

Supplier Development Framework in the Malaysian Automotive Industry: Proton's Experience

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ABSTRACT

In a dynamic market, firms need to evolve from traditional to strategic purchasing which aims to reduce the cost of the purchase and that might imply standardization of components, delivery time and levels of inventory. This effort will usually include key suppliers as joint problem solvers and with these problem-solving models to work with; the firm's attitude towards suppliers may change from confrontation to trust and partnership. From the buyer-supplier relationship perspective, the procurement practice of the buyer is critical and acts as a window to nurture the supplier development effort. This article presents the result of a study on supplier development in the Malaysian automotive industry, which focused on PROTON, and its role in developing the suppliers' relationships and development. This study indicates that PROTON and its suppliers' development program plays a crucial role in developing and extending comprehensive support to its supplier's firm such as supplier selection and appointment, development, match making, and promoting continuous performance development and improvement programs.

Keywords: Supplier chain management, supplier relationship management, supply chain management, value chain, automotive industry

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INTRODUCTION

In today's competitive business climate, buying firms increasingly rely on their suppliers to deliver technologically advanced, defect-free products, in a timely and cost effective manner. Yet too often suppliers lack the ability to perform adequately in one or more of these areas (Morgan, 1993). If the product or services provided by a supplier is deficient in some respect, the buying firm faces the decision of whether to look for an alternative source of supply, or to work with existing suppliers to remedy any shortcomings. Due to uncertainty concerning locating a better source, and the high cost of searching for and evaluating new suppliers, buying firms may choose to continue to work with their present suppliers to improve performance.

Increasing competition in the global market, characterized by shorter product life cycles, higher product quality, cheaper prices and shorter delivery times to satisfy demanding consumers, are likely to prevail strictly. Firms worldwide have responded to this competitive environment with various strategies and activities such as downsizing or concentrating on core competencies. It means firms have to rely heavily on outside suppliers to provide high quality inputs, on-time delivery, lower cost and constant innovation. Firms must, therefore, be continuously involved in supplier development to ensure that their suppliers have the same capabilities and at the same time share similar policies and objectives as theirs in order to compete in such environments.

While the supplier development concept has been around for many years in the Malaysian automotive industry; little has however, been documented about the actual practices of the program in terms of the objectives, key factors, characteristics and effectiveness. Consequently, this study will investigate and analyze the roles played by the Malaysian car-manufacturing firm (PROTON) in developing its suppliers. This study will, therefore, determine: what supplier development programs are being undertaken by PROTON *and their outcomes*.

Supplier development is defined as any organizational effort of a primary firm with regard to its supplier, to create and maintain a network of competent suppliers and to increase the performance and/or capabilities of the supplier to meet the organization's short and long-term supply needs (Leenders, 1989). It involves long-term cooperative efforts between the primary firm and its suppliers to upgrade the suppliers' technical, quality, delivery and cost capabilities and foster on-going improvements (Hahn, et al., 1990). The ultimate goal of these programs is for mutually beneficial relationships that will help both firms to compete more effectively in the marketplace (Watts and Hahn, 1993).

SURVEY OF RELEVANT LITERATURE

Supplier development literature consists mostly of in-depth case studies (Galt and Dale, 1991; Hahn, et al., 1990). Much of the supplier development literature focuses on the automotive industry, either in the United States, Europe, Japan or elsewhere and is performed primarily on large firms. Recent writings have begun to recognize the importance of supplier development in formulating corporate competitive strategies (Watts et al. 1995). This is especially true in the automotive manufacturing industry in view of the fact that in the automotive industry, up to 75 per cent of the cost of a vehicle comes from parts sourced from outside suppliers (Smith, 1995). Hence, auto firms cannot be competitive in the world market unless they deal with suppliers who share similar objectives and have the same level of performance (Watts et al., 1995; Womack et al., 1990; Helper, 1987).

