

論文 / 著書情報  
Article / Book Information

題目(和文)	国際海運ネットワークにおける競争のための港湾協力
Title(English)	Port cooperation for competition in international maritime network
著者(和文)	田川帆師
Author(English)	Hoshi Tagawa
出典(和文)	学位:博士(工学), 学位授与機関:東京工業大学, 報告番号:甲第12439号, 授与年月日:2023年3月26日, 学位の種別:課程博士, 審査員:花岡 伸也,山下 幸彦,屋井 鉄雄,室町 泰徳,瀬尾 亨,新谷 浩一
Citation(English)	Degree:Doctor (Engineering), Conferring organization: Tokyo Institute of Technology, Report number:甲第12439号, Conferred date:2023/3/26, Degree Type:Course doctor, Examiner:,,,,,
学位種別(和文)	博士論文
Category(English)	Doctoral Thesis
種別(和文)	論文要旨
Type(English)	Summary

(博士課程)  
Doctoral Program

## 論文要旨

THESIS SUMMARY

系・コース： Department of, Graduate major in	融合理工学 地球環境共創	系 コース	申請学位 (専攻分野)： Academic Degree Requested	博士 Doctor of	(工学)
学生氏名： Student's Name	田川 帆師		指導教員 (主)： Academic Supervisor(main)	花岡 伸也	
			指導教員 (副)： Academic Supervisor(sub)		

要旨 (英文 800 語程度)

Thesis Summary (approx.800 English Words )

The number of container ports cooperating to improve port productivity or profitability has been increasing. Various types of port cooperation have different business scopes, such as terminal management and hinterland access. For these cooperation types, the motivations are divided into two types based on the market in cooperation: regional welfare or competition. The main objective of this study is to reveal the effectiveness of port cooperation in competition with a strong competitor. This study analyzes the cooperation for competition from three perspectives; evaluation of current cooperation in Kobe and Osaka ports in Japan, port choice by the shipper on the demand side, and network design by the shipping line on the supply side.

First, this study evaluates the impact of port cooperation on a port hierarchy based on network analysis. Specifically, this study analyzes the cooperation between Kobe and Osaka ports (Hanshin port) in the Japanese cargo network compared to a strong competitor, the Busan port (Korea). The network is built based on Japanese cargo in 2008 and 2018, because the cooperative strategy for Kobe and Osaka ports was designed in 2009. As for the cargo in 2018, this study prepares two networks: without and with a synergistic effect called 2018(Base) and 201(Coop), respectively. The comparison between 2008 and 2018(Base) indicates the impact of current port cooperation on the network. The comparison between 2008 and 2018(Coop) indicates the expected impact of port cooperation in the network. This study finds that the current cooperative strategy did not realize the higher connectivity of Hanshin port than Busan port. The comparison between 2018(Base) and 2018(Coop) indicates that building cooperative relationships contribute to a higher position in the port hierarchy and affects the network configuration, such as creating a higher interconnection of ports as a community structure.

Secondly, this study simulates the effective cooperative strategy of ports for competition with two types of simulations considering the relationship between port and shipper as the demand side. This study analyzes the three ports competing or cooperating in a linear city where shippers are uniformly distributed in the first simulation. The first simulation derives and compares the cooperative effort, which indicates the willingness to participate in port cooperation as optimum cooperation to fit each motivation that includes cooperation for regional welfare and competition. The focus market differentiates the motivations in the simulation. The optimum cooperation levels for regional welfare and competition are different because of the difference in the cooperation effects in each motivation. Additionally, this study develops the bi-level optimization model with three equilibriums to reveal the more detailed cooperative strategies in the second simulation. This study applies the model to the competition between Hanshin and Busan ports as a case study. Optimum cooperation type changes depending on the focusing market. Specifically, cooperation to reduce the shipping time is effective for Hanshin port to compete with Busan port in North American cargo.

Third, this study simulates the effective cooperative strategy of the port for competition, considering the relationship between the port and shipping line on the supply side. This study solves the liner shipping network designing problem, defined as designing a set of weekly services, assigning vessels to the services, and flowing the demand through the resulting network. The answer to the problem indicates the deployment of shipping services to two hundred-one ports around the world. This study analyzes the impact of five scenarios about cooperation between Kobe and Osaka ports as Hanshin ports. This study obtains the following two findings. First, port cooperation is an effective strategy for competition in terms of increasing centrality in the shipping network.

Second, port cooperation affects ports other than cooperative ports, and the impacts differ depending on the ports and scenarios. Specifically, although Hanshin port can obtain enough competitiveness to compete with Busan port as a strong competitor, Hong Kong port, as another strong competitor, increase the centrality in the network.

Some findings of this study might have policy implications. The results related to network analysis of Kobe and Osaka ports in the Japanese cargo network indicate that low synergistic cooperation cannot realize higher competitiveness than a strong competitor. The results related to the relationship between ports and shippers indicate the importance of considering the port situation and focusing the market on realizing the optimum cooperative strategy for competition. The results related to the relationship between ports and shipping line indicate that although cooperation can obtain competitiveness enough to compete with a strong competitor, another strong competitor occur with the port cooperation. This study has significant contributions by policy suggestions for the cooperation for competition.

備考：論文要旨は、和文 2000 字と英文 300 語を 1 部ずつ提出するか、もしくは英文 800 語を 1 部提出してください。

Note : Thesis Summary should be submitted in either a copy of 2000 Japanese Characters and 300 Words (English) or 1copy of 800 Words (English).

注意：論文要旨は、東工大リサーチリポジトリ(T2R2)にてインターネット公表されますので、公表可能な範囲の内容で作成してください。

Attention: Thesis Summary will be published on Tokyo Tech Research Repository Website (T2R2).