

Advanced and Green Logistics in Japan

— The Compatible Policy of Sophistication in Logistics Function with Prevention of Global Warming —

Kazuyoshi Oshida

Preface

The amount of carbon dioxide emission is 1.2 billion ton per year in Japan. And, logistics activity accounts 8% share of the amount. And 90% of it is exhausted from truck transportation. The figures have been decreased gradually, from the peak of 2001. However, new government might request more reduction.

I am planning to report “The global warming measures in the field of logistics in Japan”. The measure is one of the most pressing and global issues in this century.

For pushing forward it, correspondence to sophistication in logistics function is indispensable. In other words, today’s motif is “Advanced and Green Logistics in Japan” or eco-friendly sophisticated logistics in Japan and its subhead is “The Compatible Policy of Sophistication in Logistics Function with prevention of Global Warming”

In my presentation today, I’d like to divide it into three main fields.

- 1 The first item is to investigate into “Substance of sophistication in logistics and It’s back ground”.
- 2 The next item is to analyze typical examples of “The compatible policy of sophistication in logistics function with prevention of global warming”.
- 3 The final item is to organize “Characteristics of the examples”.

1. Substance of sophistication in logistics and it's background in Japan

(1) Feature of Japanese logistics market

The first step is to investigate into the feature of Japanese logistics market, which show us cost management are carried out by sender, and conditions of delivery are decided by receiver. First, I'd like to mention that maturity of logistics market requests consumer price of all of merchandise to go down. Therefore, strict demand on logistics cost reduction has been requested by vendor.

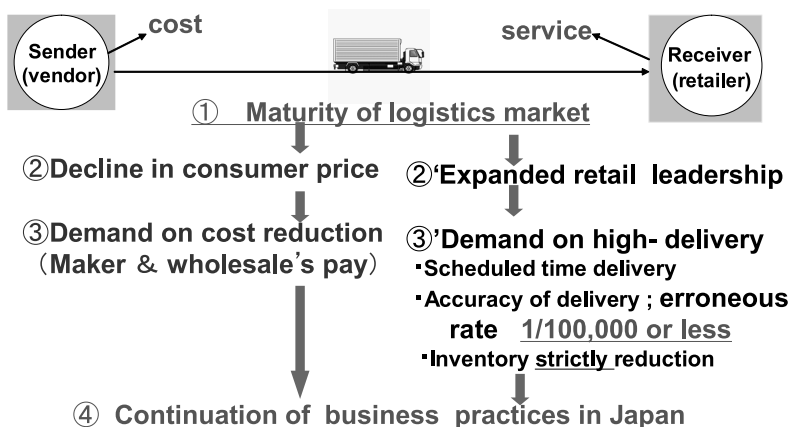
The demand side included receiver or retailer brings expansion of retail leadership. Therefore, improvement of delivery service are requested by receiver or retailer. Retailer has been faced with the activity of end users and requests more consumer information.

The contents of delivery service are as follows. The first service is "Scheduled time delivery included JIT service. The next service is" Growing accuracy of delivery. Erroneous rate of goods delivery is 1/100,000 or less. Thirdly, I want to say that "Reduction of inventory at factory floor or sales shelves of retailer" is strictly requested.

Above mentioned facts are based on long continuation of business practices

Figure 1 Feature of Japanese logistics market

(1) Cost and Service



in Japan. This situation presents that introducing of the milk run system for parts collection has the possibility of reducing the buying price, because selling price includes distribution cost.

(2) Contents of sophistication in logistics system

Let's move on content analysis of sophistication in logistics system. The first step is "Fruition of compatibility of high-level delivery with low cost" The second step is "Efficiency enhancement in firm-wide function". This firm-wide include production and sales function. The next step is "To reduce inventory in the field of procurement, production and sales" Finally, "Measures against social issues" including reduction of exhaust gas—carbon dioxide—is to be pursued,

(3) Characteristics of the inventory reduction

Some of excellent Japanese presidents insist on as follows; "Inventory is the root of all evils for business"

This table 1 show us effects of inventory reduction. These 6 effects include not only cost cut in logistics but also space creation in plants or sales shelves, enhancement in each activities and grasping final demand. Moreover, I would like to say that inventory reduction discovers the hidden business issues.

