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Yoshinori Konno

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1. Introduction

Since the 1980's, researchers in various fields around the world have conducted studies on the nature of the relationship between manufacturers and parts suppliers in the Japanese automobile industry because of its unique characteristics that are not seen in other countries. The manufacturer-supplier relationship in the Japanese automobile industry (from hereinafter the relationship is simply referred to as "Japanese (automobile parts) supplier system"), was generally called the "keiretsu" or the "Japanese keiretsu" system; that was characterized by vertical division of labor and by the existence of capital or human connection between the companies, with an extremely tight and long-lasting inter-company relationship that was often said to be comparable to a village community or family.

However recently, it is said that this community-like inter-company relationship is rapidly falling apart. Especially in relation to Nissan, known for being strongly keiretsu oriented, which is now said to have completely parted with its keiretsu suppliers. The current Nissan CEO,

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Carlos Ghosn, who was newly appointed as the president upon Nissan's capital alliance with Renault, commented that "Nissan's keiretsu system is not functioning." Indeed under its reconstruction plan named "Revival Plan," which was issued in October 1999, Nissan announced the keiretsu reorganization plan, proposing to radically reduce its equity holding companies from the then-1,394, ultimately down to 4 companies. Consequently, a lot of keiretsu companies were cut off from the capital relationship with Nissan (Fujiki, 2001). In addition, according to newspapers reports, Matsuda and Mitsubishi also undertook the same sort of approach in an effort to reorganize their Keiretsu group.

However on the other hand, many empirical studies reveal that car manufacturers and suppliers are developing stronger ties in relation to new product development activities (e.g., Fujimoto, Matsuo, and Takeishi, 1999; Han, 2002). For example, Toyota is increasing its share-holding ratio as well as dispatching executives to its keiretsu suppliers (Nihon Keizai Shinbun, October 4, 2000). Nissan also has established the "Project Partner Companies System," in order to strengthen the framework for information exchange with its core suppliers, although it is said to have completely parted with its keiretsu group in the past (Nihon Keizai Shinbun, December 1, 2004). Therefore, some sources point out that a contradictory trend also exists in this industry; that there is a movement toward strengthening the keiretsu relationship.

As such, the argument surrounding today's Japanese supplier system is somewhat mystifying, leaving the real situation in the industry very much unclear. Furthermore, in many cases, structured arguments built on objective data is lacking, and current on-going arguments seem to be so largely influenced by impressions created by the mass media. Thus, the purpose of this paper is to, using detailed data, closely examine and discuss the structural changes the Japanese supplier system is going through today, and gain insights into: the current status of structural changes, the directional character of changes, the underlying rational that drive these changes, and what is to be expected in the future.

The next section of this paper will be spent on academic survey of the existing research. In the third section, we will identify the trends in domestic motor vehicle production, and detailed explanation of changes and the current status of the supplier system, through the presentation of results of analysis we conducted in the past. The fourth section will explain the rational that drove these changes. The last section is a summary and discussion.

2. The Japanese automobile supplier system

The following section outlines, from past research, the notable features of the Japanese supplier system when compared to that of the US and European countries.

2.1 Advantages of the Japanese supplier system

At the beginning of the 1980's, when Japanese automobiles enjoyed overwhelming success and strong positions in markets around the world, many researchers conducted empirical studies to compare the Japanese supplier system with that of the rest of the world. The merits of the Japanese supplier system discovered in these studies are explained below. (For a comprehensive survey on this area, refer to Takeishi and Cusmano (1995), Fijimoto (2001)).

First of all, at least in the 1980's, the in-house production ratio of Japanese car manufacturers was comparatively lower than those of US and European car manufacturers. Also, the Japanese parts suppliers provided more parts development and design competency as compared to their US and European counterparts. This played an important role in strengthening the Japanese car manufacturer's ability to design and develop cars with less manpower and within a shorter timeframe.

Secondly, the Japanese supplier system had a hierarchical structure, with each major car manufacturer at the top of the hierarchy. The number of suppliers, whom the Japanese car manufacturers directly dealt with, were relatively fewer than the US and European counterparts. For this reason, the management cost with regard to the purchase of parts was relatively lower than US and European car manufacturers.

It must be noted however, that this hierarchical industry structure was not a "pyramid structure" as it would be generally thought. It was an "Alps type" where suppliers share several car manufacturers as their clients.

The Japanese manufacturer-supplier system in the automobile industry tended to be longer lasting, continuous, and co-operative. The Japanese car manufacturers provided its keiretsu suppliers with detailed evaluation and technical guidance in both production technology and product technology. Suppliers also tended to commit to reducing cost and improving quality on a long-term basis for their major clients. In Japan, car manufacturers and suppliers frequently exchanged information and often worked together in resolving problems. It was especially common for suppliers to take the "Design-in" approach; in which they would dispatch

their engineers to client sites as guest engineers who would participate in joint development projects. This close and frequent communication between car manufacturers and suppliers enabled them to identify problems at an early stage of production with a view to the entire model plan, which consequently resulted in high-quality production and development ability.

Lastly, suppliers could expect stable, mid/long-term contractual relationships as well as some sort of human resource or capital assistance from car manufacturers by belonging to the keiretsu group. Therefore they were able to safely make facility investment or strengthen the R&D system.

As discussed above, from the late 1980's to the mid 1990's, the Japanese supplier system had characteristics that were not seen in other countries. These characteristics played a major role in enabling the Japanese automobile industry to achieve remarkable performance in the global market.

2.2 Disadvantages of the keiretsu system and reorganization of keiretsu

In the 1990's however, the Japanese automobile industry was faced with drastic changes; decrease in the domestic demand after the bubble's burst, progression of "price destruction", the appreciation of the Japanese yen, acceleration in shifting production to overseas sites, ever-severer global competition, movement toward optimal parts procurement by car manufacturers and promotion of the establishment of a global supplying system by suppliers; all of which contributed to the formation of the opinion that "the Japanese keiretsu system was no longer able to cope with the environment of that time and it was experiencing institutional fatigue that meant its reorganization was inevitable."

Indeed, although the Japanese supplier system had many advantages outlined in the last section, on the other hand, it also had many disadvantages. Among these demerits, the most important was the fact that component transactions tended to over concentrate or be excessively dependent upon specific suppliers. Thus, there was not much shift in the transaction share, and therefore not enough competition existed between suppliers. Also, the keiretsu relationship tended to be rather "back-scratching, collusive" and led to an emotional connections between the companies. Furthermore, car manufacturers often dispatched its retired executives to suppliers, thus human relationships therein prevented the pursuit of economic rationalization in many cases. Thus for some car manufacturers, it was said to be difficult to ditch long-term primary suppliers for others for the sake of cutting costs.

