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Supply Chain of the Transportation Industry and  
Network Building Strategy

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# Supply Chain of the Transportation Industry and Network Building Strategy

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**Abstract:** The main goal of this paper is to examine the trucking businesses that have established a competitive advantage over other companies in Japan. We hypothesize that network building capabilities by discrimination of transaction methods are related largely to the ratio of sales and market share of the Japanese trucking business.

In general, the terms utilized by transaction companies have been applied to the trucking business in this paper. The analogous terminology for the trucking industry is that the B2B is mass cargo delivery to another company from the corporate consignor, B2C is small cargo delivery to consumers' shipper from the corporate consignor, and C2C is small cargo delivery (courier services) to general consumers from general consumers by trucking company. Based on the transaction system, we analyze each business model for the trucking industry.

For this, we examine a comparative analysis between major trucking businesses in Japan such as Nippon Express, Fukuyama, Yamato Transport, and Sagawa Express and the differences among transaction systems were classified. The features of the network business in the trucking business and differences of profitability within these systems are discussed.

**Key Words:** Supply chain management, Network building strategy, Transportation industry, Transaction methods

## 1. Introduction

If a “manufactured product” does not move naturally, then either factory or customers need to move. According to the 2011 logistics cost survey questionnaire of Japan Institute of Logistics Systems, there was a “review of the logistics base” and there were a lot of answers concerning logistics cost reduction measures. Based on this survey, sales logistics cost ratio was 4.9 percent in all types of industry. It indicates that the cost of pay-to-full-time workers accounted for more than half of the distribution costs.

We will discuss the transportation needs of the enterprise level business where punctuality and quality of service are critical. In particular, for high mobility, logistics focuses more on trucking businesses and consequently 3PL (Third Party Logistics) from the supply chain and logistics perspective (Japan Trucking Association, 2012). Therefore, we will be concentrating on the business model of trucking businesses and its underlying role downstream in supply chain “logistics”.

Currently, the rising oil prices due to the rapid depreciation of the yen and the global economic downturn, have resulted in a domestic production decrease. Consequently, even though there was an excess of 14 trillion yen in the market for Japan’s trucking industry in 2008, Japanese companies experienced a reduction in market funds of 11 trillion yen. This was due to a decrease in domestic production and a global recession (Japan Trucking Association, 2012).

Since then, there has been a drastic change in the trucking industry and the market became saturated with it. However, Yamato Holdings and SG Holdings, now holds a monopoly on the market of courier services. The main goal of this paper is to examine the trucking businesses that have established a competitive advantage over other companies. We hypothesize that network construction capabilities by discrimination of transaction methods are related largely to the ratio of sales and market share of the Japanese trucking business.

In general, the terms utilized by transaction companies have been applied to the trucking business in this paper. These include transactions conducted between companies and general consumers (Business to Consumer, B2C), transactions between

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companies and companies (Business to Business, B2B), and transactions between general consumers and general consumers (Consumer to Consumer, C2C). The analogous terminology for the trucking industry is that the B2B is mass cargo delivery to another company from the corporate consignor, B2C is small cargo delivery to consumers' shipper from the corporate consignor, and C2C is small cargo delivery (courier services) to general consumers from general consumers by trucking company. Based on the transaction system, we analyze each business model for the trucking industry. Analyzing the logistics of case companies will enable us to examine the business logistics of Japan as a whole. Subsequently, the results can be later expanded upon for application to the national trucking industry.

### 2. Literature Review

#### 2.1 History of the transportation industry

There has also been a modal shift after the World War II. During the high economic growth of the 1960s, with an increase in mass production and mass consumption, larger vehicles and development of road infrastructure (highway construction) were made. Japan's transportation industry began to shift away from a railway centered industry towards a truck centered industry for transporting cargo. Special loading trucks transported and delivered a mixed cargo door-to-door. The former "line service" has played a role in the promoting the evolution of Japan's transportation industry (Ooya, 2005).

In 1955, transportation was comprised of 53 percent railway (JNR) for domestic shipping, which was only 36% of Japan's total rail system and 12 percent of the overall ton-kilometer-based domestic cargo transport. 31% share in the railway, 43% domestic shipping, and 26% truck in 1965 of 10 years later, truck transport volume was 48.4 billion tons. Around 1975, the truck has surged to 129.7 billion tons of 36% share whereas the share of railway dropped to 13%,.

However, currently high economic growth is slowing down and the economy is experiencing a great downturn. Commercial cargo for B2B was the mainstream trucking practice. However, in 1976 Yamato Transport began providing "courier service." Until this point, only the post office had been doing so. The Transport Services based on

consumer transactions of C2C also began. Yamato Transport has innovated the trucking business. The performance result proved that shares of trucking were varied greatly, and some companies had not been able to make a profit until now. The transaction system of C2C caused the market shares to grow significantly.

In addition, since 1998, it handled mainly consumer transactions (business-to-consumer). Major changes that occurred in the trucking business transactions in terms of B2C, and C2C were due to the development of e-commerce. These changes began to appear in a number of courier services handling these transactions. 10 years later, 3197 million parcels were delivered in 2008. Previously the number of courier service was 1833 million parcels in 1998. However, this number has now surged (Mori, 2006). Carrying out delivery to other parties has been leading the trucking industry. SG Holdings and Yamato Holdings have been overwhelmed by handling C2C courier services.

In recent years, a few issues in the trucking business, such as traffic congestion and environmental issues have been raised many times. During the Great East Japan Earthquake that occurred on March 11, 2011, the logistics for supplying necessary lifesaving goods to consumers and critical supplies to enterprise companies was strongly tested. The importance of the supply chain via the trucking industry was practically reviewed during that desperate time.

## 2.2 Research on network construction and supply chain of transportation industry.

Network construction due to the difference in transaction method tackled the issues that differentiate the trucking business from other transportation methods in Japan. Thus we chose to discuss the network construction capabilities in this paper. Since there are network features in the trucking business, we tried to particularly examine the network construction theory through case analysis.

Generally, for more than one individual or group, an organization plays a common specific purpose. While mediating the social network beyond the boundary of the organization, the network organization is coupled vertically and horizontally. It is said to be a form of organization that can function with a decentralized decision-making structure or to be relatively autonomous (Wakabayashi, 2009).

