GLOBAL STRATEGY AND GLOBAL SOURCING IN THE WORLD AUTO INDUSTRY AND JAPANESE PRESENCE. WITH SOME CASE STUDY OF MITSUBISHI MOTORS AND NIPPON DENSO

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With the coming of the “Mega Competition” era, the world auto industry is entering the wave of globalization. Companies are approaching the 21st century, and they are realizing that global thinking and management are critical for the survival of the auto industry.

The contents of global strategy of auto industry consist of global car production and allocation strategy, global sourcing strategy, and global product development strategy. Managing globalization is also one of the key issues from the viewpoint of making strategic decisions. On the other hand, managing globalization is closely related with managing localization. Pursuing global strategy, all of the auto companies have to solve this problem: how they can co-ordinate and connect their global strategy with their strategy of localization.

The historical tendency of most of the world auto enterprises was consolidated organization of local companies such as U.S. Big 3 and some Europeans. Their local subsidiaries developed their differentiated local product by themselves and purchased local parts by their own way.

Since 1986, Japanese car makers set up local transplants by different ways in Western countries. In early steps of this process, Japanese car manufacturers tended to transfer their production and part procurement systems and their products with some local modifications. In 1990s, they were confronted with higher Yen appreciation and the rationalization of their production. During this term their strategy has been changed gradually from local oriented one to more global oriented one. They tried to build a local production network linked to the international division of labour. The local production network tended to produce international products which can be exported to the world and finally to go to the global network. These network global strategies were pursued not only by car assemblers but also by part suppliers. Japanese part suppliers supported car assembler’s localization and later their global networking because they were also entering globalization. After 1990, this globalization has been more accelerated.

Within the context of the Japanese auto makers’ plan for establishing a global network, western auto
makers plan to strengthen their global networking strategy to greater localize their production and marketing, and to organize as a world-wide network particularly for auto exports. An aggressive stance toward the development of global strategy involves producing more goods locally and purchasing a greater number of parts internationally. US and European auto makers have taken the lead in global integration of product development and parts purchases. A few examples of such companies would be the new "World Car Concept", which combines global-wide automobile product development with global sourcing.

In this paper I will describe the emerging global sourcing strategy and the global product development integration strategy with a focus on US automakers. I will also compare the US automaker' global strategy with their Japanese counterparts because there are some interesting contrasts on their approaches. I will describe some available cases of Japanese assemblers and suppliers for their globalization strategy such as Mitsubishi and Denso (Nippondenso). Finally I will discuss the significance of the background of global sourcing and the changing situation of global suppliers, the future prospect of the world car and the Asian car, and the changing product strategy contents in the global base.

EMERGING GLOBAL SOURCING STRATEGY

As I mentioned above recent discussion about the "world car" are closely related with global sourcing and global product development integration under the new dimension of global strategy by global auto companies.

Of course some companies cannot use special term "world car" in their global strategy. There are several choices, however, in approaching the "world car", such the "localized design car". Even without a "world car", auto companies should consider the possibility of global sourcing. As auto companies strategy becomes more globalized, their parts sourcing strategy are evolving.

Global sourcing means purchasing parts and components from optimal places which are characterised by global bases. Why and how has global sourcing emerged? With the coming of borderless economy, we can now overview which area is most optimal to purchase some parts and components by quality, cost, delivery, and engineering capability. We can watch the cost disparity by each countries using computer information data base. Although exchange rate and currency evaluation are still unstable, observing these data can show the best response and new choices of exchange rate free purchasing.

In considering global sourcing in the auto industry, it is quite important to examine the experiences of other industries, with companies such as Wallmart, IBM, GE, Otis, P&W, Boeing, and the Semiconductor Industry and Micro-Computer Industries. They are still perfecting global sourcing, expanding their world-wide regional business to new markets. Through this expanding world-wide business experience, they can easily find available suppliers in optimum places. More advanced distribution and information logistics are more helpful than ever before. These activities are greatly affecting automotive supplier companies in global base - and thus, auto assemblers too.

Among automotive suppliers, there is so increasing number of global suppliers. After expanding auto maker' global business and their global purchasing strategy, many suppliers have been choosing their global oriented business and regional production base network. In generally, they have a more systematized supplier capability to respond to more parts modulation, and they are establishing an outside global network with mutual complement supply with many strategic alliances. We can imagine as these global suppliers as Bosch, GM Delphy, Denso, Calsonic, Ford A.C.G., Johnson Control, Yazaki, etc.