The suppliers too, often paid too much attention to obediently fulfilling demands of their primary customers (car manufacturers), and consequently efforts were lacking to proactively make new propositions. Also, many suppliers did not focus much on conducting sufficient marketing activities in order to attract other customers. Rather they invested management resources on activities that were not necessarily or directly related to the growth of core capabilities; such as accepting the dispatch of executives in order to strengthen relationships with clients. Moreover some suppliers did not even plan their strategies. They would exert a passive attitude toward the management of the company, such as depending on primary customers to make almost all of the important decisions.

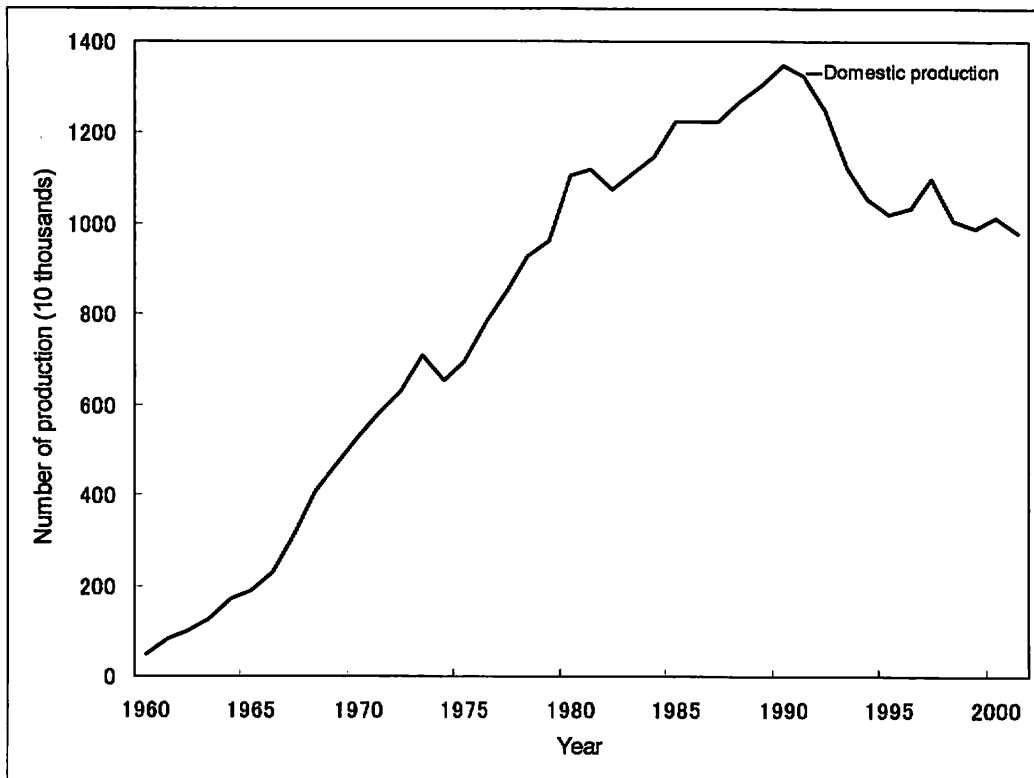
Faced with the above mentioned changes, it is generally said that recently in the Japanese automobile supplier system, car manufacturers as well as suppliers are becoming more and more inclined to proactively start dealing with new suppliers/customers, without limiting their options to keiretsu supplier/customer relations that have a long history; a tendency that is generally called the “loosening of the keiretsu relationship or diversification of the transaction base.” However on the other hand, as mentioned earlier, many empirical studies show that car manufacturers and suppliers are also inclined to build tighter relationships with each other at the same time. Indeed, as discussed later on in this paper, these two tendencies are occurring concurrently at the same time. Hence we will attempt to clarify this point in the following section, by introducing the result of quantitative analysis.

3. Structural changes in the Japanese keiretsu system

3.1 Trend in automobile production

In this section, first of all we would like to explain the trend in production of passenger cars in the Japanese market.

Figure 1 shows the trend in domestic motor vehicle production by units (number of cars) from 1960 to 2002, based on “World Motor Vehicle Statistics.” Note, in this figure, motor vehicle refers to all 4-wheel vehicles including trucks and buses. Also, domestic production includes exports.

Figure 1 The trend of motor vehicle production in Japan (industry-wide)

Source: World Motor Vehicle Statistics, compiled from the data.

The graph shows a clear change in Japanese domestic production from the first half of 1990s. Before 1990, the Japanese automobile industry enjoyed continuous high growth. Thus, the industry's global competitiveness reached its peak in the early 1980's due to the advantageous yen exchange rate, and robust competitive advantages in terms of product quality and production efficiency. In the late 1980's, cost advantage was largely diminished due to higher appreciation of the yen following the Plaza agreement in 1985, however, the Japanese automobile industry continued to improve non-price competitiveness (such as design quality and product integrity), thus overcoming these disadvantages and maintaining total competitiveness. As a result, Japanese cars retained a good level of market share in the overseas market. At around the same time, the domestic market saw a rapid increase in demand due to the bubble economy, backed up by rising popularity in luxury cars. As such, Japanese passenger car production reached its peak in 1990 (Fujimoto and Takeishi, 1994).

After 1990, however, production decreased dramatically. The reasons behind this were the deployment of full-scale overseas production, especially in the US, lower domestic demand after the collapse of the

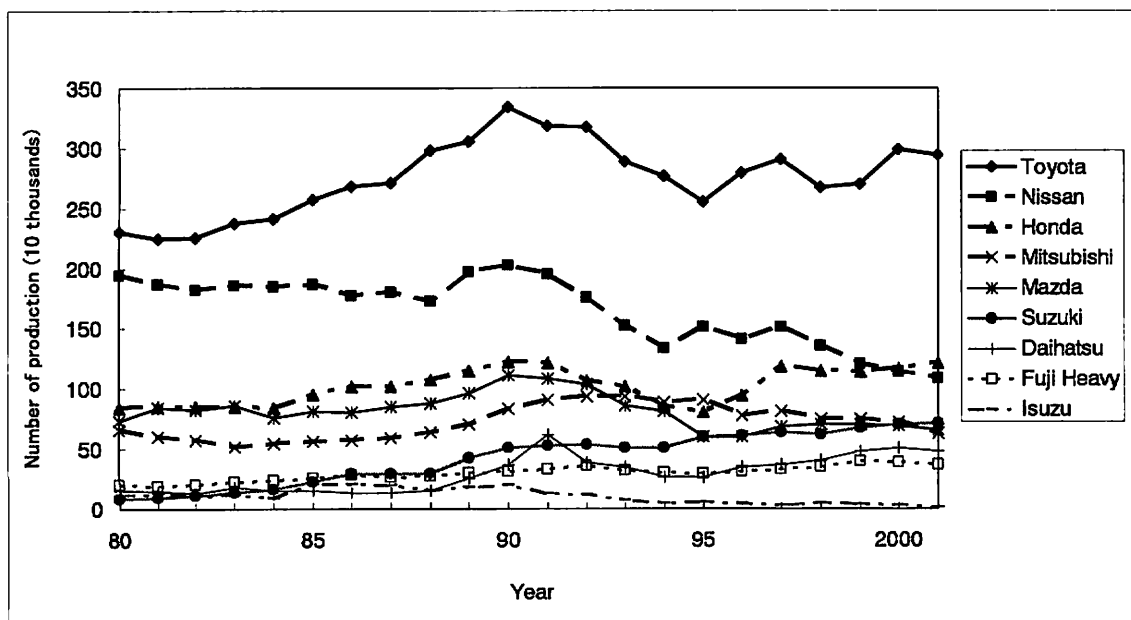
bubble economy, and the rapid increase in the value of the yen (e.g., Shimokawa, 1997). It temporarily picked up in 1996 and 1997, however, it did not last long; basically production continued to decrease. In fact, the production level in 2002 was only 86.6% of 1990 in units.

