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Tendency toward Specificity in Transactions and Compliance to Hierarchy: A Report on the Interviews with Japanese Automotive Suppliers in March, 2009

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We would like to express our sincere appreciation to the interviewees for their collaboration

Abstract

This paper documents, summarizes and analyzes the results of interviews with two typical Japanese automotive suppliers with different business focuses. The shared responses from the interviews include: the emphasis on trust and collaboration for product quality and cost instead of new product development for new customers, the pursuit for specificity in products and transactional relationships, perceptions on the maturity of the automotive industry, and the regular tier structure in automotive supply networks. All these issues are intertwined and lead to the lock-in of the current automotive industry landscape. The complex integration of many components and parts in an automobile drives the firms to pursue specificity in design and production process, which improves quality and cost in order to compete. Such pursuit of specificity for high-performance/high-quality integration has emphasized deep relationships and trust in existing transactional relationships, but limited the innovation incentive and innovation capability accumulation, and made the firms either unwilling or unable to diversify their products and transactional relationships with new customers in new market niches. Over years of evolution, automotive suppliers have become compliant to their positions in the sequential hierarchy of assembling from raw materials to components/parts, systems and the entire vehicles. The interviews have provided qualitative insights that may complement and support the related quantitative supply network analysis using archival data, in order to further our understandings on industry architectures.

Background

This paper reports, summarizes and analyzes our interviews with the executives/managers of two Japanese automotive suppliers, in the first week of March, 2009, at the support of the Manufacturing Management Research Center of University of Tokyo. One of the suppliers is an automotive system supplier, and the other is a metal material supplier.

The purpose for the interviews is to collect micro evidence at the firm level on how individual firms make local decisions on the transactional links with other firms on both

customer and supplier sides, e.g. product strategy and procurement strategy, which then influence the overall macro industry architecture. We managed to screen the factors, including technological, economic and cultural ones, which the firms have or have not considered when making the decisions on creating and managing transactional links with its corporate customers and suppliers.

The evidence collected from the interviews is expected to supplement the findings from our previous analysis using historical archival data on the Japanese manufacturing industries in 1993, industrial network model, as well as a hypothetical theory on how the nature of technology (e.g. energy processing technologies used in an automobile) may influence the industry architectures[1] of a production sector (e.g. automotive production sector). Particularly, preliminary analysis has shown that the Japanese automotive production network in 1993 was highly hierarchical (compared to the electronics sector). We hypothesize that it is the high-power nature of an automobile system that promotes mutual specificity in automotive components, production assets, and transactional relationships, which further give rise to hierarchical industry architecture (Luo, Whitney, Baldwin and Magee, 2009).

In addition, we also intended to identify the managerial value of our research on industry architectures for individual companies via systemic discussions, we tried to inspire the interviewees (company executives) about how industry architectures and dynamics, as well as the underlying forces and fundamental rules, would affect an individual company's strategies and performances. In nature, firms in the middle of the value chains can only observe its direct customers and suppliers, with ignorance of the big picture of industry architectures.

For these purposes, we managed the interview questions to fall in three major areas:

1) General questions on how the procurement and product strategies are made in the company. The discussions are related to how the company manages organizational structure, procedure and people to make related decisions.

2) Questions about procurement strategies and suppliers. We asked about the portfolio of purchases (what to buy), and the pattern of purchasing linkages with their suppliers (whom to buy from). We also sought for their decision rules (e.g. technology, cost) on their strategic choices about purchases and relationship with suppliers. Furthermore, we tended to confirm their perceptions about hierarchy in supply networks and specificity in the relationships with suppliers.

3) Questions about product strategies and customers. We asked about the portfolio of products (what to sell), and the pattern of sales linkages with their customers (whom to sell to). We also sought for their decision rules (e.g. technology, revenue) on their strategic choices about product/ innovation and relationships with customers. Furthermore, we tended to confirm their perceptions about hierarchy in supply networks and specificity in the relationships with customers.

[1] Please see Jacobides, et al (2006) for the definition of industry architectures and its importance for both academic research and business practices.

In the later sections, we first document the interviews as detailed as possible, even more than the need of our own research. Not all parts of the interview discussions fit closely with the interview questions, but we still document them for possible interests of other researchers. Then, the most impressive observations, from which we draw the title of this paper, are analyzed and summarized in the concluding section.

