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A Study on Competitiveness of Sea Transport by Comparing International Transport Routes between Korea and EU

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Contents

Abstract

This study analyzes competitiveness of the six Korea-Europe transport routes. For the criteria of analysis, the quantitative factors (total transport distance, total transport time, and total transport cost) and the qualitative factors (transport service, safety, and awareness) were selected and weighed. The factors were then applied to the TOPSIS technique to rank the routes based on their competitiveness. The result of TOPSIS analysis showed the priority in the routes as follows:

Route 1 (Trans Korea Railway(TKR) and Trans Siberia Railway(TSR))> Route 6 (Arctic Route)>Route4(Busan-Vanino-TSR)>Route2(Busan-Vostochny-TSR)> Route3 (Busan-Vladivostok-Vostochny-TSR)> Route 5 (Suez Canal Route).

Route 1 was found the most competitive, and Route 5, the most widely used sea way was ranked the lowest. In addition, the new transport routes, Route 1 and 6 are shown to be more competitive than the currently available routes, Route 2, 3 and 4. However, these routes need national level supports (rail construction for Route 1 and subsidy plan for Route 6) for the commercial use in the future.

Key Words : TOPSIS, Multi Criteria, Route Selection, Improvement Policy, Fuzzy Number

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I. Introduction

Increase in international trading raised the importance of international transport, and the traditional single mode transport systems have changed into a multimodal transport system that uses two or more modes of transport. In addition, while the international transport networks become more complicated in such processes as creating new paths and removing existing ones, it is becoming more important to select efficient transport routes.

Since the cargo volume of transport between Korea and Europe is expected to increase as the Korea–EU FTA came into effect, the expectation for realization of the Trans-Korea Railway (TKR) and the national interest in the Arctic route call for developing new alternative transport routes. Recent efforts by the Korean Government pose greater expectation for connecting the TKR and the Trans-Asian Railway and test operation of Korean transporters on the Arctic route expedites realization of this new route.

Therefore, being prepared for the realization of new Korea–Europe transport routes requires review on such new transport routes and study on strategies and plans for developing a competitive transport system. Particularly seeing that the majority of freight between Korea and Europe is being carried mainly by sea transport through the Suez Canal (Route 5), it is highly needed to assess the competitiveness of the Arctic route (Route 6) which can be an alternative to Suez route, the intermodal routes by sea and railway (Route 2, 3, 4), and the new rail route of TKR and TSR (Route 1).

In addition, a systematic study is required to determine more efficient choice among many alternative transport routes. Many of existing studies (see II. Literature Review) consist of the assessment of single transport routes or analysis on some factors, but there are not enough studies that consider various factors all together for route selection.

The purpose of the study is three fold: (1) Introduce and apply the multi-criteria decision making technique to consider the critical factors (quantitative and qualitative) simultaneously for more objective route selection. (2) Determine the overall ranks in the order of competitiveness and analyze the strength and weakness of each route. (3) Based on (1) and (2), the improvement plans for routes are proposed with which the decision maker can choose the proper options depending on surroundings or preference.