green supply chains** (Srivastava, 2007) have been identified as segments that deserve attention for an increased **coordination among governments**.

Due to **Covid-19 pandemic outbreak**, it appears there is a **rising need for cooperation** in several logistics sectors. Governmental imposed restrictions such as border closures, quarantine requirements, crew changeover and repatriation of seafarers, have **heavily affected maritime logistics** and **supply chain operations**.
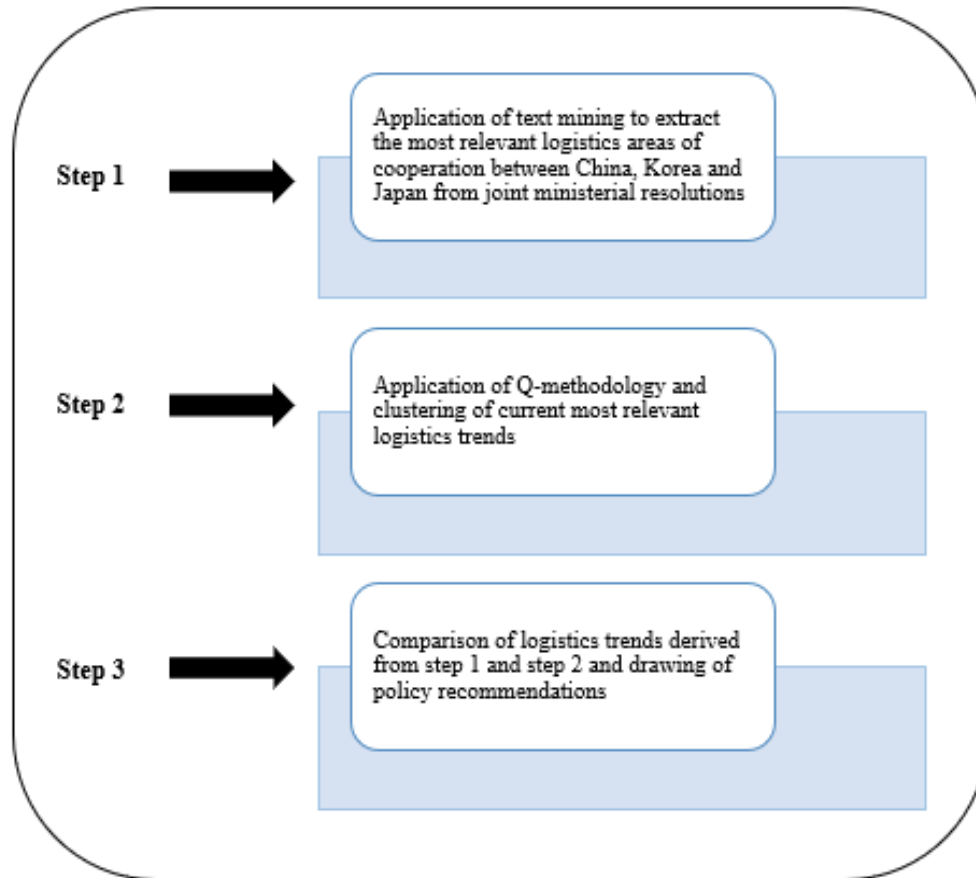
This study intends to **clarify the logistics issues that have been discussed in the past joint statements** (2006-2020) issued by the national governments of **China, Republic of Korea and Japan**

It also aims at understanding the **current important issues which need to be further discussed** for future **intra-governmental cooperation** in the region

This is the first study to attempt to develop a study which empirically shows results and **provides ad-hoc policy recommendations considering joint ministerial logistics cooperation drafts** of three countries

The Three-Steps Research Model

Step 1 →

Application of text mining to extract the most relevant logistics areas of cooperation between China, Korea and Japan from joint ministerial resolutions

Step 2 →

Application of Q-methodology and clustering of current most relevant logistics trends

Step 3 →

Comparison of logistics trends derived from step 1 and step 2 and drawing of policy recommendations

Research Questions

Based on this research model, the study aims to answer the following research questions:

(1) **What are the most important logistics areas of cooperation of China, Republic of Korea and Japan based on past joint ministerial resolutions?**

(2) **Compared to the past, are there new logistics priorities which should be properly addressed and discussed to enhance and improve cooperation between China, Republic of Korea and Japan?**

