

Improvement of Logistics Management in Japan

On APEC Seminar on Logistics Management

April 27-29,2000

Chinese Taipei

Hikaru Kajita

Senior Researcher

Nittsu Research Center, Inc.

History of Japanese Logistics Management

Logistics management is continuing to improve with the change of firms' environments. To adapt firms' logistics to the environments, firms must change their systems; this includes organization, information, and accounting. Leading firms are continuing to change their systems step by step. But less competitive businesses need to adapt their systems in a shorter time compared to leading businesses. This is a difficult problem for less competitive companies, because copying a part of leading firms superior processes of complex systems doesn't always bring expected results.

In the past, Japanese logistics management followed the United States model, which we have improved over time. To identify the steps for improving logistics management, I use three terms:

“Physical Distribution”, “Logistics” and “Supply-chain Logistics”.

Physical Distribution

In the 1920s, several American firms applied independent division system to their organizational structure. It was said that the developed

transportation infrastructure made this change. A new retailer channel, the supermarket was born in the mid 1920s. The era of mass production to mass market had begun. To enlarge their organization, their system needed to be changed.

The terms “physical distribution” and “physical supply” were born around this time. From there, the United States firms focused on logistics. Taking these into account, the 1920’s were a turning point for logistics in the United States.

At that time, Japanese marketing researchers introduced the term “Physical Distribution”, but the study of logistics hadn’t begun.

After World War II, in the United States, applying Operations Research technique in logistics systems was tried, and improved tools and methods were developed. Logistics was thought of as a system.

Briefly, physical distribution is a concept that integrates transportation and warehousing. In 1963, the National Council of Physical Distribution Management in the United States, which is a forerunner of the Council of Logistics Management or the CLM, was established. They defined physical distribution as:

“A term employed in manufacturing and commerce to describe the broad range of activities concerned with efficient movement of finished products from the end of the production line to the consumer, and in some cases includes the movement of raw materials from the source of supply to the beginning of the production line. These activities include freight transportation, warehousing, material handling, protective packaging, inventory control, plant and warehouse site selection, order processing, market forecasting, and customer service.”

In 1961, Dr. Peter F. Drucker wrote his essay, “The Economy’s Dark Continent” in *Fortune*, a famous economic magazine in the United States. The essay became a trigger for awareness of the importance of logistics.

In early 1960, the Japan Management Association created Distribution Technology Working Group for studying physical distribution. And, in 1965 the Japanese Ministry of International Trade and Industry announced a new plan about Physical Distribution. Around that time, the Ministry of Transport and the Economic Planning Agency also picked physical distribution as one area of their plan.

After that time, Japanese logistics management has been improving step by step. Prior to their plan, in 1957, the Operations Research Society of Japan was established. Many kinds of operations research tools were applied to physical distribution systems. Systemizing physical distribution was done in Japan without much delay because of the Japanese affinity towards engineering.

Business Logistics

The term “Business Logistics” was born around 1960 in the United States. At this time, the economy had changed from mass production to large-variety, small-quantity production. To adapt to the new environment, firms needed to change their management span from physical distribution to logistics.

Compared to “Physical Distribution”, the span of “Business Logistics” is broader. Adapting to the invisible market, firms need speedy responses to the tendencies of the markets. If a product is a hit in the market, firms need to produce more, and if consumers don’t buy a product, firms must stop production quickly in order to avoid surplus inventory. To

realize this, physical distribution, production, sales and marketing systems must be integrated.

The term "Business Logistics" was expanded slowly but the meaning was modified from the traditional "physical distribution" to the new meaning of "logistics". The reason lies in several factors. First, the market change began from daily consumer goods; so many industries didn't realize the need for change at that time. Secondly, recognizing changing paradigms is difficult for most people. Some articles pointed to physical distribution and logistics differences from 1960, but the concept was first generalized around 1985.