Company A

Jianxi Luo interviewed Mr. A, the executive officer of marketing and sales division of a major Japan-based manufacturing company engaged in the manufacture and sale of aluminum and aluminum alloys, copper and copper alloy products. The interview was conducted on March 2, 2009, and was accompanied by Ying Li, master student from Yokohama National University.

Company A's products are used in cans, caps, foils, printing, heat exchangers, automobiles, room air conditioners and aluminum materials for electrical equipment. The company offers its products to domestic and foreign can manufacturers, automobile and parts manufacturers, companies of chemical and electricity industries. Figure 1 below was drawn by Mr. A during the interview. The largest portion of production of this company comes from aluminum materials for cans.

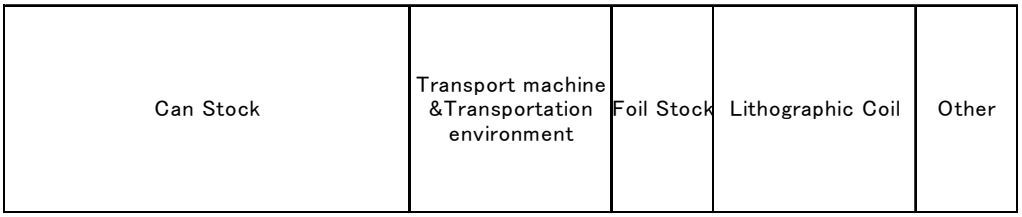

Figure 1. Product portfolio of company A (courtesy of Mr. A)

We tried to identify the company's transactional relationships with other firms in the automotive supply network in Japan. Mr. A provided some examples of the company's suppliers and customers. The company purchases raw aluminum mainly from foreign commodity markets like LME (London Metal Exchange), originally from major refining companies, including Alcoa and Rio Tinto Alcan. Company A processes the raw aluminum into materials by rolling and shoving, and then sells aluminum sheets for auto body to automotive manufacturers, radiator fin to cooling system suppliers, and forged parts for automobile suspension to suspension suppliers. Company A seems to locate at the bottom portion of the automotive supply chains, but it has a broad spectrum of customers on multiple different tiers. Mr. A drew Figure 2 for us to demonstrate the position of company A on the automotive value chain. The automakers, including Toyota, Nissan and Honda, are its customers of aluminum materials.

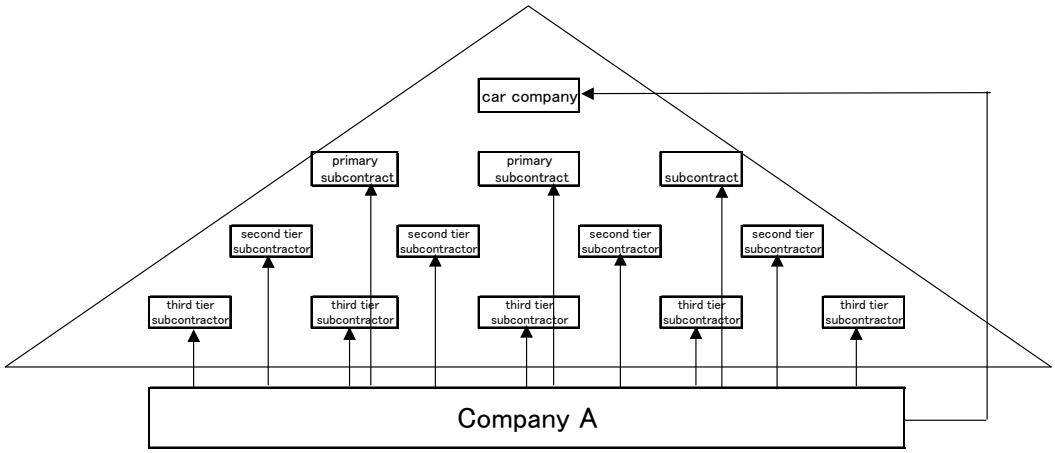

Figure 2. Position of company A on the automotive supply chain (courtesy of Mr. A)

Mr. A agreed that there is clear tier structure in the automotive supply chains. He observes the transaction patterns around company A are almost hierarchical, and there are many transactions with automakers, who are at the top of the hierarchy. In particular, Mr. A confirmed that the company clearly knows where each of its products is going to be used at the end of the supply chain, and customizes specifically for each specific use. They think having that kind of specificity is important for the quality of their products, and strive to improve that specificity by working closely and collaboratively with the customers.