(3) **What are the potential policy recommendations based on new logistics trends?**

Application of Text Mining

Information is extracted automatically via 'Netminer' software from **eight full-text documents drafted by the ministries of the three countries** (Republic of Korea, China and Japan) from 2006 to 2020

In total, **2556 words which ranged from 594 (most frequent) to 1 (least frequent) were obtained**. However, all non-logistics related words and those terms with a frequency of less than thirteen were eliminated from the list as they may have distorted the analysis

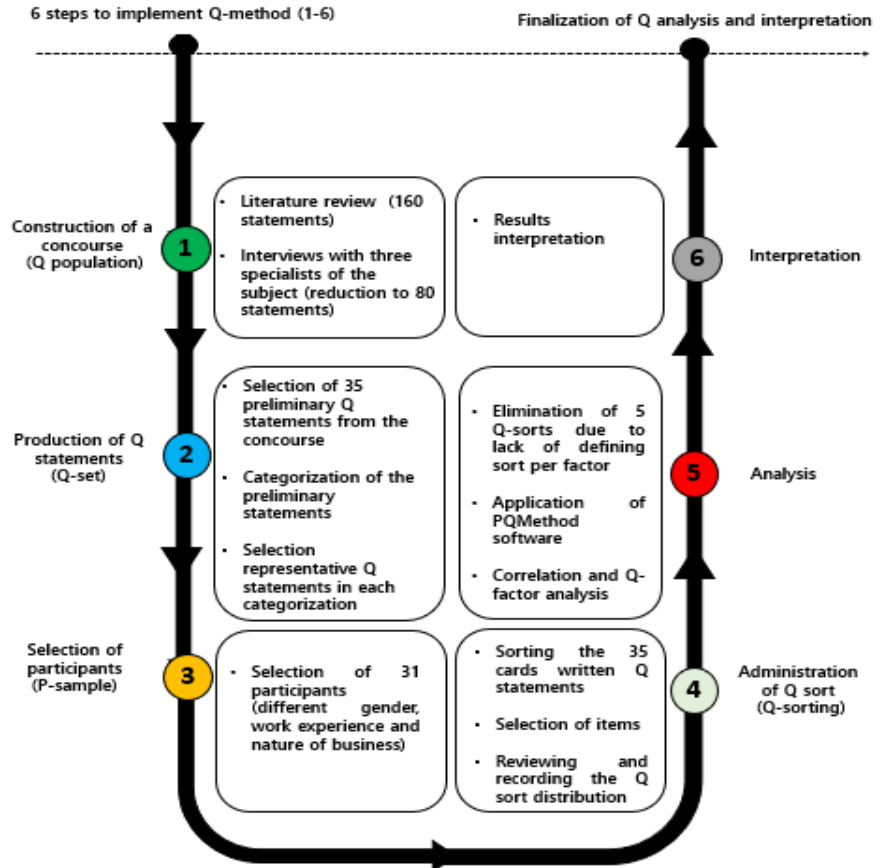All the **remaining terms were high-frequency and logistics-related terms and amounted to 62 words**

Results

In the next step, **'Degree Centrality'** and **'Community Betweenness'** were calculated to draw a hierarchical structure. Several insights from a logistics cooperation perspective which can be summarized as follows:

(1)   The existence of six unique but interconnected clusters.

1. Greenhouse / Gas / Emission / Market / Transportation

2. Policy / Research / Sharing / Information / Port / Cooperation

3. Technology / Research / Sharing / Information

4. Standardization / Region / Regulation / Safety/ Network / System

5. ASEAN / Transport / Intermodal / Port

6. Energy / Efficiency / Cost / Chain / Transport / Equipment

(2) Further, **China, Republic of Korea and Japan as nations are central to the transport value chain in ASEAN countries** and are particularly connected with the area **of trading, transportation and logistics** but **not directly** connected with the most peripheral nodes such as **emissions, energy, technology, and standardization**.

Application of Q-Methodology

- **Q-methodology** has been considered as a useful methodology while **evaluating the subjectivity of opinions and viewpoints** of a selected group of respondents (Simons, 2013).

