Featured Articles

Use of Smarter Distribution for Global Logistics Service

—High Added Value Service Achieved through Integration of Procurement, Logistics, and Information—

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OVERVIEW: Among the challenges facing the emerging economies of Asia are how to deal with high logistics costs, inefficient logistics operations, rapid increases in the volume of goods, and rising expectations for service quality. Of particular note is that management costs make up a high proportion of logistics costs in China, indicating that there are problems with logistics operations. In response, Hitachi has devised a service model that considers optimization across the entire supply chain and overcomes customer problems through the integrated provision of procurement, logistics, and information. To trial this service model, Hitachi has undertaken an in-house demonstration project to verify and assess its benefits, and based on the results, has deployed it from Japanese corporations based in China to Southeast Asia. In the future, Hitachi plans to expand the service into one that will support its logistics strategy through the utilization, analysis, and evaluation of big data to supply services with high added value.

INTRODUCTION

AS a proportion of gross domestic product (GDP), the cost of logistics in the emerging economies of Asia is more than double that in developed economies. This indicates that logistics in these economies are less efficient than in developed economies. Also in urgent need of attention are the rapid increases in the volume of goods resulting from surging production, and rising expectations for service quality.

Among Asian emerging economies, logistics costs in China, the world's second largest economy by GDP, are considerably higher as a proportion of GDP than those in Japan (17 to 18% in China compared to 8.6% in Japan). Of particular note is that management costs make up a higher proportion of logistics costs in China (13% in China compared to 4% in Japan), indicating that there are problems with logistics operations.

In response to these problems, Hitachi provides services with high added value that consider optimization across the entire supply chain through the integration of procurement, logistics, and information. Hitachi's initial aim is to overcome the logistical problems faced by manufacturers in particular, targeting China where these problems are clearly evident.

OVERVIEW OF GLOBAL LOGISTICS SERVICE

Service Model

Fig. 1 shows the service model for Intelligent Operations for Logistics, Hitachi's global logistics service.

This integrated service to manufacturers combines parts procurement (procurement), distribution and

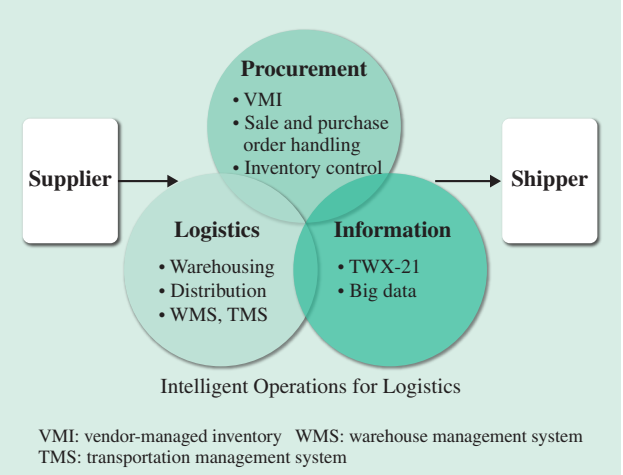


Fig. 1—Service Model.
Hitachi provides a service to manufacturers that integrates procurement, logistics, and information.

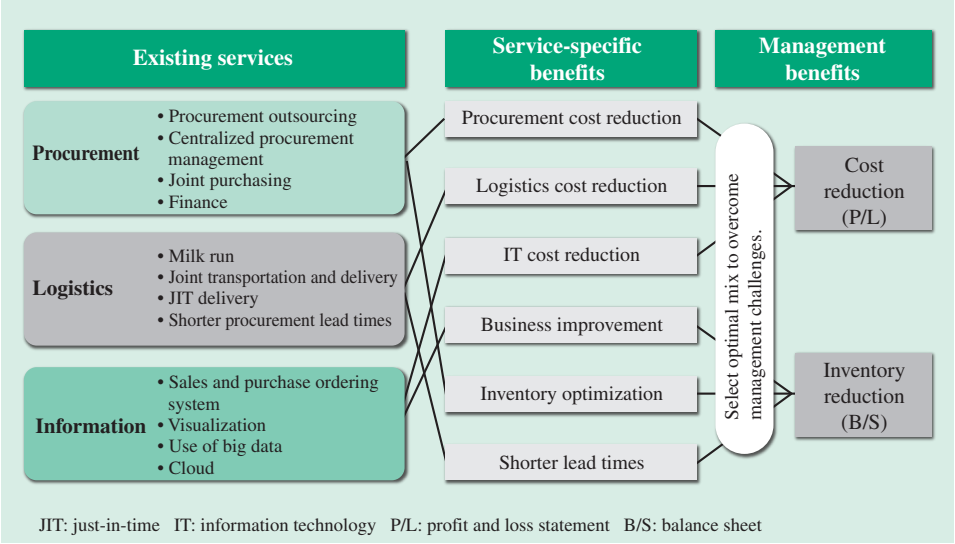


Fig. 2—Anticipated Service Benefits.
This overcomes business challenges by selecting the optimal combination of existing services.

warehousing (logistics), and information technology (IT) (information).

