

International Advanced Logistics Perspective in the Global Economy¹⁾

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Abstract

This article focuses on the international advanced logistics perspective in the global economy. The early 1980s could be referred to as the turning point for the world shipping industry. Since then world physical distribution has suffered from the effect of deregulation, IT revolution and globalization on the transactions of multinational enterprises. If applying the Vernon-Casson's product lifecycle theory to the division of multinational industries, we can discriminate the four different zones of international physical distribution, of which the innovative and the mature industries are related to the air cargo and the standardized differential and the simple standardized ones to container cargo. The flying geese theory in Asia and especially Chinese challenge to this theory have explained the structural change in the international physical distribution, which can have promoted the buffer function of Asian trade and the advantage of air logistics since 1995. Tracing the development stages in the logistics industry and differentiating the domain of shipping, we are aware of being at present either in the stage of 3PL providers with vessel (integrator) or without one (3PL forwarder). Such trend toward 3PL provider will request the shipping industry to combine hardware and software in both of shipping and air transport as the 3PL mega carrier (combined 3PL), because it will be able to guarantee both of the shipper oriented long term profit stability and the short term low risk sensitivity to business cycle.

Key words: logistics, supply chain management, 3PL provider, integrator, mega carrier, flying geese theory, product cycle

1) This paper is the revised form of my following article. Miyashita, K. (2006), "International Logistics Strategy in the Global Economy," *Proceeding of the International Symposium on "Maritime Transport Demand in Northeast Asia and Towards the Creating of New Services"* held by Ministry of Land, Infrastructure and Transport Japan, Tokyo, Japan, 18th January.

1. Overview of Shipping Markets: The Beginning of the 2nd Life Cycle

The shipping industry was build up independently of trading industry at the end of 19th century, when world shipping markets began to function in coincidence with the completion of the industrial revolution in Western Europe. From 1880 on, transactions relating to charter shipping service were conducted at the Baltic Mercantile and Shipping Exchanges while liner shipping service was facilitated by the Conference System. Such transaction systems have supported the development of the shipping industry. Since the 1970s, in terms of bulk and oil cargo transportation, a system under which long term transport contracts behind the scene are signed with shipper before ships are built has been adopted. Such a system is still used today through the use of contracts of affreightment. This type of contractual system which utilizes mid to long term contracts has lead to shipper satisfaction and has been highly assessed by also shipping industry because of the guarantee of the long term profit stability. In contrast, the Conference System proved to be sustainable for approximately 100 years until the implementation of the 1984 US Shipping Act. Under the Act, deregulatory in nature, based on contestable market theory, traditional liner shipping tends to change itself into a contract carrier instead of a common carrier²⁾.

The early 1980s could be referred to as the turning point for the world shipping history. At that time, the growth rate of world shipping services, measured in ton-miles, had declined to almost zero, concluding the first life cycle of world shipping. Faced with a new environment, traditional liner shipping firms, which had been dominated by the shipping cartels, was forced to change market strategy.

Since 1986, the world shipping industry has experienced growth, mainly supported by the continuing economic growth of East, South East and South Asia. In the last 20 years, shipping services have been growing rapidly in compared with the world shipping tonnage. This makes possible to continue a policy of deregulation in the liner shipping industry due to the fact that new entrants face zero sunk costs³⁾.

2) Miyashita, K.(2000), Global Management Problem of Container Shipping, *The Journal of the Korean Association of Shipping Studies*, Vol. 31, pp.29-43.

3) Miyashita, K.(1999), The Influence of the Asian Currency Crisis on the Shipping Industry and Its Direction towards 21st Century, *OECD/MTC/DNME, Workshop on Maritime*

It appears that the world shipping industry has entered a new life cycle and is experiencing growth. The first life cycle continued for approximately a century (1880-1985). How long can the new cycle bring about dynamic development in the new environment of the world economy?