- The methodology was **developed by Stephenson in 1936 as a tool to study human subjectivity** (Stephenson, 1936). It is unique as it is a **combination of qualitative and quantitative analysis** and enables researchers to **obtain a holistic view on the issue** rather than focusing on a single aspect (Watts & Stenner, 2012).

- For a correct application of Q-method, **six steps must be followed** in a rigorous way. The experts and the **thirty-one participants** were involved in a period from September 2020 to December 2020.

6 steps to implement Q-method (1-6)

Finalization of Q analysis and interpretation

Construction of a concourse (Q population) — 1
- Literature review (160 statements)
- Interviews with three specialists of the subject (reduction to 80 statements)

Interpretation — 6
- Results interpretation

Production of Q statements (Q-set) — 2
- Selection of 35 preliminary Q statements from the concourse
- Categorization of the preliminary statements
- Selection representative Q statements in each categorization

Analysis — 5
- Elimination of 5 Q-sorts due to lack of defining sort per factor
- Application of PQMethod software
- Correlation and Q-factor analysis

Selection of participants (P-sample) — 3
- Selection of 31 participants (different gender, work experience and nature of business)

Administration of Q sort (Q-sorting) — 4
- Sorting the 35 cards written Q statements
- Selection of items
- Reviewing and recording the Q sort distribution

Results

- Use of **PQM method software**

- The analysis included **twenty-nine sorts** which were correlated with Varimax rotation and a six unrotated factors was performed, in which **three different factors (typology) were obtained**

- Each of the **factors had a specific number of respondents** featured onto it.

- **Each factor showed a specific statistical pattern** on the way a group of participants sorted the statements in the grid.

- **Eleven respondents (n=11) were clustered in Factor** I, **twelve respondents (n=12) in factor II** and **three respondents (n=3) in factor III**. For five out of the thirty-one participants, the loading factors (number 4, 10, 14, 15, 17) did not show any defining sort to any of the types and were discarded from further analysis.

Results

- Each Z-score was assigned to a specific statement to **discern the peculiarities and characteristics of each factor**.

- The **interpretation of each factor needs a holistic approach** as a process because patterns can be extracted by comparing pairs of each factor within the same array factor.

- Statements showing a Z-score **above 1.0 were considered significant** and were interpreted as strong agreements within a factor. However, statements with **Z-values below 0 indicated a disagreement.**

	Q Statement	Factor I	Factor II	Factor III
Q1	Hold joint discussions and meeting on the impact of COVID19 on maritime logistics and transportation	1.461	1.627	-1.252
Q2	Stronger cooperation between North-East Asian countries in the field of seafarers' embarkation and disembarkation is important	1.355	1.626	1.132
Q3	Coordination in the creation of temporary medical facilities for seafarers in the region	1.628	1.653	0.954
Q4	Ensuring berth availability and quicker medical check by governments of the region on seafarers	1.427	1.496	-0.115
Q5	Joint creation of 'Green Lanes' or supply chain corridors which enables the exchange of necessity goods during pandemics and other emergency situations in the region	0.933	0.716	-0.212
Q6	Enabling fast customs procedures (paperwork included) at a regional level for specific types of necessity goods	1.042	2.089	0.256
Q7	Simplifying or waiving import-export procedures in the region to ensure smooth logistics and trade operations	0.969	0.334	-2.184
Q8	Temporary tariff suspension during COVID10 to facilitate the flow of goods	-0.345	-0.781	-0.682
Q9	Measure to improve transport business liquidity by extending or postponing payment of customs duties	-0.287	-0.410	-1.950
Q10	Joint workshops to plan joint emergency responses and risk management in the field of logistics during pandemics	-1.188	-0.169	-0.056
Q11	Discussion of a 'broader' concept of 'Port Community System' can be beneficial to the region	-1.186	0.414	-0.897
Q12	Standardization of specific technologies in regional' ports can contribute improving overall transport efficiency	-0.623	0.630	1.132
Q13	Standardization of specific technologies in regional' ports and transport-related companies can contribute improving congestion	-0.892	0.020	0.682