At this stage, Japanese logistics management still followed the United States model. The Japanese market faced large-variety conditions in the mid 1970s around the first oil shock. From late 1980, several leading companies changed their logistics management while also changing their organizations. In 1992, Japanese logistics councils chose their convention theme, "from physical distribution to logistics". Japanese logistics management began around 1990.

Supply-Chain Logistics

Information networking made the next paradigm shift in logistics management. Around that time, the improvement of transportation technologies and deregulation of transportation had also occurred. So, many logistics researchers emphasized transportation change, but I think that the increased importance of information technology had a much greater effect on logistics management changes.

Using the infrastructure of telecommunication, logistics changed dramatically. The traditional functions of maker, distributor, and retailer had to be reconsidered to exploit information network power. This means

traditional trading ways had to be changed under the information-networking era.

In the mid 1970's in the United States, strategic use of information networking was tried in several leading companies. In 1981, telecommunications were deregulated, and the application of information technology in strategic use was expanded. In 1985, a famous supply chain management concepts, Quick-Response, or QR began in the apparel industry. A similar movement appeared in several other industries. To extend inter-business networking, standardization of Electronic Data Interchange or EDI was developed. And the term "Supply chain Management" was born.

Japanese telecommunication was deregulated in 1985, 4 years after the United States. Information systems improvement started earlier. Transportation deregulation partially started during the 1990's and has been growing to the present. Most Japanese firms didn't change their management span within that time. I assume they didn't recognize its importance because their products were still cost and quality competitive at that time. Around this time, the American firms studied the competitive advantages of Japanese firms, and the new concepts, "Supply-Chain Management" and "Lean Production System" were born. Now, American products have gained cost and quality competitiveness from that study. Japanese firms had to change in order to compete globally.

In recent years, supply chain management or SCM and e-business have caused meteoric globalization. To adapt to this environment under less competitive production costs, improving logistics management to the same or higher level compared to other advanced nations is the most important objective for Japanese firms. Before the era of SCM and the Internet, technology and service were strong areas for competitiveness.

Now, logistics ability makes for strong competitiveness. The importance of logistics management has grown dramatically.

The latest definition of logistics by the Council of Logistics Management is:

“Logistics is that part of the supply chain process that plans, implements, and controls the efficient, effective flow and storage of goods, services, and related information from the point of origin to the point of consumption in order to meet customers' requirements.”

Japanese Special Characteristics of Logistics

Logistics management systems are built on each country's special characteristics. In order to understand Japanese logistics management, one must understand the special characteristics of the Japanese systems, because they have a substantial effect on logistics management systems. I will describe 5 of them:

employment systems, organizational structure, trade practice, consumer characteristics, and other special factors. We are faced with changing or adapting to these phenomena.

Employment System

Most Japanese firms organizations have special features, which are not familiar to other countries. The strength of Japanese manufactures is said to be that the employment system stores knowledge and skills. For example, Total Quality Control is a common activity in a Japanese workshop, in which a group of workers checks its activity voluntarily. By

checking activities, they hope to reduce cost and improve quality. This made for stronger competition with other countries' products.

They are built on the following features.

- So-called “life-long” employment
- Seniority system of wages and promotions
- Intrafirm labor unions

These phenomena produce high quality labor. Many systems in Japanese firms are structured ambiguously. Therefore, if some unexpected problem were to happen, employees would act by themselves, making their own decisions. This however, detracts from improvement of logistics management, as it is impossible to reengineer business processes, if systems are not defined precisely. So, when we are faced with changing logistics systems, we have to clarify all the processes in advance, which takes a huge amount of work, otherwise nothing can be changed.

The other obstruction is that “personnel expenditure is a fixed cost”. Employees are spending their whole business lives in one company. This means that, if the workload is decreased because of information technology, firms don't reduce the cost of these excess workers. Thus, it is not necessary to clarify workload costs for full time employees. Under these circumstances, firms tend not to allocate personnel costs on distribution costs accurately.

The focused solutions to this problem are “activity-based costing” or ABC and “outsourcing”. When costs are a part of each activity, the cost change of systems will become accountable. When logistics activities are entrusted to a logistics service provider, firms may get both clarified logistics costs and a change from fixed to variable cost.