Growth in the Asian economy has significantly promoted the globalization of national economies, the deregulation of economic systems and the introduction of information technology. To understand the dynamic development in the Asian economy, it is logical to apply the product life cycle theory to the analysis of multinational enterprises and international physical distribution.

2. Basic Structure of International Physical Distribution

Casson's empirical analysis of US multinationals during the 1980s differentiated four categories under which subsidiaries are dependant on their parent firm⁴⁾. The categories are equivalent to the so called Vernon's product cycle stages⁵⁾ which include innovation, maturity, standardized discrimination and simple standardization. In the global economy, the four developmental stages of multinational enterprises can be measured according to the different grades of dependence of a specific subsidiary on imports (procurement) from and exports (sales and physical distribution) to its parent firm.

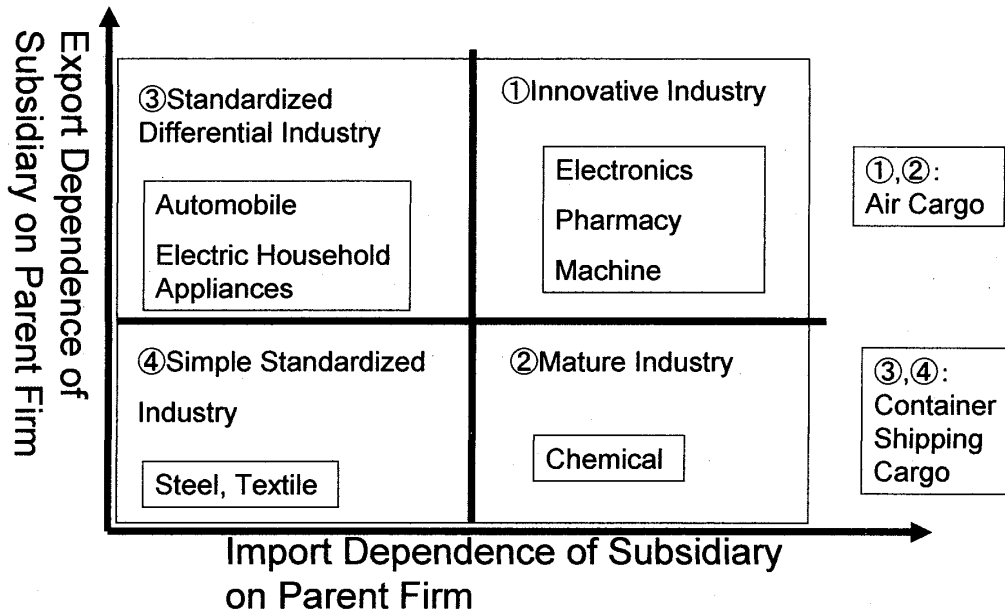
As indicated in Fig.1, for innovative industries (e.g. electronics, pharmacy, and machine), subsidiaries have the highest dependency on their parent firms for international procurement from and international sales to them. On the contrary, in simple standardized industries (e.g. textile, steel) subsidiaries have the lowest dependence on parent firms for both export and import procurement. Subsidiaries in mature industries (e.g. chemical) depend to a larger degree on imports rather than exports from the parent firm and those in the standardized discriminative industry (e.g.

↘ *Transportation Policies*, Kobe, Japan, 27th October.

4) Casson, M.(1986), *Multinationals and World Trade*, Allen & Unwin, pp.21-22.

5) Vernon, R.(1966), "International Investment and International Trade in the Product Cycle," *Quarterly Journal of Economics*, Vol.80, pp.190-207. Vernon, R. (1979), "The Product Cycle Hypothesis in a New International Environment," *Oxford Bulletin of Economics and Statistics*, Vol.41, pp.262-263.

Fig.1 Basic Structure of International Physical Distribution —
Classification of Industry by the Stages of the Product Cycle —



automobile, electric household appliances) depend considerably more on exports than imports to them..