Figure 2 shows passenger car production by each car manufacturer. It can be seen that Nissan, Mitsubishi, Mazda, and Isuzu experienced large production decreases after the collapse of the bubble economy, while Honda and Suzuki enjoyed production increases. Judging from the absolute production volume, it can be concluded that Nissan's fall and Honda's rise in production must have had a significant influence on the whole industry.

3.2 Structural change in the keiretsu system at corporate level

Based on the above-mentioned trend through the whole industry, the following section will take a closer look at the trend in manufacturer-supplier relationships. Firstly, we conducted quantitative analysis on the structural changes of the Japanese supplier system using corporate-level transaction data from 1973 to 1998. The data source of this analysis comes from issues of the "Japanese Automotive Parts Industry", 1972-2000, published by the Japan Automobile Parts Industries Association and Auto trade journal.

Figure 2 The trend of motor vehicle production in Japan (by manufactures)



Source: World Motor Vehicle Statistics, compiled from the data.

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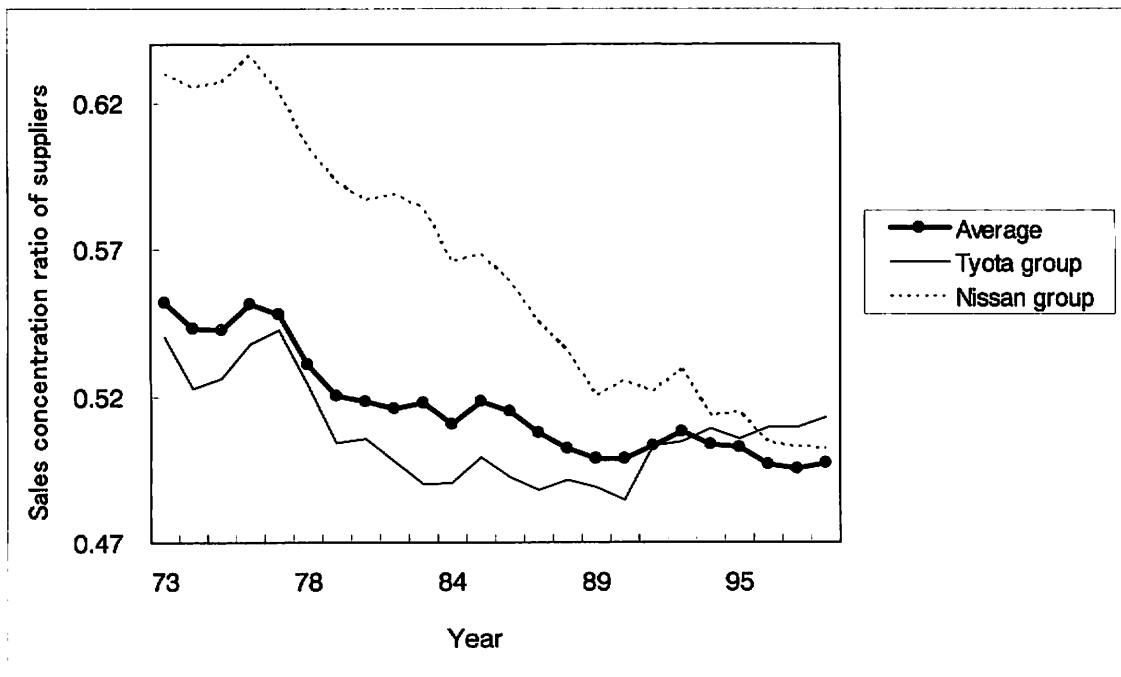
The analysis uses 2 indexes, namely “degree of sales concentration to major clients” (referred to as “degree of concentration” or “concentration” from hereinafter), and “degree of dependency on major clients” (referred to as “degree of dependency” or “dependency” from hereinafter).

More specifically, the concentration rate is calculated by determining the sum of the square of supplier’s sales to each car manufacturer; that is the same method as the Halfindal index calculation. The larger the concentration rate, the greater the sales concentrate for specific customers for a given supplier (it means less expansion of the sales base for a given supplier). Dependency is calculated by the rate of sales to each supplier’s main client. The larger the dependency rate, the more dependent the specific customer for a given supplier is (it means less expansion of the sales base for a given supplier). There is strong correlation between these two indexes, but each has distinctive features, and for this reason, these two indexes are used interchangeably for the purpose of this research.

Detailed explanation on the data extraction method will be omitted; however, the analysis was conducted by entering the sales ratio of each supplier (note that only suppliers whose sales ratio data was available were included) for each year between 1973 and 1998 to make panel data, and then the above two figures were calculated for each year for each supplier. At this time, suppliers whose sales ratio data was missing for more than 3 years were excluded from the sample. Also, if the sales ratio data was not available for more than 2 years consecutively, the average was used as a substitute. Suppliers who had less than 10% direct dealing with car manufacturers on average were excluded from the sample. Furthermore, for working out “degree of dependency,” suppliers whose main client changed during 1972 to 1999/2000 were excluded from the sample. As a result, there were 51 and 47 sample suppliers for “concentration” and “dependency” respectively.

