

Information Sharing Between Automakers and Suppliers in the Process of Target Cost Management

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ABSTRACT

In order to survive in today's business environment characterized by strong competition, it is no longer enough to be an efficient company. The efficiency in the entire value chain of a company is necessary to satisfy today's demanding customer in terms of quality-cost-time. One of the tools used by many Japanese companies since the 1960s to satisfy the quality-cost-time requirements is the proactive cost management approach, widely known as Target Cost Management (TCM).

While many researches related to TCM have been conducted during this last decade, they are more focused on the TCM process of top companies in a value chain. The importance of suppliers' involvement into the TCM process of their customers is recognized, but it is still under-explored. In this paper, an attempt is made to explore how suppliers in the Japanese automobile industry contribute to the effectiveness of TCM process of the auto-makers through information sharing between the two parties.

1. Introduction

Within this last decade, many studies have revealed numerous aspects of TCM system, enhancing understanding of the proactive cost management and reduction system as it is practiced in various range of industries in Japan.¹ Recently, other researches have showed the widespread use of TCM throughout American and European companies (Hovarth, 1993 ; Ansari, 1996).

One can remember for example in the Japanese automobile industry, it is estimated that up to about 70 percent of a vehicle components and parts are outsourced from different suppliers and subcontractors. And beside that even independent suppliers deal with their customers on the basis of long term contract. Therefore in practice, TCM process is not only a company internal activities. It requires the involvement of all participants in a company's internal and external value chain as well.

While it is recognized that suppliers involvement in TCM process (as it is practiced by companies at the top of value chains) is also one of its crucial factors, TCM process from suppliers' perspectives is under-explored. Therefore, an attempt is made through case studies in this paper to explore how suppliers' activities are organized to support the TCM system practiced by their customers.

Our cases are based on a series of interviews conducted in Japan with some parts and components suppliers in the automobile industry . The interviews were conducted from September 1996 to November 1996. The cases presented here are those of two independent suppliers, both are primary suppliers. Case studies offer insights into real-life events and contextual conditions that are lost in a statistical or historical survey of the entire industry, though they cannot be generalized to the entire population. Before to explore our cases we will briefly review the framework of assemblers-suppliers relationships in the Japanese automobile industry.

¹ From 1977 to 1996, more than 200 articles and books about TCM have been written worldwide. But more than half of them are in Japanese. Others, mainly in English have been written mostly by Japanese scholars and researchers or co-authored by them. See Nihon Kaikei Kenkyu Gakkai (Japanese Accounting Association), 1996 (pp. 153-184) for detailed bibliography.

2. Framework of Assemblers-Suppliers Relationships in Japan

As in many other Japanese industries, the automobile industry is a pyramidal structure. Though there are 10 automakers in the Japanese automobile industry,² they can be classified within three main groups: *Toyota Group* (Toyota, Daihatsu, and Hino); *Nissan Group* (Nissan, Nissan Diesel, and Fuji); and *others* (Honda, Isuzu, Mazda, Mitsubishi, and Suzuki).

These automakers are built below some 10,000 parts makers (Abe, 1990). Among parts makers, there are primary suppliers that directly supply the automakers. Then in turn, the primary suppliers organize their own suppliers—the secondary parts makers. And each secondary supplier heads a tertiary group of yet smaller suppliers, and so on (Womack et al., 1991; Clark and Fujimoto, 1991).

Exhibit 1: Assemblers-Suppliers Transactions' Matrix

Suppliers (Product Lines)	Automakers						
	Honda	Isuzu	Mazda	Mitsubishi	Nissan Group	Suzuki	Toyota Group
Art Metal MFG. CO., LTD. (Pistons, Piston pins, Wheels-light alloy)	✓			✓	✓	✓	✓
Aisin-AW CO., LTD (Automatic transmissions)		✓	✓	✓			✓
ASMO CO., LTD (Wiper motor & Linkage parts, Windshield washers, Stepping motors, . . .)			✓	✓			✓
Akebono Brake Industry CO., Ltd (Disk brake, Drum brake, Brake, linings, Anti-lock system, . . .)	✓	✓	✓	✓	✓		✓
Denso CO., LTD. (Fuel injection equipment for diesel engine, Fuel pumps, Radiators, Generators, Electronic engine control device, Car air conditioners, . . .)	✓			✓			✓

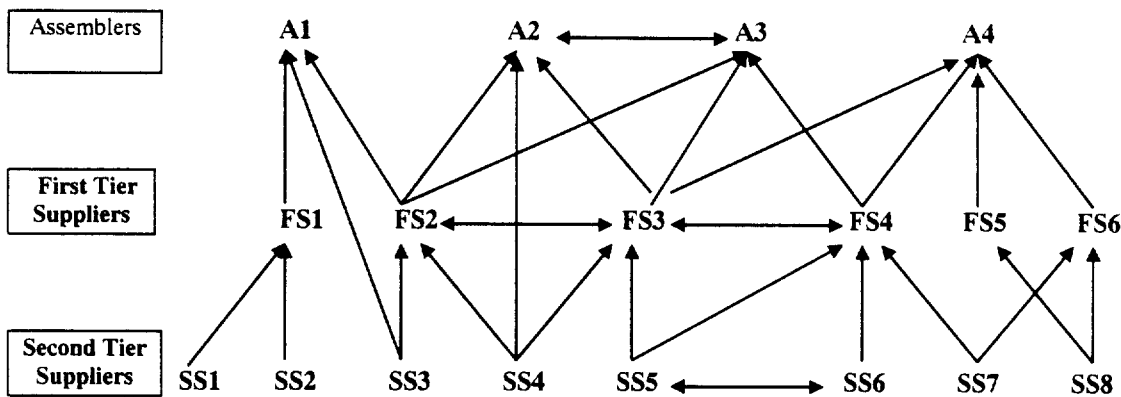
Source: Adapted from Auto Trade Journal (1995)