Anticipated Service Benefits

As described above, the service is provided by combining different services from across Hitachi. Along with the specific benefits provided by each service, this should also provide management benefits that solve the more complex management problems that customers face. Two particular management benefits are as follows (see Fig. 2).

(1) Cost reduction [affecting the profit and loss statement (P/L)]

Procurement cost reduction, logistics cost reduction, IT cost reduction

(2) Smaller inventory [affecting the balance sheet (B/S)]

Business improvement, inventory optimization, shorter lead times

Service Organization

In order to provide the best possible service after conducting a preliminary evaluation, this service includes organizational infrastructure to handle each phase (see Fig. 3).

(1) Planning phase

Formulating ways of improving logistics, consulting on how to optimize locations of sites in different parts of the world

(2) Design and development phase

Logistics model, information system design and development

(3) Operation phase

Logistics, trading, IT services

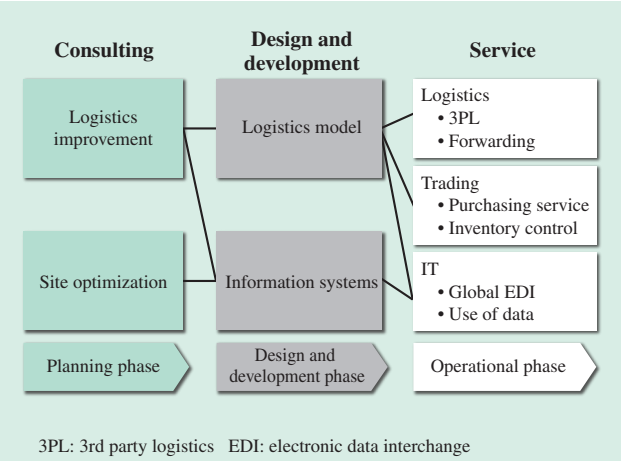


Fig. 3—Service Organization.
After conducting a preliminary evaluation, services are provided for each phase.

DEMONSTRATION PROJECT TO TRIAL THE SERVICE MODEL

Demonstration Project Model

A demonstration project involving the Chinese plants of Hitachi companies was conducted to verify the benefits of adopting the global logistics service (see Fig. 4).

The demonstration project was conducted in conjunction with the trial introduction of a "milk run service"[*1] for three Chinese domestic suppliers (operated jointly with adjacent plants belonging to seven existing companies), and involved monitoring the status of goods received before and after adopting the service and collecting logistics information to estimate the benefits. Also, procurement data from

*1 A round-trip service in which a vehicle visits a number of sites in turn to collect goods.

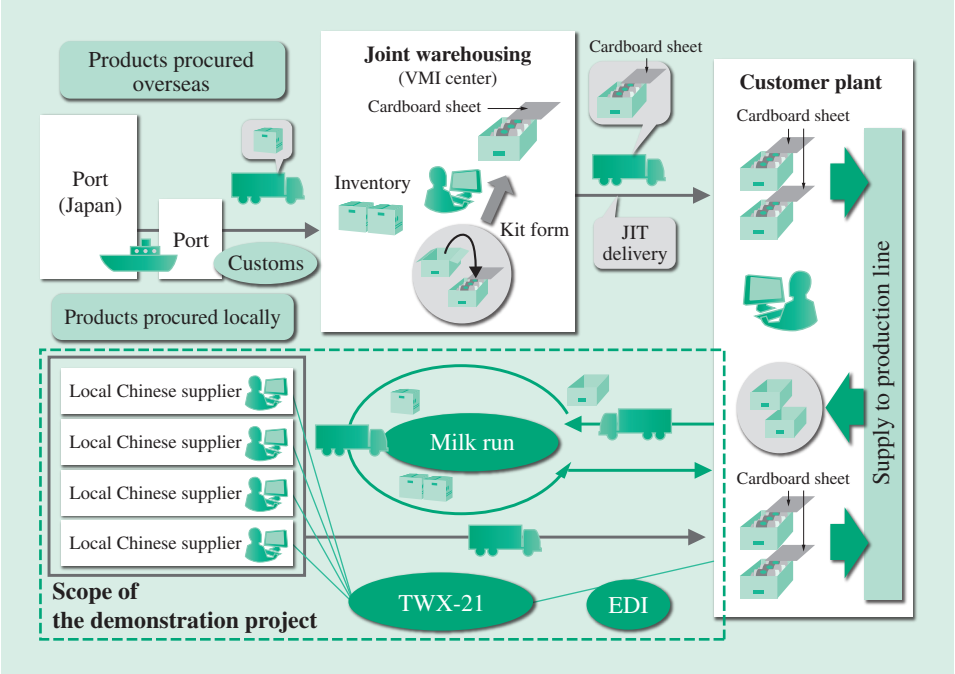


Fig. 4—Demonstration Project Model.
The diagram shows the scope of the demonstration project in terms of the three-way integrated service model.