Mr. A perceives that the businesses of company A, including automotive, are all in a saturated stage. It is said that aluminum industry of Japan has stable technology base and industry structure, as well as excess supply and competition. He emphasized that there is no “innovator’s dilemma” (Christenson, 1997) in such heavy industries as aluminum/raw materials/chemical, because the possibility for disruptive technologies (Christenson, 1997) to take place is limited. The R&D in company A is mainly to improve the QCD (Quality, Cost and Delivery) for their existing products, production processes and transactional relationships with customers.

Being asked about where to invest given limited resources, his answer was that investing in QCD and mutual trust/relationships with customers is essentially more important than investing in radical innovation (Henderson and Clark, 1990), e.g. new products for new demands from new customers in new market niches. If there is so-called “innovation” in the company, it actually represents incremental innovations (Henderson and Clark, 1990) that sustain and improve the company’s current business landscape. Investment that expects radical innovations for new demands/new customers in new market niches will become very likely a waste, simply because the industry is quite stable. We then further asked about the company’s strategy in response to the development and possible penetration of electrical vehicles in the future. He told us that his company is watching the development of the electrical vehicle market, and preparing battery-related products. It may become a big business in the future, but is still small at present.

Generally, Mr. A perceives “excess competition based on price” as their major risk for future, and the main strategy to deal with this is strengthening the relationship and trust with customers by continuously improving their QCD and providing solutions to customers’ problems. When asked about potential product portfolio change, he answered that, due to this stagnant nature of the industry and the competitive advantage of low-cost

low-quality competitors (e.g. competitors located in low cost countries, such as China), their plan is to shift the product portfolio from commodity products to highly quality products. He confirmed that they have little incentive to innovate new products for new demands in new markets, but addressed the company's focus of sustaining the competitiveness within current markets or industries by strengthening the trust and collaborations with customers and suppliers.

In general, the impression from this interview was that, company A as a major player in its segment values the improvements in QCD and trust with existing customers, more than fundamental innovation and expansion to new products for new customers in new markets. That is to say, there is limited scope of the type of transactions and limited incentives to create new type of transactional relationships in new market niches. They know where their products are used and try to seize what their customers want, and then customize specifically for improving QCD by working closely with the existing customers. This strategic focus is set upon their understanding on the current industry as a stagnant and stable one. Mr. A confirmed that the current automotive value chain is maturely organized and well smoothed as a hierarchy.

Company B

Jianxi Luo and Heejin Kim interviewed Mr. B, the manager for global procurement planning in the procurement department of a major Japanese tier-1 automotive system supplier. The interview was conducted on March 4, 2009, and was accompanied by Yanyan Jiang (acting as interpreter), master student from the University of Tokyo.

Company Structure

Company B is a major automobile component and part manufacturer, and supplies a wide range of products, including power train control systems, electronic systems, electric systems, thermal systems, ITS, etc, to the worlds' major automakers.

We started the discussion with the company's organization structure. Prior to the recent change, persons in charge of purchasing are placed in the corporate center for raw materials and facilities procurement, and in each business/production groups, including power-train, electrical, electronic, ITS, and thermal system units, for specialized parts. Meanwhile the supplier management function was placed together with strategy and planning at the corporate center. After the recent change, now they have established an independent purchasing center in parallel with other functional centers, including corporate center, administration center, technological center, production promotion center and sales group. The purchasing center has integrated the previously-distributed purchasing operations in corporate center and separate business/production groups. Such structural changes are documented in the old and current organizational charts below, in Figure 3.