² On Friday, April 12, 1996, Ford Motor Co. and Mazda Motor Corporation have agreed that Ford increases its equity in Mazda from 24.4 percent to 33.4 percent. The move puts Mazda under the control of Ford because it will allow the exercise of a veto at Mazda shareholders' meetings. So legally speaking, Mazda Motor Corporation is no longer a Japanese automaker.

From the strategic viewpoint, one might think that suppliers work only with other members of the same group. This is not always true. If it was true, a company such as Honda could not exist since it does not have what can be referred to as Japanese keiretsu system.³ In practice, there are many cases of competing automakers⁴ sourcing the same type of parts and components from the same suppliers as illustrated by the exhibit 1.

Beside the fact that many suppliers are shared among different automakers' groups, Daihatsu and Hino have assembled vehicles for Toyota; and Fuji and Nissan Diesel have done the same for Nissan. In practice, the web of transaction in the Japanese automobile industry is very complex as hypothesized on the exhibit 2.

Exhibit 2: Transactions' Web in the Automobile Industry



Subcontracting is a characteristic of manufacturing companies worldwide. However, many studies have showed that the Japanese automobile industry is characterized by a higher rate of subcontracting than its Western counterparts (Cusumano, 1985; Odaka et al., 1988; and Smitka, 1991).

The contract or trading relationship is a long term one. Japanese suppliers usually produce a complete subsystems of components; they have greater asset specificity and are customer concentrated (Nishiguchi, 1994). The interdependence between assemblers and suppliers is so strong that it was referred to as 'quasi integration' by Aoki (1990). However as

³ Keiretsu here means the combines of large-scale business with suppliers. According to Nishiguchi (1994, p.113), large Japanese manufacturers began to invest seriously in this kind of relationships from the late 1950s onward to increase their control over some of their major subcontractors—financially, managerially, and technologically—in order to ensure that they could produce the same quality products as could the in-house operation.

⁴ By competing automakers, we mean automakers which do not belong to the same group.

emphasized by Womack et al. (1991), it can be noticed that some parts and components critical to the success of a vehicle are not subcontracted:

The lean assembler doesn't delegate to the supplier the detail design of certain parts considered vital to the success of the car, due either to proprietary technology or to the consumer's perception of the product. Leading examples of parts usually reserved for the assembler's in house supply divisions are engines, transmissions, major body panels, and, increasingly, the electronic management systems that coordinate the activities of many vehicles systems (p. 147).

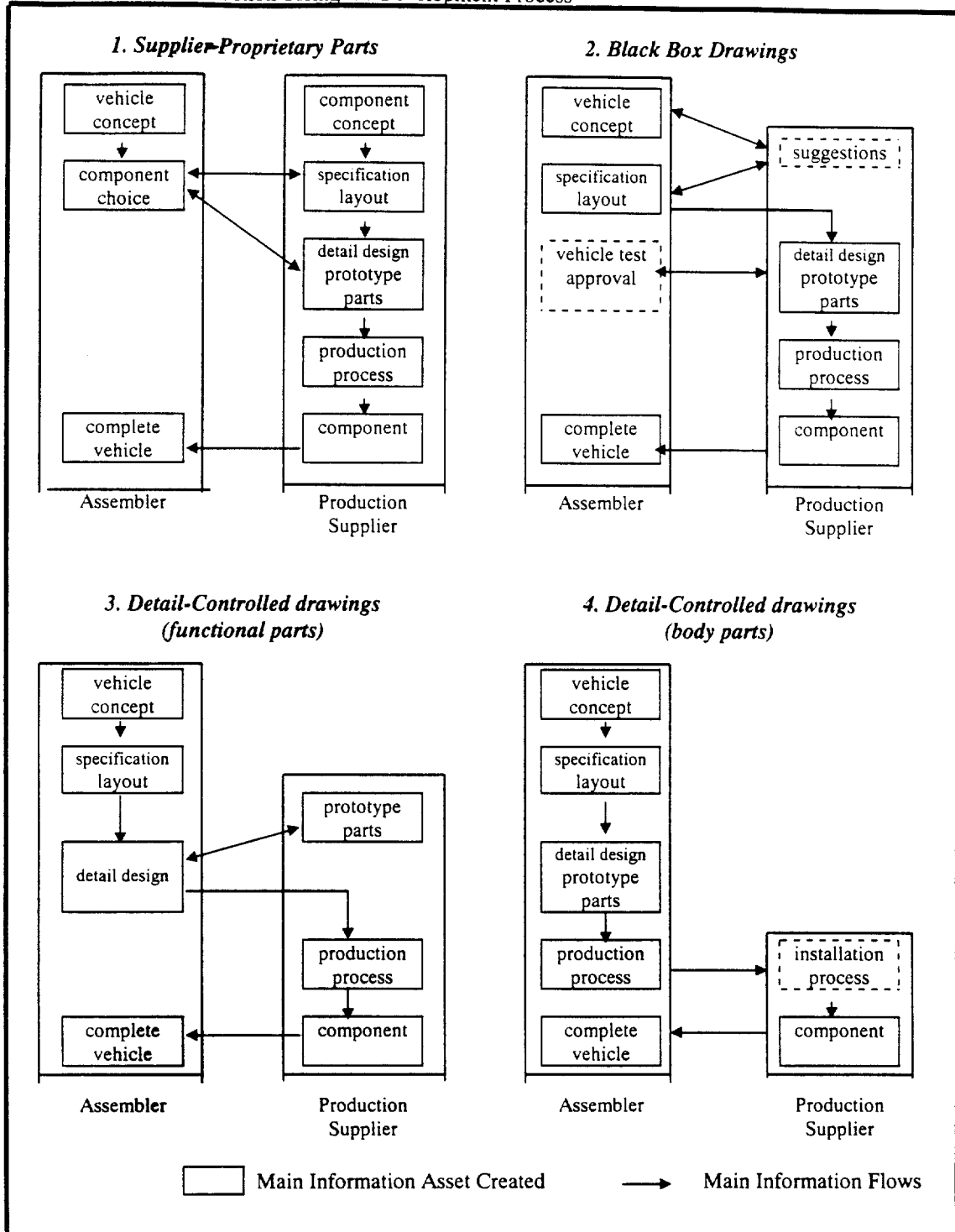
With exception of Honda, each automaker has cooperative association(s) of which its suppliers are members (Odaka et al., 1988; Smitka, 1991; Sako, 1995). An automaker's association of suppliers is not limited to keiretsu suppliers. It includes both keiretsu suppliers and outside ones. As a result of this mixture, some suppliers might simultaneously belong to, for example, Toyota's association and the Nissan one (Ueda, 1989; Miwa, 1990; Sako 1995).