the trial was entered into TWX-21[*2] and a simulation performed to assess the benefits of adopting electronic data interchange (EDI). The project also sought to identify issues for the future through consultations, etc. with customers about their inventory visualization needs (during September 2014).

Trial Results

The demonstration project identified the following benefits.

It demonstrated that using a milk run service both reduces the cost of procurement logistics and improves logistics quality. Similarly, the simulation indicated a reduction in inventory amounts.

The simulation of the benefits of adopting TWX-21 also indicated that a reduction could be anticipated in the amount of work-hours required for procurement. In numeric terms, the specific benefits are as follows.

(1) P/L benefits

(a) Reduction in procurement logistics costs

Sharing a milk run to the suppliers of the three new companies and seven existing companies with neighboring plants reduced logistics costs by 12.7%.

(b) Reduction in work-hours required for procurement

The estimated savings in work-hours for tasks such as purchasing and warehousing resulting from the adoption of EDI for procurement (simulation of 40 existing suppliers) was 17.1%.

(2) B/S benefits

(a) Reduction in inventory amounts

A simulation estimated that having neighboring plants share a milk run provides a 22.4% reduction in the amount of inventory due to more frequent deliveries made possible by the higher total volume of goods.

(3) Quality benefits

(a) Increased proportion of goods delivered on time

Switching from delivering directly from the supplier to a milk run operated by a logistics company increased the proportion of goods delivered on time from 50% to 77.7%.

(b) Lower rate of carton damage

The proportion of cartons arriving with damage fell from 12.5% to 4.3%.

Evaluation and Issues

While the fact that the demonstration project achieved logistics cost savings in excess of the 10% that had been anticipated is significant, Hitachi also recognizes that the following issues will need to be dealt with in order to operate the service business.

The milk run was the only part of the demonstration project implemented in practice, with EDI being assessed by simulation in a test environment. Furthermore, the scope of the project did not include vendor-managed inventory (VMI), meaning things like procurement outsourcing or just-in-time (JIT) delivery. In terms of assessing the service's three-way integration model, these remain as issues for the future.

*2 A business application service that Hitachi supplies globally via the Internet. TWX-21 is a trademark of Hitachi, Ltd.

Also, the benefits from the milk run applied to a subset of suppliers. The goal this service should be aiming at is to consider all suppliers and identify which operations should be included in the milk run to achieve maximum benefits, and which operations are better served by adopting VMI, and then to offer overall optimization that combines both approaches. The necessary ongoing verification work for achieving this needs to continue.

In the future, Hitachi intends to investigate and prepare for the commercial operation of high-added-value logistics services that can support business reforms involving smarter logistics, such as analysis and evaluation functions that use big data.

FUTURE DIRECTIONS

Future Activities Directed at Global Markets

The global logistics service described in this article has (from FY2015) already started supplying services to Hitachi and other Japanese companies that manufacture products such as transportation equipment, electrical machinery, and components in the Chinese market that will help improve operations outsourcing, such as warehouse management, transportation, and procurement outsourcing, and operational management such as the presentation of procurement and logistics information, and make it more efficient. Hitachi intends to expand this business from FY2016 by extending it to other industries. From FY2017 onward, Hitachi intends to extend and expand the service to emerging economies in Southeast Asia and elsewhere along with the global operations of its customers.