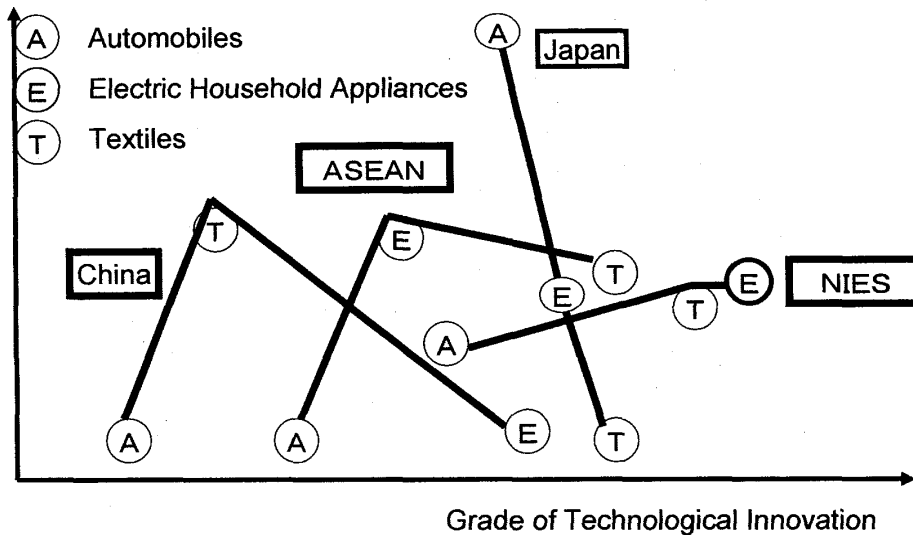
Fig.1 provides us with useful insights on how to investigate international physical distribution. The products created by innovative and mature industries on the right hand side of the chart are more oriented to air transport. On the left hand side of the chart, products produced by standardized discriminated and simple standardized industries are more oriented to sea transport. Nonetheless, there is overlap and modal competition continues to play an important role in international transport.

3. Review of Flying Geese Theory on the Container Shipping Cargo Flow

Using PIERS data (informed by the Journal of Commerce) on container cargo flows from Asia to the US for the period from the 1980s to the 1990s, it appears that industrial organization in the Asian economy has been changing drastically, especially in Japan, NIES, ASEAN and China. The automobile, electric household appliance and textile industries can be considered as three of the representative industries when container cargo flows are analysed. The growth of such flows in each country or in each industrial economy follows in principle the flying geese model, which depicts a cycle which starts at the textile industry, moves to the electric household appliance industry

and finishes at the automobile industry as shown in Fig.2⁶⁾.

Fig.2 Flying Geese Theory as Observed in Asia Pacific Container Cargo Flows:1980-98 Share of Physical Flow



Source of Data:PIERS(Port of Import/Export Reporting Service)opened by The Journal of Commerce

The vertical axis in Fig.2 denotes the share by industry (textile, electric household appliances and automobiles) of total export cargo flows in each country or industrial economy. The horizontal axis represents the degree of technological innovation as measured by the coefficient of the variation in cargo share. In Japan, the automobile industry constitutes the largest share of export flows. This replaced household appliances and in turn textiles as the largest share of export flows and thus follows the traditional flying geese model. Also, in the graph, Japanese industrial organization is represented by a relatively vertical line. This demonstrates that technological innovative ability in all three industries is similar and dominant. Even the textile industry in Japan has been restored and ranked at a standardized discriminative level that is not consistent with the results of Casson's analysis.

Fig. 2 also shows that, in China and NIES the electric household appliance industry has the highest degree of technical innovation while in ASEAN it is the textile industry.

China, as a WTO member, has not followed the traditional flying geese model and has surpassed ASEAN countries and is rapidly approaching NIES. In the 1990s, following

6) Miyashita, K. (2002), *Global Competition in Japanese Logistics Industry (Nippon Buturyugyo no Global Kyoso)*, in Japanese, Chikura-shobo, Ch.4.

national economic policy, China concentrated its efforts on the infusion of foreign investment into the electric household appliance industry. In the 2000s, China has shifted its focus to concentrate on the automobile industry.