Though recreational activities are organized, the cooperative association mainly allows the sharing of various business information between an automaker and its suppliers. However, automakers still promote inter-supplier rivalry by making public the ranking of suppliers' performance and by procuring individual parts from approximately three different suppliers (Wada, 1991; Aoki, 1988; Smitka, 1991; Takeishi and Cusumano, 1995).

In their turn, suppliers are members of their own association of suppliers (kyoroku-kai) where new findings and better ways to make parts might be shared. This inter-suppliers relation is as important as assembler-supplier relationship for technology diffusion in the industry and overall performance (Sako, 1995).

In what concerns assembler-supplier interactions, Japanese automakers can be seen as very demanding or strict about quality, cost, on-time delivery, and manufacturing technology. But when a supplier fails to meet the expected requirements, the automaker usually tries to discover the reasons for the problems and to push the subcontractors to solve them at the source. Their approach to dealing with their suppliers is referred to as 'problem solving oriented' by Nishiguchi (1994). With some additional hypotheses, the approach is referred to as 'voice relationship' by Helper and Sako (1995).

Exhibit 3: Interaction during the Development Process



Source: Clark and Fujimoto (1991, p. 141)

Studies of assembler-supplier relationships have tended to focus on product development. Asanuma (1984, 1989) analyzed and described the assemblers-suppliers' design information flows. He defined three categories of supplier: marketed goods, drawings approved, and drawings supplied; depending on how suppliers' products are drawn and consequently how do they interact with automakers. Other studies have confirmed that Japanese suppliers are integrated in the automakers' vehicle development process (Clark, 1989; Womack et al., 1991; Clark and Fujimoto, 1991; Ueda, 1995; Liker et al. 1995; Okano 1995).

Although English term used are different with of those of Asanuma, Clark and Fujimoto (1991), also classified involvement of suppliers in the automobile development process within 3 groups, though basically there is no difference about their assignments. Depending on how suppliers' products are drawn and consequently how do they interact with automakers, fundamentally the three main groups can be defined as follow (See exhibit 3) for the flow of information during the development process):

- (1) Supplier proprietary parts: typically in this case a part (from concept to manufacturing) is entirely developed by a supplier;
- (2) Black box drawings: in this category an assembler conceives the basic design and a supplier performs engineering detail and then manufactures;
- (3) Detailed-controlled drawings: basic and detail engineering performed by an assembler and a supplier manufactures.

A survey by Clark and Fujimoto (1991) identified regional differences between Europe, Japan, and United States as depicted in exhibit 4. The study by Cusumano and Takeishi (1991) also supported the fact that Japanese automakers rely more on the black box parts system.

Exhibit 4: Regional Proportion of Suppliers' Parts

	<i>Suppliers' Proprietary Parts</i>	<i>Black Box Parts</i>	<i>Detail-Controlled Parts</i>
Japan	8%	62%	30%
United States	3%	16%	81%
Europe	7%	39%	54%

Source: Adapted from Clark and Fujimoto (1991, p. 145)

Many other studies have argued that the efficiency of Japanese assembler-supplier relationships' has greatly contributed to the international competitiveness of Japanese automakers(Cole and Yakushiji [1984]; Cusumano [1985]; Womack et al. [1991]; and

Nishiguchi [1994]). For example, Clark and Fujimoto's study of 1991 showed that suppliers involvement in the product development process in Japan accounted for one-third of automakers' engineering hours in the new car development process. This gives an advantage which helps to make Japanese automakers' development time shorter than their Western counterparts.