First thirteen Q-Statements and relative Z-score

Results

Q15	Increase digital coordination between regional shipping lines and ports can strengthen logistics efficiency	-0.671	0.294	-0.021
Q16	Standardization of data collected can improve the regional transport efficiency	-1.247	0.997	-0.349
Q17	Joint research on autonomous ships to improve technological advancements in the region	-1.674	-0.185	-0.078
Q18	Acceleration of documents' digitization within the region can help boosting trade volumes	-0.869	0.277	1.074
Q19	Cooperation in the framework of port-related associations (creation of logistics association in North-East Asian countries) in the region	-0.568	-0.434	0.293
Q20	Cooperation and joint communication and exchanges on environmental topics with a broad range of stakeholders (environmental groups, community groups, the press, government, port user)	-0.050	0.040	1.657
Q21	Joint promotion of ports' network in the region as recycling hubs within the region. Within these hubs, recycling flows are delivered, transformed into new products, and re-exported around the world	0.093	-0.334	-0.704
Q22	Jointly promote industrial ecology within the region (ecology attempts to optimize waste management by making interactions between stakeholders within the same geographical area stronger (e.g., exchanging materials, water, and by-products)	-0.560	-0.630	-0.994
Q23	Implementation of common regulation on maritime emission standards (creation of ECA/SECA areas)	-0.227	0.629	0.078
Q24	Production of joint environmental performance indicators for the transport and port business sectors	-0.337	-0.265	-0.157
Q25	Sharing of logistic best practices can help improving the competitive position of the region	-0.351	0.531	1.544
Q26	Creation of joint yearly sustainable reports for transport-related companies and ports in the region following international standards	-0.243	-0.793	-0.547
Q27	Create appointment systems and increased coordination between national shipping line/national ports as a way to ease congestion on peak time and reduce emissions	0.414	-1.162	-0.173

Q28	Production of joint reports/publications on logistics indicators for the region	-1.251	-0.797	0.271
Q29	Increased cooperation in the field of education and training for Government officers working in logistics	-0.285	-1.503	2.206
Q30	Implement of smart planning in ports and logistics operators to ensure maximization of backhaul cargo	-0.054	0.096	-0.314
Q31	Cooperation in recycling by joint planning	-0.596	-0.775	-1.188
Q32	Joint marketing initiatives to strengthen the logistics position within a specific industry	0.475	-0.782	-1.345
Q33	Organization of specific logistics conferences to improve the regional network and knowledge	0.402	-1.680	0.696
Q34	Discussion on the creation on a level playing field (no public incentives) in logistics in the region	1.695	-2.265	0.427
Q35	In the case of the spread of infectious diseases such as COVID19, there is a need for exceptions to check the status of the ship and the status of compliance with various standards without face-to-face inspection and inspection of ships and ports	2.380	-0.781	1.088

Results

Factor I: 'COVID19 solution seeker and technological denier' (N=11)

- Respondents belonging to this group were labelled as 'COVID19 solution seeker and technological denier' because the statements that yielded higher were mainly COVID19 pandemic-related and the statements that yielded negative scores focused on technological cooperation.

- In particular, the participants of this group strongly agreed on the need to take joint initiatives **aimed at helping seafarers in terms of non-face-to-face inspections at ports (Q.35, Z=2.380), medical facilities installations (Q. 3, Z= 1.1628), and embarkation and disembarkation (Q.2, Z= 1.355).**

- This group of participants strongly agreed more generally in the **field of logistics and transport** as shown, in **statement 4 (Z=1.427),** in **statement 34** regarding the **creation of level playing field (Z=1. 695)**, and **faster customs procedures in statement 6 (Z=1.042)**.

Results

Factor II: was referred to as the 'COVID19 cooperation builder and trade cooperation rejecter'.

- Participants showed very similar views with the respondents of factor I and identified **COVID19 pandemic as the top priority** to be discussed by the Governments of the region.

- The highest loaded statement in this factor was **statement 6 'Enabling fast customs procedures (paperwork included) at a regional level for specific types of necessity goods' (Z= 2.089)**.

- The rest of high-yielding z-score statements showed that respondents agreed on actions aimed at **easing seafarers' conditions during the COVID19 pandemic** as indicated by **statements Q3 (Z= 1.653), Q2 (Z= 1.1626) and Q4 (Z=1.496)**.

Results

Factor III: 'The digital technology and best practices adapter' (N=3)

- Factor III was titled 'The digital technology and best practices adapter' and it showed a **more unique viewpoint about logistics cooperation in the Far-East region** in comparison to factor I and II.