Table 1 Inventory reduction

Categories	Items
Elimination of product obsolescence	Collection, dead storage, price reduction
Cost reduction	Reduction of inventory interest rate and storage fee
Space saving in production and sales	<u>Space creation in plants / sales shelves</u>
Efficiency enhancement in related business	Improvement in material handling, stock taking
<u>Grasping final demand</u>	More flexibility for total manage.
<u>Discovery of on-site problems</u>	<u>More effective improvement, elicitation of problems</u>

(4) Coexistence with the logistics sophistication and prevention of warming

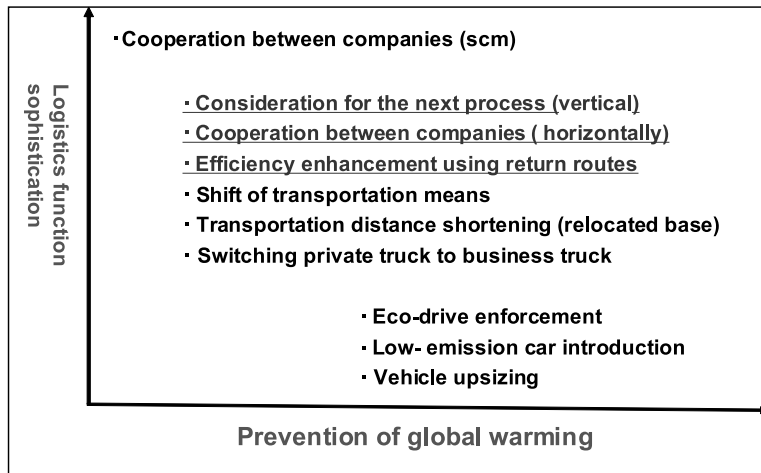
As figure 2 indicates, there are divers measures for “The Coexistence with the logistics sophistication and prevention of warming”

On this figure, vertical axis shows the degree of logistics function sophistication, and horizontal axis shows the degree of prevention of warming. At this figure, typical harmonious measures are considered as follows;

- One is “Consideration for the next process (connecting to vertical cooperation)”
- Next is “Cooperation between companies (horizontally cooperation)”
- And other is “Efficiency enhancement using return routes”.

There are a similarity between these measures, and the feature is that all of logistics sophistication is based on energy saving.

Figure 2 Coexistence Policy



2. Typical examples of coexistence with the logistics function sophistication and prevention of global warming

Now, we are going to look at typical examples of the coexistence.

- (1) The first example is coherent delivery of motor parts for the order of

operations in automobile plant.

(2) The next one is joint delivery in household appliance.

(3) The 3rd one is using return routes system by carrier vehicles for finished cars.

(1) Coherent delivery of motor parts for the order of operations in automobile manufacture

Now, let's move on the example of "Coherent delivery of motor parts for the order of operations in automobile plant".

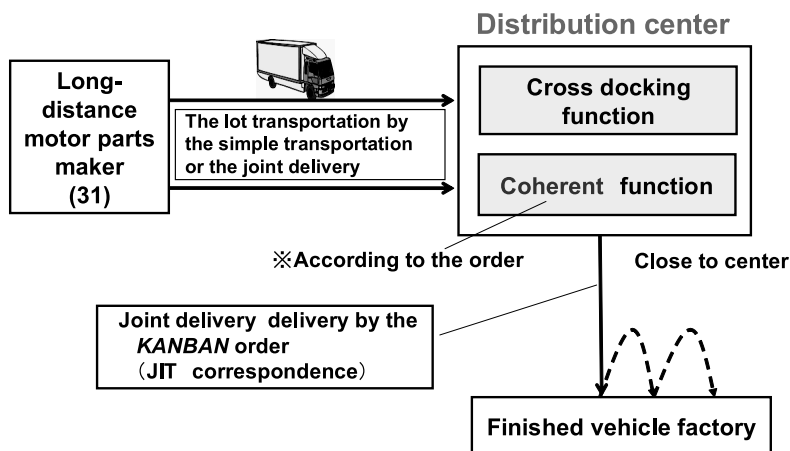
This example shows joint delivery system constructed of about thirty motor parts makers which locate at fairly long distance from the assembly plant. These parts makers use distribution center, which located at near the assembly plant. And they intend to follow JIT delivery and reducing transportation cost at the same time

The most important point here is the coherent function, which arranges the motor parts according to production process at the assembly plant, corresponding to JIT delivery by KANBAN system.

This system offers to maintain the production system without inventory and to reduce transportation cost by joint delivery. This cost reduction produce more merits than increase of distribution center cost.

In comparison with the past, the frequency of delivery per day has reduced

Figure 3 Coherent delivery of motor parts



140 to 57, decreasing about by 40%. Introduction of this new system and switching diesel truck to hybrid truck reduced. 20% of carbon di-oxide.

(2) Joint delivery of household appliance – cooperation between competitive makers –

The next example is joint delivery in household appliance. The characteristic of this system is distribution cooperation for household appliance. The products flows from competitive household manufactures to it's big chain stores.