The 'relation-specific skill', which derives from the stability of long term trading relationships, leads to high performance since suppliers acquire customers' experiences, contribute to design and development and invest in asset specificity (Asanuma, 1989). Beside this, defect rates of parts supplied by Japanese suppliers are also very small in comparison with Western suppliers (Womack et al., 1991; Cusumano and Takeishi, 1991; Nishiguchi, 1994).

3. Information Sharing in TCM Process

This section is mainly based on two case studies. At the request of the companies involved, their names and products have to be disguised. Therefore, we nicknamed companies concerned as Company X, and Company Y; and did not mention the names of their products.

3.1 Company X

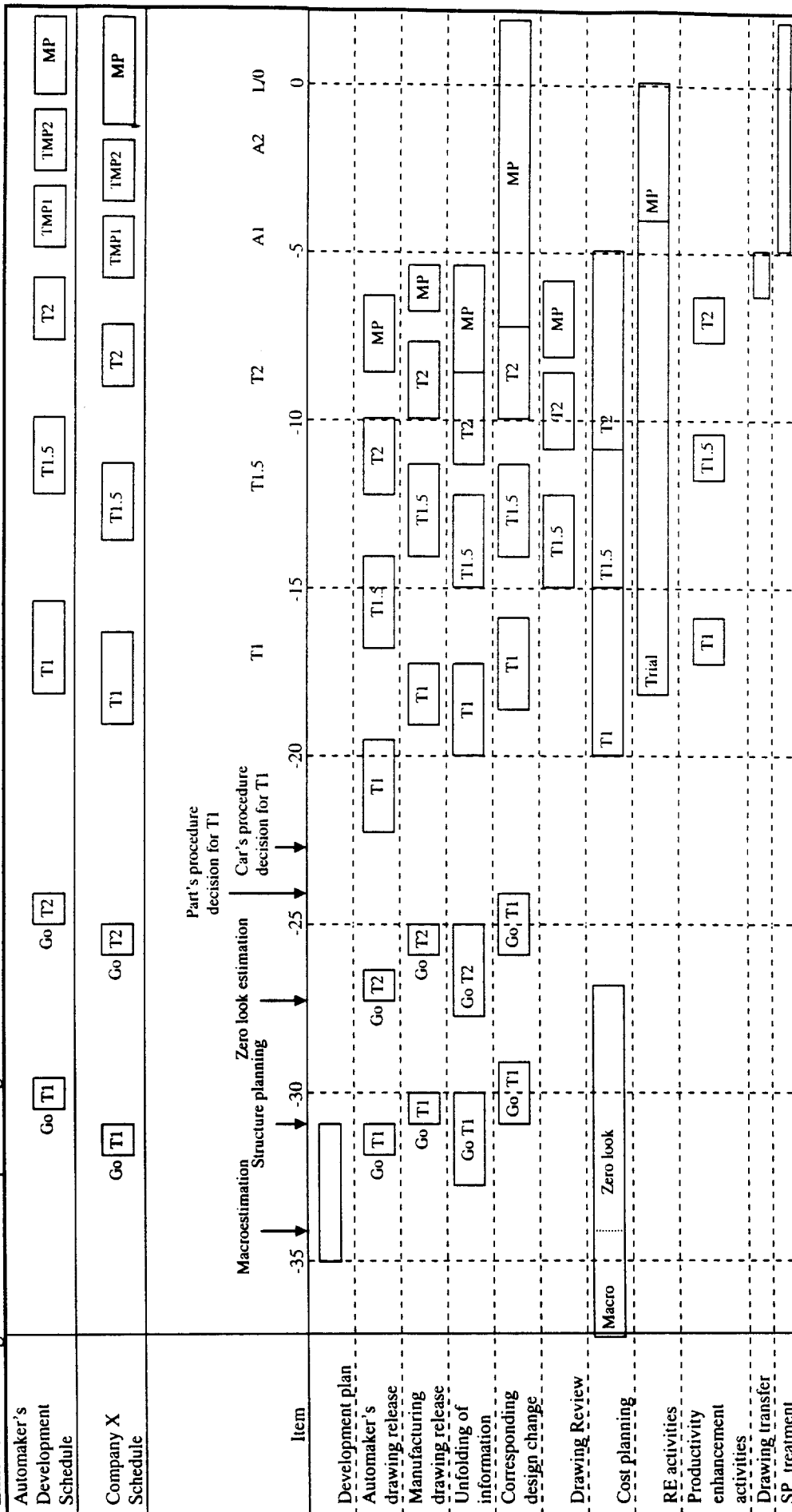
Company X is an independent supplier which has more than 5,000 employees in Japan, and three product lines (which lead the company to have three divisions). The main product line (nicknamed P) which accounted for about 74 % of its revenues in 1994, is supplied to almost all Japanese passenger cars' makers—Daihatsu, Isuzu, Honda, Mazda, Mitsubishi, Nissan, and Toyota. Company X market of P is the second largest in Japan and the third in the world.

Company X has other affiliated companies worldwide. However, the case here is mainly focused on product P and the interaction between Company X and its Japanese main customer, one of the leading Japanese automaker.

1. Inter-firms Product Development Process and Long Term Cost Management

The vehicle concept activities (development aim, fundamental design, styling, and so on) are exclusively carried out by the automaker, considering all the requirements of market and technology, the analysis of competitors, industry, and so on. Independently, Company X also carries different in-house activities of its products (See Exhibit 5) for the Inter-organizational Development Program).