Recently, many auto makers are decreasing their number of platforms and reorganized number of part suppliers with classified simple tiers. This tendency is eminent in U.S. and Europe. In U.S. along with the cutting modular of platform types, the Big 3 are in process of rapidly reducing their parts suppliers. GM is aiming for 600, from a peak of several thousand. Ford has cut the number of its suppliers by more than half, from 2,500 to less than 1,000, and says it plans to purchase main components exclusively from only about 180 firms in the future. Chrysler also plans to focus on about 150 firms, down from 1,500.
Narrowing the field to only system and module suppliers leads to purchase from suppliers with high technical capability who can operate on a global scale.

Reducing the number of suppliers will also promote the integration and restructuring of sub-system makers, promoting a tendency whereby small and middle-size suppliers - who cannot transform themselves into global players but have original techniques - can join in global networks.

Of course not all suppliers can transform themselves into a global supplier. Transforming into a global supplier, for first tier suppliers particularly, can be risky because of the necessary huge R&D and overseas investment. In general, car assembler still needs their local suppliers. But the auto-maker’s behavior will be more global, decreasing number of suppliers and concentrating on available system module suppliers. If so, the most independent and capable supplier should be global supplier who has organized other local supplier networks.

GLOBAL PRODUCT DEVELOPMENT INTEGRATION STRATEGY

Along with increased tendency for global sourcing and decreased number of suppliers for reorganizing supply chain, the auto maker’s product development system is going to integrate globally. Of course, each car maker product development system has special characteristics because of their product strategy contents. Some companies are trying to do more centralized and others are looking more localized in respect to their product development system. But there are common tendencies such as platform integration by each car segment, elimination of dual R&D efforts, the reduction of R&D cost, the shortening of development lead time, effective and efficient coordination in the R&D activities, and the strengthening more higher simultaneous product development engineering with design-in suppliers.

Currently, the U.S. Big Three have gone a step further and are streamlining the types of platforms they use and cutting their suppliers while reforming product development processes. The cutback stems from an international point of view and, consequently, are not concentrated in any specific region. For example, Ford, which boldly publisized its global strategy under his "Project 2000", has concentrated his product development organization toward five vehicle centers. It has concentrated development center for luxury car, big size car, mid size car, and commercial vehicle, to the Dearborn head-quarters. Small car development is delegated to the UK. As a result Ford is now going to decrease number of platforms from 24 to 16 after platform integration. And GM is going to cut one third of its 96 platforms. The company wants to develop its car products on the base of 8 elementary platforms in the future. Among the mid size and small car segments it is now going to integrate its platform with Opel. Chrysler, which doesn't have overseas development center, wants to decrease its number of platforms from 12 to 7 or 8.

As a result of advanced three-dimensional computer-aided-design (CAD) techniques, a variety of car bodies can now be designed using one platform. This integration has eliminated overlap in new car development, allowing for short cuts in costs. As I noted above, Ford is developing a new "world car" strategy, where global product teams use a single platform to design for sale internationally. The plan is revised to increase the number of models per platform while meeting demand unique to each region.

While the Big Three are employing strategies of international unification and are focusing on development and purchases, Japanese are engaged in an active shift of production abroad and have increased their purchase of overseas parts.

Generally speaking, Japanese auto-makers have also tried to eliminate duplication by cutting back on the variety of platforms and expanding local development systems abroad through restructuring, while simultaneously strengthening their international purchasing network.

Comparing U.S. with Japan, we see common and contrasting features in each strategic approach. Both countries are cutting back or decreasing number of platforms and commonizing use to the same platform. Historically Ford and GM’s world-wide product development approach was completely local. Their North American R&D center and European one work independently each other. Before the early 1970s, the German Opel and Ford, and the British Ford and Vauxhall developed different cars. Now they are concentrating their R&D power to unify one organization or to coordinate completely, eliminating duplicated jobs in
the global base. Ford and GM’s global product development strategy is essentially moving from a localized to centralized integration approach.

Contrasting with GM and Ford, the Japanese auto maker’s approach has generally been one of centralized R&D systems changing to a localized one. Their essential R&D power is still keeping centralized system in their home country, but year by year their portional local R&D power has been developing with expending local parts purchasing. Among Japanese auto makers there are many different approaches in their R&D localization. This issue will be more discussed further next chapter.