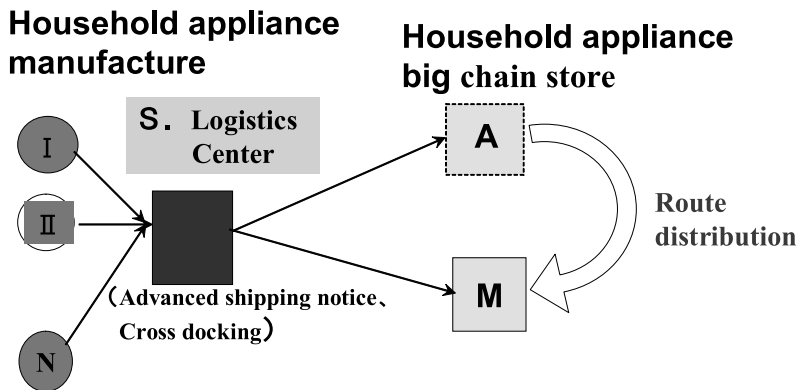
Products by competitive manufactures are integrated at S. (SANYOU) Logistics Center, and are distributed systematically to each big chain stores.

Advanced shipping notice and cross docking system at the center have supported and improved this distribution cooperation.

This system makes urban transportation, goods receiving and it's inspection in the stores effective.

By the way, SANYOU logistics subsidiary which is operating this system, is in close association with the logistics subsidiary of HAIER in China.

Figure 4 Joint delivery of household appliance



(3) Using return routes system by carrier vehicles of finished cars

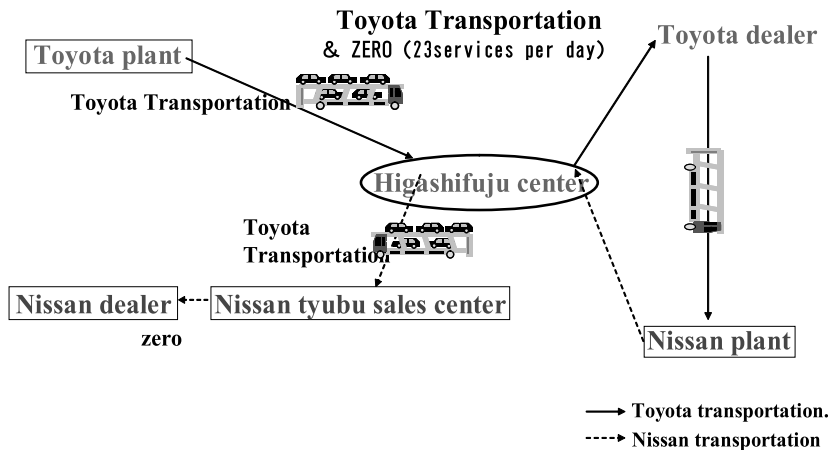
The 3rd example is the joint use of carrier cars by two big automobiles companies, which distance between two is about 350km.

The use of return trips of Toyota carrier vehicle for the carrying of Nissan cars reduce expenses and exhaust gas — in each industries.

The joint use of special transport vehicles by these same or competitive industries are extremely effective.

The characteristic of this system is the operation by each logistics subsidiaries.

Figure 5 Using return routes system by carrier vehicles of finished cars



3. Characteristics of the examples

Above mentioned three examples show us points of views for system construction. This system construction is executed from the standpoint of extensive functional analysis and institutional or organizational analysis.

(1) As for the functional view points, they are as follows;

One of point is “Pursuing efficiency at the next-process”

Next point is “To attach great importance to on-site power (the field power)”

The 3rd one is “Put trade off analysis to practical use”

(2) Then, as for the institutional view points, they are as follows;

One of feature is “Development of logistics subsidiary—as a New 3PL”

Next is “Expansion of local logistics government”

(1) Extensive functional analysis

① Viewpoint for pursuit of efficiency at the next-process

From the standpoint of extensive functional analysis, we are going to investigate for pursuing of efficiency at the next-process”

First, let’s look at policy examples. They are as follows;

One is “Coherent delivery of motor parts for the order of operations of automobile plant, as I mentioned beforehand.” Other is “Methodical delivery by the order of aisle and shelf at superstore”, which example is to be illustrated later on.

Next, let’s look at it’s efficiency. One is pursuing merit of scale by batch-process at the previous step. The other is that policy for next process increases it’s feasibility.

(Example—Methodical delivery by the order of aisle and shelf at superstore)

Next example related to the efficiency at the next-process is methodical delivery by the order of aisle and shelf at superstore.