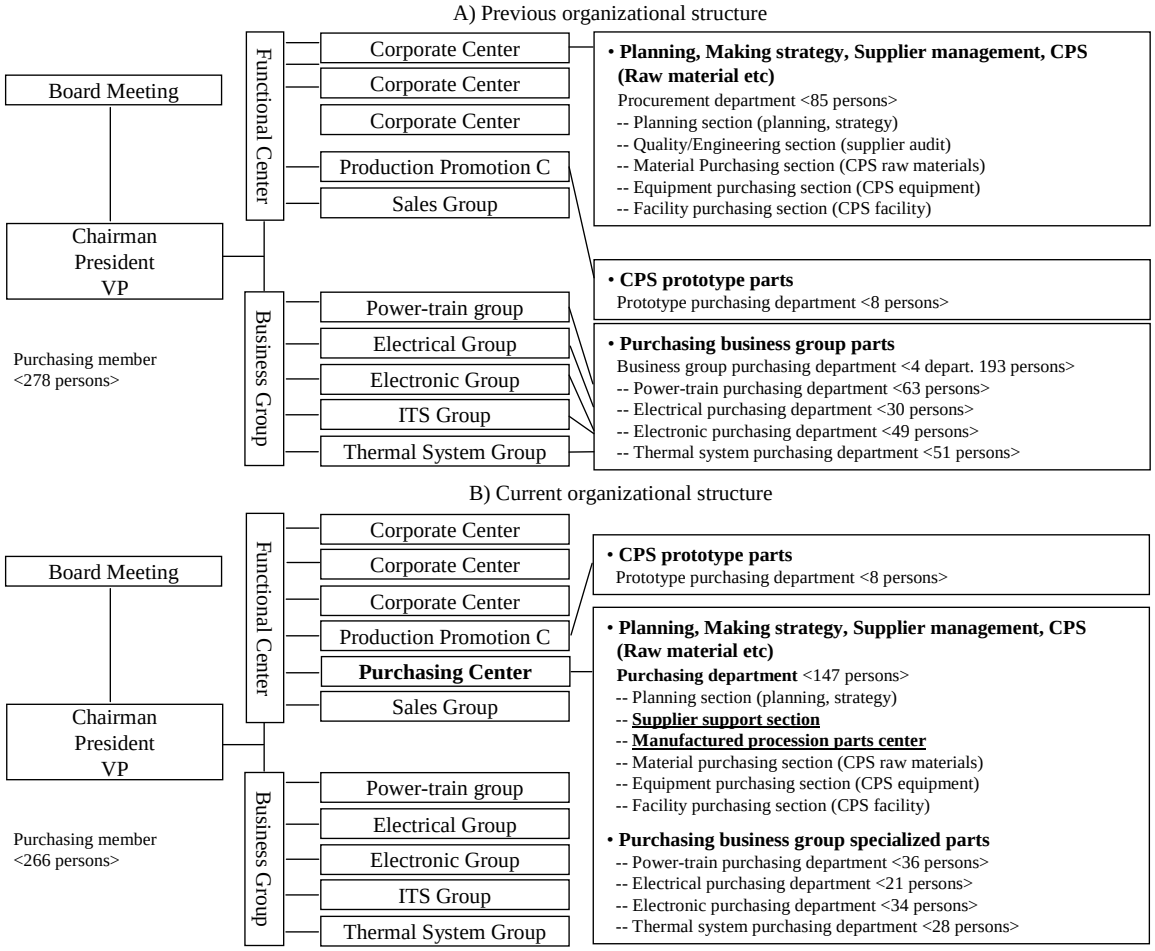

Figure 3. Organizational structures of company B before and after a recent organizational change (courtesy of Mr. A). Note: CPS is Central Purchasing System

However, Engineering Research & Development Center is still not involved in purchasing decision making process. The Engineering Research & Development Center is mainly responsible for long-run (10~20 years) product strategies, while purchasing center for relatively short-term (4~5 years) procurement strategies. Thus, generally, the Engineering Research & Development Center has a different strategic viewpoint from purchasing center. There is no organizational mechanism for purchasing managers and R&D managers to interact and influence the decisions of each other, while the purchasing center persons do sit down together with those from the production/business groups to discuss and plan production and purchasing strategies together. However, Mr. B commented that it would be desirable if the purchasing center could join the product development process and make active proposals from the initial stage of product engineering. Without that, the Engineering Research & Development Center tends to make plans adapting the assumed parts supplied by the suppliers which the company has already had transactional relationships, and thus some chances of cutting costs from re-architecting products are lost.

Components and Suppliers

We asked if the company views the supply chain as a clean tier structure. Mr. B confirmed it, and explained that the automotive supply chains have been smoothed and well organized after decades of evolution in Japan. The company's suppliers all know

their supplies are going to company B's specific automotive products, and customize specifically for the best of quality and cost. In particular, when asked about possible cycles of purchasing transactions (for example of a cycle, company 1's customer is company 2's supplier, while company 2 is a supplier of company 1), he could not think of any formal/regular one. However, there are still some interesting situations.

