Logistics Visualization Cloud Services in Asian Developing Countries

TERAKADO Tomohisa

Abstract

Manufacturing and distribution industries are penetrating in Asian developing countries where economic is growing rapidly and logistics infrastructure is actively improved to support supply chain. At present, many of logistics companies in the Asian region directly contact the in-house relevant departments or related companies when they receive inquiries about the transportation status of the cargo from the owner. This poses issues such as necessity of time to reply to the owner or increase in man-hour to handle inquiries. This paper introduces the "Logistics Visualization System" as a solution to such issues.

Keywords

Asian developing countries, logistics, global supply chain, cloud service

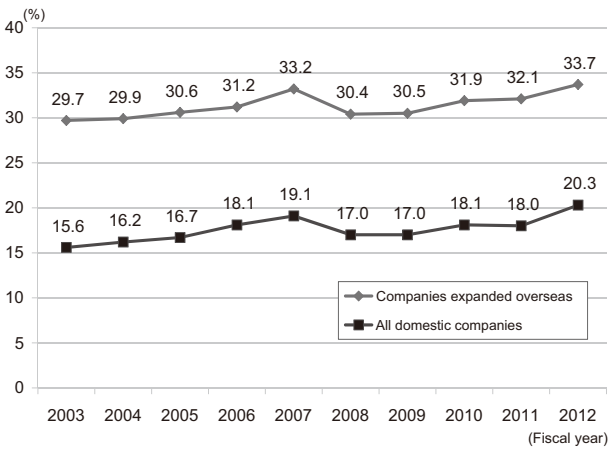
1. Introduction

As penetration of manufacturing and distribution industries in Asian developing countries that show rapid economic growth progresses in these years, logistics infrastructure that supports supply chain is being improved.

Asian developing countries attract foreign capital companies to large-scale industrial complexes and are proactively investing to improve and to expand logistics infrastructures including ports, airports, railways and roads as well as to logistics strategy in the nation wide scale. These policies are expected to increase opportunities for employment by investing foreign exchange obtained by export policies to plant construction and improvement of infrastructures in the urban areas, to attract more companies by strengthening international competitive edge, and to further advance economic development by supplying cheaper labor.

2. Logistics-related Issues in Global Supply Chain

Fig. 1 and **Table** show, not only the overseas production rate but also the local procurement ratio has been increasing because of the further reduction of costs through foreign production as globalization of businesses advances. While such situation poses urgent issues such as precise understanding and reduction of overseas logistics costs, excessive orders and surplus stock are generated because it is difficult to understand transportation status precisely and whether the cargo will ar-



* Based on METI's "43rd Basic Survey of Japanese Business Structure and Activities Overseas" (July 2013)

Fig. 1 Transition of overseas production ratio of Japanese companies (manufacturing industry).

Table Comparison of local and regional sales ratio and procurement from Japan.

	Local and regional procurement ratio			Local procurement ratio			Regional procurement ratio		
	FY2003	FY2012	Difference	FY2003	FY2012	Difference	FY2003	FY2012	Difference
North America	62.4	65.3	2.9	58.1	61.4	3.3	4.2	3.9	▲ 0.3
Asia	67.6	71.0	3.4	53.7	60.3	6.6	13.9	10.6	▲ 3.3
Europe	56.8	64.4	7.6	28.7	41.9	13.2	28.1	22.4	▲ 5.7

(Unit:%)

	Procurement ratio from Japan		
	FY2003	FY2012	Difference
North America	33.7	28.6	▲ 5.1
Asia	30.6	26.7	▲ 3.9
Europe	37.6	28.6	▲ 9.0

* Based on METI's "43rd Basic Survey of Japanese Business Structure and Activities Overseas" (July 2013)