In addition, Korea, which overcame the Asian currency crisis, has returned to a high level of economic growth as an OECD member. The tremendous growth in China and NIES has resulted in East Asia driving the Asian economy, generating large volumes of international container cargo distribution flows.

ASEAN's position has been severely affected by both China and NIES and is becoming weaker. Though there is political discussion on how much further East Asia should be allowed to develop, the international logistics industry has ensured a wide range of business opportunity in Asia by taking advantage of the competitive advantages and disadvantages in each country. The Asian economy has driven the logistics industry firms to develop and improve upon their economies of scale and economies of scope.

4. Buffer Function of Air Cargo Trade with Asia

The flows of value added air cargo in Asian trade has been growing. This trend is supported by data generated from a time series of air export prices per cargo tonnage from Japan to the USA and Asia. In 1985, export prices to the USA were about 5 million yen higher per cargo tonnage as compared with prices to Asia. However, in 2004, export price levels to Asia slightly exceeded levels to the US.

On the contrary, the price to import air cargo from Asia into Japan has been almost half of levels from the US and the EU. In other words, the terms of trade for air cargo are approximately double the levels as compared with the terms of trade from the US and the EU. Thus, the Asian economy has started to play a buffer function role as related to Japanese trade, which has an effect on the global economy.

Both the driver and buffer functions played by Asian trade in the global economy have forced not only the international logistics industry but also the shippers' business world to take note. When shippers develop a logistics strategy relating to Asian business, it has become impossible to avoid the role of the Asian economy.

Thus, due to the development of the Asian economy, the quality and quantity of

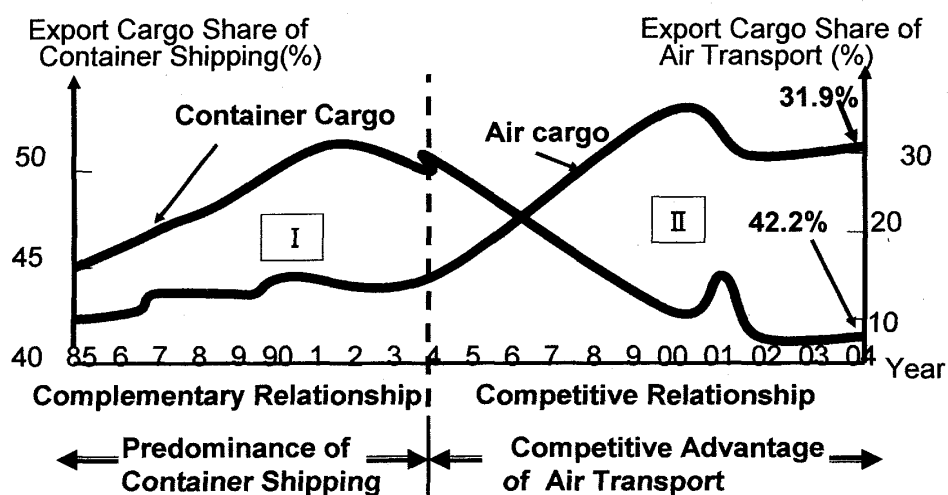
world trade has been growing. In particular, the value added trend in Asian trade has accelerated the importance of time costs in addition to the traditional space costs. Shippers have focused efforts on minimizing total costs in order to reduce inventory costs⁷⁾.

5. Developing Trend of Air Transport

The share of air cargo trade, generated from Japanese exports, in value terms, has been increasing since the second half of 1990s (Fig.3). In general, until then, the complementary nature of sea (container ship) transport and transport by air had been predominant over a long period of time. However, at the present, air transport plays a leading role in international logistics and has pushed the limits as to how the logistics industry functions. This has led to a competitive relationship with sea transport. Such a remarkable change in modal competition in value terms demonstrates that shippers have become extremely sensitive to time costs.