JAPANESE AUTO MAKER’ GLOBAL STRATEGY

In early 1980s the auto trade friction became more intense and local production was appearing as a key of Japanese strategy. In early step local production started as a primitive localization approach of how the Japanese could simply transfer the Japanese system (such as the production system and part purchasing system) to other countries and adapt to the local situation. In this stage, local production was an export substitute because they couldn't increase car export. Basic components such as the engine, transaxle, platform and so on were exported from Japan and assembled in each transplant. After 1985 G5, the Yen appreciated radically, leading to increased local production and part local contents. It became clear that car categories would be available for either export or local production. Basic mass produced cars were produced for local production and high priced luxury car or sporty roder such as niche products became export oriented. This outcome signalled that the Japanese car makers had started a new strategic approach which changed from export orientation to local production international network orientation.

Strengthening this trend, product development localization by Japanese companies also advanced with increasing local contents ratio in their local plants. They established local R&D center and hired local designer and design engineer. This center started from body design which could be adaptable for local needs, and soon it produced a prototype. During this early step, R&D localization had the basic motive to evaluate local parts for level up local parts quality and engineering capability and to reflect the car design in a corresponding Japanese R&D center. Soon this step moved to more globalizing product development and production system, which clearly differentiate the car developed and produced in Japan, introducing more local compatible concept along with local production ratio enhancing.

After the second radical appreciation of the yen, in 1990s, the globalizing R&D production, and parts procurement network, became more dominant as the new strategy to decrease car export with increasing local production in the continuing restructuring of auto industry in Japan. In North America, Japan’s biggest market and production base, Toyota, Nissan and Honda, enhanced their local contents ratio almost same as U.S. Big Three with engine local production, and their production capacities also expanded up to 600 thousands or 700 thousands. In U.S. their R&D system has developed further and their R&D center launched original car models -- medium size car and station wagon which completely differed body design, interia, axle and so on, but still commonized with Japanese model. In addition to the Honda Accord wagon, Toyota Camri wagon, Toyota Abaron, Honda Accord, Nissan Altima are mainly developed by their U.S. R&D center and produced in local plants. Some of them are exported to Japanese market, Europe or Latin America and other Asian markets.

Localization and global networking were accelerated by the Yen’s more continuous appreciation, and on behalf of Japan-U.S. auto negotiation Japanese auto makers decided their global vision; it became more decisive. In this vision, they proclaimed that they would cut off their car export and basically they still respond for local market with their local produced car. They would also strengthen product development localization and local parts procurement. This global vision showed that Japanese auto makers wanted to solve auto trade in balance with U.S. and initial big stream of globalization in the business world. They would try a new challengeable strategy in which they could organize world-wide with optimum location and optimum production in a global network. In this strategy they would mutually supply their cars and components - developed and produced in locations determined by
the market for both home use and export. After all, Japanese auto-makers want a grand strategic aim in which they can respond to the exchange rate change in every region.

Under this grand strategy Japanese auto maker's R&D systems are going to more globalization with strengthening local R&D center. In general, they are now using a common platform world-wide, but the Honda Accord for example, is developing more locally. Only a few platforms are like this, but in case by case it may soon follow. If the trend become more popular, as I have described before, and essential R&D power is not centralized any more, how they will co-ordinate home centralized R&D power and local R&D power will be interesting. Of course among Japanese auto companies the contents of global product strategy and global R&D network are different each other.

Generally speaking, as I have noted, Japanese auto makers have also tried to eliminate duplication by cutting back on number of platforms and expanding local developing systems abroad. One difference between U.S. and Japanese auto makers can be seen in the attitude towards suppliers. Japanese makers have established orderly, hierarchical relations with parts manufacturers over the years. As opposed to limiting dealings with just a few parts makers, they encourage suppliers to participate in the planning and development of cars at the design and engineering stages. The goal is to cut back on redundant designs and parts and share common components between different cars.

They are now also moving towards increasing the number of overseas parts makers with whom they do business, while evaluating their capacities and the costs and quality of their products. Though the Japanese will design fewer platforms, the overall number of suppliers should grow internationally. Special emphasis is being placed on expanding local development (main body and interior design) and parts procurement for their overseas operations in an effort to meet the diverse needs of the U.S. European and Asian markets.