- Respondents did not find COVID19 pandemic as a main priority for cooperation but rather expressed their common opinion in the **field of education, information exchange and digitalization of logistics**. For instance**, education and training (Q29, Z= 2.206), information exchange on environmental issues (Q20, Z= 1.657), sharing of best practices (Q25, Z= 1.544) and digitalization in logistics (Q12, Z=1.132; Q18, Z= 1,074)** were all seen as important areas for intra-Governmental cooperation.

Consensus Statement

- The **consensus statement** provide an overview of statements which **did not show distinguishing patterns** between pairs of factors.

- **Consensus shows similarities in view among factors** and eight different statements were extracted.
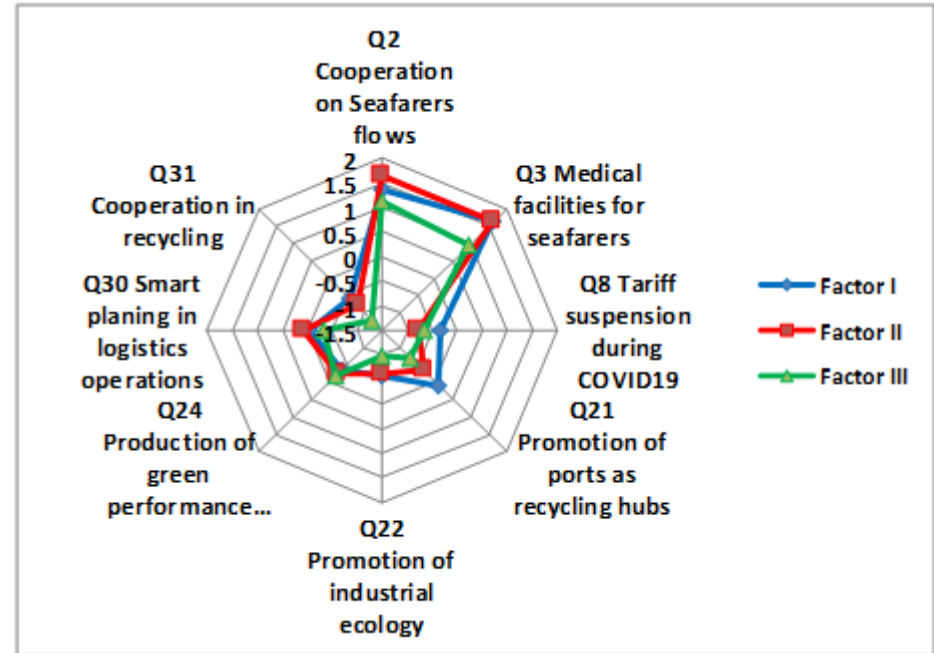
Conclusion

- The Governments of China, Republic of Korea and Japan have r**ecognized the importance of cooperation in the logistics industry** and have produced biennial joint statements to address new challenges.

- However, compared to the past, **new areas of logistics cooperation emerged during the COVID19 pandemic, in particular for digitalization and new environmental regulations**. Based on this the following implications can be drawn:

- 1. It was revealed that COVID19 pandemic emerged as a critical area of cooperation among the three Governments, with a focus on **improving seafarers' conditions** (cooperation needed on facilitating fast medical checks, medical facility installation, visa waivers, and seafarers' repatriation via commercial flights).

- 2. The **accelerated adoption of digital technologies and best practices** stands out as a paramount area for cooperation. Implementing new technologies and standardizing data exchange can significantly enhance transport efficiency (reduce congestion and waiting times, as well as fostering efficient cargo flows).

- 3. **Environmental pressures are on the rise in logistics**, necessitating collaborative efforts. Establishing new Emission Control Areas (ECAs) in international waters and promoting green governance through joint research and communication on environmental indicators are key steps.

Limitation

- In conclusion, **while multiple areas of discussion exist among the three governments**, prioritization of some of them is essential. The Far-East region's importance in international trade underscores the **necessity of cooperation to strengthen relations and improve logistics operations**.

- However, it is also important to note that the **study's findings may have a local bias as all respondents were from the Republic of Korea**, hence, considering respondents from China and Japan and different logistics sectors other than purely maritime networks, could enhance the study's applicability.

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Thank You