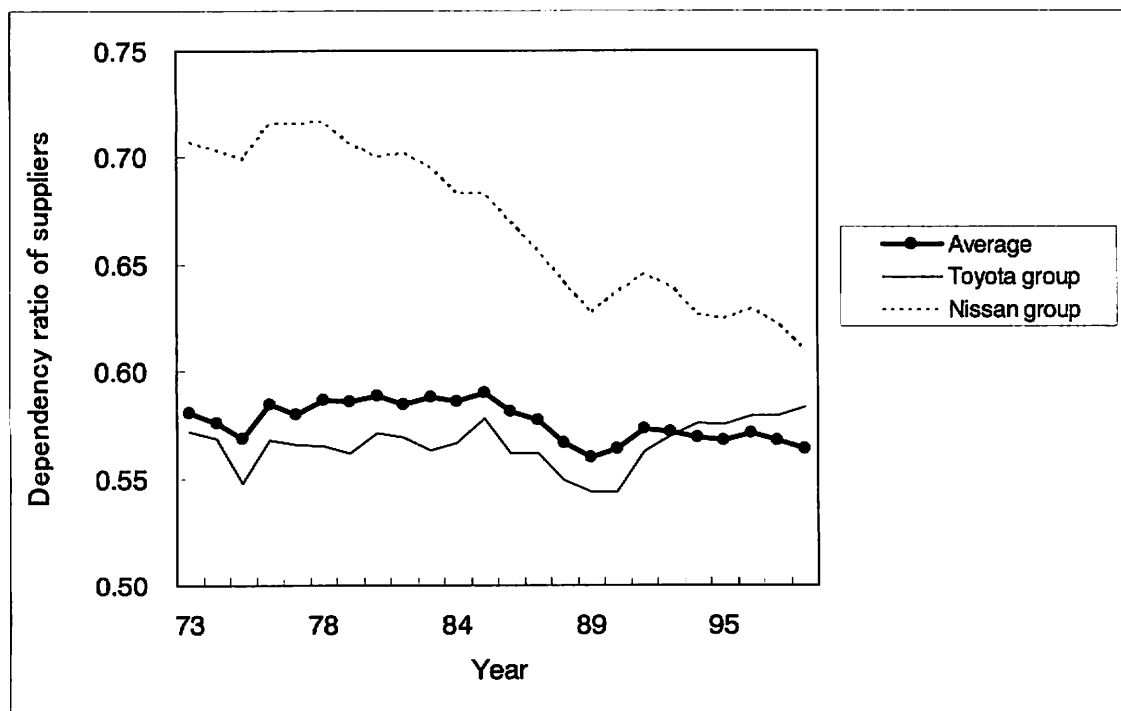
The analysis findings are shown in Figure 3 and 4. Figure 3 shows the changes in “degree of concentration” of 51 suppliers from 1973 to 1998. Generally speaking, the “concentration”, although it has frequent small rises and falls, was on a general decreasing trend from 1973 to 1998. Especially during the period from 1976 to 1990, it experiences a long-term decline. Conversely, it only shows small decrease after 1990, with some small-scale fluctuations. Figure 4 shows the “dependency” of 47 suppliers for period between 1973 to 1998. Here, the curve is rather flat compared to “concentration” from 1976 to 1989.

Figure 3 The structural change of the Japanese supplier system (companies level) ①



Source: Japanese Automotive Parts Industry, compiled from the data.

Figure 4 The structural change of the Japanese supplier system (companies level) ②



Source: Japanese Automotive Parts Industry, compiled from the data.

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Next, we examined how the two indexes changed for suppliers who mainly dealt with Toyota (referred to as “Toyota group” from hereinafter), against suppliers who mainly dealt with Nissan (likewise referred to as “Nissan group” from hereinafter). Suppliers whose main client changed during the analysis period were excluded from the sample, thus as a result, each group had the same number of samples for both indexes, Toyota 17, and Nissan 19.

Looking back at Figure 3, Toyota group’s concentration, on average, declined from 1977 to 1990 with small fluctuations; however, after 90 it picked up again and showed a slightly upward trend. In contrast with this, Nissan group’s concentration consistently declined from 1976 to 1999, except between 1989 and 1992/1993. The decline was much sharper in comparison to the Toyota group.

Looking at Figure 4, Toyota group’s dependency stayed almost flat during 1976 to 1985, declined a little from 1985 to 1990, but started to rise slightly from 1990. On the other hand, the same index for the Nissan group was flat from 1976 to 1985, but after that it consistently declined except between 1989 and 1991.

The above analysis suggests that at least since the 1970’s major suppliers tended to lower concentration and dependency and instead have been steadily enlarging the scope of customer bases for more than 20 years, at least at corporate-level.

From the 1970’s to the 1980’s, both the Toyota and Nissan group lowered concentration and dependency on major client-manufacturers, thus analysis of the whole sample clearly shows a declining trend for both indexes. In the 1990’s, both indexes for the Nissan group started to decline again, while for the Toyota group, the indexes started to rise. This suggests that Nissan suppliers have focused more effort on finding new clients, largely due to a vigorous decrease in Nissan’s sales after the collapse of the bubble economy. As for Toyota suppliers, presumably concentration and dependency on Toyota increased, since, pro rata to transition in Toyota and other car manufacturers’ sales, sales to Toyota increased while sales to other car manufacturers saw only sluggish growth. Of course, it is also possible to assume that Toyota suppliers may have been affected by repercussions of Nissan suppliers’ attempts in diversifying the customer base, or it is also possible to presume that Toyota had already started to strengthen its keiretsu relationship at this time. Whichever may be the case, Toyota group’s increasing trend and Nissan group’s decreasing trend cancelled the effects of each other. After the 1990’s, the indexes for the

whole sample group had a rather flat trend.

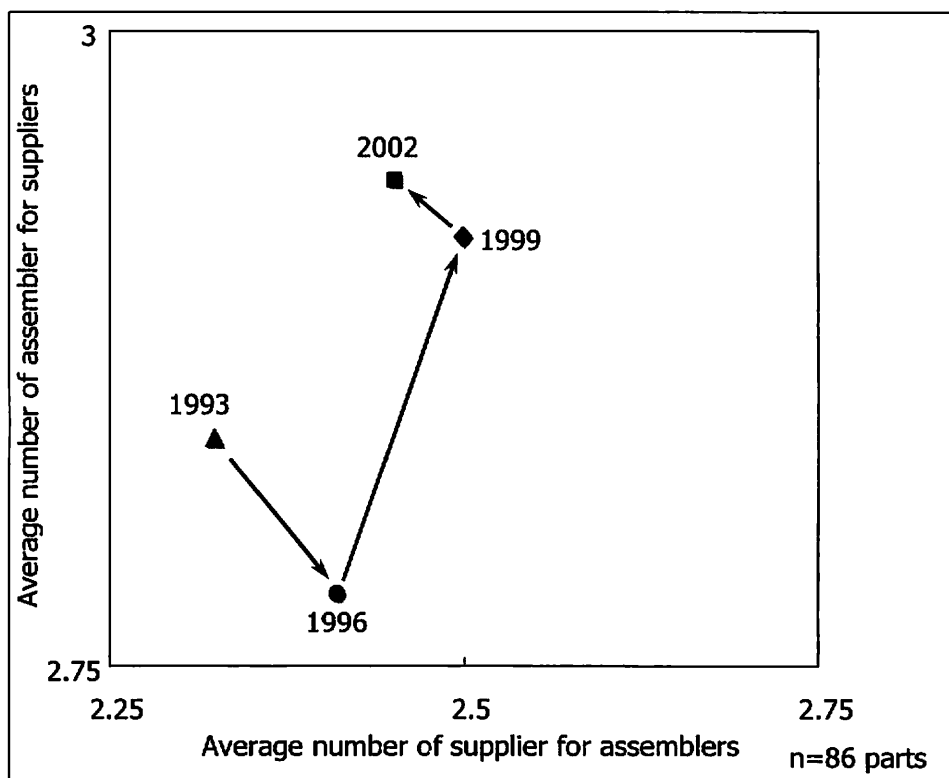
3.3 Changes in the supplier system relationship at components level