Sometimes there are supplies in reverse way, that is, from company B (Tier-1) to its Tier-2 or Tier-3 suppliers. This happens when a lower-tier supplier does not have certain necessary parts for making its product for company B. In that case, company B purchases that kinds of parts from another supplier and then "provides" to this supplier. Another incentive underlying this phenomenon is that company B can purchase the needed parts at a cheaper price than the supplier which actually needs the parts. Mr. B called this "provision", and does not view it as a formal market-based purchase transaction.

Sometimes, company B also purchases products from its competitors (company on the same tier), such as Bosch and Visteon. For example, when an automotive customer requires specifically using a part of Bosch's parts, or Visteon is the only manufacturer of certain parts, company B has no choice beyond buying from them. Thus, exactly speaking, the products are not competing items with that of company B.

Concerning questions about global supply networks, Mr. B said strengthening global supply networks is one of the primary concerns of their purchasing center these days. Many foreign subsidiaries of company B still import parts from company B's suppliers in Japan, which accompany risks and high costs. Thus, purchasing center is busily working to search for qualified local suppliers.

Mr. B perceives the bankruptcy of their suppliers as the major risk on the supply side amid the current economic recession since 2008. If that happens, they have to consider producing many components or parts in house if these are complex products, and sourcing from alternative viable suppliers if these are general or commodity parts. Costs may increase in any case.

Products and Customers

On the product/customer side, Mr. B confirmed that the company knows well where its products are specifically used in the automobiles made by different automakers. In particular, company B even examines the usages of its commodity type of products at the customers. If a customer is not specific in purchases and uses of its certain products, the company will be concerned about the performance of that customer and may withdraw from supplying products for it. Company B is very concerned about the quality and performance of the system product after integrating the components and parts supplied by it.

Mr. B told us that his company is worried about the risk that they cannot receive the payments on time from the automakers due to the slump of automotive sales since 2008. In spite of such risk from its automotive customer base, the company still insists its concentration in the automotive industry. We asked him about potential changes in future products portfolio and the possibility for company B to diversify its business beyond automotive components (electronics, finance, medical, etc) and to evolve into a company

like General Electronics (GE). In response, Mr. B emphasized his company's automotive DNA, and does not think there is strong incentive inside the company to expand to other non-automotive business. There are cultural and historical reasons.

Still about this business scope issue, he mentioned the difference in product portfolio between his company and a company such as Bosch, which has 60% revenue from automobiles and 40% from other businesses such as agricultural machines and tools. He also provided a historical story that his company actually tried some other non-automotive business about 10 years ago. For example, around 1996, they developed and patented the first batch of EL Crystal Panel, but failed to make a profit from that business because of their limited distribution channels in the consumer electronics market. They also invested almost ten billion yen for the television business. However, later the television factory switched to the production of automobile parts.

Therefore, in the past decade, the company has chosen strategically to focus on the automotive business, and believes that its DNA is automotive. The key for automotive business is the collaborative relationship and trust with its customers -- Toyota and other major Japanese automakers in this mature and stable automotive market. If the company is investing in certain innovation, it is the type of innovation that improves quality and performance of their existing products and processes in the needs of or pulled by the automakers.

He commented that the company hesitates to expand to consumer electronics industry also because it has been rooted in the culture of the relatively slow-paced automotive industry, and cannot get used to the dynamics of the consumer electronics market. Even though company B recognizes the value to capture the end-user needs faster than its automotive customers, it has been insensitive to the end-user's needs, largely due to its value chain position as a Tier-1 supplier since its establishment. This historically-developed characteristic of company B makes it difficult to diversify its business. In the company's DNA, they are better off focusing on sustaining and improving relationships with the automakers, rather than facing the dynamic demands of individual customers, and fast-paced innovations of its competitors.

However, he also speculated a little that such strategy may change to some extent because of the slump of automobile sales amid economic recession, and the potential failure of the automakers. Because of the reduction of production for current products, about 30 percent of the employees can be utilized in searching for new fields of business. For last ten years, when automobile market has been in good condition, company B was too busy to think about possible diversification or utilizing its advanced technologies in another field of business. In that sense, this recession could be a good chance for company B. They might re-start the efforts of exploring new products for new customers in new market niches.

Summary and Conclusions

The key points from the two interviews and documented above are summarized in Table 1.