Organizational Structure

The organizational structure of many Japanese manufacturers has also assisted in establishing the competitive advantage of their products. When business units were designed, they were divided not by products but by functions.

The uniqueness of this system is the responsibility of business units. Production business units sell all the products that they produce to the sales business units or a sales subsidiary company. Production business units mainly respond to production costs, so they concentrate on increasing capacity usage ratio. The advantages of Japanese products may also depend on this system. In mass production conditions, low production cost makes for strong competitiveness with other countries.

However, these phenomena hinder the improvement of logistics management. In unclear market conditions, the risk of excess inventory is high.

To solve this problem, Japanese firms are trying to change their organizational systems. For example, several large manufacturing firms introduced company systems recently, which take responsibility for product cost and profit.

Trade Practice

One of the Special Japanese characteristics in domestic trade practice is a high wholesaler to retailer (W/R) ratio. This was an efficient system when transportation and communication infrastructures were poor. But under current conditions, distribution systems have to be changed, and the change is starting in many industries.

Pricing systems are also different from the United States. That is, delivery cost is included in selling price. From the order side, delivery service seems to be free; therefore, Japanese delivery service is very complex and expensive in many cases. This is one barrier for foreign firms.

Consumer Characteristics

Some of complexity in logistics service is inevitable to respond to the end user, that is, the Japanese consumer. Without recognizing it, entering the Japanese market is hard for foreign companies.

In 1991, the 8th Distribution Issue Committee in the Economic Planning Agency investigated the problem of complex distribution services. In their study, they made a hypothesis that retailers were too sensitive about the date of production on processed foods. They sent questionnaires directly to the consumer, and they found that consumers check the date of production very carefully. It may come from the Japanese custom of eating raw seafood.

The next feature of Japanese consumers is that they are very fashion conscious. This means that the lifecycle of products in Japan is very short. For example, canned drinks may disappear from retailers' racks after only 2 weeks from their introduction. Almost half of the items in convenience stores change within a year.

To sell these products to the consumer, delivery lot needs to be small, and delivery lead-time needs to be short. Of course, in several cases, delivery services are clearly excessive, but in order to change the logistics service, detailed research is needed.

Other Factors

Japanese firms are also affected by other factors. One is high land cost. Before the collapse of overheated stock and real estate markets, during the so-called bubble economy when land prices soared, having warehouses was a very large investment in Japan. Firms tended not to account building and land costs on logistics costs.

The next factor may be the largest problem in Japan. Japanese have not taken logistics seriously enough. Logistics curriculum in Japanese universities is still poor. Shortage of capable logisticians is also hindering logistics management improvement. To improve logistics management, a wide range of knowledge is needed in the areas of trading systems, production systems, marketing, finance, information systems, and off course, logistics systems.

In recent years, there have been many changes to adapt to global competition, but the speed is not rapid enough to fit the dramatically changing environment.

Advantage of Japanese Firms Logistics

The superior factors of Japanese firms logistics also stand on the Japanese employment and organizational systems. Because of “life-long” employment, employees accumulate knowledge and skills. Therefore, people may work to improve systems, and the mission of each person is not necessarily defined clearly. The differences between leading companies and followers come from “the use of scientific methods” and “innovation” in logistics.

The term “Supply Chain Management” came from a study of Japanese Automobile industry’s just-on-time system, which was made by TOYOTA and called “Kanban system”. This innovative system was thought of in the production division. The production division reengineered the process of supply in order to reduce production costs. This is an original Japanese concept. Top companies in Japan are chosen as leading cases of logistics in the world.

SONY constructed a world satellite network as a global logistics information system in the late 1980s, which is named STREAM. In this system, SONY can capture their entire inventory around the world almost in real-time. The base of this system was constructed in the 1970s to grasp the entire parts ordering status for global procurement. In the information network era, quick logistics action is needed. For global firms, reports of overseas logistics status in almost real-time base are needed. Now, using this system, SONY is able to allocate inventories of products dynamically, in order to fit the ever-changing market place.