Next, this section will interpret the results of quantitative analysis, using components-level transaction data of 9 years from 1993 to 2002. The source of data for this analysis are the 1993, 1996, 1999, 2002 issues of “Automotive Parts Sourcing in Japan” published by IRC Corporation, respectively.

This analysis uses 2 indexes, namely “the number of suppliers from which a car manufacturer procures a certain type of component” (labeled “number of suppliers”), and “the number of customers (car manufacturers) to which these suppliers sell the same type of component” (labeled “number of customers”). Detailed explanation on the data extraction method will be omitted; however, the size of sample was 86 as a result. The two indexes for each of the 86 components were then averaged.

Figure 5 illustrates the changes in manufacturers-suppliers transaction relationships with regard to the 86 major vehicle components, using these two variables. This Figure shows the following results.

Figure 5 The structural change of the Japanese supplier system (parts level)①



Source: Automotive Parts Sourcing in Japan, compiled from the data.

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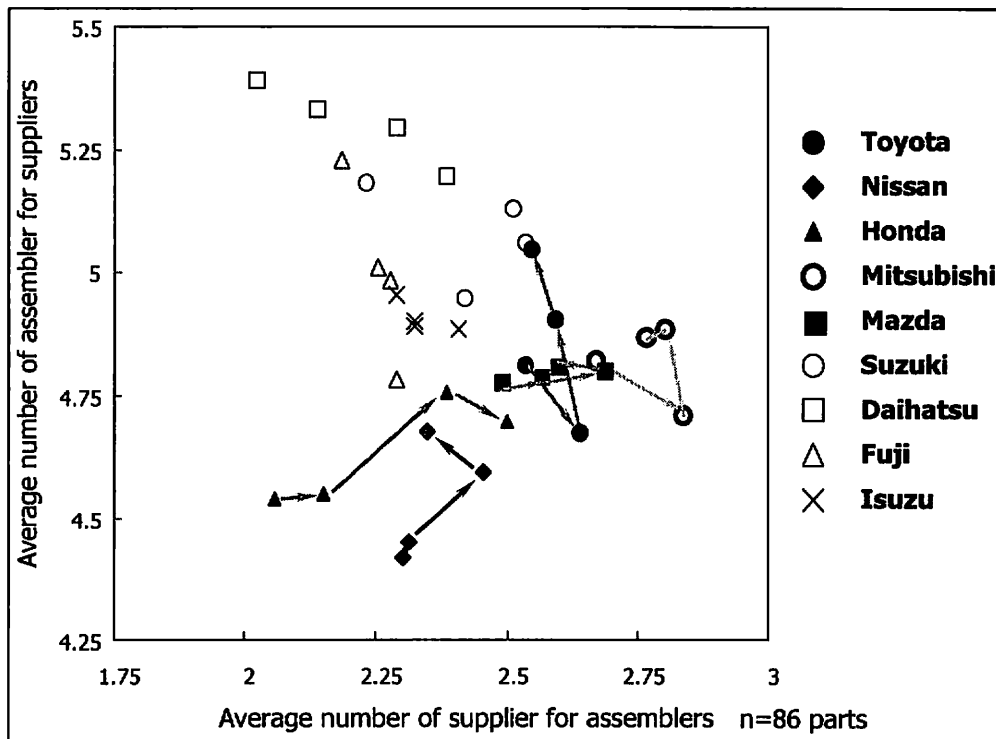
First, the number of suppliers peaked in 1999 and declined during 1999 to 2002. This result shows that there was a high possibility that Japanese car manufactures changed their procurement policy during 1999 to 2002.

Secondly, broadly speaking, the number of customers tended to increase although there were some temporary decreases. We will omit detailed explanation, but the reason for the temporary decreases in the average number of customers is due to the increase in the amount of foreign capital suppliers that entered the market during this period. Most of these suppliers only dealt with 1 or 2 customers initially, thus it resulted in a decrease in the average number of customers for suppliers as a whole. On the other hand, many suppliers who only had a few clients left the market during this period, resulting in an increase in the average number of customers. Also on average, suppliers who stayed behind in the market consistently expanded their customer bases.

One way or the other, however, generally speaking, Figure 5 suggests that the leading suppliers were expanding their customer bases during this period.

Figure 6 illustrates the trend in these two indexes of each car manufacturer. This Figure shows that Honda expanded its supplier base, while on the other hand Nissan suppliers expanded their customer base.

Figure 6 The structural change of the Japanese supplier system (parts level)②

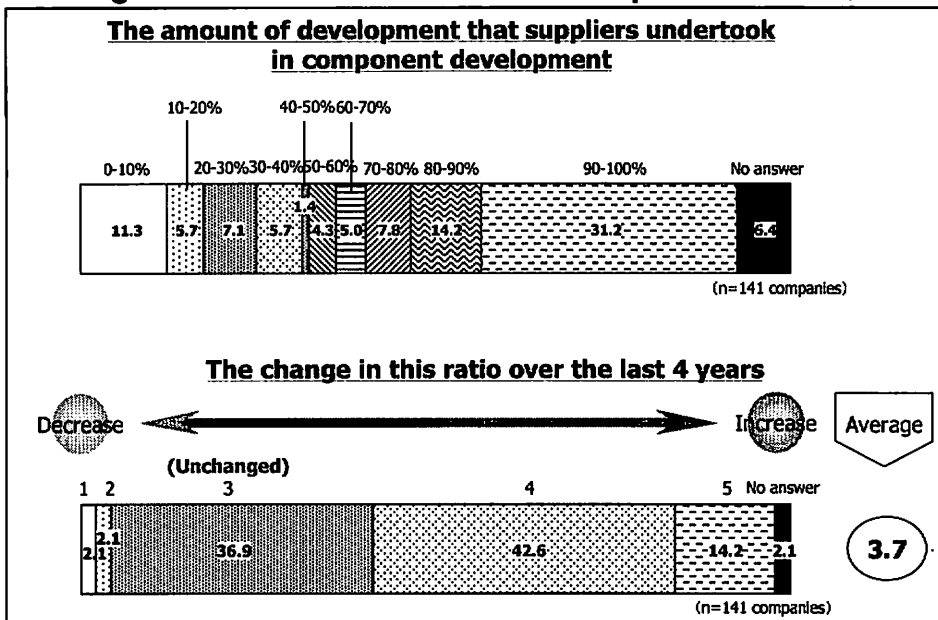


Source: Automotive Parts Sourcing in Japan, compiled from the data.