The competitive gray zone which exists between container shipping and air transport

Fig.3 Development of Trade by Air in Japan Competitive and Complementary Relationship with Container Shipping



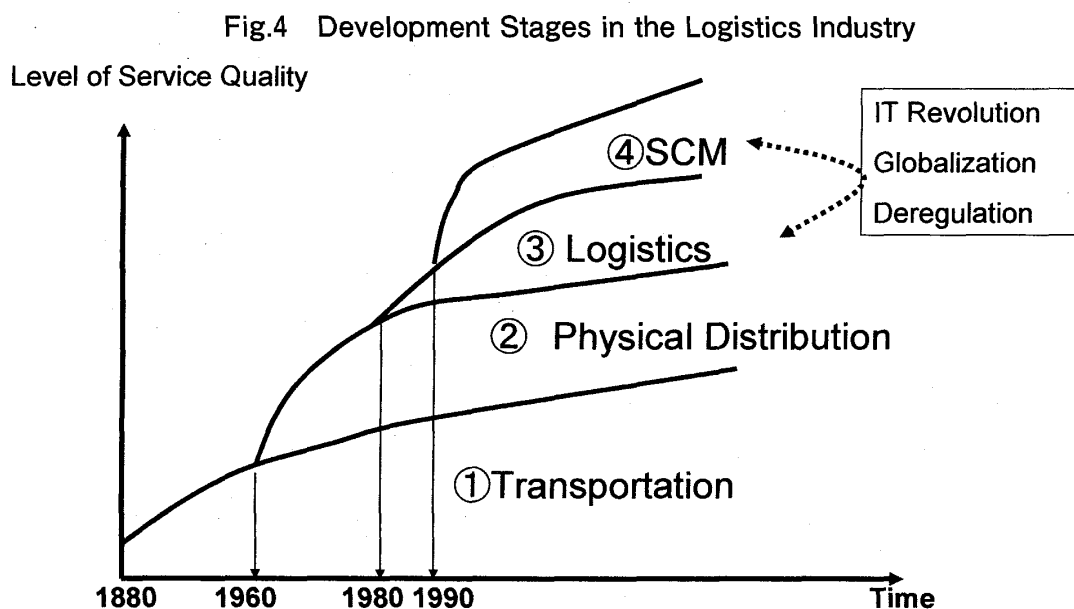
(Source of Data) Ministry of Finance

7) Miyashita, K.(2006), Japanese Economy and Global Logistics (Nippon Keizai to Kokusai Buturyu), (in Japanese), *Proceeding of the Work Shop on Knowledge Intensive Logistics Cluster*, held by Kobe University, 27th February, Kobe, Japan, Section 6, pp.12-13.

is not only being influenced by changes in opportunity costs in both business cycles and product cycles, but also recently by the further development of the shippers' logistics strategy and SCM (supply chain management)⁸⁾.

6. Four Stages of Logistics Development and the Strategic Logistics Support

Fig.4 represents the four stages of logistics development from transportation to SCM. Since the second half of the 1980s, in a deregulatory environment, it has become a popular and necessary strategy to incorporate a logistics system into a business model with the intent to promote information technology. From that point on, the traditional physical distribution industry has moved beyond the hard infrastructure (transportation) and soft infrastructure (physical distribution including multimodal transportation) stages and reached a stage which supports the logistics strategy of shippers. The third stage is referred to as logistics support and the fourth and final stage as SCM support. The logistics system supports intra-firm trade and SCM inter-firm trade.



8) Miyashita, K. (2005), *What Kind of Structural Changes Have Been Found in International Physical Distribution by Air?* (*Kokusai Ku-Un Buturyu Ha Dou Kawatta Ka?*), (in Japanese), Aviation Policy Research Association Series, No.454, pp.1-2 and 16.

