Concept and best practices of city logistics

Professor Eiichi Taniguchi
Kyoto University

Outline

1. Introduction
2. What is city logistics?
3. Visions for city logistics
4. Best practices
5. Conclusion
1. Introduction

Urbanisation

• About half of the World’s population (7 billion) live in urban areas
• The convergence of people and resources into urban areas for better lives---job, meeting, education, entrepreneurism, culture, transport, medical care....
• However, the growth of cities generates problems on traffic congestion, environment, public health, safety and security... --more serious in mega-cities

Seamless urban freight transport

• Seamless urban freight transport is an essential element for supporting efficient economic and social development in urban areas
• In addition, we face the aging society which requires more costs for medical, nursing and rehabilitation service as well as delivering daily commodities to elderly people
Challenging issues (1)

• Competition
• Efficient logistics systems --- Just In Time transport systems
• Freight carriers --- better services with lower costs
• Shippers --- designated time windows

Commercial logistics

Challenging issues (2)

• Increase in urban freight transport
  – Congestion
  – Negative environmental impacts
  – Crashes
  – Energy consumption

Intervention of public authority is needed

City logistics

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Smart solution by city logistics

- **City logistics** play an important role for balancing the economic growth of cities and social and environmental issues.
- Because city logistics provides the basic **framework** for social, cultural activities of people and economic activities of companies.
- However, many urban planners and politicians have **overlooked** urban freight transport.

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Framework for activities of people and companies in urban areas

- **Efficiency**
  - Activities of people (Shopping, cultural, sport...)
- **Environment**
  - Activities of companies (Location of depots, truck routing, e-commerce...)
- **Safety & security**
- **City logistics**
- **Urban transport planning**
- **Urban land use planning**
2. What is City Logistics?

- City logistics is the process for totally **optimising** the logistics and transport activities by private companies with the support of **advanced information systems** in urban areas considering the **traffic environment, its congestion, safety and energy savings** within the framework of a market economy (Taniguchi *et al.* 2001)

Characteristics of City Logistics

- **Total optimisation** taking into account environment, congestion, safety, energy etc.
- Relatively free activities of companies supported by public sector through deregulation
- Full utilisation of **advanced information techniques** including ICT and ITS
- Mindset of **Co-opetition**
3. Visions for city logistics

- Resilience
- Sustainability
  - Global competitiveness
  - Efficiency
  - Environment friendliness
  - Congestion alleviation
- Mobility
  - Security
- Liveability
  - Safety
  - Energy conservation
  - Labour force

Essential viewpoints

- ICT, ITS and city logistics
- **Urban planning** and city logistics
- **Land use planning** and city logistics
- **Units** of urban freight transport planning
- Subsidies and additional charges from the public
Average loading factor of trucks in Tokyo

(Capacity of truck)

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</thead>
<tbody>
<tr>
<td>Less than 1 ton</td>
<td>19.8%</td>
<td>24.2%</td>
<td>28.2%</td>
<td>26.2%</td>
<td>42.1%</td>
<td>49.5%</td>
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<td>1 ton – less than 2 tons</td>
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<td>2 tons – less than 5 tons</td>
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<td>5 tons – less than 10 tons</td>
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<td>10 tons or more</td>
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<tr>
<td>Average for all truck types</td>
<td>19.8%</td>
<td>24.2%</td>
<td>28.2%</td>
<td>26.2%</td>
<td>42.1%</td>
<td>49.5%</td>
<td>49.5%</td>
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</tbody>
</table>

Average loading factor in the Tokyo metropolitan area (loading weight/potential loading weight x 100) (%)
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Percentage of Cargo with Specified Delivery Time Windows (Tokyo)

- Unknown: 6.1%
- Time specified: 14.3%
- Time period specified: 16.5%
- Date specified: 26.0%
- Unspecified: 36.6%
- 699,000 case/day

Source: Survey of cargo flow in the urbanized part of Tokyo in 1994 (wholesale base)

Percentage of Loading/unloading Place (Tokyo)

- Parking space on the road (2.1%)
- Off street parking area (4.2%)
- Sidewalk (10.6%)
- On the road (83.1%)

Source: Survey of cargo flow in the urbanized part of Tokyo in 1994
Two driving forces to promote city logistics schemes

• Development and deployment of **Innovative technology (ICT and ITS)** in logistics area
• **Behaviour change** of shippers and freight carriers associated with corporate social responsibility (CSR)

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Environmental management in logistics

• **ISO 9001 & 14001** series
  – Plan, do, check and action procedure
• **Green management schemes** for small and medium size enterprises
• **CSR** (Corporate Social Responsibility)
## Approaches to urban freight transport management