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On the other hand, in view of the network construction theory in terms of a social structure, a key individual plays a role of mediator in the relationship of the people. People would lose the connection in the social structure, if it were not for this intermediary. Burt (2001) referred to this intermediary as a structural hole. Profit and control of information obtained from the network-rich structural holes are reflected in the innovation. Profitability is determined not only by human capital and financial capital, but by whether or not you are connected to the social network. In addition, if you have a preferred social network, it is possible to effectively control the information, or increase the "opportunity" for profitability (Rost, 2011).

These topics will lead to the discussion of complementary assets. Teece (1986) discusses the concept of sustainable innovation in the most successful commercialization. There is a comparative relationship between complimentary assets, and capability and resources of know-how. For example, an information channel is required for commercialization of new pharmaceutical products. Also some computer companies want to take software content, such as OS, application software and game content as their complementary assets. A good example showing that the failure to acquire complementary assets leads to the demise of a company was Sony's victory of transistor radio over the United States electronic company, RCA. RCA relied heavily on technology license revenues from the Japanese company Sony. However, Sony sought to acquire complimentary assets of manufacturing and cheap labor cost. RCA failed because they didn't obtain the complementary assets of manufacturing capability, where as Sony became a global competitor.

Kim and Mauborgne (2005) and also Porter (1980; 1987) mentions the importance of complementary assets and complementary goods. As one of the risk avoidance strategies for the concept of value innovation strategy, they propose the blue ocean strategy to achieve this. They have suggested avoiding Search Risk by using specific techniques: (1) look to the industry to provide alternative services and alternative materials, (2) oversee the strategy of various groups, (3) look to the difference in the conventional buyer groups, (4) oversee the complementary services and complementary products, (5) question the sensibility rational or functional rational and (6) lengthen the time axis.

In this way, network construction can be a decisive factor of the most important

strategy to acquire complementary assets. This established the sustainable competitive advantage of the company. On the other hand, value was created through open process, such as the network feature of having public goods (Chesbrough, 2007). It is considered as a concept similar to the so-called public infrastructure. The value of openness can be seen by network effects (Chesbrough and Appleyard, 2007). The conventional theory of point ownership due to the internal network construction enterprise has been the focus of the main discussion. The barriers to entry, switching costs, and inter-industry competition of public goods in an open network are particularly difficult. In other words, earning value generated from innovation by companies lead these companies to claims rights to intellectual property (Park and Hong, 2012).

However, the substantial portion of the value that is generated does not go into the hands of individual companies. Therefore, it is important to acquire the value that has been created by open innovation. The architecture of network construction is the bases to bring together knowledge that is scattered. Furthermore, if there is no judgment on how and whether the system is sufficiently operated as open knowledge source, then the system will not be able to provide a useful solution. Therefore, the strategically important point in an open innovation network is the ability to adjust to individuals and communities, without alienating members of the Ecosystem further. This further creates value acquisition that lasts. This approach will be applied to consider the role of the network in the supply chain of the transportation industry.

As mentioned above, when examined from the point of view of sociology, people lose their ties in the social structure if there are no intermediaries. Likewise, if there is no intermediary (network that mediates) some companies' "products" are not able to move. They cannot simply go out in the world by themselves and manufacturers also need to make profit. The intermediaries of the trucking business and transport companies in Japan are discussed in this paper.

The trucking industry has a different "base network" from other companies. However, they have a similar characteristic to the "social network." Particularly, B2B operations are quite similar to social networks in regard to the format of carrying out transactions; the timing and frequency of sharing information between companies; also in terms of the form and amount of incoming and outgoing information, etc. On

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the contrary, once selected, the network format and style of the exchange of information allow for the consideration of changes in transaction structure and competition patterns. It is believed that by this network of e-procurement system, the format of the transaction will continue to have co-evolution through the dynamic interaction (Oh and Fujimoto, 2001).

After the E-procurement network has been selected, it is believed that the transaction structure is gradually changed. It will continue to co-evolve through the process of dynamic interaction. Likewise, it is possible to apply a similar concept to the trucking business. Historically, in the case of trucking industry, it was observed that after the transaction type is selected, the network construction is gradually changed. This was evident in cases where certain features of the network structure were present in specific transaction systems.

The research on network construction of trucking business used the case analysis of a typical courier service business, Yamato Transport (Amikura, 2009; Amikura and Shintaku, 2011). By examining Yamato Transport, we were able to record a profit in the private courier business which was contrary to common sense in that industry at the time. This company had to be considered as a large "network business" courier. According to the analysis by Amikura and Shintaku (2011) of Yamato Transport, some may want to know what to do in order to secure profits in the network business. They found that the network business is time-consuming to implement and expensive to build a collection of delivery networks nationwide. It requires significant capital expenditures to start such a business. Even after it is completed, the cost of maintaining the pickup network nationwide also continues to occur. Since the maintenance cost will occur in the network, a potential increase in product carrying may hint that maintenance could increase as well. However, even if product carrying does increase, it will not be a great increase. Therefore, if it is possible to increase sales by developing the latent demand, it is possible to recover the operational costs for network maintenance and initial investment for network construction and make a profit.

However, the research by Amikura (2009) focusing only on the analysis of the courier business of C2C is used in this paper. This paper focuses on using it to compare network construction strategy of the transportation industry to C2C from B2B.

### 3. Case Study

This chapter deals with features of B2B, B2C, and C2C and will continue to analyze the cases of successful companies' transaction methods. It began as a national policy concerning quickly building B2B network abroad. Nippon Express operating income is one place in the trucking business of concern currently. Fukuyama Transporting grew from a small local company by constructing a network across the country. An example of the transaction system of B2C, ranked second in home delivery market share is SG Holdings (Sagawa Express). This company grew to its present size from an Express messenger company. We will present an analysis of Yamato Holdings (Yamato Transport), one courier which brought innovation to the C2C trucking business. The analysis on this company will be centered on three aspects of the framework; (1) How it has grown, (2) Building of a network and (3) Future Development to deal with each method.