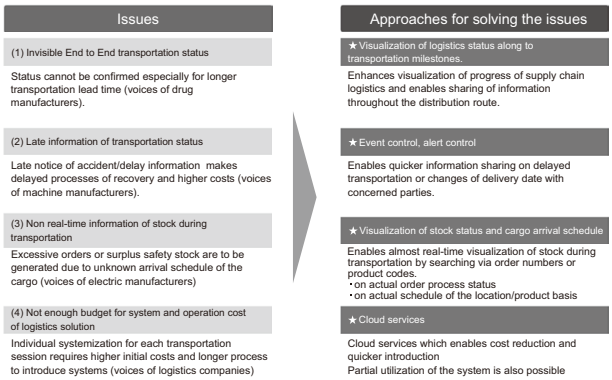
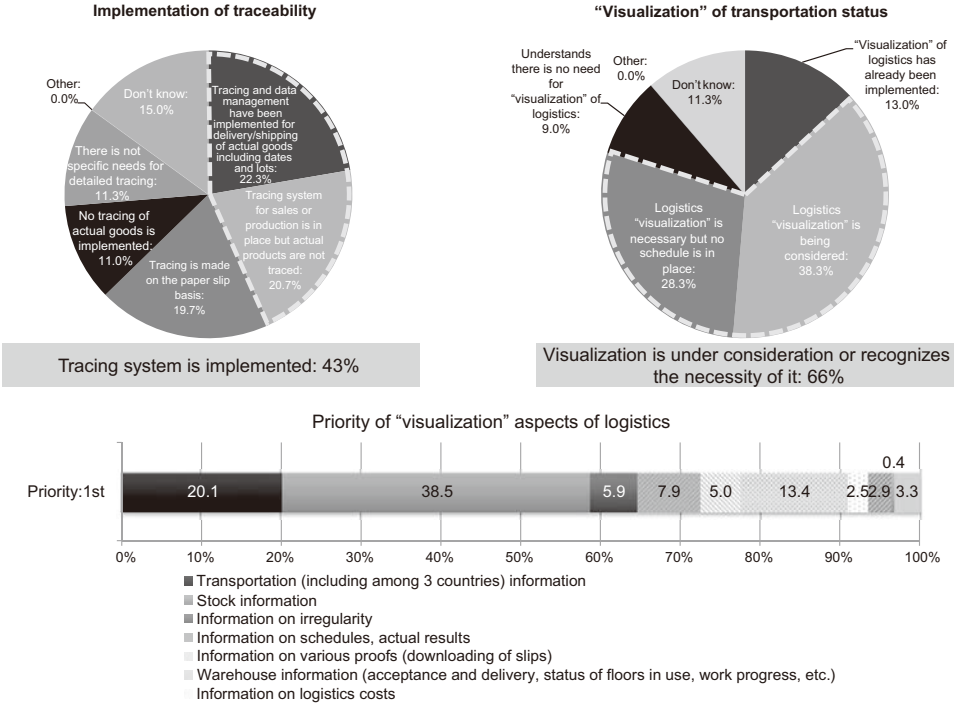


Fig. 2 Needs for visualization of logistics.



*Research in January 2014 by NEC System Technologies, Ltd. (present NEC Solution Innovators, Ltd.)
*Respondents: One hundred respondents each from cargo owner companies and cargo owner companies that are also engaged in logistics (300 in total).

Fig. 3 Results of questionnaire on logistics visualization needs.

rive on schedule or not cannot be determined in particular for transportation of a longer lead time.

To solve these issues, it is needed to visualize logistics in order to reduce stock and global logistics costs for the entire SCM (Supply Chain Management) (**Fig. 2** and **Fig. 3**).

3. Logistics-related Issues in Asian Developing Countries

As mentioned above, amidst of ever advancing "globalization of logistics" as can be seen in shifting to overseas production by manufacturing companies and globalization of procurement of materials, delay in transportation or non-delivery of goods will greatly and adversely influence on the production plans as well as business activities themselves.

In Asian developing countries in particular, precise estimation of number days necessary for transportation has become extremely difficult due to prolonged transportation lead time depending on the congestion at the ports, ICD (Inland Container Depot) or the customs as well as poor improvement of railways, roads or other infrastructures.

Cargo owners are usually given no alternative but to use the cargo tracking service offered by logistics companies or to