<table>
<thead>
<tr>
<th>Approach</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Infrastructure</td>
<td>Development of bypasses-ring roads, urban distribution centers, loading facilities</td>
</tr>
<tr>
<td>(2) Regulatory</td>
<td>Introduction of fuel taxes, road user charge, dedicated freight, Impose vehicle restrictions, Introduce congestion charging</td>
</tr>
<tr>
<td>(3) Logistical</td>
<td>Use of small delivery vehicles, Improved terminal operations, Improve driver competencies</td>
</tr>
<tr>
<td>(4) Co-operative</td>
<td>Form freight partnerships, load sharing systems (increase load factors), Joint delivering</td>
</tr>
<tr>
<td>(5) Technology</td>
<td>Use of electric delivery vehicles, Use of GPS and FTMS, Implement a vehicle parking reservation system</td>
</tr>
<tr>
<td>(6) Behavioral</td>
<td>Implement anti idling messages, Improve social acceptance of urban freight activities, Use of recommended truck routes</td>
</tr>
</tbody>
</table>

Source: PUBLIC SECTOR GOVERNANCE OF URBAN FREIGHT TRANSPORT, PIARC 2012

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## Measures for urban freight transport management

<table>
<thead>
<tr>
<th>Traffic Management</th>
<th>Measure</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Through-traffic optimization</td>
<td>Infrastructure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic management</td>
</tr>
<tr>
<td></td>
<td>In/out-flow optimization</td>
<td>Infrastructure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic management</td>
</tr>
<tr>
<td>Parking management</td>
<td>Infrastructure</td>
<td>Loading/unloading facility</td>
</tr>
<tr>
<td></td>
<td>Traffic management</td>
<td>Truck-only parking space</td>
</tr>
<tr>
<td>Time management</td>
<td>Limited time window for trucks</td>
<td></td>
</tr>
<tr>
<td>Vehicle management</td>
<td>Low-emission vehicles</td>
<td></td>
</tr>
</tbody>
</table>
# Measures for urban freight transport management

<table>
<thead>
<tr>
<th>Measure</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Better transport method</strong></td>
<td></td>
</tr>
<tr>
<td>Joint delivery</td>
<td>Infrastructure Joint delivery center</td>
</tr>
<tr>
<td>Intermodal transport</td>
<td>Infrastructure Transshipment equipments</td>
</tr>
<tr>
<td><strong>Harmony with urban structure</strong></td>
<td></td>
</tr>
<tr>
<td>Land-use plan</td>
<td>Infrastructure Environmental buffer along arterial roads</td>
</tr>
<tr>
<td></td>
<td>Land-use management Restriction of residential building along arterial roads</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
</tr>
<tr>
<td>Improve vehicle movement</td>
<td>ITS, ICT</td>
</tr>
<tr>
<td>Organizational activities</td>
<td>Freight Quality Partnership</td>
</tr>
</tbody>
</table>

Source: PUBLIC SECTOR GOVERNANCE OF URBAN FREIGHT TRANSPORT, PIARC 2012

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# Stakeholders of City Logistics

- **Shippers** (manufacturers, wholesalers, retailers)
- **Residents** (consumers)
- **Freight carriers** (Transporters, warehouse companies)
- **Administrators** (national, state, and city level)

City logistics company
Public private partnerships (PPP)

- **Coordination** and cooperation among stakeholders
- **Meeting and discussing together** urban freight transport issues from the initial stage of planning
- **Sharing** data and thoughts
- **Identifying** problems, finding approaches and measures, implementing policy measures, evaluating them and feedback
- **Benchmarking**
  - Performance indicators

Examples of measures in traffic simulation

<table>
<thead>
<tr>
<th>Description</th>
<th>a) Truck route designation</th>
<th>b) In-flow traffic restriction</th>
<th>c) Joint delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trucks are allowed only on designated routes</td>
<td>No through-traffic</td>
<td>Joint delivery</td>
<td></td>
</tr>
</tbody>
</table>

**Expected effects**

- Reduction in freight transport on local streets
- Reduction in environmental burdens and accidents
- Reduction in freight transport in the restricted area
- Reduction in environmental burdens and accidents
- Reduction in number of freight vehicles in delivery
- Reduction in environmental burdens and accidents

Source: PUBLIC SECTOR GOVERNANCE OF URBAN FREIGHT TRANSPORT, PIARC 2012
Results of Traffic Simulation in Tokyo

**ESTIMATED CHANGE IN TRAFFIC VOLUME**

- Increased 100 or more vehicles/day
- Increased less than 100 vehicles/day
- No change
- Increased less than 100 vehicles/day joint delivery center
- Increased 100 or more vehicles/day joint delivery center

**Most effective measure package**

- Current (no measures conducted)
- Truck route designation
- Inflow traffic restriction
- Joint delivery + truck route
- Joint delivery + inflow restriction