#### 3.1 Analysis of business-to-business case

##### 3.1.1 Features of business-to-business case

B2B, and the like, as a transaction system in the trucking business, has been the mainstream for a long time. A similar business model has to be built to meet the core competencies of each Sagawa Express and Yamato Transport in the B2C, C2C and B2B.

In the case of commercial cargo handled in B2B, delivery occurs every day to fixed locations. This is easily characterized by some degree of demand forecast. But, a demand forecast for the decline in the level of service is not possible in the network structure if delivery to customers. Prediction of efficiency and generating profit is also not possible. In a case of B2B transport, where the baggage is one less than usual, it is easy to evaluate efficiency of transport. However, in the case of delivery to an individual it is not easy to accurately analyze how efficient it is to perform the work every day (Ogura, 1999). Furthermore, correspondence to each shipper can be characterized by types of transactions systems that are easy to build into a 3PL. On behalf of shipping companies, 3PL proposes the construction of the logistics system and planning of the most efficient logistics strategy (Yuasa, 2008). The benefits of

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building a 3PL is for an expansion of revenue. It is the acquisition of new shipping companies that lead to the expansion of the business scope. By introducing and increasing the proportion of cargo handling shippers, a company can thereby maintain and improve the growth potential, and improve profitability. This can also be expected with an increase in the accumulation of know-how and cost reduction, through joint use of warehouses and joint delivery.

Since it is beneficial to set up a bulk trustee framework to share information and shippers business, it leads to an arrangement of stable revenue because trust is established for a long period of time (Terada, 2010). From the fact that small-lot proceeds in B2B market of business-to-business, quick delivery was to be required, and the courier came to be more widely used. B2B also requires the shipper to make just-in-time deliveries. This leads to a continuation of building a more efficient network of correspondence (Japan Trucking Association, 2012).

### 3.1.2 Nippon Express Co., Ltd.

Nippon Express Co., Ltd. began with the name suggested as "Land based company" in 1872. Then it was reborn as a national policy company in 1937, and listed on stocks in 1950. After establishing an office in New York in 1958, it started to dispatch personnel in regions abroad to great "hubs" in places such as London, Amsterdam, Hong Kong, and Singapore. This allowed the company to build an international network (Ishikawa et al., 2003). Nippon Express is a logistics leader in Japan and is currently a leading company in the trucking business. Nippon Express has expanded immensely in terms of initiate performance to its present state. This is noted in the "Pelican Bin (Delivery), BOX Kantanbin" in 1977, until the 1990s in the service center at the "Arrow Bin (Delivery)". It is true that in the development process of Nippon Express courier service a significant role was played by "Pelican Bin (Delivery)" and the "Arrow Bin (Delivery)" to become industry-leading today.

Nippon Express is a company which underwent express development and quickly became skilled in the art of shipping. The company was originally good at large enterprise cargo transport. It can be said that the rapid economic growth of Japan is responsible for the Package Contractors logistics and manufacturing industry. It had begun early

in the trucking industry as "3PL."

For such manufacturing industries in Japan which have advanced abroad, we have put the emphasis on international transport operations. The main company for examination will be the Center of Nippon Express, which also expanded abroad. Overseas expansion of Nippon Express was very fast, even compared with other transportation business. It can be said that we have to build a global transport network in such a short time.

As an expert to analysis of "Nippon Express" says that it is strong in international transportation and B2B logistics", there are many core competences of Nippon Express that helped it has continued economic growth in the field of B2B and international transport. It can be said that it was a courier handling a number of small cargo, and has grown rapidly since 2000. Among the prominent competitors, the two companies, Sagawa Express and Yamato Transport, Nippon Express is largest. "Pelican" has taken the third place since 2009. It can be seen that the B2C also had increased sales as well.

But "Pelican Flight" Nippon Express has cast share rapidly from 2009. Nippon Express was separated from the business of other courier in the late 1990s. It has proceeded in courier service, but has reorganized into "specialization parts" the 2000s (LOGI-BIZ, 2001).

In recent years, it has established a company to integrate the courier and postal services, such as JP Express Co. However, integration was postponed and it became a form of Postal Service take over. The home delivery business of Nippon Express challenged the postal service. Disconnecting the transaction system of B2C by eliminating a home delivery service of Nippon Express, the "Pelican Bin" took B2B as a core competence of the company. This strategy focused on international cargo trade, and the trucking business proved to provide the greatest operating revenue.

### 3.1.2 Fukuyama Transportation Co., LTD.

Fukuyama Transporting Co., Ltd. is a logistics company headquartered in Fukuyama City, Hiroshima Prefecture. In 1948, it took over the facilities of Fukuyama branches of shipping company when it went out of business. It was founded as Fukuyama Cargo Transport Co., LTD and it attracted the attention as emerging from the Land Transport

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company that was focused on small cargo transport using tracks. It established a national transportation network in 1994, and is in possession of a network base of trucking across the country.

By performing a comprehensive business alliance with Hitachi Transport System Ltd the most competitive leader in information systems, and utilizing a more robust transportation network across the country, Fukuyama Transporting increased sales in 1999.

The company deals with logistics of famous enterprises like Daisosangyo and Fast Retailing (Hashimoto, 2010). Fukuyama Transporting Co., Ltd. has been dealing with a lot of small cargo historically. It is a trucking business that is active in the transaction system of the B2B, which is similar to Nippon Express. As mentioned above, by partnering with leading companies such as Fast Retailing and Daisosangyo, it was possible to obtain a benefit of B2B, a stable income, and has made sales of the top 10 in the transportation industry. The network construction of Fukuyama features from local companies that are different than what is in Yamato Transport and Nippon Express. The nationwide network of Fukuyama Transporting is built up of subsidiaries and a main body. This construction method is similar to the construction method of Sagawa Express. The acquisition of the transportation industry in each region has established the name of Fukuyama as a strong competitor in the market. It benefits from shipping without the need to build a new network in a specialized area, and this compensate for the shortage of human resources. Also, by absorbing other companies' core competences, it is able to develop new services. An example of a subsidiary is Kinukawaya transportation which was established in 2012. It is its own delivery network in the Tokyo metropolitan area, and expands the company to the joint delivery of mainly food-related cargo. Kinukawaya transportation has its own warehouse, and uses it in response to storing hazardous materials at room temperature, and specialized cargo requiring refrigeration. These privileged services are in several locations, such as Koto-ku and Tokyo. It also developed a wide range of business activities such as performing logistics for other businesses. By mergers and acquisitions of these companies, the companies have quickly built their networks cheaper and faster than their predecessors. In recent years, it has developed an EC site such as "Ajinohurusatobin" to its main site in order to widen the transaction system of the

B2C. By partnering with companies on products, it has implemented a service delivery fee. At present it only supports credit card transactions, and delivery typically takes about one week after the initial order is made. This shows that challenges do remain, but it does not have the business development challenges in term of transportation that other business may have. They are able to use their EC site to make their own transportation service. In this way they build an area of B2C, to expand into new transaction system from B2B.