Literature reviewed appear to be in agreement on issues that concern this study, i.e. the traditional posture, one of adversaries, adopted by buyers and sellers in buyer-seller relationships, is being replaced by a very different stance – cooperation relationship. In this respect, there is still a contrasting difference between the Western and Japanese model of buyer-supplier relationships. Most of the suppliers in the Japanese automotive industry have and continue to maintain stable business relationships with their primary auto firms over long periods of time (Womack et al., 1990; Harrison, 1994). The link between the auto firms is in the mutual interest of both parties (Odaka et al., 1998). These elements led Japanese auto manufacturers to be highly regarded as the most efficient and highest-quality producers of motor vehicles in the world (Womack et al., 1990; Cutts, 1992; Harrison, 1994).

METHODOLOGY

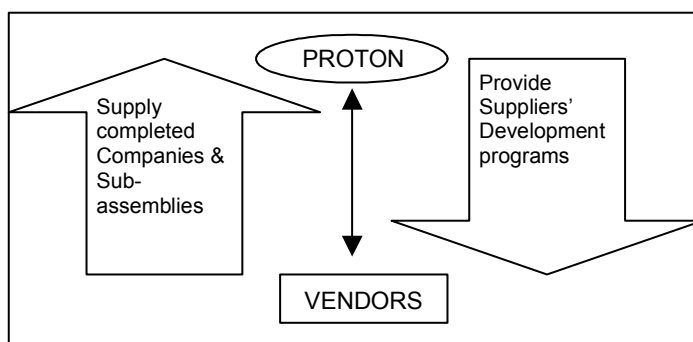
This study relies mainly on primary information. The author conducted a two stage field survey. First, after objectives were set to trace the trends of car manufacturers' and suppliers' relationships, particularly between PROTON and its suppliers. The first step of this research entailed visiting PROTON and conducting extensive interviews with PROTON managers/employees to examine the purchasing and suppliers' development practices in PROTON¹. Studying the procurement or purchasing practices from local suppliers at PROTON offers a more appreciable explanation about the actual practices and how this practice could contribute to supplier development efforts as well as to nurturing closer relationships between PROTON and its suppliers.

¹ The author was able to interview PROTON's manager of Supplier Sourcing and Technology (SST) department and its executives.

For the second stage of the field survey, the author examined PROTON's supplier firms through: (a) personal interviews with the owner or senior executives of the twelve selected suppliers; (b) to further verify the accuracy of the analysis and interpretations, the author collected additional data from a large sample of suppliers through mail questionnaires. Additional to this, structured questionnaires were sent through mail to 78 PROTON suppliers categorized under Small and Medium Industries (SMIs) with 30 or 40.5 per cent response rate and this data was used to validate the prepositions developed during the exploratory interviews, and (c) plant tours and site visits were also carried out for direct observation of processes and activities carried out in the plants.

SCOPE AND LIMITATIONS OF THE STUDY

This study is conducted at Perusahaan Otomobil Nasional Berhad (PROTON) and on its suppliers (parts and components manufacturers) in Malaysia. The scope of the study has been delimited in a number of ways. (a) The study is confined to the passenger car industry alone². (b) The study will be limited to PROTON and its suppliers (182 firms). It is considered to be well presented as PROTON accounts for about 70 per cent of the total production and sales of passenger cars in Malaysia. Thus, it is the backbone of the industry. In order to seek answers to the research questions, this study will only cover the area of supplier development between PROTON and its primary or first tier suppliers (Figure 1).



Source: author

Figure 1 Scope and focus of the study

² This is considered very representative as passenger cars dominate more than 70 per cent of total product mix of the industry while the rest are commercial vehicles such as buses, lorries, taxi and hire cars, etc.

BACKGROUND OF THE STUDY

Strategic products are generally obtained from one supplier where the short and long-term supply is not guaranteed and represents high value in the cost price of the end product. The strategy is to strive for a partnership-like relationship with the suppliers in order to obtain significant improvement in quality, cost, delivery, product development and innovation.