Seven-Eleven Japan may be one of the most excellent retailer logistics management cases In Japan. It operates convenience stores, which are one type of retailer channel. Convenience stores are developed on franchise system. Seven-Eleven Japan provides the franchisee the supply and selling system for their growth. One store’s floor area is around 100 square meters, most stores are operated 24 hours a day, and one store sells only 3,000 items in a variety of fresh and processed foods, household items, stationery, magazines, and so on. When they first began business, the brand and systems were imported from the United States.

After starting, the system was continuously improved and changed, both to fit the Japanese market and to become more competitive with other

retailers. They strongly focused on logistics and information systems. Now, the convenience store system has advanced to use information strategically.

They use Point of Sales data, but they also use knowledge of their purchaser. For example, they use their personal network to get events information on events around their store. When they get information about an athletic meeting of an elementary school, they ask the question; "in this event, what kinds of items are preferable, and how many are needed?" After the event has finished, they check the sales data that the store system accumulates. Data and worker-acquired knowledge are used for next events. Seven-Eleven Japan calls this method, "Hypothesis and Checking."

The store information system also accumulates demographics data; that is, when, gender and what age group buys what item. The system also shows the weather forecast for order support. Using these accumulated data with a data mining system, they construct a highly efficient supply system.

Now Seven-Eleven Japan leads "Convenience store EC model," which is an original new way of handling goods that consumers order on the Internet. It is said that the total hours spent working is longer in Asian countries. To receive goods ordered on the Internet, using stores that are open 24 hours may be one of the most convenient choices for consumers.

Necessity of Activity-Based Costing for Logistics Management Improvement

To improve logistics management, indicators that show current status are necessary. In the “logistics management” era, Cost indicators are important because of the adjustment of production and selling processes. We must know, what kind of product, and which kind of customer is not profitable. In the “Supply-Chain Management” era, this condition is indispensable. To improve supply chain management, we need to know what kind of concrete process change gives how much cost increase or reduction for the company.

One solution for this is Activity-Based Costing or ABC. ABC clarifies cost of each activity that composes the logistics process. To calculate them, activities of all the logistics processes, each activity due resource, and operation time of each must be clarified. To apply ABC, Industrial Engineering may also be applied on logistics systems simultaneously.

Accurate cost accounting is also indispensable to global procurement. In Quick-Response or QR of apparel products, accurate costing showed that domestic products’ lower lead-time can compete against imported goods’ lower production costs.

Introducing ABC is needed for all types of firms; manufacturers, wholesalers, retailers and logistics service providers. For the logistics service user, it gives the solution for improving supply chain management, and for the logistics service provider, it gives an efficient operational solution. In addition, under the circumstance of third party logistics, service rate should be based on ABC; otherwise shippers cannot examine collaboration methods of their supplier or customer.

ABC just indicates current status. To use it more valuably, using other indicators in conjunction is important. For example, using a timetable, quality data, and other indices with ABC shows more accurate process status and leads to more efficient solutions.

Change of Logistics in Internet era

Logistics has the prospect of greatly altering the processes of e-business. The Internet expands global procurement and global sales. Global competition is going to be heated, and the change in speed may be more rapid than ever experienced.

We need to satisfy four requirements. First, distribution speed must be closer to information speed. Second, distribution accuracy must be closer to information accuracy. Third, inventory of the whole distribution chain must be minimized. And of course, the fourth requirement is cost reduction.

To satisfy these requirements, the functions of logistics are greatly changed, and the speed of change is rapid.

Transportation

Under the conditions of Internet commerce, the quantity transported might be closer to the end-users quantity. The increase of small lot cargo transport in both procurement and distribution is assumed. Least order-to-shipment lead-time is required for inventory reduction, which is required to adapt both to global financial markets and short product life cycle. Also, importance of logistics service quality will increase.

