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A Study on Logistics Cluster Competitiveness among Asia Main Countries using the Porter's Diamond Model *

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ABSTRACT

Measurement and discussions of logistics cluster competitiveness with a national approach are required to boost agglomeration effects and potentially create logistics efficiency and productivity. This study developed assessment criteria of logistics cluster competitiveness based on Porter's diamond model, calculated the weight of each criterion by the AHP method, and finally evaluated and discussed logistics cluster competitiveness among Asia main countries. The results indicate that there was a large difference in logistics cluster competitiveness among six countries. The logistics cluster competitiveness scores of Singapore (7.93), Japan (7.38), and Hong Kong (7.04) are observably different from those of China (5.40), Korea (5.08), and Malaysia (3.46). Singapore, with the highest competitiveness score, revealed its absolute advantage in logistics cluster indices. These research results intend to provide logistics policy makers with some strategic recommendations, and may serve as a baseline for further logistics cluster studies using Porter's diamond model.

1. Introduction

In a ceaselessly open and integrated world economy, national competitiveness has become a main concern for both advanced and developing countries (Porter, 1990).

Many researchers have defined competitiveness at the country level. Scott and Lodge (1985) refer to competitiveness as the national ability to create, produce, distribute, service and/or products in international trade. The OECD's (1996) definition is the degree to which a country can produce, under free and fair market conditions, the goods and services that meet the test of international markets. The World Economic Forum (WEF, 2003) defines it as the ability of a national economy to grow. It is measured by a set of factors, policies, and institutions that determine a country's level of productivity. While these definitions are not exactly the

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same, they share a similar spirit, namely the creation of a country's prosperity. This latter definition has attracted considerable attention from researchers and policy makers.

Therefore, many indicators have been developed to measure national competitiveness. Indicators such as cost indices published by the IMF(International Monetary Fund), economic indices released by the World Bank (WB), and logistics and trade indices published by the WEF compare various levels of national competitiveness.

We should take note of the existence of the yearly publications of the WEF (2015) and WB (2015), which assess the competitiveness of nations annually by opening a list of rankings. The publications analyzed by these reputable organizations are used by researchers. However, the WEF and WB reports have been criticized by a group of academics (Peña-Vinces, 2009; Lora, 2005). The criticisms emphasized a set of weaknesses, ranging from a lack of reliability of the surveys on which the models are based to the lack of a robust statistical analysis due to the arbitrary allocation of the "weights" of the competitiveness indicators used in the rankings (Cho and Moon, 2000; Kaplan, 2003; Lall, 2001; Lora, 2005; Squalli et al., 2008).

Porter (1990) develops the diamond model by studying national competitiveness with reputable indicators. Following its development, this model has been widely applied in studying the competitiveness of different countries (Bellak and Weiss, 1993; Hodgetts, 1993). However, Porter's single diamond model is not free from criticism. The model is narrowly focused on domestic indicators when analyzing national competitiveness. Therefore, we need to expand the domestic focus of Porter's single diamond into the international context.

This study proposes a solution to the problems emphasized above. First, we used the Analytic Hierarchy Process (AHP) to assign the weights provided by each of the competitiveness indicators. These indicators have been taken from data published by international organizations such as the WB, WEF, and Doing Business (DB). Secondly, the calculated weights were applied to generate a ranking of the logistics cluster competitiveness of Asian countries using the diamond model by adding international indices such as Foreign Direct Investment (FDI) inflow, share of world trade, starting a business, and others, to domestic indices.

The above literature has never described an AHP method aimed at prioritizing logistics cluster competitiveness.

The main purpose of this paper is to develop assessment criteria for logistics cluster competitiveness based on Porter's diamond model, to calculate each weight by the AHP method, and finally to evaluate and discuss logistics cluster competitiveness among Asia main countries. These include Korea, Japan, China, Hong Kong, Singapore, and Malaysia, which were ranked in the top positions based on the 2014 LPI (Logistics Performance Index) report released by the World Bank. Taiwan, which has a logistics performance that is equivalent to those of the above six countries, was excluded because the IMF, WB, and WEF have never been provided with a list of indicators for Taiwan. Moreover, this research invited 20 experts to evaluate different logistics cluster competitiveness via the proposed AHP method. This research intends to provide government with some strategic recommendations.

The rest of the paper is organized as follows. Section 2 presents the literature review leading to the specific indicator development, while Section 3 presents the research methodology, including a description of data collection. Section 4 describes analysis of respondent's background and the statistical analyses performed. Section 5 presents the discussion and conclusions, including future work.

2. Literature Review

2.1. *Porter's Diamond's Model*

Porter (1990) introduced the diamond model to examine industry competitiveness. After that, Krugman (1996) and Aiginger (2006) have accepted the concept of international competitiveness of a nation. According to Porter`s Diamond, four broad attributes of a nation fundamentally determine the competitiveness of a countries or an industry at microeconomic level:(a) factor conditions (FC), referring to the supply of skilled labor or infrastructure, (b) demand conditions (DC), (c) related and supporting industries (RSI) and (d) firm strategy, structure, and rivalry (FSSR). One of the main contributions of Porter's (1990) model is that a country's competitiveness depends on the interaction among these factors (FC, DC, RSI, and FSSR). Competitiveness should therefore not be evaluated as an independent variable but as a result of the four. Afterwards, the diamond model has been expanded by other researchers. Rugman and D'Cruz (1993) developed double diamond model, as an extension of Porter's original diamond model and in which domestics and international diamond models were considered. Although Porter's diamond model has some weaknesses, the model was used as a key tool for the analysis of countries competitiveness applied in many areas (Dunning, 1993; Krugman, 1994; Garelli, 2006; Gugler, 2007; Kalimeris, 2012; WEF, 2015). The most important reason was that it has provided many feasible results in identifying indices influencing the competitiveness of countries (Stelios et al., 2005, Ajitabh et al., 2004).

As previously mentioned, the study is comprised of four determining factors taken from Porter's (1990) diamond to identify indicators influencing the logistics cluster competitiveness of countries. Adapted to the context of Asian main countries, the factors are as follows.

2.1.1 Factor conditions (FC)

Amin and Thrift (1994) postulated the idea that the performance and competitiveness of national economies in a globalizing world is critically dependent upon their "institutional thickness". Similarity, WEF national competitiveness report (2015) suggested institution was the legal and administrative framework within which the cluster like individuals, firms, and governments interacts to generate wealth. Institution, an indicator, supported by Amin and Thrift (1994) and WEF (2015) is introduced.

Porter (1990) proposed that the stronger these factors (FC) were, the more strength a country had to compete internationally could attract international companies more easily, enticing FDI into this countries. (Dunning, 1993; Gugler, 2007). FDI measures the ability of companies and governments to exploit the advantages they provide (Clarke, 2009; Peña-Vinces, 2009). According to above supports, FDI is included as an indicator of FC.

In addition, the concentration of various firms in industry clusters facilitates the development of value added services. Then, value added services that is considered as an indicator of FC are recommendable offerings that go beyond basic and simple logistics of transportation and warehousing. Generally, value added services such as tagging, kitting, labeling, recycling and packaging, impact customer service levels, other indicator of FC, like just in time (Skjøtt-Larsen, 2000; Reichhart and Holweg, 2008). In addition, labor market efficiency, supported by the Chiang Kao et al.(2008), and Chia-Chi Sun et al.(2009), is introduced as an indicator of FC. The complete list is included in Table 1, identified as FC.