Before the establishment of PROTON the component parts manufactured locally were few and catered basically for the replacement market. However, with the introduction of specific localization programs for the industry, in the mid of 1980s, by PROTON through its Suppliers Development Program (PVDP), more components were produced to cater to the domestic as well as export markets. Many suppliers were born, and later developed and grew solely as a result of this PVDP. There were only 17 suppliers supplying 52 parts when PROTON commenced operations in 1985, most of which were low-tech traditional local parts like batteries, tires, and the like. Today there are 182 suppliers supplying more than 4,000 parts to PROTON (Interview with the President PROTON Suppliers Association, 2006).

In 1986, PROTON established the Procurement and Suppliers Development Division (PVD) whereby the objective is to develop its own group of suppliers in order to formulate and implement the local content program for the national car. It was envisaged that with the implementation of this local content program the automotive parts industry would expand. This expansion was much needed not only by PROTON in its endeavours to build a strong industrial base to depend on, but also by the Government as a source of employment absorption and reduction of imports.

Local Outsourcing

Data from interviews at PROTON show that types of local sources for parts and components can be divided into two categories:

- (a) From PROTON associate or subsidiary suppliers,
- (b) From independent suppliers.

Table 1 shows the parts and components outsourced from both categories. Table 2 also shows that PROTON has relatively fewer items outsourced from its own associate suppliers. The reason for this is that PROTON has only a few associate suppliers that produce metal-part related items. This is because out of PROTON's 22 active associate companies only six are producing parts and components at domestic level. Of those six, only three are related to metal parts and components

Table 1 Proton's supplier development and localization program achievements

Year	No. of Suppliers	In-House Parts	Local Parts	Total	Model
1985	17	176	52	228	Saga
1986	33	223	102	325	Saga
1987	40	237	161	398	Saga
1988	46	345	180	525	Saga
1989	67	519	382	901	Saga
1990	78	524	490	1014	Saga
1991	99	528	649	1167	Saga
1992	106	259	1057	1316	Saga
1993	125	394	2505	2899	Saga/Wira
1994	134	394	3050	3444	Saga/Wira
1995	137	394	3640	4034	Saga/Wira
1996	140	394	4300	4694	Saga/Wira
TOTAL	140	394	4,300	4,494	Saga/Wira

Table 2 Locally produced parts initiated by Proton

Parts Classification	Main Parts/Items
1. Body Parts	Body stamped-parts, fuel tank, exhaust system, safety glass, weather strips, mouldings, etc.
2. Engine Parts	Filters, radiator hoses, air filter housing, spark plug, piston, piston liners, etc.
3. Drive, Transmission and Steering Parts	Wheel rim, wheel nuts and studs, control cables, rack and pinion steering assembly, etc.
4. Suspension Parts	Coil and leaf spring, U-bolt and shackle assembly, shock absorber, disc pad, etc.
5. Electrical Parts	Battery, horn, wiring harness, alternator, starter motor, voltage regulator, wiper and washer assembly, instruments cluster, relays, fuse box, etc.
6. Trim and Upholstery	Carpet, floor mat, rear parcel shelf, seat assembly, safety belt, melt damping sheet, etc.
7. General Parts	Paint and thinner, underseal, tyre, air conditioner, radio, screw jack, etc.

Source: Proton, PVD Dept., and December 2005

production. Examples of these suppliers are PHN Industry Sdn. Bhd.³, Exedy (Malaysia) Sdn. Bhd.⁴ and PEPS-JV (M) Sdn. Bhd.⁵ As for direct consumable items, these items are also customized, for example paint, radio and air conditioners. These items are supplied only for PROTON cars and not for other non-PROTON vehicles. This would lead to closer and longer-term relations between PROTON and its suppliers.

