

論文 / 著書情報
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| 著者(和文) | KavirathnaChathumi Ayanthi |
| Author(English) | Kavirathna Chathumi |
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論文要旨

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学生氏名 : Kavirathna Chathumi
Student's Name Ayanthi

指導教員 (主) : Hanaoka Shinya
Academic Supervisor(main)

指導教員 (副) : Kawasaki Tomoya
Academic Supervisor(sub)

要旨 (英文 800 語程度)

Thesis Summary (approx.800 English Words)

The increasing complexity of the contemporary liner-shipping industry emphasizes the significance of having effective interactions among key market players to enhance the efficiency of the port value chain. Owing to the disadvantages of extreme competition and cooperation, this study proposes the coopetition among market players considering both the intra-port and inter-port levels. The coopetition refers to the simultaneous presence of both competition and cooperation, thus having a strategic implication for those engaged in the same market to focus on a win-win strategy. This study analyzes the coopetition among ports and terminals considering their different ownership types and discusses the significant implications of coopetition derived from the model formulations and application with numerical analysis and case studies.

First, this study proposes an intra-port coopetition strategy, which simultaneously presences both competition and cooperation among terminal operators in a single port when competing with external ports and terminals. As the coopetition strategy, the terminal operators cooperate with each other to enhance the entire port competitiveness although they simultaneously make a competitive effort on price adjustment, operation cost reduction or time efficiency improvement at individual terminals. Thus, the attitudes of terminal operators towards competition and cooperation are analyzed, and the coopetition strategy is formulated as a multi-periods non-linear optimization problem incorporating a generalized cost approach. Both the private and public terminals are considered with different extent of profit and social surplus maximization objectives associated with them. As per the numerical analysis, the incentives of terminal operators depend on the terminal ownership types and the private terminal in a public-private terminal combination demonstrates a free-riding behavior when the public terminal focuses on enhancing the entire port competitiveness. However, coopetition enables a win-win situation for terminals in one port to erode demand from external competitors.

Secondly, a coopetition strategy is proposed for sharing container berths and facilities among terminals in one port in a congested circumstance to reduce berthing delays and to improve the entire port competitiveness. As the coopetition strategy, the terminal operators have competitive interactions in the contract stage when negotiating with shipping lines to obtain more vessel calls towards the own terminal. However, their cooperation with a vessel transfer policy in the operational stage enables

vessel transfers between two terminals if one terminal has idle berths and the other has excess vessel calls, simultaneously. The effectiveness of the cooperation strategy is evaluated in comparison to an extreme competition strategy, where terminal operators have only competitive interactions during both the contract and operational stages. A mixed-integer programming optimization model is formulated incorporating a game-theoretical decision-making approach and tested with the Port of Colombo, Sri Lanka. The occurrence of vessel transfers and berthing delays are significantly different depending on the port authority's policy on collecting terminal fees for transfer vessels and the objectives of terminal operators. However, the intra-port cooperation strategy enhances port competitiveness than the extreme competition strategy.

Finally, a cooperation scenario is analyzed considering both the intra-port and inter-port levels, which incorporates the decision-making behaviors of a global terminal operator who has own terminals in two competing ports and a port authority who has both the public terminal operated by the port authority and the private terminal operated by a global terminal operator in the same port. As for the case study, initially, the potential competition between Colombo and Hambantota ports in Sri Lanka is discussed with both domestic and transshipment cargo flow analysis. Thereafter, a terminal pricing scenario is developed considering a range of objectives associated with the port authority and a global terminal operator. Both the port and terminal levels are considered in the analysis where the pricing decisions for the terminals in the same port, and for the terminals owned by the same global terminal operator are analyzed with a multi-periods non-linear optimization model. As per the results, the attractiveness of Colombo port for domestic container handling and that of Hambantota port for transshipment container handling are revealed and the policy implications on port development are discussed. The pricing decisions on terminals made by the port authority and the global terminal operator change significantly based on their objectives and they tend to balance the interests on both competing ports especially with their profit maximization objectives.

This study makes a significant contribution by analyzing cooperation at both the intra-port and inter-port levels while addressing the challenges given by the liner-shipping industry. Moreover, the decision-making behaviors of the key market players with a range of objectives and ownership types are analyzed while discussing related implications. To this end, this study is a vital addition to describe on how to respond to the globally mounting challenges associated with port usage. In a world that is progressively in need of such solutions, this study creates immense value for every actor involved: policymakers, port service providers, port customers, and all agents engaged in establishing cargo flows among ports and terminals.

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 1 copy of 800 Words (English).

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