**Key Performance Indicators for evaluation**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Objective</th>
<th>Indicator</th>
<th>Source</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life quality</td>
<td>Emissions reduction</td>
<td>-noise</td>
<td>-field study</td>
<td>-modeling, measurements</td>
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<tr>
<td></td>
<td></td>
<td>-air quality</td>
<td>-local authority</td>
<td>-traffic counts</td>
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<td></td>
<td></td>
<td>-CO2</td>
<td>-police</td>
<td>-literature research</td>
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<td></td>
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<td>-traffic volume</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>-accidents</td>
<td></td>
<td></td>
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<tr>
<td>Economic development</td>
<td>Economic development</td>
<td>-Commercial floor space</td>
<td>-local authorities offices,</td>
<td>-statistics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-number of visitors</td>
<td>real state</td>
<td>-questionnaire study</td>
</tr>
<tr>
<td>Accessibility</td>
<td>Improving accessibility</td>
<td>-vehicle-km</td>
<td>-carriers</td>
<td>-questionnaire study</td>
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<tr>
<td></td>
<td></td>
<td>-travel time</td>
<td>-drivers</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>-number of obstacles</td>
<td>-field study</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>-police</td>
<td></td>
</tr>
<tr>
<td>Transport efficiency</td>
<td>Improving vehicle load factors</td>
<td>-average load factor of</td>
<td>-operators</td>
<td>-study</td>
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<tr>
<td></td>
<td></td>
<td>vehicles</td>
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<td></td>
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<td>-fuel consumption per unit</td>
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</tbody>
</table>

Source: PUBLIC SECTOR GOVERNANCE OF URBAN FREIGHT TRANSPORT, PIARC 2012

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4. Best practices
(1) Urban consolidation centre
(Motomachi, Yokohama Japan, 2004-)

Structure of cooperative freight transport in Motomachi, Yokohama

- Conceptual schematic
- Delivery with petty parcel service
- Delivery centre
- Sorting
- Cargo station
- Urban consolidation centre
- Delivery to participating stores
- Delivery to stores
- Cargo consolidation centres

<table>
<thead>
<tr>
<th>Type</th>
<th>Before (participating centre)</th>
<th>After (jointly-owned centre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of carriers</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>Total number of vehicle-days</td>
<td>40 vehicles: 30 days</td>
<td>20 vehicles: 30 days</td>
</tr>
<tr>
<td>Type of vehicle</td>
<td>Diesel truck</td>
<td>CNG truck</td>
</tr>
<tr>
<td>Number of participating stores</td>
<td>-</td>
<td>Almost all stores</td>
</tr>
<tr>
<td>Goods of execution</td>
<td>-</td>
<td>Directly delivered goods from manufacturers, high-value items</td>
</tr>
</tbody>
</table>
Outline
1) Started in 2004
2) Objectives are reducing CO₂ emissions and congestion as well as keeping good atmosphere of streets
3) No subsidies are given by public authorities just providing parking space on street—business model
4) Around 85% of goods are covered by cooperative freight transport systems

5) Both pickup and delivery are taken by the system
6) Whole area of Motomachi is covered by the system (1,300 shops as well as 500 individual homes)
7) Neutral carrier takes part in delivering and collecting goods
8) Motomachi Shopping Street Association financially supports this neutral carrier with 2.4 million yen (30,000 USD) per year
9) Each carrier pays the neutral carrier 150 yen (1.9 USD) per parcel
10) 1,000-1,200 parcels are treated per day
11) Excellent leadership
12) Number of trucks was reduced: 100 (11 companies) to 29 (1 company) for 10 days

Motomachi shopping street
CNG truck for cooperative freight transport

Parking area for cooperative freight transport
Urban consolidation centre

(2) Urban consolidation centre for high-rise buildings (Shinjuku, Tokyo, 1992-)
Impacts on air pollutant by urban consolidation centre

![Graph showing emission levels of air pollutants (NOx, CO, HC, PM) for different vehicles: Diesel truck (before JD), Diesel truck (after JD), CNG truck (after JD).]

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(2) Public-private cooperative organisation activity (East Osaka, Japan, 2006-)

1. Eliminating trucks’ on-street parking
   - Development of logistics parking
   - Informing the location of parking space

2. Eliminating private cars’ on-street parking
   - Instructing and raising awareness about illegal street-parking
   - Tightening of regulations

3. Managing traffic flow
   - Traffic restriction into the residential roads
   - Access route map of the subject area

4. Improving the local environment
   - Planting trees and trash-picking activities
   - Idling stop practice
Parking space dedicated for trucks

On street parking

Off street parking
(3) Parking lot booking systems using ITS for loading/unloading

(1) Objectives
● To support early promotion of ETC
● To create new market by the introduction to parking places

(2) Used functions
● Use Vehicle ID of ETC (ORSE-ID)
● Users are registrants
● Insertion of ETC card is necessary

(3) Accounting
● Month-end accounting for the time being

(4) Truck/load matching system KIT

Click map below directly to select region or click the select all button.

Further detail search or sort is available. Easy to find information you are seeking.

Detail search available

Easy to find the newest information
5. Conclusion

- City Logistics provide powerful tool for solving complicated urban freight transport problems
- Efficient and environmentally friendly logistics systems for mobile, sustainable and liveable cities
- Modelling is needed for evaluating policy measures
- Public-Private partnerships play vital role for implementing city logistics schemes
The 8th International Conference on City Logistics

- Date: 17-19 June 2013
- Location: The Grand Hyatt Bali, Indonesia
- Organised by: Institute for City Logistics
  [www.citylogistics.org](http://www.citylogistics.org)
- Submission of abstract: End of September 2012

The 7th International Conference on City Logistics in Mallorca, Spain in 2011