Exhibit 5: Inter-organizational Development Program



After a vehicle concept and styling have been approved, almost three years before the beginning of mass production, Company X is contacted and sends its engineers to the automaker's development center as guest engineers for a certain period of time. Those engineers send back crucial information on quality, performance, and so on to company X's R&D center. It is important to notice here that those engineers not merely contemplate the automaker's one. Whenever possible, they make proposals for rationalizing the product. If it is considered mutually beneficial and technologically possible, the design can even be changed to fit these new requirements.

During this stage different negotiations and interactions are carried out both with the customer's design department and purchasing department. After reaching the agreements on different targets, the product management committee begins to plan, coordinate, and control different in-house activities as described above (See Exhibit 5).

In-house New Product Management Committee

□ Objective

The main objective of the committee is to decide on all activities from the planning stage to the after sales service, and on the quality of the product.

□ Starting

The head of the Quality Assurance Department usually presides over the committee. After different agreements have been reached, each business department is told what his responsibility is and starts with its plan.

Generally, the committee has to meet in the two following cases: (1) When there is an introduction of new model, or model change; (2) When a new production process, or technology is introduced. In the case when only a part of Production Department is concerned, it is not necessary to call a meeting. The head of the Production Department is going to analysis the case.

□ The Structure of the Committee

Basically, the committee structure is as described in the exhibit 6. However, depending on the customer and the vehicle model concerned, there are some variations.

Exhibit 6: Structure of New Product Management Committee

Committee Chairman

Chairman-Assistant

Administration: Heads of Production Management and Quality Assurance Departments

Sub-committee meeting	Assignment	Department									
		Production Management	Production Technology	Business Planning	Quality Assurance	Design	Manufacturing	Sales	Parts		
Preparation of production	Analysis of necessary conditions about people, equipment, and so on related to the mass-production	○	●	●	●	●	●	●	●		
New technology	Analysis of different factors related to new technology		●	●	●	○					
Production technology	Analyzing the effectiveness of the new production process		○				●				
Cost planning	Analysis of profitability	●	●	○		●		●			
Procurement of parts	Analysis of different part procurements										
	Outsourcing parts	○				●		●		●	
Direct parts procurement	In-house parts					●		●		○	
	Preparation of production direct									○	○

○ : Department in charge; ● : Other concerned Department

□ The Operation of the Committee

The length of activities of the committee is very flexible. The duration of operations depends on the customer, the type of vehicle, the technology implicated, and so on. Company X works very hard to reduce the average lead time. At the beginning, the design department provides the drawings. And the committee assigns different targets to each department and division, and asks each to construct its own plan within a determinate period of time. Before meeting for the first time, it requires each department to submit its plan. Then during the meeting, different targets are set that will allow to company to fully satisfy its customer requirements while still securing its own business. In practice, Company X develops its product and conducts its strategic cost management activities linearly or in parallel with a customer.

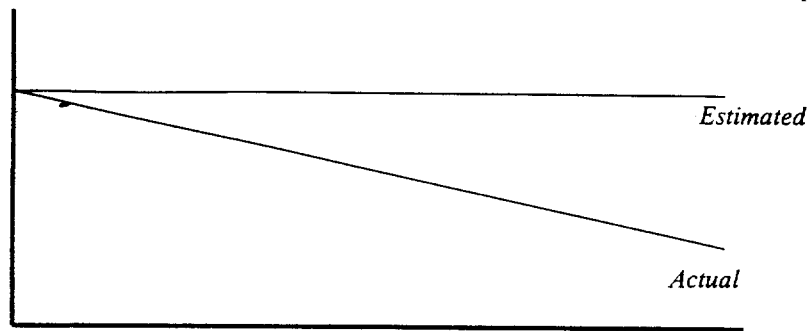
2. Short-term Cost Planning System

Company X deals with almost all Japanese passenger cars' makers as stated above. Since each automaker has its requirements and each vehicle is specific, products are not standardized as such. Company X has to produce many varieties of the same products to accommodate each customer and each model. So, the cost planning process is based on standard costs. The planning costs include material costs, conversion costs, selling and administrative expenses. Thus focus of cost analysis is internally oriented.

The standards are based on the results of the previous period, and different provisions made by management for the new period. Usually, this plan is established for one year, starting in April—the beginning of fiscal year in Japan. This plan is made by division, then by product, and then by parts. At the end-of-year, necessary adjustments are made and actual costs are calculated. **Exhibit 7** depicts the relationship between standards (estimated costs), real costs, and productivity for a period.

As it can be seen from the exhibit, standards are used only for the planning purpose, not for the control. Continuous improvement of activities, such as work processes, setup times, operating procedures and so on, are conducted during a period to improve the performance of activities that increase customer satisfaction. Therefore, real costs are usually lower than the planned one. Company X's managers favor standard costs because it is easier to calculate and the huge work that Kaizen budgeting might require, if variety and specificity of each customer and each vehicle are taken into account.