3.4 Collaboration between car manufacturers and suppliers with regards to R&D activities

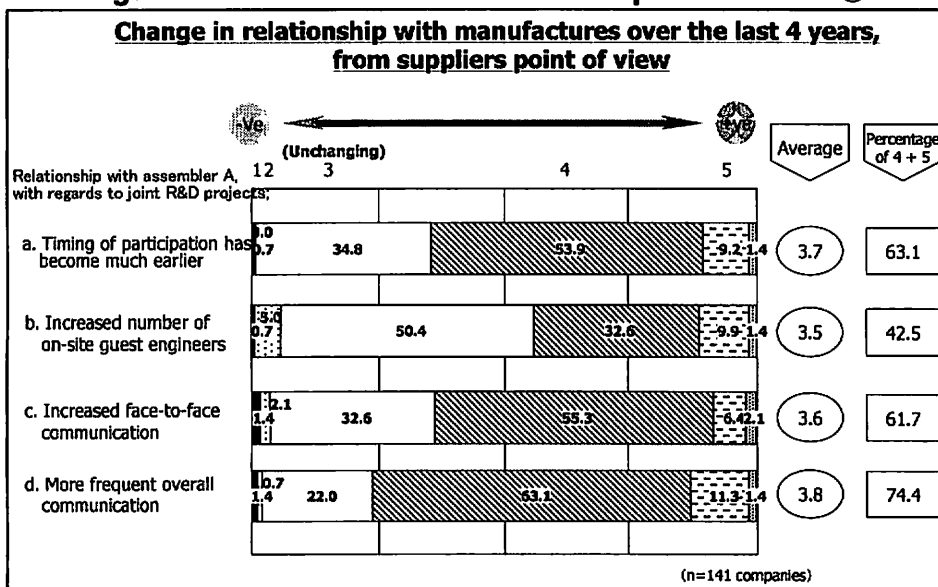
Next in this section, in order to outline the latest trend of manufacturer-supplier product development collaboration in the Japanese automobile industry, we will interpret part of the results of the research questionnaire, which was conducted in November 2003 by Takahiro Fujimoto, a professor of Tokyo University, and Ku-sun-fun, a lecturer of Kyoto Industry University.

Figure 7 The results of our research questionnaire ①



Source: Fujimoto, Ku, and Konno (2004).

Figure 8 The results of our research questionnaire ②



Source: Fujimoto, Ku, and Konno (2004).

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In this research project, a questionnaire was sent to 340 first tier suppliers that were members of the Japanese Automobile Parts Industries Association. Responses were submitted by 140 companies, about a 41.5% response rate.

In this questionnaire, the suppliers were first asked to select the most important component in their business. Then they were asked about relationships they have with their major client-manufacturers with regard to that component. Note that the components chosen as the most important spread over 7 categories; namely equipment sub-assembly components, electronic/electrical components, machinery processing components, press components, plastic, molding/casting components, and others. The main client mentioned by the questionnaire respondents were Toyota 39%, Nissan 16%, Honda 13%, Mitsubishi 8%, Matsuda 7%, which is roughly the same as the domestic vehicle production share.

In the questionnaire, 27% of the respondents answered that in terms of competition for major clients, the number of competing suppliers including themselves, has increased in the last four years, and on average this was a 0.43 increase (However 60% of the companies answered “no change”). On the other hand, 23% of the respondents said that the number of clients they are dealing with has increased over the last four years, which amounts to an average increase of 0.34. (However 69% of the companies chose “no change”). Thus, it seems that both car manufacturers and suppliers are still increasing their customer / supplier bases, although it may only be a slight trend.

As for the amount of development which suppliers undertook in the component development process, 63% of the respondents answered that they “undertook more than half of the development workload themselves.” This shows that many suppliers are responsible for quite a high ratio of the component development. Moreover, regarding the change in this ratio over the last 4 years, 57% of the suppliers said “it is increasing”.

Regarding the relationship with car manufacturers, 63% of the respondents chose “started to participate in development activities from a much earlier stage than before”, 62% chose “face-to-face communication during the development process increased”, 74% chose “there was more frequent overall communication (includes all forms of communication, emails, phone calls, and face-to-face)”, 43% chose “we have increased the number of on-site guest engineers who work at manufacturers site”, respectively. These results suggest that the relationship between car manufacturers and suppliers is becoming tighter and closer.

Further, 51% of the respondents answered that the key to winning

supplier competition is to propose or develop innovation beyond mere enhancement of existing technologies.

Next, 33% of the suppliers who deal with more than 2 car manufacturers answered that “man-hours (only for the portion that the supplier is in charge) for developing components of major commercial models of their main client” was “more than twice” that of “regular development man-hours for developing components for other car manufacturers”. This question was followed by more specific questions about the timing of participating in joint development projects of main clients, or gaining development co-operation from main clients. 23% of the respondents answered “1. At the phase of developing components or modules with a new concept, or at the phase of researching new technology (for example, new raw materials). It includes pilot-study like projects that are not targeted or related to a specific commercial model.” And 43% of the respondents chose “2. Projects related to or targeted at specific commercial models, however these projects involve new technology that is not mere enhancement of existing technologies. Or these projects involve development of products (components) that encompass new concepts.” Moreover, when asked about the changes with regards to the timing of participating in development projects, 66% of the respondents answered, “it has become earlier.”

Adversely, when asked the same question above but in relation to car manufacturers other than major clients, the rate was much lower, with 11% of respondents answering “1” and 26% answering “2,” respectively. However, for the second question of timing as compared to 4 years ago, 43% of the respondents answered, “It has become earlier.” In addition, 30% of the respondents who answered “1” in the above questions also chose “1” for clients other than their main client. Of the respondents who chose “2” in the above question, 56% chose “1” or “2” for clients other than their major client.

Thus these results showed that generally speaking, suppliers have started to collaborate at an earlier stage with major clients.