Related to the development of global strategy is the highlighted international division of the work in Asia - especially ASEAN, where they have responded to the localization policy with SKD or CKD. Auto market in this area is still expanding, and some of the Japanese auto makers like Toyota, Honda publicized their new trial of "Asian Car" last year. Toyota already has been producing "Kijan" which is popular commercial vehicle as original ASEAN model especially for Indonesia. The company also announced that it would introduce small popular passenger "Soluna" based on Tarcel model in this area particularly for Thailand. Honda publicized a new popular small passenger car for the ASEAN area called "City" based on "Civic" model. Nissan also publicized its AD Van, produced by almost all ASEAN countries local production network.

Japanese car makers are very cautious to prevent synonym of cheap car with the special term "Asian Car". They want these model to evolve as reasonable but also as something new in terms of its quality. In the ASEAN area, as the result of technology transfer, local based division of work complementation such as Brand to Brand Complementation, and the development of automotive market synergized - and local production, international division of work become more dominant than before.

Of course, Japanese auto maker's strategies vary from one auto maker to another. For example, to what extent should local development be pushed? Should different platforms be adopted by region? Should companies go the route of "World Car" or "Regional Car"?

Basically, for the time being Japanese auto makers will promote localization in production, development and purchases independently in each main region. In the same time, they are sliding toward the promotion of mutual supplementation of cars and parts between regions from an international perspective, although the pace has been slow.

**GLOBAL STRATEGY OF MITSUBISHI MOTORS AND DENSO (NIPPON DENSO)**

**Mitsubishi Motors**

As I mentioned above, the Japanese auto companies are going to move from their international localization age to globalization age in their way of strategy. In this chapter I will describe Mitsubishi Motors' global strategy and Denso' global strategy as the case study. Through these case studies we can confirm some way of the Japanese auto maker's global strategy and the Japanese global sourcing supplier's global strategy.
Mitsubishi Motors' (M.M.C.) global strategy consist of three parts mainly. One of the major parts is North America, second major part is Asia, and third one is EU. If we want to understand its global strategy contents, we should summarize Mitsubishi Motors' historical background and business contents.

Historically M.M.C. had higher engineering capability in its engine technology and production technology. Its shortage was in marketing area especially to its domestic market. Therefore, this company has pursued many strategic alliances and business group support. Most eminent case were the collaboration with Chrysler and Mitsubishi group especially Mitsubishi Shoji (Trading Company) fully support. This company is now producing fully covered cars and truck segments, from minicar to 3.5 liter passenger car and from mini truck to heavy duty truck. The company is now producing 1.28 million cars and trucks (1996). It also produced about 9 hundred thousands cars and trucks overseas. And it sold 8.2 hundred thousands cars and trucks in domestic market and exported 4.6 hundred thousands cars and trucks.

In general Mitsubishi's most important key issue in its global strategy is the reconstruction of North American transplant MMMA (Mitsubishi Motor Manufacturing of America). This plant originally was established as the joint venture business with Chrysler in 1985 so called Diamond Stars (DSM). This plant started car production in 1988. This plant at first produced small car Mirage for Mitsubishi channel and Eclipse for Chrysler channel. In 1991 Chrysler wanted to sell its stock ownership of the plant to Mitsubishi because of its cash flow shortage. Then Mitsubishi bought it and DSM changed its company name as MMMA with 100% owned by Mitsubishi.

Still now MMMA is producing and supplying 50% Chrysler brand cars by OEM. And MMMA and Chrysler are still continuing collaboration relationship in parts and components procurement area. This plant' annual production capacity was 1 hundred thousands in early stage and now expanded 2.4 hundred thousands. The plant installed 470 robots in its body and final assembly line and, so called total final assembly automation ratio is 20% as the top class not only in U.S. but also in Japan. The plant also introduced FMS line, therefore, which can respond for 5 or 6 mixture cars production.

MMMA produced 21 hundred thousands cars in 1995 as the top record but it still improved its profitability not yet. Its accumulating red figure is $ 80 million in 1995. Its amount of over debt was $ 40 million same year. In 1996 Mitsubishi invested additionally $ 54 million. Using this new invested money MMMA paid MMMA’ total debt. MMMA also cut their R&D cost about 20% e.g. almost $ 20 million. It is also cutting parts purchasing cost, then MMMA's final target is decreasing break-even point down to 1.9 or 1.4 hundred thousands number of vehicles per year.