Exhibit 7: Relationships between Estimated Costs, Actual Costs, and Productivity in Company X



4. Management of the Survival

Though there is cooperation between Company X and its customer, its survival depends greatly on it being efficient business with the parent company is not taken for granted. Company X has to be efficient as well to secure its survival. Some of the measures taken by Company X management to monitor its effectiveness and performance are:

- The company continually provides programs for training and upgrading the staff.
- Each day, the Production Department restudies the existing manufacturing process on at least one product component.
- The company strives to further strengthen its R&D capability so that new and unrivaled technology and products should be created.
- The company strives to improve its profit performance by adjusting the corporate structure whenever possible for maximum efficiency.
- Intensification of in-house research and development cooperation, including subsidiaries, to allow the smooth exchanges of information between different business fields to strengthen the superiority of the corporate-wide products.

3.2 Company Y

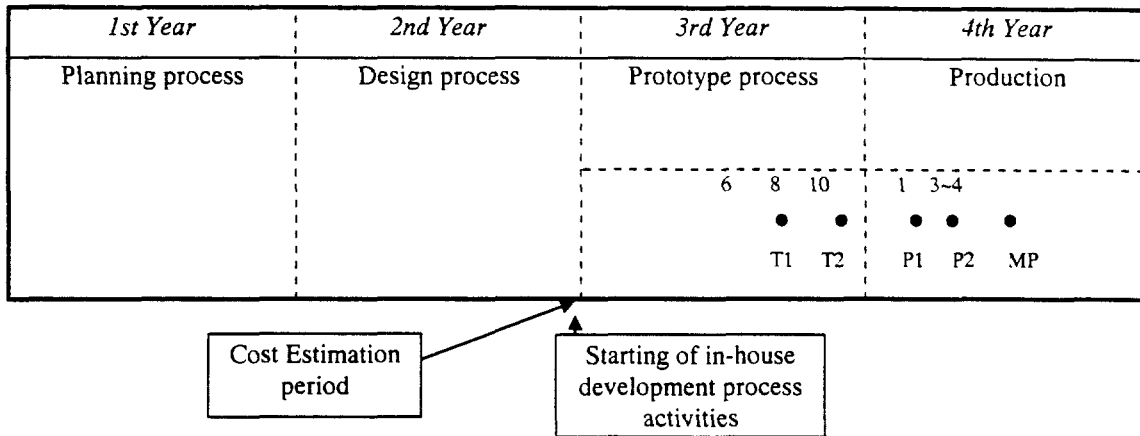
Company Y is a family owned company. It was created in the 1950s and is an independent supplier which has about 900 employees in Japan. The company has three factories and many

others facility in Japan, and two other plants outside Japan—in South East Asia. Company Y has three divisions.

The automobile related division is the most important. The company has been continually dealing with three automakers. The case made here is mainly focused on the interaction between Company Y and its main automaker customer with which they have been in business relation for more than 30 years.

1. Inter-firms Product Development Process and Cost Management

Exhibit 8: Product Development Schedule



□ Planning Stage

During this stage, different activities are mainly conducted by the automaker. Confidential information is gathered from different sources: sales department, dealers' opinions, market research, and so on.

After the decision about the creation of a car model is taken, studies on overall development aim, concept and design of a vehicle are conducted. Decision about costs, quality, performance, sales volume, profit and, other development targets are made in this stage.

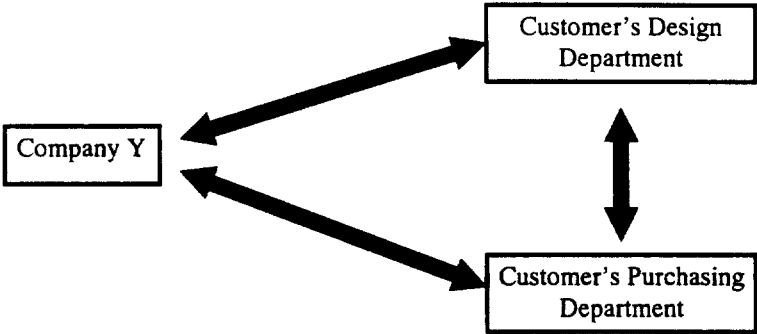
□ Design Stage

This stage is referred to as design-in stage. Suppliers engineers are located at the automaker's product development center, and jointly design parts. Different negotiations about buying/selling are carried out during this stage and whenever possible, final decision is taken.

Once the agreement on part requirements is reached, Company Y set its different targets and starts its in-house Cost Reduction (CR) activities. The automaker’s target cost is its target price. From this target price, the target profit margin is deducted. The difference between target price and target profit margin is the target cost the company has to achieve. Target profit margin is secured by keeping costs below the agreed price, without trading off product quality and performance.

It is interesting to notice here that cost/price negotiations are carried out both with the customer’s design department and purchasing department as illustrated above (See exhibit 9). Usually, the bid of the purchasing department is lower than that of the design department. But whatever the case, the in-house product development and cost reduction program only start after the agreements are reached with the customer. After reaching the agreements on different targets, the product management committee is set up to plan, coordinate, and control different in-house activities.

Exhibit 9: Target Cost/Price Negotiation Pattern



Company Y interacts its development and production departments to carry out cost reduction activities by studying different VE/VA approaches; then the design is made accordingly. The length of time depends on the type or kind of a part. But generally, it varies from 6 to 12 months. To shorten the development time, Company Y used to involve its collaborate companies (*Kyoroku Kaisha*) in the process.

In order to improve efficiency both of design and production, the automaker and its suppliers alike usually agree to ‘commonize’ some parts and components whenever possible. Commonization allows both suppliers and automaker to lower some development costs, investment costs, and the rate of defective parts.