To solve these requirements, the importance and use of consolidation systems have increased. Fortunately, in Japan, there are

many consolidation systems. For delivering direct to consumers, we have several home delivery service networks. Most of them have cargo-tracing systems on the Internet, so users can check the status of their cargo directly. Several consolidation networks provide time delivery service, where users specify the delivery time within a two-hour range. Some provide delivery over a 24-hour period, so we can receive goods even at midnight.

The Internet is also useful for reducing the cost of transportation. There exist several load matching services in Japan, which are both exchange or auction type.

For quality improvement, use of a type of cellular telephone, called “i-mode”, has begun. To check the status of cargo almost on a real-time basis, information terminals need to be installed on trucks. This type of portable phone is a substitute.

To construct global markets, the development of a transportation infrastructure that is linked to information systems is needed.

Warehousing

Warehousing flexibility is also needed because of matching delivery with information speed.

In “Physical Distribution” era, warehouse location was decided for reducing total cost of transportation and warehousing. In “Logistics” era, the number of warehouses was reduced, but each became larger, in order to reduce total cost of transportation, warehousing and inventory. In “Supply Chain Logistics” era, the joint operation of warehousing had to be increased either for customers’ convenience of receiving goods or for reducing costs

from scale merit. Standing on these changes, warehousing is changing to the next step.

As information systems can capture the status of goods in almost real-time basis, we now can control variation in item stock in variation in numerous stock points with keeping or decreasing inventory level. For time consuming delivery, trucks may substitute for the function of stock and distribution node as a “mobile warehouse”. Furthermore, a warehouse comes to have the brokerage function of procurement and distribution, as well. Finally, it is also presumed that the case of applying cross-dock systems will be increase and the function of it will change.

Inventory Control and Information System

The logistics system’s inventory control, which makes shipping directly to the consumer possible, must meet two conditions: First, both transportation and manufacturing lots are going to be smaller than now. Next, integration of inventory management is required at various points from the supplier to the consumer.

Furthermore, achievement of operational synchronization with the supplier is necessary for total chain management. The famous personal computer maker, DELL’s model reserved the flexibility of the production system by allocating the industrial orientation of the supplier near its workshop. As for ebusiness, it is presumed that procurement becomes global with the same inventory level. Procurement and production in smaller lot becomes necessary as well for the supplier.

Increases in both efficiency and accuracy of processes are needed for compressing both total lead-time and total inventory from supplier to the consumer. The exploitation of the information system becomes

necessary to complete this. It is expected that the improvement of Global Information Infrastructure decides the expansion of global e-business of the future.

The rapid increase of globalization in both procurement and sales has been predicted. In this circumstance, a greater variety of items in a small amount in least lead-time with high quality and low cost is required in logistics. To realize them, advanced logistics management is mandatory for of firms, especially regarding information and logistics infrastructure.

Conclusion

In this article, I showed you the checkpoints for logistics management improvement, based on my research and experience in Japan.

On the first subject, "History of Japanese Logistics Management", I picked up 3 stages of logistics management. The control span is continuing to become wider. To make successful balanced logistics management, recognizing the current level of integration is necessary.

Regarding Japanese special characteristics of logistics, factors that impact logistics in Japan was pointed. To improve logistics management, obstructing factors must be clarified, and reengineering current system of intra-firm, and intra-distribution is needed.

On the third subject, "Advantages of Japanese Firm's Logistics", some cases of advanced logistics management in Japan were picked out. Continuous improvement using personal knowledge and experience, scientific methods and innovating logistics systems is a force for logistics excellence at leading companies.

Next, the necessity of Activity-Based Costing for logistics management improvement is explained. Without indicators, nothing can be improved. Especially in logistics, many inter-organizational problems exist. To make effective decisions about them, accurate cost is the most powerful measurement.

Finally, the presumed logistics functions as changed by the Internet. E-commerce is making for rapid globalization were picked out. To keep or gain advantages in this competition, advanced logistics management of firms is a mandatory condition, especially regarding information and logistics infrastructure.