What is the reason which explains why MMMA's profitability become bad? Main reasons come from huge burden of initial investment and marketing power shortage. MMMA's plant in Illinois is most modernised plant but its total initial investment with higher automation is too much high. The plant introduced flexible manufacturing line but its operating ratio experienced too much frequent change. Especially introduced new car, such as from Mirage to Galant exchanged model and fully model change of Eclips, tended to production line trouble and longer time for production line change. After all, FMS line did not operate completely. On the other hand Mitsubishi’ car marketing power in North America is not so strong because Mitsubishi has too much delayed its establishment of own channel on behalf of old Mitsubishi-Chrysler agreement. Chrysler’ marketing channel in late 1980s and early 1990s had also weak point. This marketing weak point reflected to MMMA' plant operation ratio declining. But after reconstruction strategy started MMMA’s profitability in 1997 is going to improve for one year. Even though MMMA is still confronting hard time not only by sexual harassment trouble but also by marketing in US market.

Nevertheless in spite of in spite of its business difficulty in US, on the other hand, Mitsubishi's Asian strategy is going on very successfully. In this area, especially ASEAN area, Mitsubishi's presence has been quite important such as Toyota after the 1970s. On behalf of its agreement with Chrysler, Mitsubishi lost its business chance in North America until early 1980's, then M.M.C. strengthened its Asian strategy. Basically, its Asian strategy consists of four parts, Korean, Taiwan, China and ASEAN countries. In Korea M.M.C. started engine technology transfer to Hyundai
Motors in 1975 then Mitsubishi invested 15% ownership of this company with Mitsubishi Shoji in 1982. In this time M.M.C. assisted car manufacturing technical know-how to Hyundai. Some model of the Mitsubishi such as Granger which is one of the luxury model was directly transferred to the Hyundai by giving technical licence base. In this alliance it was given to available licence fee to Mitsubishi for a while. Soon or later, Hyundai developed its car by itself with lessen help by Mitsubishi.

Comparing with Korea, Mitsubishi's fully support for China Motor Company (C.M.C.) is a very successful business in Taiwan. In early stage Mitsubishi assisted C.M.C by light truck and small R.V. But year by year C.M.C business situation has been promoted and Mitsubishi transferred its passenger car technology. After all C.M.C total market share became number one in Taiwan Market as 15%. But Taiwan auto market were opened to western auto makers and competitive situation became very tough. After all, Mitsubishi and C.M.C. have a plan to invest main land China. This project, however, is established not yet although Mitsubishi is still keeping its technical licence agreement with several Chinese companies. But in the near future some possibility in C.M.C. new investment for Fukan with collaborating with Malaysian Proton still exists. C.M.C. has already entered Mitsubishi's ASEAN division of labour network. In ASEAN area Mitsubishi's strategy has been very aggressive because its North American strategy was enlimited by Mitsubishi-Chrysler collaboration agreement until 1982. In this region Mitsubishi developed its CKD production bases in each ASEAN countries and established its parts and components division of labour network. From 1970 on Mitsubishi followed in each ASEAN countries auto industry its local promotion policy, collaborating with local government and capital; it founded many local joint venture companies in; each country to produce SKD and CKD, assembly plants, main components, engine, transmission and die-casting parts, and so on.

Mitsubishi's ASEAN business contents are :

- In Malaysian Proton company M.M.C. is jointly producing press parts, die-casting, engine assembly, and body and final assembly.
- In Indonesia M.K.M. company and others produce press parts, and assembly engine and body of Mitsubishi's vehicle,
- In Philippines PAMCOR and ATC company produce parts, and assemble body and transmission.
- In Thailand MSC company assembles engine, body and vehicle.

Among these plants in ASEAN countries Mitsubishi complementary supplies parts and components each other on the base of B.B.C. (Brand to Brand Complementation) schema. After 1996 the AICO (ASEAN Industry Corporation Organization) agreement being started, Mitsubishi is going to change from B.B.C. base to AICO base. AICO schema includes supplier based division of labour network in which supply parts and components complementary in ASEAN area. From now, therefore, Mitsubishi's ASEAN strategy may become more comprehensive including global suppliers.

This year Mitsubishi introduced new Asian car. This car is a van typed family wagon with 1.5 liter engine, and produced in Taiwan, Thailand and Philippines on the base of complementary components supply. In this project Mitsubishi will use AICO schema with enhancing local contents ratio; pursuing this way Mitsubishi will educate strongly its local vendors with world-wide special quality guarantee by Mitsubishi.