□ Prototype Stage

During this stage, the automaker requests all suppliers to bring their drawings for examination and approval. Drawings are submitted along with other critical information for the bidding. Prior or during the planning process, in the case a supplier have presented the state-of-art products, which appealed and got approval of the automaker, the market is assured for the first two models in which the part is going to be used.

In other cases, suppliers usually compete for the market. For Company Y's main products, there are often five to six other companies to compete with. The cost information to provide either for bidding or each semestral negotiation includes the following items (See exhibit 10):

Exhibit 10: Structure of Cost Information Submitted to the Customer

A.	Material Costs	
B.	Part Costs	
C.	Processing Costs	
D.	Mold Costs (Amortization)	
E.	Administrative and Selling Expenses	
		5% of (A + B) for storage expenses
		30% of (C) for packing and transportation
		10% of (D) for maintenance
F.	Profit Margin	
G.	TOTAL (A + B + C + D + E + F)	

It is necessary to notice that, even in the case were estimated costs submitted by a supplier are equal or below the target costs set previously, the contract is not assured unless an effective VA program to lower cost during the life cycle of a product is provided. In other words, a supplier can be assured of a contract only in the case where all requirements concerning quality, performance, delivery, and an effective cost reduction program for the entire life cycle are met. Suppliers can request the automaker's engineers to visit their plant to study with them how to lower costs any time there is a need.

It is during this stage that Company Y usually makes its final decision about specific investments in tools, molds, inspection tools and so on. Sometimes, the automaker can provide the necessary tools or machines needed for the tasks under specific agreements.

The next important step in this stage is the trial of a prototype vehicle. The automaker always requires the prototype parts made of the same materials and using the same processes that are going to be used during the coming mass production stage. Prototype parts are made and brought to the automaker for the trial. They have to satisfy all the requirements of the prototype drawings.

For parts that do not meet the requirements, an urgent request for improvements is made. And since the automaker rarely adjusts its development schedule because of a supplier, speed is of the ultimate importance for a supplier to carry out necessary tasks in order to reach the overall goals for a part. After the improvement of all failures in the first trial, the automaker carries out a second trial which will lead to the production pilot; which in its turn, will lead to the mass-production.

The ordinary time from the conception to the market is about 42 months. However, many automakers are seeking ways to shorten this period to 24 months in order to lower development costs. During these 42 months and thereafter, the automaker and suppliers (affiliated as well as independent suppliers) jointly work together in order to provide the final customers with a high quality, innovative, and low cost vehicle.

2. Value Analysis

The philosophy of cost reduction is very strong for the automaker and its suppliers alike. To achieve significant cost reduction, products are designed with cost in mind and cost reduction activities are being carried out as early as possible in the planning process. But still cost reduction efforts continue during the mass-production stage, therefore covering the entire life cycle of a product.

Automakers are aware of the fact that costs should decline as a result of learning effect that improves productivity, VA efforts, and so on. Therefore, price also should decline throughout the life cycle of a product. During the mass-production stage, prices of each part and component are lowered by a fixed rate of 5% every six months. As was described above, beside satisfying the first target cost the contract is not assured unless a supplier can assure an effective VA program to lower cost during the entire life cycle of a product.

To be profitable, a supplier has to continually improve factory productivity by undergoing various VA activities. The cost savings on parts either derived by the supplier's effort beyond those agreed upon, or derived by the supplier's effort but within the agreed range, or derived through joint-efforts are all shared equally.

3. Selling Volume Fluctuation

Usually, a model change is made after four year of mass-production. But since huge costs of investment are spent during the development process, sometimes a model can wait until the sixth year if the predicted sales volumes are not reached in the fourth year.

A range of predicted selling volumes is estimated by the automaker's sales department. Since this range is taken into account in the contract, it is the responsibility of the automaker to achieve sales within this range. However, various conditions might rise that could affect the contract:

1. If a part is going to be used as such in a concurrent model, this means that supplier's volume of sales is going to increase. Therefore, the automaker asks for greater price reduction.
2. If the range of predicted selling volumes is exceeded, again the automaker asks for greater price reduction.
3. If after the fourth year, the selling volume is still below the predicted one, the automaker's managers have to decide either to withdraw the model or to extend its production for one or two more years. If the decision is taken to withdraw the model, the automaker will pay the salvage value of specific investments made by its suppliers for its project. Depending on a case, a supplier can also be asked to continue supplying the part for the next model.

4. Management of Survival

Due to various macroeconomics' constraints, the national production of automobiles has been declining and automakers have been transplanting outside the Japanese border. Beside these factors, Company Y is facing strong competition from other competitors at home. Its survival greatly depends on its capability to satisfy its customers' requirements—high quality and performance, low cost, variety, speed, reliability, and so on. Its main concerns are continually to improve its productivity and the value of its products (See exhibit 11). Satisfying the customer means future business, better outlook for employees, and profit improvement.