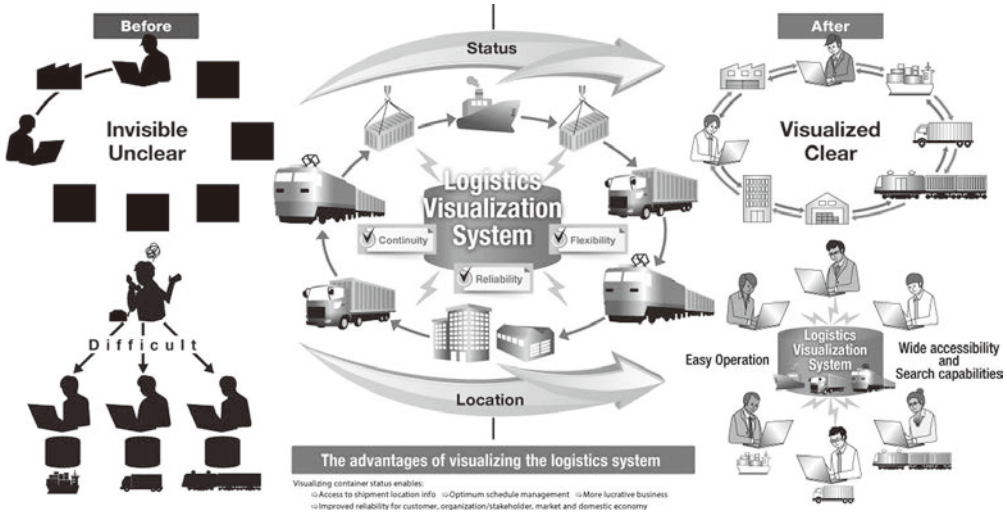


Fig. 4 What LVS aims to.

make inquiries directly to several companies in order to confirm the transportation status, which poses a great burden to owners. On the other hand, many of logistics companies directly contact the in-house relevant departments or related parties when they receive inquiries about the transportation status of the cargo from the owner. This poses issues such as necessity of longer time to confirm the logistics status making reply to the owner slow or increase in man-hour to handle inquiries because of the industry structure the most part of which consists of owner-operator truckers and smaller trucking companies.

4. What the Logistics Visualization System Aims to

The "Logistics Visualization System" (hereafter, LVS) is the software developed by NEC based on the cloud service "Neo-Sarf/Logistics" whose operation was started in Japan in 2012 to support visualization of courses of logistics.

The extent of tracking services offered by logistics companies are limited to the contracted transportation service and, in international transportation with a longer lead time, multiple transportation means such as ocean, air, customs clearing, railways and trucking for domestic transportation are concurrently used which often means that there are two or more logistics companies are involved and cargo owners are forced to confirm information about their cargoes with each of those companies as shown in **Fig. 4.** Cloud service has visualized the entire course of logistics for which only fragmentary information was visible in the conventional services.

As the operation image in **Fig. 5** shows, companies engaged in logistics can confirm the current status of cargoes almost instantly by searching by any of "Container number," "INVOICE number," or "transportation order number" once this software has been introduced. Transportation companies will be able to

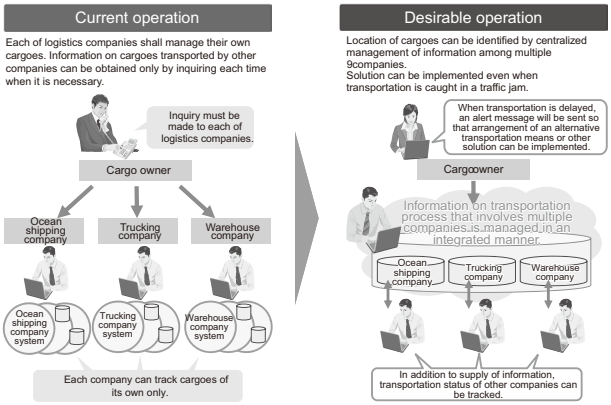


Fig. 5 Operation image of LVS.

quicken and improve efficiency of processing of inquiries from cargo owners as well as to process unexpected transportation delay more quickly. Enhanced visualization of cargoes and sharing of precise transportation information among transportation companies are expected to improve reloading between transportation processes or between companies thus shorter logistics lead time can be expected.

Cargo owners (manufacturers) can expect to improve precision of production plans and production efficiency with improved supply chains by utilizing cargo status information and they can also expect to improve management indices through logistics cost reduction by optimizing stock (stock reduction) and shortening logistics lead time.

LVS also supports optional services including acceptance of transportation orders, function to centrally control warehousing, containers, stock, charge & payment, bidding by logistics companies, simulation of route & charge, dynamic management by

utilizing GPS positional information, or function to streamline driver operations by linkage with smart devices according to the development status of logistics in specific country to realize further improvement of logistics services and improved efficiency of business meeting the different needs of different countries.

5. Functions of the Logistics Visualization System

As **Fig. 6** shows, LVS reviews the "history of logistics" until today in Japan and classifies the course of development of logistics into three periods: "Predawn period," "Developing period," and "Maturation period." It has three menu systems based on the assumption that the development of logistics in Asian developing countries will follow the same process of development as Japan (**Fig. 7**).