Determinants of local procurement strategies

In recent years, increasing local content has become a major issue in Malaysian industrial and technology policy. The result of the questionnaire and field survey provides some insights on the likely roles of potential sources of technology for upgrading local suppliers within the framework of technology transfer via buyer-supplier relations. From the buyer's point of view (PROTON) deciding how much to source locally is affected by two groups of variables:

- (a) Firm-specific factors, which characterizes the firm itself (either the subsidiary/ affiliate of PROTON or the technological capability of the tier one firms), and,
- (b) Policy related and export market requirements, which define the policy on local procurement ratio and export market requirements (for example, General Standard of Preference (GSP)).

With regard to firm-specific variables, the extent of production experience of the local suppliers is probably positively related to increased buyer sourcing from local firms. In fact, the shift from old to new suppliers, adaptation to the new economic environment, the simulation effect on the local suppliers created by the procurement practice of PROTON, and a number of other related factors, require some time to become significant.

Second, equity ownership affects local sourcing; and the presence of local capital and manpower encourages the use of local parts. The ratio of local procurement should therefore increase in the case of joint ventures with local suppliers or when investment occurs through acquisition of, or capital participation in the equity of local suppliers (for example PROTON-PHN, PROTON-Exedy, PROTON-HICOM-Teck See, PROTON-Aluminium Alloy).

³ PHN manufacturers stamp parts and sub-assembly automotive metal (a joint venture company between HICOM, Nagoya Oak and PROTON where PROTON has 35% equity).

⁴ Exedy manufacture manual clutches and automatic transmission parts (a joint venture between PROTON, Exedy Corporation of Japan and Yew Teong Sdn. Bhd. PROTON has 45% equity).

⁵ PEPS-JV manufacturers cross member no. 2 and rear suspension system (A joint venture between PROTON, Mutual Concept Sdn. Bhd. and Sam Lip Ind. Co. Ltd. PROTON has 21% equity).

Thirdly, the procurement strategy will change with the degree of final product sophistication (the car), as the technological requirements of inputs vary accordingly. For instance, by using the destination of sales as a proxy for product quality, and by assuming that the quality of locally sold final products is, on average, lower than that required for export, one can expect the procurement of lower-technology intensive parts from local firms to increase with their share of local sales. On the other hand, one can argue that a national automaker like PROTON will be under greater pressure from national authorities to increase local content, and therefore expect a larger share of parts and components to be procured locally.

Fourth, another important factor affecting the procurement or sourcing strategy of PROTON is probably associated with PROTON's technological innovation efforts. A high R&D sales ratio is probably associated with a higher share of "in-house" or "intra-firm" input sourcing and hence a lower share of input procurement for local outsourcing. In fact, the technology gap between PROTON and its suppliers is currently still wide.

Policy-related and export market requirements would also affect the procurement strategy of PROTON. First, the concentration ratio of supporting industries, particularly PROTON's own direct supply base and their standards (quality, cost, delivery), will be positively related to an increase in the local procurement ratios of parts and components. In fact, the greater the availability of input producing firms, the higher the ratio of local procurement; and conversely, the scarcity of suppliers implies a lower local procurement ratio.

Second, the existence of strict policy requirements to increase local content of "made in Malaysia" automobile parts should induce the growth of the share of locally procured parts and components. Sometimes, however, such regulations may have the perverse effect of discouraging this, and also limiting the extent of international technology transfer.

Third, the suppliers' absorptive capacity will be positively related to the input procurement ratio. It was argued that the cost of technology transfer is reduced when the technology recipient has a higher absorptive capacity. This will in turn be associated with a lower cost of production that will increase the procurement ratio of parts and components, so that a positive relationship between local sourcing and the absorptive capacity of local firms can be expected.

Fourth, an increase in the availability of economic and social infrastructure as well as of human capital will be associated with higher local input procurement (software technology) ratio due to the decrease in production costs, reduction of delivery time and increased quality of parts produced by locally based firms⁶.

⁶ Fukao and Capanelli (1996) and Belderbos et al. (1996) did a study analyzing the effects of firms and country related variables on the local procurement strategy of Japanese electronics MNCs using a data set based on the "1992 Kaigai Jigyokatsudo Kihon Chosa" (1992 Basic Survey on Foreign Affiliates Activities), Ministry of International Trade and Industry, Japan.