Establishment of IT Service Platform

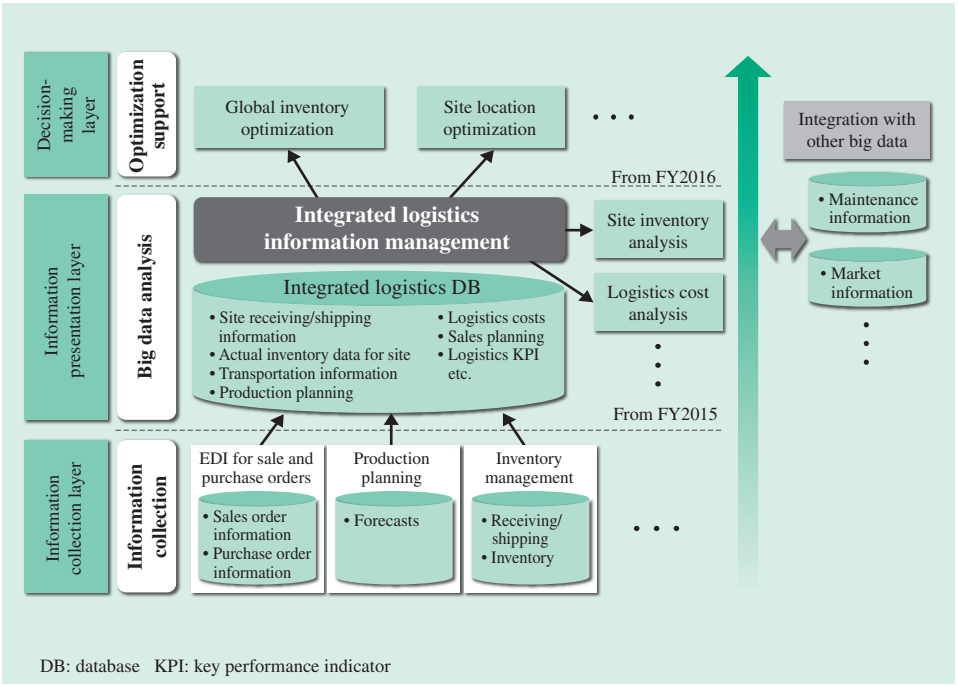
To provide an IT service platform to underpin this service, Hitachi has extended the information collection layer to include production planning and other production management information and sale and purchase ordering information, expanding the collection of logistics-related data to build an integrated logistics information database, and using the EDI functions that handle the exchange of data as a base. It will use this information as a basis for offering analytical services for logistics, such as inventory analysis and logistics cost analysis. The ultimate aim is to provide information that supports logistics strategies that are based on business strategy, including optimization of things like global inventory and the location of operations (see Fig. 5).

High-added-value Services

Along with establishing an IT service platform, Hitachi is also considering the use of big data for analysis and evaluation to supply high-added-value services. The following are three examples of this work.

(1) Inventory analysis service

This service improves customers' production management by determining best practices for things



DB: database KPI: key performance indicator

Fig. 5—IT Service Platform. From its use for information collection, the service will be further developed to use the information for analysis, and subsequently to become a service platform for providing information to support management strategy.

like safe inventory levels and order points for the inventory information stored in the integrated logistics database.

The service uses order information, production information, inventory information, and inventory simulations to provide the following inventory analysis reports.

(a) Inventory trend analysis: Identifies inventory trends for each product.

(b) Emergency transportation analysis: Identifies trends in emergency transportation for each product.

(c) Safe inventory level analysis: Identifies the appropriate safe inventory levels for each product based on demand fluctuations.

(2) Supplier assessment service

This service improves supplier management by analyzing supplier-specific trends in orders received, forecasts, and other supplier information handled by customers.

The service uses supplier information to provide the following supplier analysis reports based on quality, cost, and delivery (QCD).

(a) Quality analysis: Identifies trends in defects for each product.

(b) Cost analysis: Identifies supplier-specific cost trends for each product.

(c) Delivery time analysis: Identifies trends in proportion of on-time delivery for each product.

(3) Site location optimization service

This service is used to identify which of a number of candidate cities is the lowest-cost option for production, warehousing, and other facilities when a customer makes changes to their supply chain.

The inputs to the service are the candidate sites; actual data on things like sales, production, and inventory volumes; and management indicators (for maximizing revenue), and it uses mathematical optimization techniques to rapidly search through site location plans. Providing a number of potential location plans that maximize revenue enables the customer ultimately to narrow-down the possibilities. This optimizes the customer's supply chain costs to support their global operations.

In the future, Hitachi intends to realize these proposals for consideration in accordance with market needs.

CONCLUSIONS

This article has described a global logistics service for manufacturers operating throughout the world that contributes to the reform of logistics through the integration of procurement, logistics, and information. With logistics markets in emerging economies, particularly in Asia, being forecast to experience rapid growth, leading to an ongoing expansion in demand for ways of making logistics more efficient, Hitachi sees this as a field where it can make good use of its strengths in both operations and IT.

In the future, Hitachi intends to expand the service into one that supports customers' logistics strategies by creating new services that have never existed before, such as cross-industry coordination and high-added-value services that use big data on logistics collected from this service.

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(2) Japan Institute of Logistics Systems, http://www.logistics.or.jp/english/about.html

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