3.5 Short summary of the analysis

From the analyses above, it can be concluded that two trends of “diversification of the customer base” and “strengthening of relationships” exists concurrently in the current Japanese automobile industry.

In more detail, analysis of transaction relationships at the parts level showed that, at least until 2002, suppliers tended to increase transaction

bases. Also from corporate level analysis, at least the Nissan suppliers were eager to expand customer bases, at least until 1998. And the questionnaire result also shows that this trend is still continuing today. In short, our surveys clarify that the Japanese supplier system has become more “open” or “diversified”; that is for example, some Toyota-group suppliers started to deal with Nissan and vice versa.

However, on the other hand, the questionnaire survey also shows that during the same period, the business relationship between Japanese car manufacturers and their major suppliers has become tighter and closer with regards to R&D activities.

Why do these two seemingly contradictory movements occur concurrently at the same time in recent times in the Japanese automobile industry? To be brief, the key to solving this puzzle is the fact that “both car manufacturers and suppliers provide different collaboration levels in accordance with the nature of the development projects.”

The questionnaire responses showed that man-hours for major customer (car manufacturer) and other customers differ, and also that suppliers generally participate in development projects of major clients from an earlier stage. This suggests that collaboration in development projects for major customers and other customers are different in nature.

In the next section, we will attempt to clarify the logic behind concurrent occurrences of “diversification” and “strengthening of relationships” by explaining this point in detail.

4. Discussion

4.1 Providing different levels of collaboration in accordance with the nature of development projects

Because an automobile is the typical integral architecture product, in order to produce a valuable and profitable new model, car manufacturers and suppliers must co-operate with each other, maintain deep and frequent communication, and come up with optimal designs for almost all the components (Konno, 2000). Consequently, even when developing a derivative model of an existing product, car manufacturers and suppliers need to exchange information and jointly come up with a new design. However, this does not mean that car manufacturers and suppliers must re-design all the components from scratch. In fact, development of a new vehicle involves different sorts of projects; actually, only some of the projects involve

completely new product and production technology or new raw material technology. Most of the times, however, many of the developments only require minor adjustments or modifications to existing components using well-established technology.

The important point here is that although development activities require some sort of collaboration between car manufacturers and suppliers, the degree of collaboration required in projects for developing innovative technology, is so largely different from the degree of collaboration required in projects for only modifying or adjusting existing designs, that the resulting relationship between car manufacturers and suppliers are also different (Konno, 2004b).

4.2 Rationale behind building a tighter relationship with major customers

When car manufacturers invite suppliers to participate in new technology development projects, the suppliers invited are often limited to the core suppliers of that car manufacturer. Core suppliers in this sense refer to suppliers for whom the car manufacturer is the main client, with whom the car manufacturer has had a long-term, co-operative and trustful relationship, and moreover suppliers who have high R&D competencies.

Suppliers tend to give higher priority to its major customer, so if a car manufacturer is not the main client of the supplier, this supplier may, although not intentionally, leak important information about this manufacturer to its main client manufacturer. On the other hand, if a car manufacturer is the main client of a supplier, suppliers are normally well aware of the fact that “betrayal” would result in loss of business to their major customer. Hence this car manufacturer does not need to be concerned with this kind of knowledge spill-over in the first place.

Also, new technology development projects are more difficult to manage than projects that only involve making adjustments to well-established technologies. With the former projects, valuable and innovative technology is only actualized when both parties provide their latest technology and know-how to each other, engage in extended information exchange and repeat trial and error processes. This kind of knowledge transfer, fusion and creation process is bilateral, highly sophisticated and invisible, it is therefore difficult to manage. And even if a car manufacturer and a supplier succeeded in generating new technologies, it is difficult to measure how much contribution has been made by which party, or how much of the resulting profits should be attributed to which party.

Additionally, these projects are also not free from a high level of

uncertainty, so the parties find it difficult to precisely judge in advance what each of them should do to what extent, what level of resources (human, materials, financial or knowledge) should be provided and the probability of success.

Furthermore, even if parties closed NDA (Non-Disclosure Agreement), in case either of them disclose proprietary information to third parties, the repercussions are tremendous and it is difficult to prove illegal activity / or wrong doing on an objective basis.

Moreover, for new technology development projects, although car manufacturers tend to select suppliers on the relational factors explained above, suppliers must have sufficient R&D capabilities. This is understandable since suppliers' technological competencies largely affect the outcome of projects. In fact, in the above-mentioned questionnaire survey, 51% of the primary suppliers answered that, "Not being limited to mere enhancement of available technologies, but being able to propose or develop a new component technology or component based on a new concept" was the "most important competency required in successfully competing against others."(Fujimoto, Ku, Konno, 2004).

According to the above discussion, we can conclude that; because joint development activities for innovative technologies are difficult to manage only by way of contracts, car manufacturers tend to collaborate with the truly core suppliers- suppliers, who have sufficient R&D ability and a long-term stable relationship with the manufacturers- so that they can co-operate in accomplishing the development project upon strong mutual trust. Consequently, the relationships between car manufacturers and these types of suppliers should become closer (Konno 2002).

4.3 Rationale for diversification of transaction base

On the other hand, most projects only involve minor adjustments to existing designs. Such projects have lower uncertainty and the technology and know-how used are not the latest (at least products using such technology or know-how are already available in the market), as compared to new technology development projects. Thus in these kinds of projects, knowledge spill-over is not a serious concern. For car manufacturers, this makes the project management comparatively easy, and there is no imperative to choose existing suppliers. Rather, it is more advantageous to increase the transaction base of a specific component to a certain extent.

The advantage of expanding the transaction base is; first of all, if car manufacturers keep purchasing from a specific supplier, it is inevitable that

this supplier's motivation for new technology development will lower, but if car manufacturers exert competitive pressure by procuring from several suppliers, lowering of motivation can be prevented. As mentioned earlier, one of the disadvantages of the Japanese supplier system is that it generated "collusion" between car manufacturers and suppliers. To prevent this, it is important to inspire competition among suppliers (Nobeoka, 1997).

Secondly, to objectively assess the QCDD (Quality, Cost, Delivery and Development) of a specific supplier, car manufacturers would need to obtain information for comparison against other suppliers. However such information is difficult to accumulate unless the car manufacturers actually deal directly with the supplier (Nobeoka, 1996). Thus, to understand the industry standard, it is important to deal with several suppliers.

Thirdly, through dealing with several suppliers, car manufacturers can have more opportunity for accumulating important information regarding a specific component. Especially, if a car manufacturer obtains parts from suppliers that have close relationship with the car manufacturer's competitors, the car manufacturer has more opportunities of indirectly knowing other car manufacturers' approaches and technological trend (Takeishi, 2003).