At the distribution center of superstore, goods integrated from vendors are arranged for the order of aisle and shelf of each stores, and the goods are delivered systematically to each stores. This system makes selection and exhibition of the goods in each stores effective.

Viewpoint for pursuing efficiency at the next-process is very practical for constructing total system.

② To attach great importance to logistics on-site (field) power

Next functional points is to attach great importance to on-site power (or field power). The examples of on-site power are closely related to capability of truck driving, goods delivery, logistics center operation, and the power is exercised not at office but at field work. As for supporting work sites, I would like to say that information system for control on the progress of operation by workers—is indispensable.

There are 3 levels at on-site power. They are as follows;

- The initial stage is “Improvement on just own business”
- The second is “Pursuit of efficiency on related business”
- The final is “Proposals for company-wide improvement”. In case of Toyota-610 thousand cases are proposed per year by on-site power.

From the stand point of managerial concept, on-site power is closely related to empowerment faculty and sensibility in practice. One of the examples is conditions for using return routes.

(Example —Using return routes system by truck)

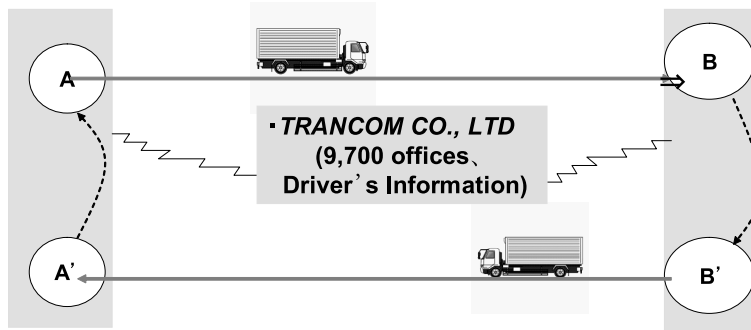
Related to attach great importance to on-site power. I dare to show you an example of “Using return routes system”

Transportation, T (Trancom Company) as of medium sized company is engages in 3PL and matching business. 22 information bases are located in all over Japan and they network 9,700 offices of shippers and truck companies. According to the matching, vacant track run were shorted by 20 million kilometer, and carbon dioxides was reduced by 57 thousands tons by year.

The characteristic of this system is to offer shippers and truck companies substantial on-the-spot information, It contents not only characteristic of trucks but also driver’s appearance and his talking way. This Company shows the amount of reduction of carbon dioxides on it’s home-page everyday. As of this Oct 1st, it showed reduction of CO₂ by 298 ton, which correspond to the amount of gas exhausted by 21,014 household.

As this example shows us, on-site situation conditions the success of logistics system.

Figure 6 Using return routes system by truck



③ Put trade off analysis to practical use

As the 3rd approach, I will briefly run through trade off analysis, or antinomy analysis. This method is very effective for the construction of system

consisted by 2 targets which are on inverse relation, as the relationship between logistics cost reduction and prevention of global warming.

Characteristics of the approach are as follows;

First, it support to investigate real target and criteria for the system construction.

Second, it support to plan both from short and long- term process.

And, it support to express creative power by group.

Among these approach, “Sensitivity analysis” is striking one. This invests the relationship between policy condition and it’s results. Table2 shows the relationship between delivery service level and it’s cost. As for example, 23% cost increase in 2 times delivery par day, compared with 1 time per day for the same amount of transportation,. And 73% increase, by 3times delivery per day.

Table 2 Sensitivity analysis approach

Delivery Industry	Frequency / day		Del. Method	Lots
	1 delivery(=100)		Planned(=100)	Corrugated box
	2 del.	3del.	JIT delivery	(=100) Small-lot
Capital goods	123	215	157	193
Electronics	111	152	130	140
Textile	145	190	120	168
Food product	115	144	139	150
Cosmetic			154	160
Average	123	173	141	162

(2) Institutional analysis

④ Activity of logistics subsidiary

As I told you before hand, system analysis is composed of functional analysis and institutional or organizational analysis. Now, let’s stand at the point of institutional analysis. We have covered two examples, one is “Coherent delivery of motor parts for the order of operations in automobile manufacture”, other is “Joint delivery of household appliance -cooperation between competitive makers-”

There are some similarities between these examples. These system are

operated by logistics subsidiaries by Toyota, Nissan, Sanyou etc., and logistics subsidiaries are developed as the core of the logistics activity of the major manufactures. The subsidiaries are built on the freight of parent company, and the experience in production and sales activities are expected to be applied to a wide range of logistics field.

Subsidiaries drive the cooperation, joint delivery with competitors is very effective, and the integration is threatening the existing logistics specialist. They profess that “Competition exists on the shelf of retail store, collaboration with same business makes logistics sophisticate.”