Following demand from shippers, physical distribution industry firms acting as either the carrier or the forwarder have transformed themselves into Third Party Logistics (3PL) firms. Shippers entrust the logistics function to 3PL as a business partner, who promotes new frontier business in order to offer shippers' strategic logistics system.

To enter into such a new business, the freight forwarder forms a much closer relationship with exporters and typically has their staff work at the client firm, putting a greater focus on sublimation of traditional reverse integration strategy.

On the other hand, shipping firms have built up their freight forwarder division and transformed themselves into a shipping integrator in order to competitively challenge 3PL business. This is because shipping firms have been affected by large scale shippers' forward integration strategy under which the forwarder is bypassed and the shipper deals directly with the carrier.

The large scale shippers have traditionally managed their own forwarding division. Therefore, it will not be easy way for shipping firms to provide 3PL services which can be differentiated from the large shippers' traditional forwarding services. A knowledge management strategy should be adopted by shipping firms rather than an infrastructure-based strategy.

Thus in the shipping domain, four kinds of business fields are simply differentiated as follows (Cf. Fig.5)⁹⁾:

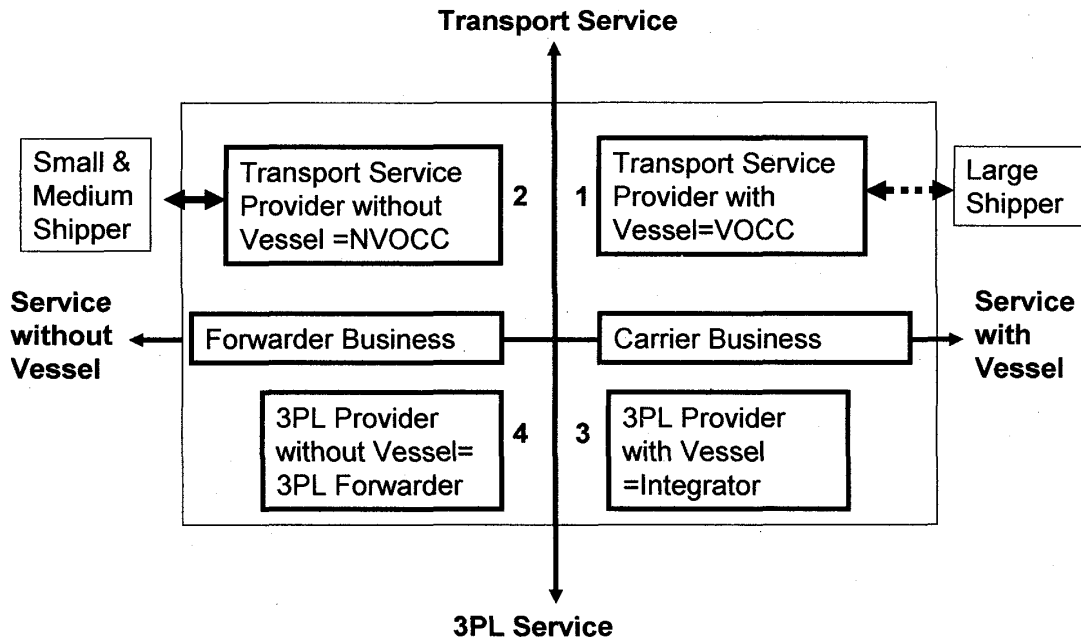
1. transport service provider with vessel=carrier business=VOCC,
2. transport service provider without vessel=forwarder business =NVOCC,
3. 3PL provider with vessel= carrier business=integrator, and
4. 3PL provider without vessel=forwarder business=3PL forwarder.

