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Preface

Sharing development and One Belt One Road Initiative provides a visionary blueprint for global economic development in the new world order. It is set to reinvigorate the seamless flow of capital, goods and services among Asian nations and the rest of the world, by promoting further market integration and forging new ties among communities. Sharing development and One Belt One Road Initiative Policy will have significant influences on the regional economies and logistics; boost trade, investment and lead to economic growth and take advantage of international transport routes as well as core cities and key ports to further strengthen collaboration and build in-

ternational economic cooperation corridors. Facilities connectivity will be made to give priority to removing barriers in the missing sections and bottleneck areas of core international transportation passages, advancing the construction of port infrastructure facilities, and clearing landwater intermodal transport passages. The connectivity of infrastructure facilities, including railways, highways, air routes, telecommunications, oil and natural gas pipelines and ports, also will be promoted. This will form part of a move to establish an infrastructure network connecting various Asian sub-regions with other parts of Asia, Europe and Africa.

To get benefit from the One Belt One Road Initiative proposed by China, as neighboring country, Republic of Korea (KOR) also seeks the way to promote the economics and cooperate with China actively. The author of this monograph, my student Wang Ying finds this interesting and meaning topic and studies about this topic. Ying is a talented student and during her master and

PhD study, she have published several papers about the maritime and shipping logistics, she is good at obverse some current important issues in maritime logistics and analysis some problems by enhancing the management and operation efficiency. She found that the trade from KOR to Central Asia is increasing and forming an efficient intermodal route for cargo transport is becoming significant. Until now, the intermodal routing for longdistance transportation is still facing some operational challenges such as customs clearance matters, track gauge differences matters or climate limitation. One Belt One Road Initiative proposed in China this year can improve trade and transport links in Asia, and promote the forming of efficient transport route focusing on the railway service provided in China. It is the chance for neighboring countries to take full use of this road for promoting international trade with the countries corridor the road. Additionally, currently, high-income countries export large quantities of second-hand vehicle to low-income countries

with multimodal transportation, especially in KOR, second-hand vehicle export shows the highest growth in recent years. The international multimodal transport network problem for second-hand vehicle from KOR to Central Asia is becoming an important issue in the industry but so far few researchers interested in it.

Therefore, Ying have the research on intermodal cargo transport route planning from KOR to Central Asian country viewed second-hand vehicle as target cargo. The objective is to find out the optimal transport network and route for second-hand vehicle transport from KOR to Central Asian country Kyrgyzstan by combining experts' opinion and real data of these exist alternatives, nodes and routes in the transport network. To make clearly about the current situation of this transport route and network, she takes half of a year to visit some important nodes in this transport route and some potential nodes, also some businessmen were interviewed and their ideas and some information are gathered. Some policy makers of One Belt

One Road Initiative who are specializing in transportation are also interviewed to help solving the current facing problems in the perspective of policy.

By collecting the opinions from the businessmen and experts, finally, the hierarchical structure of the evaluation can be identified with five factors (total cost, total time, reliability, security and transportation capability) and sixteen sub-factors (transport cost, handling and storage cost, empty container return rate in factor total cost; transport time, transit time and customs clearance time in factor total time; performance of forwarding partner, mode connection efficiency, consolidation with other cargo, cooperation and emphasis among state organizations and information system in factor reliability; freight damage rate, facility shortage rate and international financial service in factor security; load capacity of rail and number. of shipping route per month in factor transportation capability). Based on the evaluation structure, the alternative transport route, such as Sea + TCR,

Sea + TSR and Deep Sea + Truck/Railway are evaluated for choosing an optimal one for cargo transport. After that, the nodes in the main routes are evaluated for making a most effectively routes for cargo transport from KOR to Central Asia and for to the Europe.

An integrated qualitative and quantitative analysis is employed by applying Fuzzy Delphi and Fuzzy ELECTRE I. Fuzzy Delphi is applied for obtaining hierarchical structure of factors and sub-factors to evaluate multimodal transport alternative networks of second-hand vehicle from KOR to Kyrgyzstan by clustering opinions from experts and modified fuzzy ELECTRE I is used to conduct the evaluation process of sixteen sub-factors and five alternative routes selection under TCR.

The analysis result shows that in the five factors, total cost is the most considerable factor, followed by reliability, transportation capability, total time and security. Additionally, in the mainly three multimodal transport networks, Sea + TCR ranked first, followed by Sea +

TSR and Deep Sea + Truck/Railway. In the whole of sub-factor weights, the transport cost is ranked first and co-operation and emphasis among state organization is ranked second, under the results of second-hand vehicle multimodal transport route selection, route 3, i. e. Incheon – Qingdao – Khorgos – Bishkek is the most preferable one as the potential effective route for cargo transport from KOR to Central Asian and to the Europe. Lastly, a sensitivity analysis is conducted to obtain the ranking reversal of five alternative routes by increasing or decreasing 10% of each sub-factor's weight to find out the development priority of these routes. Also the development strategies are shown for route to enhance their competitiveness.

It offers some important implications for both academic and industry. For academic: (1) solve the multimodal transport network problem by not only liner programming (LP) method but by an integrated Fuzzy Delphi and Fuzzy ELECTRE I methodology; (2) an inte-

gration way for both including the real data from actual second-hand vehicle industry and advice from experts is employed to find out the optimal transport network and route for second-hand vehicle from KOR to Central Asian country Kyrgyzstan. For logistics and forwarding companies who are operating transport business between KOR and Central Asia: (1) better understand the complex relationships and structure among the relevant factors and sub-factors of second-hand vehicle transport; (2) more clearly understand the condition and changes of alternative multimodal transport networks, routes and nodes; (3) determine whether the services they received from current route are from the most efficient route and also make prompt adjustments to meet their development strategies.

On the whole, it is a meaningful work for catching the new topic for solving the actual transport problem for countries along the Silk Road and as an indicator for enhancing the logistics efficiency and reducing potation cost for companies that have businesses in this area. Mean-

while, the analysis results can give some information for government for making some more effective and in demand polices for promoting trade and logistics development.

여기태

Gi – Tae Yeo

Dean of Graduate School of Logistics

Incheon National University

Introduction

Due to the increase of trade from KOR to Central Asia, forming an efficient intermodal route for cargo transport is becoming significant more and more. Until now, the intermodal routing for long-distance transportation is still facing some operational challenges such as customs clearance matters, track gauge differences matters or climate limitation. The initiative of the Silk Road Economic Belt proposed by China in 2013 recently can improve trade and transport links in Asia, and promote the forming of efficient transport route focusing on the railway service provided in China. Currently, high-income countries export large quantities of second-hand ve-

hicle to low-income countries with multimodal transportation, especially in KOR, second-hand vehicle export shows the highest growth in recent years. The international multimodal transport network problem for second-hand vehicle from KOR to Central Asia is becoming an important issue in the industry but few researchers interested in it. The objective of this book is to find out the optimal transport network and route for second-hand vehicle from KOR to Central Asian country Kyrgyzstan by combining experts' opinion and real data of these exist alternatives, nodes and routes in the transport network.

An integrated qualitative and quantitative analysis is employed in this research by applying Fuzzy Delphi and Fuzzy ELECTRE I. Fuzzy Delphi is applied for obtaining hierarchical structure of factors and sub-factors to evaluate multimodal transport alternative networks of second-hand vehicle from KOR to Kyrgyzstan by clustering opinions from experts and modified fuzzy ELECTRE I is used to conduct the evaluation process of sixteen sub-fac-

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