Table 1: Categorized interview results

Company		A	B
Type		Material supplier	Tier-1 system supplier
Product Technologies		Material + Chemical	Electrical + Electronics + Mechanical
Transaction Patterns	**Purchases and Suppliers**	Commodity; buy from commodity market, but know original sources	Specific; suppliers are required to design and produce specifically
	Products and Customers	Specific; care where products are used	Specific; care where products are used
	Purchase from higher-tier firm	No	No
	Supply to lower-tier firm	No	No
	Perceive Cycled Supplies?	No	No
Perceive Industry Tiers/Hierarchy?		Yes	Yes
Perceived Industry Status		Mature/Slow-paced	Mature/Slow-paced
Major Risks		Competition in price, cost, quality, service, etc	1) Cannot receive payments from customers on time 2) Supplier bankruptcy
Given limited resources, which one of the two to invest? (1) Trust/collaboration with customers and suppliers for QCD improvements; (2) new products for new customers in new market niches		(1)	(1)
Attitude toward trust and relationships with customers and suppliers		Most important	Most important
Attitude toward innovation for new products to new customers in new market niches		No need	Hesitation due to the failure of historical trials
Future Product Strategy or Portfolio Change		Same products, but move from commodity segment to quality segment	Depending on the needs of automaker customers

First of all, the automotive suppliers view the automotive supply network as a tiered architecture, and perceive no example of supply cycles, or non-hierarchical transactional relationships -- transacted supplies from a higher-tier company to a lower-tier company[2]. In particular, they attribute such perception of "being well organized", e.g., hierarchical regularity in transactional links, to the maturity of the current automotive industry.

Secondly, they have similar strategic choices in terms of transactional relationships on both purchase/supplier side and product/customer side. On one hand, the firms emphasize that the trust and collaboration with their customers and suppliers are core for their business. Their products are specifically tailored in design and production in order for the high-quality integration into the larger system products of their customers; meanwhile they also favor specific design and production from their suppliers.

On the other hand, about product strategy, they emphasize the focus on QCD in their current product portfolio for current customers, and their reluctance to develop radical new products and explore new customer base. Explanations include: the reliance on the pull of the automakers, slow-paced "corporate DNA" formed in the historical and deep involvement in the automotive business, some cases of failures of expanding to unfamiliar broad products/customers, etc. For such reasons, company B, which has expertise in electronic and electrical technologies, finds it extremely difficult to enter the fast-paced and dynamic consumer electronics industry.

[2] In our analysis on the archival data of the Japanese automotive supply network in 1993, we only found one supply cycle of 3 companies, among 679 firms and 2,437 supplier-customer relationships among them.

Generally speaking, perceiving the saturated status of competition in automotive business, the supplier firms tend to value incremental improvements in QCD, and the collaboration and trust within transactional linkages for QCD, more than the innovations for new products to new customers in new market niches. In fact, the collaborative efforts (aimed for QCD) at both plan level (Womack, Jones and Roos, 1990) and inter-firm level (Dyer, 1996) in the Japanese automotive manufacturing industry have also been documented by past studies.

Such strong incentive toward trust and collaborative transactional relationships may be traced to the integral architecture of a contemporary automobile. The current dominant design (Suarez and Utterback, 1995) of an automobile has a large number of parts and large amount of integrated interactions. A high degree of integrality is necessary for an automobile to meet complex systemic requirements (technical, market and regulatory), such as energy efficiency, emission, noise, vibration, safety, stability, driving feel, design, cost, etc, in order to attract consumers (MacDuffie, 2008)

Takeishi and Fujimoto (2001) observed a "shift to integral architecture" in the Japanese automotive industry. They found that, the functions assigned to individual parts in an automobile became more and more complex, and the need for structural or functional coordination in system integration had even increased.

Therefore, in nature the automotive supplier firms tend to pursue specificity in products and production process for tight coupling and effective integration. Such pursuit of product and asset specificity (Williamson, 1981) has given rise to the specificity in existing transactional relationships (Baldwin, 2008), which are important for collaborative effects and the QCD of the integrated products. Fujimoto (2007) argued that the collaborative attitudes and capabilities have actually provided the Japanese firms with architecture-based comparative advantages in the international competition of producing and exporting integral products, for which automobile is a typical example.