⑤ Efficiency of medium & small enterprise leaded by local government

Logistics market mechanism has failed in making medium and small enterprise effective. To pursue sophistication in logistics function and tackling with social problems are matters of great urgency.. 99% of the truck companies are medium and small enterprise. The compatible policy of sophistication in logistics function with prevention of global warming is not easy to realize.

Therefore, not only central government but also local government (for example; prefecture, city) and local civilian association (for example; Local Track Association — 47 area—) have to take an active role in the realization.

One of the diverse policies is to pursue efficiency enhancement using return routes for medium and small enterprise, by the local civilian association. This system is operated by “United Association of Japan Freight Transport” constructed by 47 local bases, “Web-KIT system” and the ratio of reaching is 35%.

Other policies are receive wide recognition in the field of finance support and guidance system. This time, let’s see the sign of “Certification of green logistics management”

The requirements for getting ISO 14,000 series needs manpower and finance. Therefore, the ECOMO Foundation founded “Green Management Certification system” in order to promote environmental preservation activity for the medium and small-sized transportation industry. This system was composed of examination, certification and registration, basing on ISO 14000 series.

This sign is pasted on the body of truck. And it shows that concrete environmental prevention activity of each industries. As of March of this year (2010), numbers of registered firms are 3,000. Numbers of truck are more than

Certification of green logistics management



The ECOMO Foundation's system basing on ISO14000 series

180 thousands and increased to 10% of whole trucks.

Conclusion

By the end of my presentation, I'd like to sum up now.

- 1 We have “piles of challenges for the compatible policy of pursuing logistics efficiency with prevention of global warming,” Henceforth, “Global exchange of information related to excellent business model” is effective for the compatible policy.
- 2 “Inventory reduction” “Efficiency at the next-process” “Logistics subsidiary” “Logistics on-site power” “Trade off analysis”, may sound a little bit strange for you. However, comparison analysis is indispensable for the creation of excellent “Business model”.
- 3 Logistics activities are linked to industry over a wide area, therefore, logistics researchers sre available to get expanded knowledge. The knowledge makes good use of discovering new managerial assignment.

In other words, we dare say that “Basic purpose of logistics is to make hidden managerial assignment visible.”

Bibliography

- (1) Kyoto Protocol target achievement plan Ministry of Land, Infrastructure, Transport and Tourism MILT2008.7
- (2) 16th Japan logistics society magazine: foreword, : OSHIDA, 2008.5
- (3) Kazuyoshi OSHIDA: Japanese Logistics, CHUOKEIZAI-SHA. INC, 2004
- (4) Nikkei Ecology, Nikkei Business Publications, Inc. 2008
- (5) Research on Logistical Collaboration in Japan, Japan Logistics Society, project general manager Hideki TSUKUI

あとがき

本年(2010年)10月6,7日,反日行動が勃起する直前の中国,成都の西南交通大学,物流学院において“Logistics Engineering and Management”の国際会議が開催された。米国,独逸等6カ国が参加し,出席者は200名に及んだ。その主題を“Green Logistics”としていたことが何よりの特徴であり,いままで,「環境」とくに「温暖化」対策に背を向けてきた感のある中国が,多少表面的にせよこの課題に向き合うことに共感を覚え,その招聘に応じることにした。本文はこの場での私の発言内容である。PPT file を利用しての発表結果の取り纏めのため,その記述に荒いところがあるが,ご容赦頂きたい。

本報告に対して多分にリップサービスとなっているが,富山大学の李瑞雪先生から以下のコメントが寄せられている。「西南交通大の友人によると,先生のご発表はコンファレンスの出席者の中で大きな反響をよび興味を持たれたそうです。(中略)先生の重厚な研究発表は中国の研究者らに大きな刺激を与えたに違いありません。」

本報告でも視点とし,また物流システム設計での日中比較で心しなければならない事項に以下があることを付記して置きたい。

在庫削減;日本の物流では生産,販売の各分野で在庫とトータルコスト低減を同時目途としてそのシステム高度化を進めてきた。中国では最近まで在庫は産業の豊かさを象徴するものとされていた。

現場重視;日本では物流現場で汗する人からの発想・提言を重視するが,中国ではこれらの役割を事務スタッフへ全面的に託している。

共同化推進;日本の企業間協力ではまず組織としての「規模の経済」を追求し,共同化投資の懐妊期間を耐えて実効を待つ。これを経て個別企業の利を求めると,中国では共同化メリットを直接的,短絡的に個別主体が追求する。

中国における物流システム設計の今後の方向を注目したい。