7. Concluding Remarks: Perspective of International Logistics Industry

Freight forwarders already ship cargo by both the sea and air modes of transport. Air cargo integrators (FedEx, UPS, DHL, TNT etc.), on the other hand, have experienced an increase in the demand for their services as a 3PL provider. Taking into account such a considerable increase in the demand for shipment by air cargo in value

9) Miyashita, K.(2006), Japanese Economy and Global Logistics, *op.cit.*, pp.17-19.

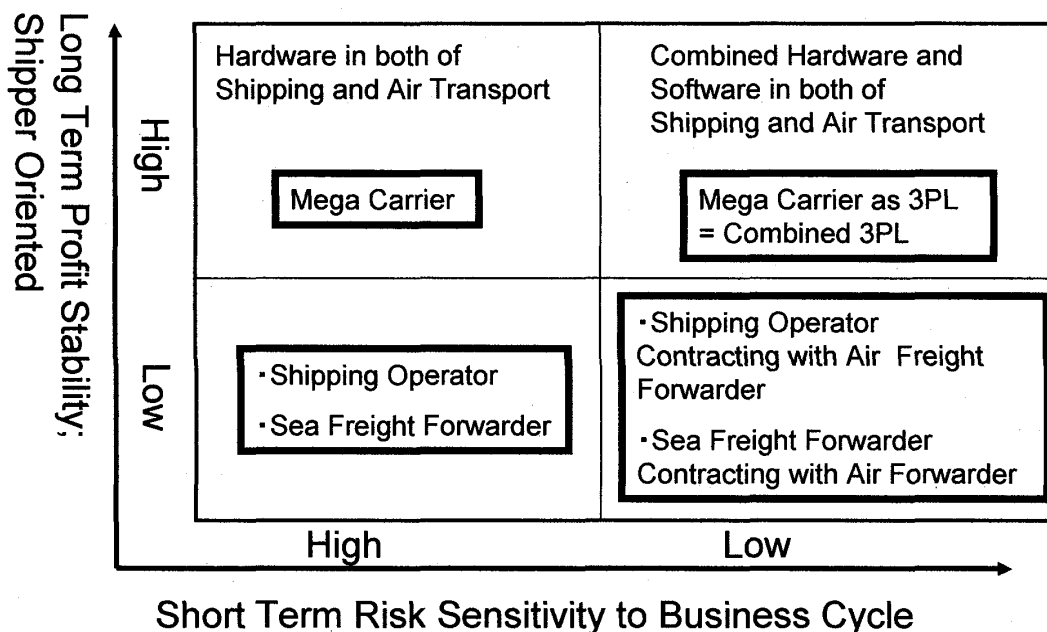
Fig.5 Simplified Domain of Shipping



terms, there will be strategic advantages for the shipping industry to offer air cargo transport services in addition to container shipping services. This kind of transport operator is generally called a mega carrier. If the operator manages air cargo freight forwarding as well, it can be referred to as a combined 3PL.

The mega carrier as a combined 3PL has become the focus of strategy planning in

Fig.6 Enlarged Domain of Shipping



the international logistics industry. This is because the competitive advantage of such a structure can be found in both long term profit stability and in short term insensitivity (low risk) to the business cycle.

Thus, in the enlarged domain, four kinds of business fields for the shipping industry can be differentiated as follows (Cf. Fig.6):

1. long term profit stability and short term low risk (sensitivity) to business cycle
=mega carrier as 3PL=combined 3PL
2. long term profit stability and short term high risk (sensitivity) to business cycle=mega carrier
3. long term profit instability and short term low risk (sensitivity) to business cycle
= shipping operator (carrier) or sea freight forwarder contracting with air freight forwarder
4. long term profit instability and short term high risk (sensitivity) to business cycle = shipping operator (carrier) or sea freight forwarder

Which field of business is best selection for a specific firm, depends on the scale of its financial and human resources, in addition to the business concept of top management. Shipping and air cargo industries both complement and compete with each other in this new business field, where forwarders and integrators as well have entered the market as players. Strategic competition in the international logistics industry is an important area for future research.