### 3.2 Analysis of B2C transaction case

#### 3.2.1 Feature of B2C transactions

Expanding EC market shows continued growth. B2C has emerged as a new transaction method for transportation companies that support them. In the future, B2C is noted as a transaction method that can be expected to grow the most in the trucking business. The method of B2C includes the advantages and disadvantages of C2C and B2B. In B2C, the collection location has been decided, but the shipping location is unspecified, which is a clear disadvantage of the method. Secondly, in C2C transaction method a small quantity of products is being transported and there is an unstable income. However in the transaction of B2B, a large quantity of products are being transported and there is a stable income via a contract. In the long run, B2C will have these two aspects as well. Investment needs are high in order to realize the service for customers. The investment in the pickup location can be controlled, however the high investment occurs on the customer service end because the delivery locations are unspecified and numerous. Furthermore, distributors began to request that the trucking company provide high-frequency of small-lot deliveries for purchases made via e-commerce. As a result, the profits of the trucking companies were reduced drastically.

Number of trucking companies playing the role of sellers is greater than that of distributors playing the role of buyer. More buyers (distributors) have a stronger position than sellers (trucking companies) in the logistics industry (Tamura, 2004). The quantity of products transported in B2C transaction method shows potential increase in the future which means a potential lower transporting cost. However, that economy of scale does not work as expected. Trucking companies believe they would

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obtain a stable income when partnering with other leading companies. However, that benefit will not be realized because distributing companies request discount. It is known that the more distributors become the leader the stronger the industry becomes.

### 3.2.2 SG Holdings (Sagawa Express)

In 1957, based mainly in Kyoto and Osaka, Mr. Kiyoshi Sagawa, founded and established Express Messenger Industry. Then in 1966, he founded the Sagawa Express. However in 1998, it officially changed its business description from a specialized cargo delivery company to a home delivery company as an "express messenger service." Soon thereafter, it became the second in the home delivery industry, following Yamato Holdings (Hashimoto, 2010). Like other trucking business companies, Sagawa Express has also attained growth in the B2B trucking industry. Sagawa demonstrates two B2B features that are beneficial. First, it expands the services that are specific to the needs of the distributors. Second, it has grown and evolved from a simple trucking company into a comprehensive delivery service company that handles all logistics for product transport.

Many corporations need similar small products related to the business of each company. These products are often very necessary and are usually needed in a hurry (e.g. important documents, clothes and machinery). These deliveries are typically small quantities of multiple items that take time and effort. Therefore, the time value of urgency is more emphasized by the corporation over the cost of delivery. Utilizing the elements of "urgency and reliability," trucking companies manipulate target corporations for higher delivery service fees. In this sense, small cargo business is comprised of commercial cargo and home delivery (Kimoto et al., 2001). A typical example is the apparel industry service. One trend of the apparel industry is delivery of products from manufacturer to retailers without packaging. Items are transported and delivered on hangers. This shortens the production and sales cycle, as well as increases the production quantity. As a result of this new trend, Sagawa trucking company now provides storage, packing and delivery services. Copping with customers' needs flexibly, Sagawa achieved a high performance record in the courier business. In Japan Sagawa achieved the titles "mule" and "handyman" based on their performance

for the emergency cargo service for small wholesale-retail businesses (LOGI-BIZ, 2001; Sagawa Express HP, 2012).

This flexibility is the core competence of Sagawa Express. In addition it is armed with the customized power of a built in logistics system and information system tailored to the needs of mail order companies and individuals. By the development of the Internet, Sagawa Express widened their transaction system from B2B to B2C service. They continue to strive to differentiate themselves from other companies by trying to be more flexible and accommodating to the needs of their customers (LOGI-BIZ, 2006).

Internet sales introduce the problem that deliver requires the individual to be at home to receive the order (Kimoto et al., 2001). To solve this problem, network construction was essential. Sagawa Express used the method to acquire trucking companies in each region to construction its network (LOGI-BIZ, 2001).

As Sagawa extended their transaction system from B2B into B2C method, it broadened its range of network coverage at the same time. Sagawa was first in the industry to provide the service of “e-collect.” By providing this flexible service, Sagawa took a high market share of B2C that will increase in the future. Furthermore, it aims to become a total logistics enterprise as well as a courier trucking company.

### 3.3. Analysis of consumer transactions case

#### 3.3.1 Features of consumer transactions

In this case, the features of C2C transaction method will be considered. The newly born trucking business Yamato Transport will be used as an example. This company developed a courier service between individuals transaction in 1976. C2C is not fixed compared to the B2B. In C2C parcels pick up location and delivery location are not fixed. Furthermore, since individuals use the service, the quantity of transactions is not frequent. Consequently this transaction system is very inefficient. However, even in this inefficiency the profit margin of personal home delivery is very high. Collection costs to pick up the product are higher than courier companies using the B2B or B2C method. However, the delivery cost to deliver to the final addressee is also the same as B2C. The pickup fee per package for C2C is about twice the fee of B2C courier companies. As customers cannot haggle with the pickup fee in a C2C delivery

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system, the potential for profit is high. Moreover, compared to B2B, there is no difference in profit in the off-season and prosperous period (Nippon Koa Sonpo, 2008; Ogura, 1999).

As mentioned in part of the disadvantages of C2C, the origin of products is a contingent. Therefore C2C companies build networks on a national scale, and require a lot of capital investment. However, contrary to the trading method of B2B, the profit margin is higher in C2C. It is possible that C2C transaction companies can have such a good nationwide circulation that overcomes the disadvantages aforementioned. Currently, home delivery market of C2C is becoming saturated by causes such as population decline. Thus presents a major issue of how to continue expanding this business in the future.