Soon or later Mitsubishi's total production of this area will become 6 hundred thousands including Australia.

Mitsubishi third important production base is Holland NED Car company in Europe. This plant is the joint venture business with Volvo. Many people are much interested in the encounter of Volvo production system and Mitsubishi production system. Nevertheless, NED Car's main product depends on Mitsubishi small car, then Mitsubishi production system becomes dominant. Its car production capacities are one hundred thousand and some of them are exported to Japan.

In general, Mitsubishi has developed its product by centralized R&D center in Okazaki. It has the design center in U.S. and Europe. Both organizations supported Okazaki center. And Okazaki center is everytime watching and bench marking local parts Q.C.D.E level from the point of view of global sourcing.
Denso (Nippon Denso)

Denso is a typical Japanese major global sourcing supplier with high engineering capability and production technology. Now its world-wide sales volume ranking in global suppliers became second place.

This company started from on 1949 on by separating Toyota' auto electrical parts division. In early time the company produced radiator, distributor, starter, spakplug and so on. It supplied mainly Toyota in early stage. Now its percentage of supply to Toyota becomes less than 60%. It is now supplying almost all of the Japanese auto makers except Nissan. Its supply chain network is almost fully covered with foreign major auto manufacturers such as U.S. Big Three.

This company now earned net sales $ 13.81 billion by consolidated base and $ 11.94 by non consolidated base. Its net income is $ 483  million and $ 929 million each other. Its overseas net sales and net income, therefore, are $ 1,87 billion and $ 154 million. This means Denso's overseas business earned 13 % total net sales and contributed almost one third of total net income. This company already organized global business network. It has 29 overseas plants for 16 countries such as U.S., Mexico, Brazil, Argentina, U.S., Spain, Italy, Australia, Thailand, Indonesia, Korea, Malaysia, India, Taiwan, China, and Philippines. Denso also has 13 sales and administration subsidiaries. These overseas plants and sales organizations are administrated by three regional head-quarters companies, such as Denso International America, Denso International Europe and Denso International Singapore. The company hired 56,300 total number of employees, including 15,500 foreign employees. Denso main products now contain car air conditions and heaters (33.9% for total net sales), electrical automotive and electronic control products (28.4%), fuel management systems (16.6 %), radiators (5.8%), meters (4.4%), filters (3.2) and other products (7.7).

Why did this only local parts supplier in Toyota group become world-wide global supplier? The main reasons in summary are following:

- Denso has been long time in partnership with Toyota and this relationship guaranteed their long term trusteeship with advancing quality, cost, delivery, and engineering capability. Toyota was highly educated for Denso's quality guarantee system, just-in-time production technology, and simultaneous engineering, e.g. design-in capability.
- Although its tight relationship with Toyota, this company decided its business strategy by himself especially its international strategy. In early stage the company was only subordinate subcontractor for Toyota but year by year it expanded its business to other Japanese auto companies such as Honda, Mitsubishi, Matsuda etc. Of course it has been keeping its responsibility as the O.E.M. supplier.
- Denso has been pursuing R & D engineering oriented company. It established many technological licences in the world. It developed its R & D capability in which covered many fields of parts and components elementary technology. Its early stage of engineering priority was machine manufacturing area such as radiator, meter, filter and fuel pomp. Then it developed more systematic product like air conditioner. Finally, it tried more high tech oriented engineering fields especially electrical and electronic parts such as E.F.I., sensor, and semi conductor. Its main stream of R&D development suited exactly with car electronics technology.
- Denso has highly talented production technology. Its production technology too much contributed its refining process of practitionizing for its introduced technical licence from western companies, such as Robert Bosch, Bendix, Texas Instrument. In 1960s and 1970s it introduced many technical licences but soon later Denso modified them and given these practical licences to its licensers. Denso got Deming prize in 1961 four years earlier than Toyota. They introduced Toyota production system in 1974. After all its production technology...
become excellent level. And using its production technology Denso developed its machine engineering capability especially robots and factory automation system. Denso’s main factory such as Takatana and Koda plants are fully installed Denso’s self made robots and F.M.S. This machine and automation system is fully supported by talented Kaizen activities with T.P.M. activities by shop floor level.