(1) Basic Service

For developing countries whose logistics development level is in the "Predawn" period, two functions are avail-

	1960s	1970 to 1980s	1990 to 2000s	from 2010s
GDP per capita (PPP, in real terms)	$5 - 14K	$15 - 29K	$30 - 34K	$35K -
Major players in the retail industry	Department store Small retailers	Super market GMS	CVS	Multi-channel
Historical backdrop	Economic growth from post - war recovery	Rapid economic growth	Economic bubble time	Economic stagnation
Purchase mode	Mass production, mass consumption	Large - lot purchase, low price sale	Many kinds, small amount production and sale	What is necessary when necessary
Production and sale	- Enhancement of production capability - Shifting to production automation	One - stop shopping	Rise in production cost	Globalization
Logistics strategy	Enhancement of railway/transportation industry with transportation enhancing policy	- Display and processing at cargo receiving center - Specification of delivery time	- Separate delivery to stores - Logistics of many kinds, small amount	- Integration of production, sale and product - IT revolution - SCM - Small lot, frequent delivery
Development of logistics	Development of whole sale industry	- Shifting and streamlining to and of logistics system - Logistics as a source of earnings - Setting-up a logistics professional depart within a company	- Sophistication of logistics services - Just-in-time system	- Whole scale optimization - Logistics approach

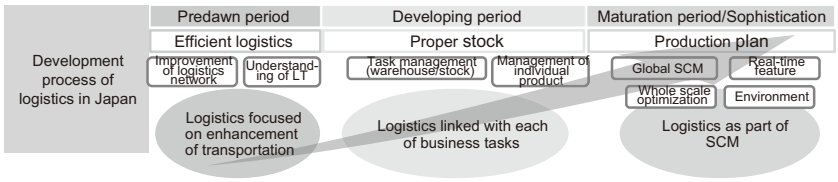


Fig. 6 History of logistics in Japan.

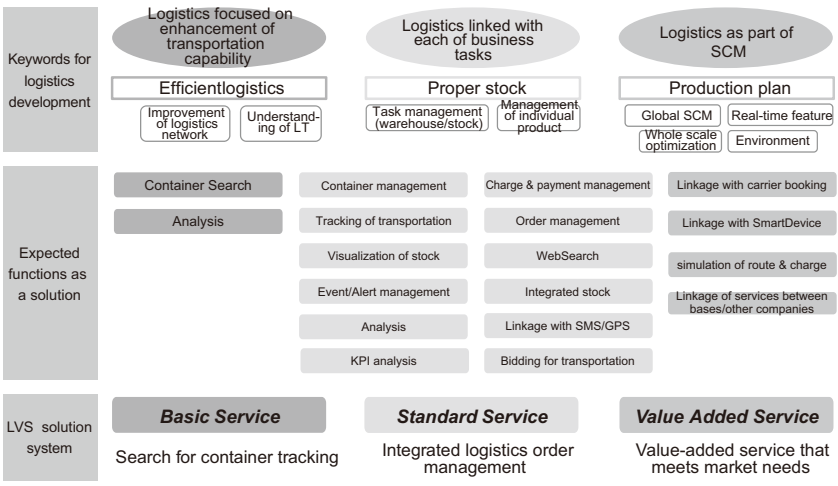


Fig. 7 Overview of LVS functions.

able: "Search" function that enables all users to utilize easy-to-use and reasonable cargo tracking services to obtain precise positional information and job information and a function to analyze collected information to determine a logistics service level.

(2) Standard Service

For developing countries whose logistics development level is in the developing period as well as for global companies whose level is in the maturation period, functions are supplied to manage status on the logistics order basis, to manage payment and charge to reduce logistics costs and to implement just-in-time by improving work efficiency and shortening the lead time.

(3) Value Added Services

A bunch of value added services that support additional functions to meet changes in market needs in the future.

6. Features of the Logistics Visualization System

(1) Continuity

As described above, LVS strives to meet the latest market demands with optimal solutions for functional enhancement that support customers and market sustainability. This responsiveness is made possible by NEC's ready-made logistics visualization solution. NEC continuously provides the best possible solutions that not only resolve current issues but also work towards bringing a brighter future for all.

(2) Reliability

Visualization of the entire transportation process on the End to End basis means that LVS helps speed up the implementation process and optimize the entire logistics value chain with its wide-ranging experience in social infrastructure, ICT and networks. That can enhance reliability of logistics in the nation-wide extent, grasp diverse market needs across countries/areas and attract foreign capital industries. Thus, LVS contributes to economic development, to enhance national level logistics policies.

(3) Flexibility

An optimal transportation data collection model can be offered through cooperation with local companies. LVS's services range are from total system consultation to system implementation and cover everything from upstream (data center, etc.) to uses of specific systems (EDI, RFID, GPS, image recognition, etc.).