### **3.3.2 Yamato Holdings (Yamato Transport)**

Yamato Transport Co., Ltd. is a transportation company that was founded by Yasuhiro Ogawa in 1919. It completed a trucking network of scheduled and runs around the Kanto region by 1936. However, long-haul truck transportation was improved after the development of Japan's road system, and improvement in the quality of train tracks in the late 1950s. The Yamato Transport used the railway for long-distance transport, and trucks for short-distance transportation. In addition, since in the metropolitan area like Tokyo, it had powerful customers such as department stores. Consequently, it could not respond to the modal shift of the market environment, i.e. from train to truck method of long-distance transport. It was behind its competitors in establishing a network of transport and sales across the country. Therefore, by selecting the way of diversification as improvement measures, it aimed at integrated logistics enterprises into the company. In terms of sales it was sluggish and stuck to the acquisition of large cargo business-to-business. As a result, the income of trucking commercial cargo deteriorated.

Masao Ogura who became president of Yamato Transport in 1971, conceived the project to narrow down consumer transactions and smaller. However, this was thought to be a disadvantage until then. In addition, the origin, pickup location and delivery of product are not fixed. Therefore it was believed that the revenue would be unstable.

Moreover, the profitability did not negate bad pickup incidence, so nobody entered this market. However, by overcoming this disadvantage through establishing "agency shops," Yamato Transport brought innovation to the business of trucking transportation industry.

The scale of Yamato Transport's nationwide delivery network and the strength of the collection force are the major differentiation from its competition. As a result it has built up the #1 market share in the home delivery trucking business. The progress of Yamato Transport in the future is a challenge of how to continue growing in the personal home delivery market, which is now saturated. It aims and is expected to become a comprehensive logistics company in the B2B area, although it once failed in this effort after the war.

#### 4. Result analysis

##### 4.1 Comparison of the difference in transaction system

In this chapter, the difference in transaction systems is made clear through the analysis of results. To show the features of network construction we analyzed four items: 1) sales, 2) operating income, 3) number of locations and 4) average salary.

First, the difference between profitability and network construction is revealed by transaction method. Sales for each company in 2011 were as follows: one trillion 628 billion for Nippon Express, 248.4 billion for Fukuyama, 881.1 billion for Sagawa Express and one trillion 260.8 billion for Yamato Transport. When it comes to sales, it can be said that Nippon Express of B2B and Yamato Transport of C2C are very high.

Mainly, trucking business is a labor-intensive industry, so the ratio of the wage cost is very high. For the domestic employees of each company, Nippon Express is about 60,006 people, Fukuyama Transporting is approximately 20,000 people, and Sagawa Express is about 70,000 people. Comparing these four companies, it is clear that Yamato Transport surpasses the others by an overwhelming amount, at about 170,007 people (Kaisha Shikihou, 2012).

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Figure 1. Sales of case firms

