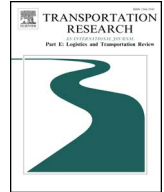


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# Analysis of logistics service supply chain for the One Belt and One Road initiative of China

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## ABSTRACT

This paper explored the supply chain coordination issues arising from the One Belt and One Road initiative (OBOR), and investigated the impacts of the cost sharing contract on the key decisions for logistics service supply chain with mass customization. Our motivation was derived from the growing individualized demands for logistics service in the OBOR region. In this study, a logistics services supply chain, consisting of one functional logistic service provider (FLSP) and one logistics service integrator (LSI), was considered and performed on the OBOR. Based on a game theoretic approach, the supply chain performance was evaluated with four models of the cost sharing contract between the FLSP and the LSI, respectively. As a result, several key managerial insights were discovered in our modeling study. More importantly, the impacts of cost-sharing on the key decisions of each player was analyzed in details, and the interaction mechanism of mass customization was also estimated. From our perspective, it will be indeed beneficial to improving logistics service in the OBOR region.

## 1. Introduction

In September 2013, President Xi of China, proposed building the Silk Road Economic Belt to boost regional cooperation, and called for establishment of a new regional cooperation model. These proposals are officially termed as the One Belt and One Road initiative (OBOR) or the Belt and Road initiative (BRI) (Huang, 2016), the geographical coverage of which is illustrated in Fig. 1. OBOR is trying to usher a new era of economic and regional diplomacy along the breadth and length of Asia, Europe and Africa. This ambitious plan connects China with its neighbors in Asia and beyond, involving more than 60 countries. Among the objectives of OBOR, a key one is to ease the bottlenecks for cross-border trade, especially to investigate how to achieve a well-connected transport infrastructure with effective logistics services (Garca-Herrero and Xu, 2016).

On a macro scale, OBOR countries have accelerated the construction of transport infrastructures to promote cargo freight. China Railway Express, for example, is able to transport container from China to Europe and other countries along OBOR (PRC National Development and Reform Commission, 2016). In accordance with the goals of the OBOR strategy, cross-border e-commerce is growing rapidly. According to reports from Alibaba, half of its customers, which are more than 100 million, on the Business-to-Customer (B2C) platform locate within the OBOR region. Therefore, it can be seen that international logistics cooperation is essential to meeting the growing demand. In this paper, the concentration is to find out the supply chain coordination issues arising from

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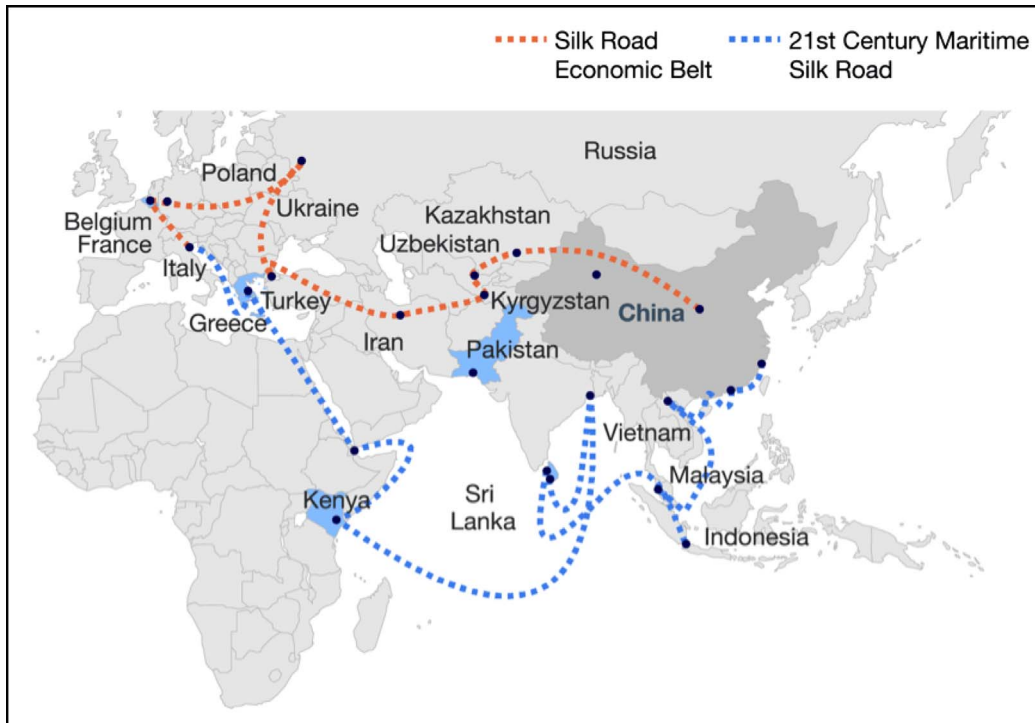


Fig. 1. The map of One Belt and One Road initiative.

Source: McKinsey Company. <https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/one-belt-and-one-road-connecting-china-and-the-world>

OBOR initiative, and explore the impacts of cost-sharing contract on the key decisions of logistics service supply chain with mass customization service.

The *logistics service supply chain* (LSSC) is a new type of service supply chain with the following basic components: *functional logistic service providers* (FLSP), a *logistics service integrator* (LSI), and manufacturers or retailers (Liu et al., 2011). A functional logistics service provider, or called a *provider* for short, is a traditional third party logistics company, such as a transport company and a warehouse. The *logistics service integrator*, called an *integrator* for short, is responsible for integrating the service capabilities of the functional providers together and then providing customized services to customers. *Mass customization* is defined as the ability to provide individualized designed products and services to each customer through a high level of process with flexibility and integration (Silveira et al., 2001). According to these descriptions, it can be found that there are interaction and mutual reinforcement between the logistics service supply chain and the mass customization. However, the combination of these two requires a high cost, but a good cooperation between the integrator and the provider is beneficial to reducing this cost through the economy of scale.

The problem addressed in this paper is particularly motivated by the initiative of the Alibaba Group. Alibaba has no own logistics infrastructure, but is capable of integrating other logistics companies together. In the international marketplace, Alibaba collaborates with five warehouse providers to establish seventeen oversea warehouses all over the world. These warehouse providers include ‘360 zebra’ in American, ‘Wano Ji’ in Russia, and so on (Alibaba Group, 2017). Oversea warehousing is a new mode of operation, in which a B2C seller stocks a batch of goods in target destinations in advance. When a customer in such a destination places an order, the logistics company can then deliver the ordered product to the customer directly. This operation can shorten the order cycle, reduce the cost of transportation and expand the oversea markets (Cao and Xu, 2013). In line with the OBOR initiative, Alibaba is enlarging its international logistics service network by integrating more logistics service companies. However, there are also problems coming along. For example, in order to develop the logistics service capacity, especially its customization capability, larger investments are required for infrastructure development and management optimization. The addressed obstacles from this are that how the investments should be shared by the different players, and what kind of model is suitable for the entire logistics service supply chain? Overcoming these obstacles is crucial to the development of logistics and trade under the OBOR initiative. Therefore, this paper aims to answer the following three questions:

- (1) There are four models of cost-sharing contract in logistics service supply chains, including the centralized decision model, provider dominated decision model, integrator dominated decision model, and Nash bargaining model. What effects will the sharing of customization cost have on the logistics service price, the wholesale price of logistics service capacity, and the profits of the integrator, the provider and the overall logistics service supply chain?
- (2) How will the customization level influence the pricing of the logistics service, the wholesale price of logistics service capacity,

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