7. Conclusion

LVS is a cloud business model that will be offered to customers in cooperation with local capable service business partners taking activation of local business and regulations on local service companies in different countries into consideration to cope with and support sophistication of logistics infrastructure implemented as a result of governmental policies of Asian developing countries as well as logistics strategy such as industrial complexes, cooperative delivery centers, or logistics complexes (logistics parks).

By solving logistics-related issues in developing countries, supply chains can be optimized through the improvement of software-based logistics information network utilizing IT, in addition to the improvement of hardware-based logistics network. LVS is a solution that develops as the sophistication and growth of logistics based on the long experience in Japan and know-how to continuously support development of logistics.

This enables continued supply of services following the development of logistics.

In addition to LVS introduced in this paper, NEC also offers "image and weight based product inspection solution" that enables automatic inspection of foods, beverages, pharmaceutical products and other solid items by employing the image recognition technology for the first time in the industry.

This solution uses NEC's proprietary high speed, high precision image recognition technology and a weight scale, inspects products by checking against their image and weight information registered beforehand to instantly identify the type and quantity and thus improves product inspection efficiency on shipping while maintaining the inspection quality of inspection processes which have been carried out manually in many cases so far.

As can be seen in these efforts, NEC supplies and is committed to improve solutions to promote visualization of logistics, streamlining of works at actual logistics sites, and improvement of quality for the overall logistics-related work by combining actual results and experiences accumulated in many years and the latest ICT (Information and Communication Technology).

Authors' Profiles

TERAKADO Tomohisa
Department manager
4th Integration Department
Transportation and Logistics Solutions Division

The details about this paper can be seen at the following.

Related URL:

NEC Global Enterprise Solutions for Logistics
http://www.nec.com/en/global/solutions/enterprise/logistics.html

Information about the NEC Technical Journal

Thank you for reading the paper.
If you are interested in the NEC Technical Journal, you can also read other papers on our website.

Link to NEC Technical Journal website

Japanese

English

Vol.10 No.1 Special Issue on Enterprise Solutions to Support a Safe, Secure and Comfortable Life - Value Chain Innovation Linking "MAKE," "CARRY" and "SELL" -

Remarks for Special Issue on Enterprise Solutions to Support a Safe, Secure and Comfortable Life
NEC's Approach to Value Chain Innovation
- Safer, More Secure and More Comfortable Living Through Value Chain Innovation -

Value chain innovation: "MAKE"
Making the Manufacturing Industry More Responsive – NEC Manufacturing Co-creation Program
NEC Industrial IoT - Building the Foundation for Next-Generation Monozukuri
Industrie 4.0 and the Latest Trends in Monozukuri Innovation in the Auto Industry

Value chain innovation: "CARRY"
Logistics Visualization Cloud Services in Asian Developing Countries

Value chain innovation: "SELL"
ICT and the Future of the Retail Industry - Consumer-Centric Retailing
An Advanced Electronic Payment System to Support Enhanced Service Provision
NEC's "NeoSarf/DM" E-Commerce Solution and the Omni-Channel Era
NEC Smart Hospitality Solutions - Deploying OMOTENASHI or the Unique Japanese Way of Entertaining Guests

Sustainable living/Sustainable lifestyles
Transit System Smart Card Solutions and Future Prospects
NEC's Commitment to Smart Mobility
EV Charging Infrastructure System That Facilitates Commercialization of EV Charging
IoT Device and Service Platforms Development and Realizing IoT Business

NEC's advanced ICT/SI for the enterprise domain
NEC's Approach to Big Data
Demand Forecasting Solution Contributing to Components Inventory Repair Optimization
Predictive Analytics Solution for Fresh Food Demand Using Heterogeneous Mixture Learning Technology
Global Deployment of a Plant Failure Sign Detection Service
Application of Big Data Technology in Support of Food Manufacturers' Commodity Demand Forecasting
Contributing to Business Efficiency with Multi-cloud Utilization and Migration Technology
Integrated Group Network Using SDN Case Study: Toyo Seikan Group Holdings
Meeting the Challenge of Targeted Threats
Security Assessment Ensuring "Secure Practice" Against Escalating Cyberattacks
Control System Security Anticipating the Coming Age of IoT
NEC's Approach to VCA Solutions Using Image Identification/Recognition Technology
Quick-Delivery, Low-Cost Web Development Architecture born from Field SE
Embedded System Solutions for Creating New Social Values in the Age of IoT
NEC's Advanced Methodologies for SAP Projects

Vol.10 No.1
December, 2015

Special Issue TOP