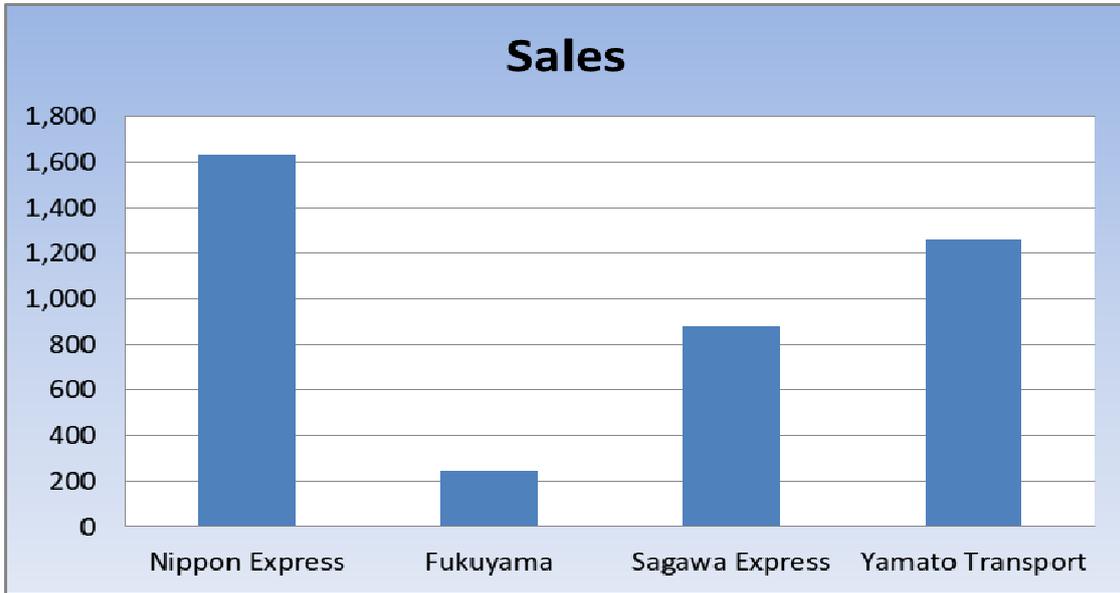
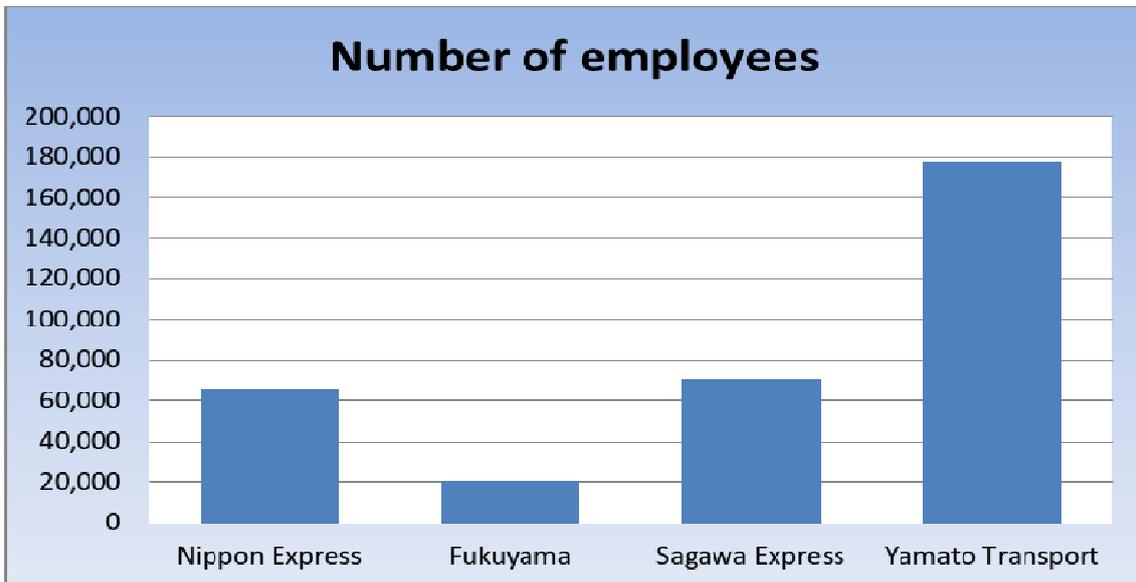
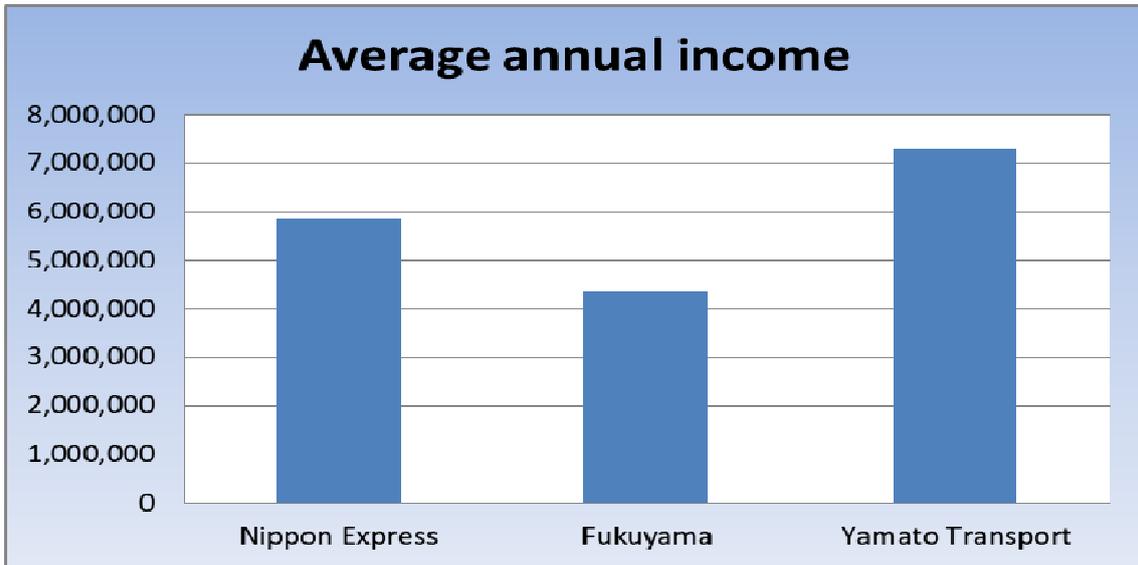


Figure 2. Number of employees of case firms



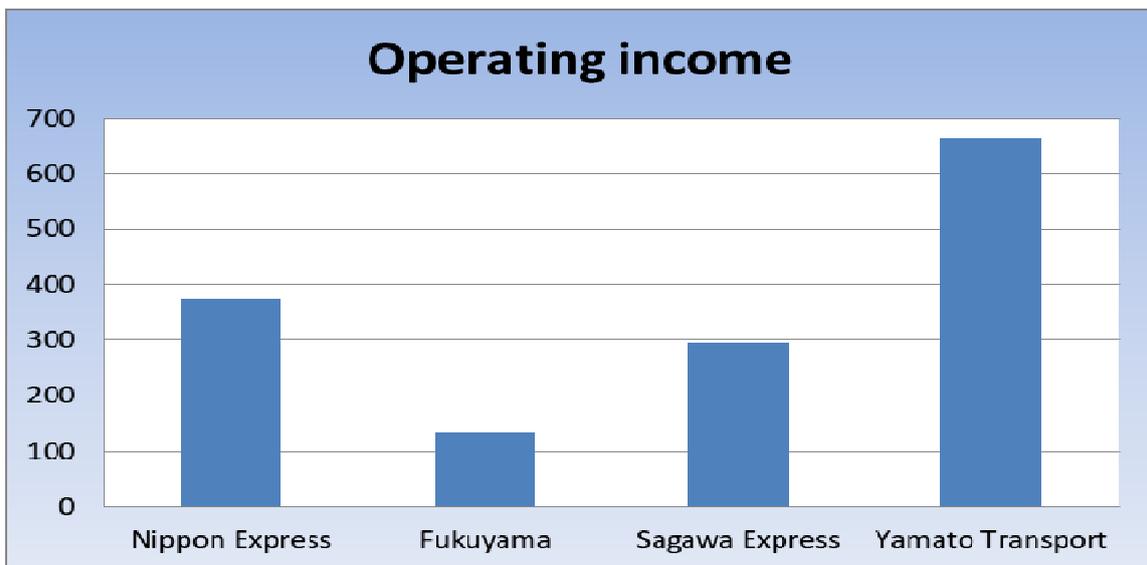
Average annual income of each company is about 5.85 million for Nippon Express. Fukuyama Transporting is approximately 4.36 million. Yamato Transport is approximately 7.3 million (Sagawa Express is not listed, because there is no data) (Source: NenshuLab).

Figure 3. Average annual income of case firms



In terms of sales and cost of labor, there is a large difference between Yamato Transport and Nippon Express. However, if we look at the operating income of companies in 2011, Nippon Express was 37.4 billion, Fukuyama 13.5 billion, Sagawa Express 29.5 billion, and Yamato Transport 66.6 billion (KaishaShikihou, 2012).

