

# Redesigning Global Logistics Networks with Respect to One Belt & One Road



LogDynamics

International Graduate School

China's One Belt & One Road Initiative (OBOR), referring to the proposal to build "the Silk Road Economic Belt (SREB)" and "the 21st Century Maritime Silk Road (MSR)", aims at improving traffic connectivity and cooperation in Eurasia. The SREB plans to establish roads, railways, and gas pipelines across central Asia to Europe, while the MSR goes through the South China Sea, the South Pacific Ocean, and the Indian Ocean area.



Both OBOR Routes (Source: PwC's Growth Markets Center)

Facilities connectivity, along with policy coordination, unimpeded trade, financial integration, and people-to-people bonds, together form the five major goals of OBOR. This unveiled in 2013 initiative, is now visibly changing the Eurasia economic and transport context, as well as the regional and even global marketplace landscape.

## Motivation

Under the background of OBOR, challenges and opportunities in the short, medium and long term are existing in the

entirety of the Eurasian continent, influencing the business environment and logistics activities, which lead to several consequences:

- Impacts on the business environment: the new extending markets, policies for improving trade liberty and finance integration, lead to the growth in foreign investment, and fluctuation of labor cost, land cost, import/export duties, taxation, etc. What are suitable information analytic methods for each phase especially in the middle of life of the product?
- Impacts on the logistics activities: improving facilities connectivity brings access to global markets. The new transport corridors create newly available trading and logistics routes, shorter delivery time can be expected, as well as more competitiveness in transport services.

Above-mentioned impacts necessitate the redesign of global logistics networks, especially for the international manufacturers. Due to the transnational allocation of their different functional subsidiaries, they are more sensitive to the changing political and socio-economic environment.

## Problem Definition

A logistics network consists of facilities, including suppliers, manufacturing plants, warehouses, distribution centers, and customers; as well as raw materials and finished products that flow between the facilities. Sometimes the information flow and financial flow are also considered as component parts.

A global logistics network is the one that establishes facilities in different countries. The logistics networks design problem is configuring facilities' locations, quantities, and capacities. Redesigning a global logistic network focuses on its reconfiguration, including decisions on closure and



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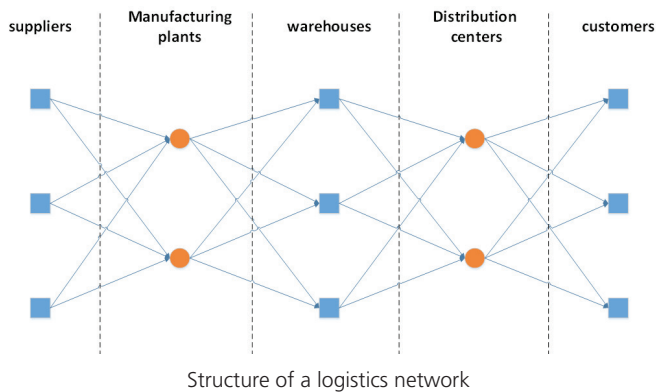
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extension of existing facilities, as well as establishing new facilities.



To redesign a global logistics network for a multinational manufacturing firm while considering the impacts of OBOR, there are several questions, which need to be taken into consideration:

- What is the concrete content of OBOR?
- On which aspects, will OBOR influence the global logistics networks?
- How to evaluate the current logistics networks? Or how to define that the current logistics networks need to be redesigned?
- Regarding the logistics networks of multinational manufacturing firms, what are the most crucial factors affecting the decision-making process for reconfiguration of the logistics networks?

Thus, two perspectives will be studied: the impacts of OBOR on global logistics networks; and the location-specific crucial factors for a multinational manufacturing firm.

### Application of System Dynamics

The main research method to be applied is System Dynamics (SD), which is originally called industrial dynamics, origins in control engineering and management. It is a computer-aided approach based on information feedback and delays, aiming to understand the dynamical behavior of complex systems. As one of the system approaches, SD modeling has been widely applied in comprehensive areas to solve complex system problems.

A logistics network can be analyzed as a complex system with dynamic features. The prominent advantage of SD modeling is the possibility to consider the influencing factors, which are difficult to quantify, compared to the commonly used methods. This can explain why SD is suitable for application in policy analysis for solving real world problems. Considering the redesign of the global logistics networks with respect to the OBOR, advantages of applying SD as the main methodology are as follows:

- Influencing factors of the redesign include quantifiable variables (delivery time, transport costs, currency fluctuation, etc.) and unquantifiable variables (bilateral/multilateral trade policies, terrorism, political disorder, etc.). SD modeling can be utilized to analyze all the considerable variables involved.
- The OBOR initiative is a long-term strategy, and the impacts of it on logistics networks are dynamic and perennial, which means delay of the impacts exist, makes SD a suitable approach.
- SD modeling facilitates the analysis of causal relationships of variables, which will be fully transparent as opposed to the black box type. This enables decision makers to take a causal view of reality and implement means to investigate the response of the system to various policies.

### Expected Outcomes

A conceptual model will be developed, to support multinational industrial firms to make decisions on reconfiguring their existing logistics networks on a regional scale, while considering the impacts of OBOR. This model can also provide a systematical perspective to policy makers of OBOR or decision-makers of global logistics networks reconfiguration.