- Denso has been strengthened in strategic alliances with many western major components manufacturers. The company got important components’ basic elementary technology by giving licence agreement from Bosch, T. I., GM, GE etc. as I mentioned above. But the company returned its modified technical license and new licenses to its alliances as its licenser. And Denso established many joint venture business with its world partners including their licensers. For example the company established Bosch-Denso’s venture business in Tennessee and Valeo-Denso’s joint venture-business in Spain in late 1980s.

- Denso did its commitment for internationalization at a very early stage. Especially after late 1960s, Mr. Tanabe, who became vice chairman later, joined with Denso from Mitsuibussan (general trading company), Denso’s strategy became more internationalized. The company established overseas subsidiaries very early. For instance, Denso established Nippon Denso Los Angeles in 1971, Nippon Denso Thailand and Australia in 1972, and also Nippon Denso Europe in 1978. Those subsidiaries were export sales office and reason office of its licensers. But soon or later the company invested small manufacturing plants which produced spark plug and air conditioner etc. for after market in each country.

- When after 1980s Japanese car maker’s new transplants emerged, Denso invested more huge money for its transplants. After its new trial for transfer technology and production system, these overseas plants became more profitable and nowadays they established R&D center in each region. Denso’s internationalization as the global supplier was ahead and advanced more than Toyota because Toyota’s strategic decision of internationalization started from 1983 after its decision for NUMMI which is joint venture business in Fremont California.

- Denso has well organized its excellent suppliers. The company has given highly educated engineering capability. Starting from quality guarantee system by each supplier, the company strengthened its leadership for the supplier with high productivity. Then it induced just in time delivery system by adapting Toyota production system. Even if small, its suppliers enhanced their technical capability to respond multiple various production with small lot. Its suppliers also accumulated many Kaizen activities and these enhanced technical capability supported Denso’s flexible production system.

Considering Denso’s globalization strategy, we can see two cases of Denso transplant new way of production system in Battlecreek Plant in Michigan, and European Denso’s strategy. Denso’s Battlecreek plant is producing radiator, heater at first, then come cleaning units, condenser, evaporator. Among these production items there were two types products in which suited for mass production and non suited for it with small lot production. Then, the plant was deeply concerning for control of delivery system and tight linkage with its vends.

About its delivery system, for example, in heater assembly lines were separated five lines with 26 docks in the stockyard, and supply orderly to suit delivery lots and frequency with keeping the racks. And disposable Kanban used for CKD components and in-house manufacturing products,
then inhouse production schedule and its results could make sure by each process. This system tended to be usable for contrasting schedule with real performance and stock control.

This plant has expanded local contents ratio from 45% to 70% with much trouble to local vendors. The local vendors disliked small lot production order, using special new materials. Its quality and delivery tended to be good for their testing process but if the process moved to mass production their response was getting worse. The local vendor’s top people could be understandable its necessity of Kaizen but it tended to be impossible to penetrate its way of thinking by itself.

Beyond these trouble this plant now expanded its business area and sales volume with stable profitability. After all in 1988 Denso established its new plant in Tennessee to produce starter, alternator and meter etc. In 1989 Denso opened new joint venture plant with Bosch in Tennessee to produce fuel pomp.

In North America Denso’s strategy is very aggressive to expand its big manufacturing plants network. On the other hand, its European strategy is more cautious and contrastive. In Europe it had long time alliance with Bosch as the relative relationship between licenser and licensee. In its making strategy for Europe Denso considered welcoming entrance by its partner and competitor.

Evading direct competition with local parts makers in Europe, not only with Bosch, Denso chose its advanced products fields in which used its R&D and production technology with high quality and management capability. This way could contribute to European parts supply industry. Therefore, Denso specialized for the product field such as evaporator and radiator in U.K. and air conditioner in Spain. Another special characteristics of Denso’s European strategy is that they thought never brought over-capacity after its European investment because there were many auto makers and parts makers. Its European investment started by M&A or the joint venture business with European companies. Two plants in U.K. were purchased by Denso for local plants. Denso’ plant in Spain started as the joint venture with Valeo then Denso purchased Valeo’ ownership by its asking.

What is the reason why Denso’ priority in Europe is based on U.K.? Main reason came from U.K. government’ eager support for Japanese investment for U.K. especially in manufacturing field. The other reason came from Japanese auto maker’s investment concentrated for U.K. In U.K. Denso’ plant designed as the midscale plant with not so big and small. It is very interesting story that Denso invested medium sized plants to keep with available profitability and is establishing its presence to penetrate for the weak point of European parts makers with strategic alliance.