Of course, expansion of the transaction base has disadvantages, too. First of all, the development cost per component tends to be more expensive when bought from several suppliers, as compared to when it is bought from a single supplier in bulk (Nobeoka, 1999). Secondly, expanding supplier base beyond necessity, the manufacturer's buying power decreases due to reduced purchase amount, and they may miss out on gaining components with truly needed specifications (Konno 2003). Thirdly, expanding the supplier base, the management and adjustment costs of joint development activities increases (Nobeoka, 1999).

Thus, it is not wise for car manufactures to increase supplier base unlimitedly. However, as discussed above, up to a certain degree, there exists a sufficient logic for expanding the supplier base for a specific component. New suppliers are acceptable and car manufacturers even encourage their existing suppliers to expand their customer base. Consequently, the relationship between car manufacturer and their non-core suppliers has opened.

4.4 Reconciliation for concurrent occurrence of "diversification" and "strengthening of relationships"

As explained in the previous sections, for a given component, a relatively small number of projects involve development of advanced

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technology while others do not. For the former, car manufacturers tend to prefer close collaboration with their core suppliers with which they have long-term stable dealings and various shared routines and strong mutual trust. Since these projects involve the development of new innovative technologies, it is extremely difficult to manage them in an ordinary joint development scheme. On the other hand, however, in less technically advanced and relatively simpler projects which require minor adjustments or modifications to existing components, the management of projects is not so difficult that car manufactures can safely deal with new and additional suppliers, and they can even encourage their existing suppliers to expand their customer base.

Thus, it can be summarized that the “diversification of customer base” refers to the latter category of joint development projects, and the “strengthening of R&D-related ties” to the former.

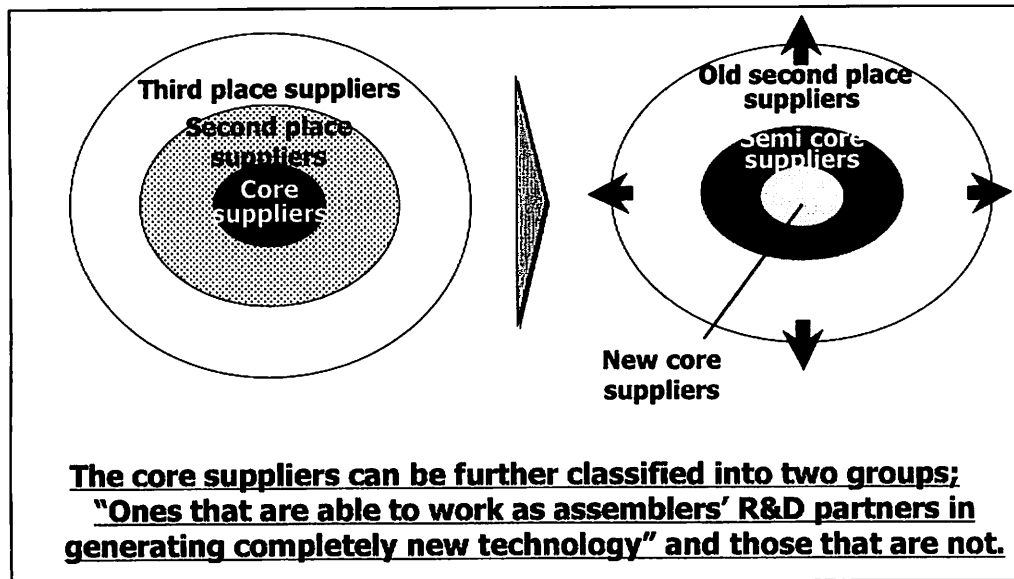
Let’s look at the above-mentioned trend from a “knowledge management perspective.” The characteristics of inter-company collaboration in the “knowledge creation” phase, which means the phase of generating an innovative new technology, is different from in the “knowledge utilization” phase, which means the phase of applying existing knowledge for producing various derivative products.

Following Badaracco(1991)’s terminology, it is safe to say that the former process (the process which makes up innovative new technology) corresponds to the “knowledge chain” and the latter process (the process which only modifies existing components) corresponds to the “product chain”.

And the manufacturer-supplier relationship in the Japanese automobile industry is also becoming tighter and closer in terms of the “knowledge chain,” whereas in terms of the “product chain,” the relationship is becoming more open.

In fact, from interview surveys, at least some major car manufacturers are now classifying their once core suppliers further into two groups; a group consisting of truly core suppliers that can play an important role in generating completely new innovative technology, and a group consisting of remaining suppliers.

Figure 9



Source: Konno (2004b).

5. Conclusion

5.1 The future of the supplier system

As mentioned earlier, in the past mass media, a lot of experts eagerly reported the "collapse of the keiretsu system in the Japanese automobile industry." However, this paper reveals that such view is somewhat superficial.

Surely, the transaction base in the supplier system is expected to be more and more diversified in the future. As far as we know from interviews and surveys, Japanese car manufacturers started to proactively encourage their suppliers to expand the transaction base after 2000. This is largely because car manufacturers realized that rapid, large-scale expansion of production, which was seen in the past, was no longer likely to happen. Another factor, which set off the above movement, was Nissan's success in significantly reducing purchase costs, brought about by their 'Revival Plan' and the subsequent review of purchasing strategy.

Also, technological divisions of car manufacturers once tended to be a rather passive opinion that "if keiretsu suppliers are permitted to diversify their customer base, it will lead to leakage of our technology." However recently, the prevailing opinion is "even new technology is relatively easy to imitate once it is in the public domain (i.e. launched in the market). If this is the case, proactively selling our co-developed technology from an early stage and making that technology the de facto standard, will lead to cost

reduction causing production increase, which in turn would benefit both parties (car manufacturers and suppliers).” Such opinion also seems to be assisting the movement toward diversification.

However, such movement does not necessarily lessen the importance of long-lasting, co-operative and stable relationships between car manufacturers and suppliers. In fact, car manufacturers need their core suppliers in order to develop new innovative technologies collaboratively. On the other hand, almost all suppliers face many advanced technology issues which could only be dealt in collaboration with car manufacturers, so it is crucial for suppliers to join co-development projects of main customers for new innovative technology and gain more useful information and technology know-how. For this reason, the Japanese supplier system is becoming diversified with respect to the “product chain,” however, with regards to the “knowledge chain”, tie between car manufacturers and suppliers are becoming increasingly stronger and closer, as stated repeatedly elsewhere in this paper.

This means that at least in the Japanese supplier system, the two seemingly contradictory movements of “diversification” and “strengthening” of relationships among car manufacturers and suppliers, are likely to progress concurrently at the same time. From a different perspective, the keiretsu system is not going to collapse, but the fundamental quality of the keiretsu system, “co-existence of competition and co-operation” (Itami, 1988) is likely to be refined and strengthened in the future.

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