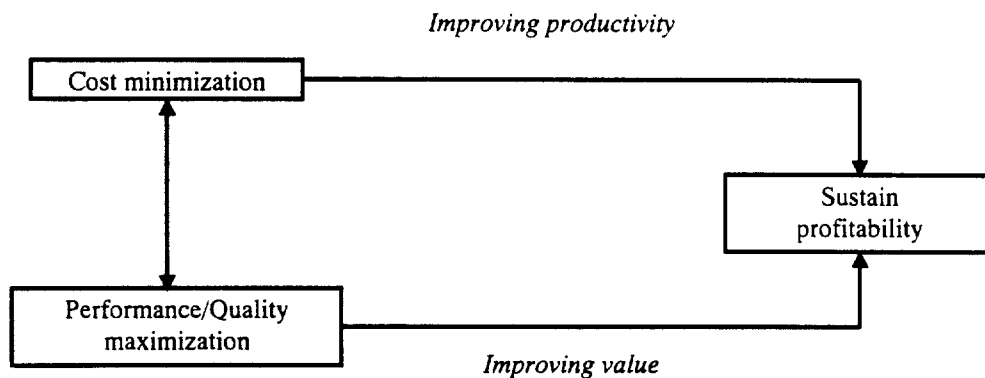
Therefore, Company Y managers continuously:

- Ask the work force for ideas that would reduce costs, raise productivity, and improve morale. Twice a year, all company's employees are gathered for what is called '*Quality Circle Event*'. In total, there are 90 circles countrywide. Each circle choose a theme about the improvement of factory or any other themes that might

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Beside QC circles, each person is asked to give six suggestions a year. This year up to now, 560 persons have already provided 4,334 new ideas (about 7.74 per person on average) that positively influence company performance.

Exhibit 11: Company Y Means to Sustain its Profitability



- Train people for the effective use of VE/VA which upgrades the value-added (Automakers give some rewards for that).
- Try to be ahead of competitors by anticipating the trend of the market and final customers' needs. So, R&D works hard to relate company goals and objectives to research and engineering objectives.
- Upgrade the factory automation and flexibility, essential factors for high quality, low cost, quit delivery, and production of varieties. In one hand, equipment is designed so that waste and lead time are eliminated or strictly minimized. And products are designed to automate the production and avoid waste.

4. Conclusion

Customers (either general public or business organization) expect high quality products at reasonable prices. To remain competitive in today's business environment, businesses have continuously to seek ways to lead people and efficiently satisfy customers. In order to satisfy customers efficiently, a firm needs to maximize its efficiency throughout the entire value chain. If efficiency is not maximized throughout the entire value chain, costs might rise above those of rivals and it might be difficult to recoup these higher costs through price increases.

Practitioners and researchers recognize the merit of optimizing product success factors early in the product life cycle. And since almost 80% or more of a product costs are committed by the end of the design stage (Yoshikawa et al. 1993; Lorino, 1994; Hongren et al., 1994), proactive cost management and cost reduction efforts during the preproduction stage is more efficient than thereafter.⁵ Greater efficiency can be reached if all participants in a business value chain cooperate smoothly. The role played by suppliers for the effectiveness of proactive cost management and cost reduction was explored in this paper.

Like automakers that have to satisfy customers needs to survive in a highly competitive environment, suppliers have to meet automakers—their customers— requirements for a product critical success factors—cost, quality, innovation, and time—in order to survival. Survival of a supplier greatly depends on its capability and ability to satisfy its customers' requirements—high quality and performance, low cost, variety, speed, and so on. Satisfying the customer means future business, better outlook for employees, and profit improvement.

Though we can not generalized from only two cases, suppliers (independent ones as well as keiretsu ones) are involved in the automobile design and development process with specific targets on **performance**, quality, and costs. Critical information flow between both sides. Usually, **suppliers engineers** are located at an automaker research and development plant and jointly work with an automaker engineers in order to reach targets. This implies that there are

⁵ Johnson & Kaplan (1987) analysis on the lost of relevance of American companies' management accounting data led them to recommend among other things the proactive cost management for better cost reduction rather than heroic efforts at process improvement and automation for a poorly designed product (see pp. 257-258).

transcendence of organization barriers, and the existence of high level of trust and confidence among the participants.

While developing their product to meet customer requirements, suppliers concurrently set their in-house TCM requirements and struggle to meet their different targets. The main findings of our field research can be summarized as follows:

□ Suppliers' Role in the Effectiveness of TCM

- Competition among suppliers lead them to be creative in order to secure their profit. Their in-house TCM requirements or cost reduction programs are tailored to meet specific customer's requirements as shown by each case. This leads to the prevalence of high quality/low cost culture throughout the value chain.
- Because of long term commitment between assemblers and suppliers, suppliers willingly undertake necessary research, invest in the development of new materials, processes, and technologies in order to rationalize their products and reduce costs. In other words, supplier's willingness to make specific investments for a customer is sustained by the horizon of the contract.
- Inter-organizational product development, the result of transcendence of organization barriers, is what makes techniques such as value analysis and value engineering more effective. Beside this, inter-organizational product development enhances inter-organizational learning which raises technical expertise of suppliers allowing them to continually upgrading the value-added of their products.

□ Main Lessons

The shift in the global economy has led many companies in various industries to seek horizontal alliances to strengthen their competitiveness. However, vertical strategic alliances are as important as horizontal ones and cannot be overlooked. Having an efficient supply chain is one of sources for strategic competitive strength. When links with the supply chain is backed up by long term commitment, trust, motivation, and consensus between all participants, suppliers are assured of future orders and are likely to expand their investments in new material, processes, and technology to support the transactions.

In contradiction of what some might think, we consider that Japanese assembler-supplier relationships is firstly economic in nature, therefore transferable beyond the Japanese border. For firms wishing to implement TCM, the lesson is that the focus on technical issues only will not lead to great success unless there is an environment in which trust, consensus, and partnerships with suppliers are built.

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