CONCLUSION: FUTURE PROSPECT OF "WORLD CAR" OR "ASIAN CAR", GLOBAL SOURCING AND CHANGING GLOBAL PRODUCT STRATEGY

The tendency of global networking for local production is spreading not only among Japanese car makers but among GM, Ford and European makers such as VW, BMW and Mercedes Benz. Among these makers the most attractive plan is Ford’ ambitious “World Car strategy” and “Global Sourcing strategy”.

In 1994, as I mentioned above, Ford publicized Ford 2000 project as its 21st Century’ grand strategy with new world car strategy. In this project Ford exhibited its grand design targets as follow:

- Advancing effectiveness by global integration of Auto R&D, Design and Production.
- Reorganization and vitalization of bureaucratic organization.
- Active entrance for new developing market like China, India, Latin America and ASEAN countries. Strengthening established market share.
- Global advancing R&D cost cutting and quality improvement by suppliers integration.
- For this global strategy, Ford has integrate its R&D center globally, and introduced 5 Vehicle Centers. The development center for large, mid size, luxury and commercial vehicle is concentrated at the Dearborn Headquarters; small car are also centralized
(Dagenham in the U.K.), and the development of power-train is in Köln, Germany. This integration of R&D organization will cut the number of human hour of product development, which was duplicated by regional based development separately. With this strategy Ford will globally unify the basic platforms and components of its cars, which will be produced and sold in Europe, North America, Asia and Latin America. By pursuing this strategy, the "World car", which needs to be developed and produced world-widely, can be truly realized. Ford already publicized its midsize car Mondeo Mystique series as its "world car". Now Ford' international product strategy will proceed, focusing on the "world car" with platform commonization. Of course this "world car" strategy is closely relating with parts international optimum procurement strategy by global sourcing. It is natural that the integration of world-wide suppliers under project 2000 is also closely related with global sourcing.

A "world car" developed and produced with a global strategy and allocated locally with a global network of suppliers by global sourcing is Ford's global strategic plan for the 21st century. People said this "world car " project is very risky because GM's "world car" concept 1980 was unsuccessful. It is true that among the other auto makers except Ford there is question whether or not the local compatibility responding to regional customer needs can be attained with "world car" product differentiation. It is not impossible, though, to integrate product development under a global strategy, and to differentiate car body design using three dimension CAD/CAM with speedy information exchange. As opposed to a decade ago, it has become much easier to have a world-wide choice and integration of suppliers and their network now that we have better information technology. A world-wide distribution system, closely integrated with the information revolution have aided in the globalization of development and purchases. Databases for the development parts purchasing systems, as well as the quick utilization of accumulated information through networking, have helped in this regard. It is true that international logistics of parts and components mutual supply became less risky rather than before when information technology advanced not so much. Ford's "world car" strategy will become more changeable in its contents, as shown by Ford 2000 catch-phrase "Think Globally, Act Locally, with Agility". This strategy, however, different from GM "world car" before, may have somehow possibility towards future success. If this ambitious strategy can realize, it will have a big impact toward world automotive society.

Not only with Ford 2000, but also in the world automobile industry major auto makers - whether or not using the name "world car" - are moving towards world-wide car production and supply networking based on global product development and platform commonization, connecting with their home country with overseas eminent markets, and production bases. The internationalization of development and purchases can also serve as a buffer to lessen the impact of exchange-rate fluctuations through the flexible networking of supplying parts between regions. German auto makers, whose labour costs are quite high, as well as the Big Three, have displayed great interest in these types of international purchases, among others. Different regions offer different advantages for the purchase of auto parts, such as lower distribution costs. In a globalized network, goods will be purchase based on cost comparisons of the optimum product in a prime location. Even GM is moving toward global networking strategy almost similar to Ford strategic behavior in its core elements. Japanese auto makers who have begun to get on the right truck for their local production, and European auto makers, who are challenging the global strategy, are following these behavior or taking a more independent approach. As the automobile industry becomes internationalized, it is necessary to built a global network for developing and supplying cars, as well as the purchase of parts, while avoiding exchange risk as much as possible. With a decrease in the number of suppliers internationally, the question of how they should merge and how localization will balance with globalization is the main challenge facing the auto industry.
Not only globalization strategies by Ford and GM but also by Japanese auto makers and global sourcing suppliers such as Mitsubishi and Denso are also interesting story with step by step approach with localization.
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