

The 9th International Conference on City Logistics, Tenerife, Canary Islands (Spain), 17-19 June 2015

## Logistics facility distribution in Tokyo Metropolitan area: Experiences and policy lessons

Takanori Sakai <sup>a\*</sup>, Kazuya Kawamura <sup>a</sup>, Tetsuro Hyodo <sup>b</sup>

<sup>a</sup> Department of Urban Planning and Policy, University of Illinois at Chicago, 412 S. Peoria St., Suite 215, Chicago, Illinois, 60607, U.S.A.

<sup>b</sup> Department of Logistics and Information Engineering, Tokyo University of Marine Science and Technology, 2-1-6, Etchujima Koto-ku, Tokyo, 135-8533, Japan

---

### Abstract

We use the large-scale freight survey data to examine the historical transition of the logistics facility distribution in the Tokyo Metropolitan Area (TMA) and investigate the possible causal factors for the changes. The analysis revealed the decentralization of logistics facilities during the period 1980-2003 and suggested that the asset price bubble during 1986-1991 was likely a significant factor. In addition, the examination of the relationship between logistic facility locations and land-use regulations indicates the challenges that even a relatively common land-use regulation framework faces. The study offers valuable insights into the spatial distribution of logistics facilities in the largest metropolitan area in the world.

© 2016 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of the organising committee of the 9th International Conference on City Logistics

*Keywords:* Logistics distribution; locational analysis; land-use policy

---

### 1. Introduction

The evolutions in logistics practices that occurred along with globalization, the innovations in information and communication technologies (ICTs) and infrastructure development, have resulted in the changes in logistics land-use in metropolitan regions around the world. What Dablanc and Rakotonarivo (2010) define as logistics sprawl, “the

---

\* Corresponding author. Tel.: +1-312-996-5240; fax: +1-312-413-2314.

E-mail address: [tsakai3@uic.edu](mailto:tsakai3@uic.edu)

historical trend towards spatial deconcentration of logistics terminals in metropolitan areas” (p. 6087), is widely observed in North American and European cities as a consequence of the changes in both the requirements for logistics operations and the supplies of spaces and transportation systems in metropolitan areas. It is suspected that logistics sprawl often leads to mismatches between logistics and other land uses, potentially exacerbating the negative impacts of urban freight traffic such as congestion, emissions, energy use and infrastructure damages. However, formulating effective policy responses to either prevent the sprawl in first place or address the impacts requires understanding the forces that drives logistics sprawl and the role of the public sector, especially regarding the land regulations. In most urban areas, location choice of logistics facility is a part of business strategies of private entities and the regulations and controls of the facility development are often (but not always) the purview of local municipalities. As such, the spatial distributions of logistics facilities in metropolitan areas often do not subscribe to any holistic vision or policy framework. As freight and freight facility demands are rapidly growing in metropolitan areas, understanding the shifts in logistics distribution is increasingly important for policy development to achieve the sustainable urban transportation system.

The goal of this study is to contribute to the body of works on the dynamics of logistics facility distribution and the relevant policies. In this study, we use the data from the 2003 Tokyo Metropolitan Freight Survey (TMFS), one of the most comprehensive and the largest urban freight surveys, to examine the historical trend in the logistics facility distribution in the Tokyo Metropolitan Area (TMA) and to investigate the possible explanatory factors of spatial distribution. We especially focus on the influence of the asset price bubble that occurred during the period 1986-1991 in the TMA. We also examine the relationship between land-use regulations and the logistics facility distribution.

The contents of the rest of the paper are as follows; in section 2, the literature review that covers the studies of the logistics facility distribution is provided; in section 3, the data and analytical approach are presented; in section 4, key features of the TMA that are potentially relevant to logistics facility distribution – population and densely inhabited area, transportation network, land price and land use regulations – are briefly reviewed; in section 5, the analysis of the logistics facility distribution in the TMA and its relations with land price and land-use regulations are provided; the final section summarizes the major findings and proposes the topics to be addressed in future research.

## 2. Literature Review

The recent trends in logistics facility distribution in metropolitan areas are reported by several studies, mainly in the context of decentralization. Dablanc and Ross (2012) analyze the data for the Atlanta Piedmont Megaregion and find that warehousing establishments moved outward by 2.8 miles (4.5 km) on average during the period 1998-2008, while the business establishments in general moved outward only by 1.3 miles (2 km) during the same period. In a subsequent study (Dablanc et al., 2014), the same approach is also applied to the Los Angeles and Seattle Metropolitan Areas for the period 1998-2009. The results indicate a significant logistics sprawl in Los Angeles, while in Seattle the spatial distribution of logistics facilities compacted. Cidell (2010) investigates the trends in logistics facility distributions in and across metropolitan areas in the U.S. and reveals “the move towards inland distribution centers and the suburbanization of freight activity” though she also found exceptions. Dablanc and Rakotobarivo (2010) provide a case of Paris, focusing on the locations of large parcel and express transport companies. Their analysis indicates that freight terminals of those companies have significantly decentralized in the past few decades; the average distance to their barycenter was 6 km in 1974 and increased to 16 km by 2008. Sakai et al. (2015) analyze the historical trend on the distribution of logistics facilities in the TMA based on the establishment year data using the 2003 TMFS data. They find that the average distance of the inland logistics facilities from the urban center increased by roughly 4 km between 1980 and 2003. They also indicate that logistics facilities tend to be located farther from their optimum locations in terms of shipment distance as the facilities are located farther away from the urban center.

In contrast to the abovementioned studies focusing on the historical transition of spatial distributions, other studies attempt to unveil the location choice mechanism for logistics facilities. Hagino and Endo (2007) analyze the potential of lands for future distribution facility development using the multinomial logit model framework for the TMA; they develop location choice models for regional freight facilities and distribution centers using demographic information, accessibility, land price and land use regulations as main explanatory variables based on the 2003 TMFS data. Similarly, Nguyen and Sano (2010) apply the mixed logit model to analyze the location choices of logistics firms. They estimate models for retailers, product wholesalers and other manufacturers and identify zonal population,

Download English Version:

<https://daneshyari.com/en/article/1106597>

Download Persian Version:

<https://daneshyari.com/article/1106597>

[Daneshyari.com](https://daneshyari.com)