Figure 4. Operating income of case firms



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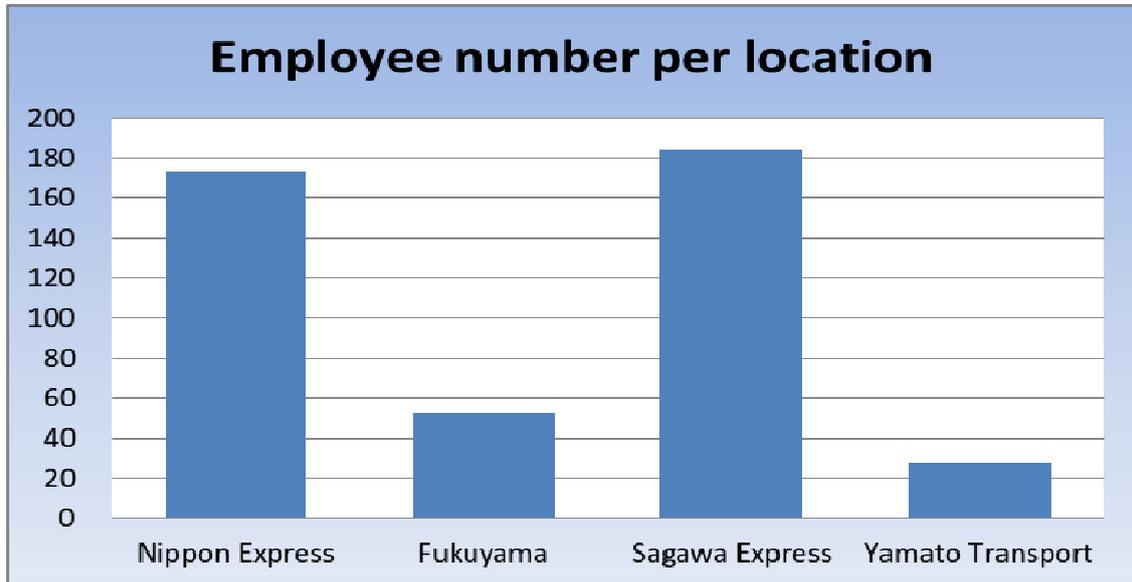
Compared to other companies, Yamato Transport pays the highest in wages. Yamato Transport gained an exceptional operating profit. Analysis would show that it is related to the profit margin per product, based on its transaction method. Annual product handling quantity of each company is as follows: Fukuyama of B2B is about 6250 million, Sagawa Express of B2C is about 13 billion, and Yamato Transport is set to about 1.4 billion 20 million. Calculating unit price (sales / number) for each company, Fukuyama is 382 yen, Sagawa Express is 678 yen, and Yamato Transport is the 888 yen. And the profitability of one unit (Sales - cost of sales / Number), Fukuyama Transporting Co., Ltd is 27 yen, Sagawa Express is 45 yen and Yamato Transport 68 yen. There is no data in the annual number for Nippon Express, but it has a transaction scheme of B2B method. Therefore it would have a similar profitability unit price of Fukuyama. In addition, we can see near data (Pelican income / pelican service shipment number) for the average unit price of Pelican in Nippon Express for 2007. This is about 496 yen (Source: Nippon Express home page).

From these analyses, the B2B transaction method has a low number of locations, and low location cost, however profitability per product is very low. On the other hand, C2C transaction method has a high wage and location building costs. However, it has been able to generate a positive income from the high profitability per product compared to the B2B. In terms of cost competitiveness, it is considered that there is no great difference in each company's profitability per product in the B2B.

Second, even in the same transaction, we found that the size of the network affects the profitability. This paper compares the Fukuyama Transporting Co., Ltd. and Nippon Express as a case of B2B. However Fukuyama profitability is higher than Nippon Express. Even though Nippon Express has similar number of locations as Fukuyama, Fukuyama reduced the size of the network per location. Furthermore, Fukuyama keeps a low employee number per location. Therefore, the cost per person is low and their profit margin is high.

Third, by comparing the cases in this paper, it is possible to give a suggestion about the size of the optimal network from B2B to C2C transaction method. As of 2012, Nippon Express has 782 locations (domestic 380 locations), Fukuyama Transporting has 383 locations, Sagawa Express has 382 locations, and Yamato has 6248 locations (LikuNabi, 2014).

Figure 5. Employee number per location of case firms



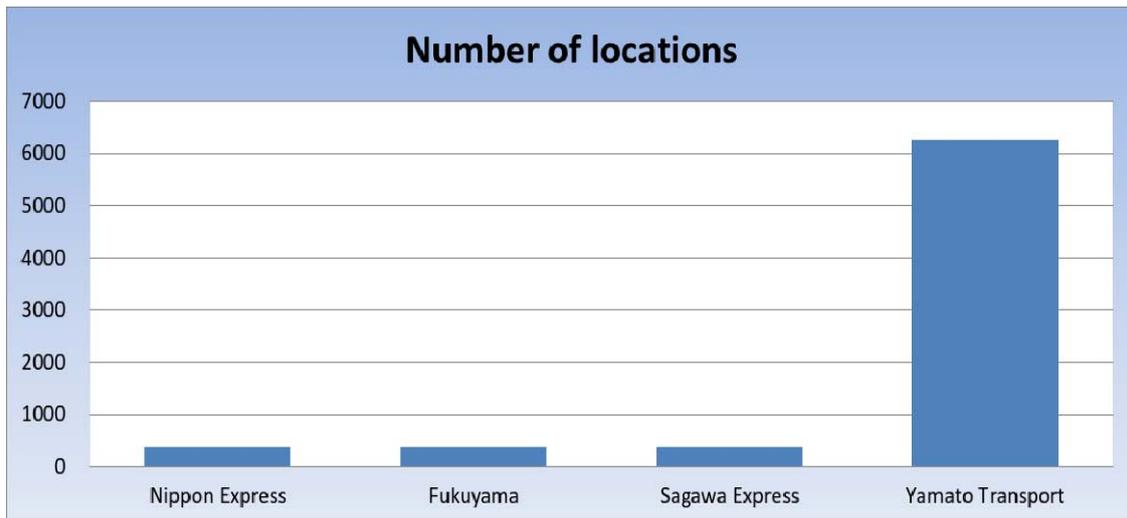
Number of locations that are denoted represents the locations of Yamato Transport. However, Yamato Transport builds the agency shops, and as a result, it provides a service to reduce the pickup fee by 100 yen, when the consumer brings the product in the agency shop. There is no gap in the whole country, when we consider Yamato Transport network coverage such as the agency shops. The initial agency locations were in liquor stores, but in recent years these agency shops have moved into convenience stores such as Family Mart and Seven-Eleven. Yamato Transport agency, has signed a partnership with Seven-Eleven store, which has the biggest number of domestic stores (14884 stores), and it has also signed a partnership with Family Mart (9320 stores). Compared to other transaction method, Yamato Transport is building a vast network.