However, the necessary specificities in the product design, production process and transactional relationships (between customers and suppliers) have not only limited the incentive of suppliers to innovate, but also the development and accumulation of their capability to create new products for new customers. Integral product architectures may limit the innovation dynamics and technological progress rates of that type of products (Koh and Magee, 2008). Currently, the automotive suppliers in general are either unwilling or incapable to diversify their product portfolio, and the scope of transactions with new type of customers. The R&D efforts in automotive supplier firms are mainly for sustaining and incrementally improving their traditional products and business.

The lack of incentive and capability to develop new products for new customers further locks the supplier firms at their positions where they used to be. Reversely, the lack of radical innovation mechanism in the automotive industry will intensify the competition on QCD which discriminates radical innovation and favors incremental innovation. The reinforced lock-in in the relationship between the lack of radical innovation and specificity in transactional relationships in the context of automotive supplier network is demonstrated in the diagram in Figure 4.

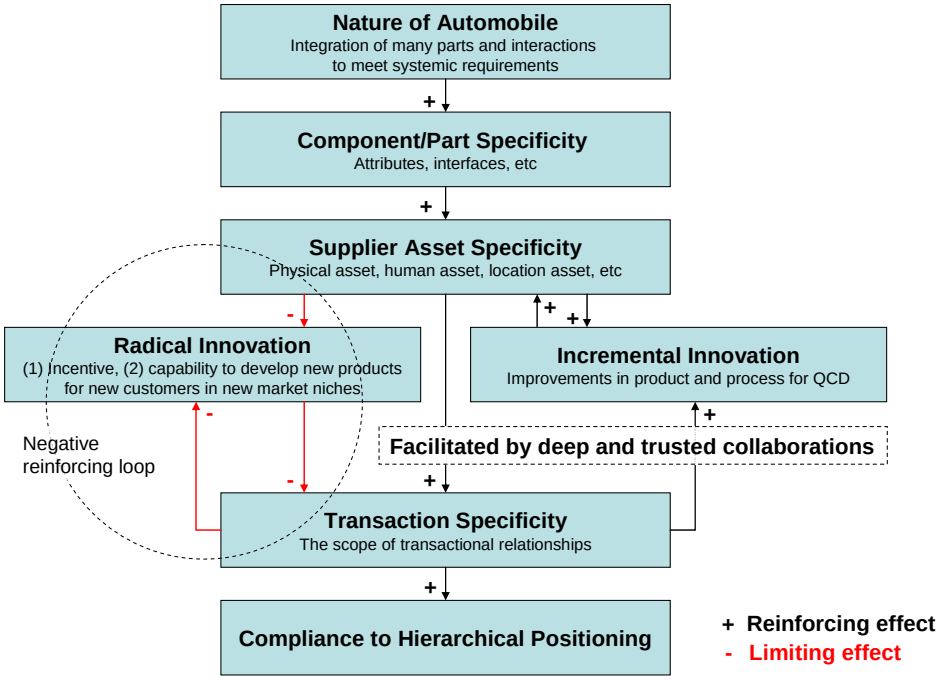

Figure 4. Causal relationships underlying observed patterns in automotive supply network in Japan

Over years of evolution driven by the competition on QCD favoring specificity in products, production assets and transactional relationships, the automotive suppliers have been compliant to their positions in the sequences of assembly automobiles from raw materials to components/parts, sub-systems and entire vehicles -- the hierarchy. The purchase and sale transactions of a company tend to follow a regular direction from lower tiers to higher tiers. It has taken a long history of evolution for the automotive industry to reach this status. This is agreed by the result from our quantitative analysis -- the Japanese automotive supply network in 1993 was almost purely hierarchical (Luo, Whitney, Baldwin and Magee, 2009).

As for a potential next step, it will be valuable to conduct homologous interviews in an industry where such lock-in may not exist to the degree in the automotive sector. For instance, if a product's systemic requirements are not so strict, or the product architecture is not so complex, the need for satisfactory integrality might not be able to limit the freedom of innovations and the scope of transactional relationships. The consumer electronics industry is presumed to be such a case. Therefore, we also plan to interview the suppliers in the consumer electronics industry.

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In particular, we would like to express our sincere appreciation to the interviewees for their collaboration. The first author is responsible for any errors in the interview notes and oversights in the analysis.

Notes

We also conducted an informal interview with an automotive electronics supplier with similar questions. For some reason, it is informal and is not to be unpublicized. However, the general insights from the unpublicized third interview were also consistent with the insights from the two interviews and the synthesized analysis in this paper.

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