Comparing B2B, to C2C the unit price per order, C2C is about 500 yen higher than B2B. Secondly, the profitability per unit increased about 40 yen than B2B. Also, it has more than 6000 locations, which are about 20 times as many locations as B2C and B2B. From this fact, it is shown that C2C transaction method has created a high-priced service as a result of undergoing a broad scale network construction. In addition, it is possible to suggest that if it cannot undergo a broad scale network construction it cannot make a profit through consumer transactions. It is easy for C2C companies to enter "B to" including B 2B and B2C. From the point of view of a location network,

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B2B cannot enter C2C and B2C. Therefore, there exists an entry barrier to network construction capability. Yamato Transport has sought to establish a home delivery system as network business and built organizational capability to realize it.

Figure 6. Number of locations of case firms



As mentioned above, in order to break through the downturn in the transportation industry competition, Masao Ogura decided to advance towards the individual home delivery business. This was to overturn the common sense of the mailing industry. In the transport industry at the time, it was thought that home delivery business and targeting individual customers was not profitable. However, in order to capture the network business similar to the telephone company, the individual home delivery business built a collection and delivery network nationwide (Amikura and Shintaku, 2011). It was costly to build the initial network in the network business, but building the network will later generate revenues that will cover the small initial deficit. However, profit will occur through the increased utilization of the growing network once it is in place. For collection and delivery network construction of retail home delivery market, Masao Ogura called the demand for individual home delivery fee. Goods are received at locations called "depots". Goods are collected from and delivered to each household by small cars, and allowed to aggregate in a center, as a collection of local sales offices (Ogura, 1999). Products in the same area are delivered between centers, and products going towards other regions were carried to a location for

service car to pick up. Then they are brought to one place (base). There is at least one in each prefecture. Delivery is made via heavy-duty trucks every night to their destinations. Like "Herb-and-spoke" system of the airline, if a collection and delivery network is built on a national scale, Yamato Transport network could provide mechanisms of next day delivery services with a constant cost (Amikura and Shintaku, 2011). It was a postal parcel that already built a network of nationwide; however, in order to compete with this, it planned for all parcels to be delivered to the next day as a general rule. With the exception of long-distance block, it adopted a flat rate of 500 yen as fare. Moreover, for the convenience of the user, it built agency stores such as a rice shop and liquor store which are close to living places. In order to enhance the service, it has also provided the best services such as a thorough education of drivers and delivery being at home and developed its own information system to manage a consistent process of all services including collection, transportation and delivery. Looking at the success of Yamato Transport in the 1980s, more than 30 companies entered the private home delivery business. However, rival companies that did not build the organizational capabilities of the network business and superficially imitated Yamato Transport system. As a result, they failed in network construction which is required for the courier business (Amikura and Shintaku, 2011). From the perspective of organizational capability in network building of Yamato Transport, it seems that it is extremely difficult for B2B firms to enter B2C or C2C transaction method.

On the other hand, the most powerful rival of C2C will still be a postal business for Yamato Transport. It took 4 to 5 days to deliver, if using the postal parcel by mid-point 1970s. However, postal services also strengthen the home delivery business and are becoming competitive compared to previous times. Moreover, the number of post offices is more than that of the Yamato Transport. In this sense, it might be a tough rival for Yamato Transport, which does C2C business (number of Japan Post, post office) is estimated to be about 24700 stations domestic (Wikipedia, 2013).

## 5. Conclusions

It is said that if B2B can have a contract with big consignor companies, it can make

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steady income. However, it is a transaction method, which is easy to be significantly affected by global economic fluctuations. If global economy shrinks, sales of trucking business also will not grow. Therefore, an issue of B2B in the future is how it to save costs. Compared to other transaction systems, it is comparatively easy for B2B to build an optimal network, as a result, it is possible to achieve cost savings. It is determined from where to where cargos move in advance, unless those are urgent. By building a simulation system, it takes the statistical data and increases the efficiency concerning where to build a location and how to do the delivery route. Hence, it leads to cost reduction.

As it is easy for B2B to be affected by a change of global economy, it seems that C2C is impacted by that of personal income. Different from B2B, as it is not shown from where to where the products to carry in the case of C2C, it is very difficult to take the statistics. As a result, there is a need for significant investments in network construction. However, as there is no discount requirement from the consignors and unit price per product is high, so profitability is very high. This result can be demonstrated through the financial situation of Yamato Holdings. Yamato Holdings also enters B2C at present, as well as C2C which is saturated, utilizing built networks, thus it is possible to increase serviceability.

On the other hand, B2C is easy to comparatively take statistics. It is the combined network construction of B2B and C2C. Delivery amount of B2C will increase in the future by expansion of the Internet business. For any trucking companies also try to get a steady income in B2C through contracts with the major consignor companies, competition will be intensified. However, due to the products of free shipping by the Internet business, cargo delivery revenues can be diminished. In addition, since companies that have mainly done B2B, take into account the delivery of "to C" in the future, it is necessary to expand location network building.

Finally, in order to achieve the supply chain management for consignors companies in case of B2B or B2C, it is necessary to respond flexibly to logistics operations tailored to each consignor. By using a network construction considering transaction systems, it is challenging for trucking business that will be collection and delivery of cargo without waste and just-in-delivery.

It is necessary that companies build "3PL" tailored to individual enterprises and

consider production and sales department, and the logistics sector at the same level. Consequently, it will lead to supply chain cost reduction. If a company builds a network to meet the challenges of their shippers and companies by performing simulations using IT systems, it will be able to cover any transaction methods and advance into a dominant position than other companies.

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