On the other hand, the interviews and field survey also confirmed that the automobile industry, particularly local parts manufacturers, is in critical need of an increased number of "Production Testing Facilities" for their products. The facilities that are installed at PROTON are exclusively related to PROTON, while the Standard Institute Research of Malaysia (SIRIM) is mainly meant for research and so, local parts manufacturers have to turn to private firms which are too costly for them.

DISCUSSION

Supplier development practices at PROTON

The suppliers' performance has a greater impact on the productivity, quality and competitiveness of PROTON. The company has offered and performed various functions and activities to develop the component parts manufacturers further than they could conceivably achieve on their own. The key functions or activities that were carried out by PROTON, in developing its suppliers, is as discussed below.

Parts and suppliers identification, appointment and development

A critical strategic decision for any organization centers on the issue of make or buy. PROTON's management supports the philosophy of sourcing from outside suppliers. The main reason was the challenge of maintaining long-term technological and economic viability for non-core activities. It is, therefore, the company's responsibility to search for or develop capable suppliers suitable for the strategic needs of the organization. PROTON's supplier development programs starts with the identification of parts to be localized and potential local suppliers to undertake the manufacturing of these parts locally. The decision to place a certain volume of business with a supplier is based on a reasonable set of criteria. Normally the decision is governed by the perception of the supplier's ability to meet satisfactory quality, quantity, delivery, price, service, and the like.

The potential parts for local production are selected from the list of CKD parts imported from Japan. These parts are then included in the long-range product plan of PROTON (LRPP). The LRPP is for a period of three to five years. The parts selected for localization would be tabled in the Annual Management Plan (AMP) of PROTON for top management approval prior to its implementation. Upon approval of the AMP, the parts selected will be analyzed using Engineering Cost Estimates for further consideration for local production. Finally, the parts that meet review will then be considered for implementation. For example, 690 parts were approved for localization in the Annual Management Plan for 2006.

PROTON is still importing parts and components from abroad, particularly parts and components related to engines, transmissions and fasteners. This is because PROTON has to procure these parts from its own joint venture partners in Japan and these parts are patented items of parent firms in Japan (Mitsubishi). However in the case of domestic procurement, a subcontracting arrangement is the main alternative for PROTON in procuring parts and components. Generally, it is important that PROTON controls the quality of their products so that it has high quality parts and components to use in the production of its automobiles. Hence, it is interesting to investigate the suppliers' selection process of the automaker (PROTON).

To come-up with this information, a questionnaire and open-ended questions as well as interviews were conducted with PROTON to identify how the screening and selection of suppliers is implemented. Thus, in this section, the presentation of the survey results will be divided into subsections to explain the process of supplier selection. The first section presents the search process, which explains how they first locate the suppliers. The second describes the standard requirements of PROTON, where PROTON prefers to select or to appoint its suppliers. The last section presents the evaluation process to evaluate the standard of these suppliers.

Supplier identification, selection and evaluation process

The suppliers are identified and selected based on PROTON's policies. PROTON's supplier selection policies are: single sourcing, no displacement of investment, harnessing or optimizing available/existing facilities, and local supplier participation. The appointment of the suppliers is carried out in two stages: First, the feasibility study stage, where the suppliers are assessed and evaluated based on the 4M assessment (Man, Machine, Material and Method) and SWOT analysis (Strength, Weaknesses, opportunity, and Threat). Second, cost and price evaluation of the component parts based on the target cost as suggested in the Cost Estimate Review Table. The suppliers that meet the above two criteria will be appointed as PROTON suppliers for the particular component parts. When the suppliers are appointed, the assistance program for suppliers will commence, beginning from the development stage until mass production stage and continuously thereafter.

The evaluation of suppliers is a continuing purchasing task. Current suppliers have to be monitored to see if expected performance materializes. New suppliers need to be screened to see if their potential warrants future consideration. PROTON separates the suppliers into two categories. The first category constitutes established suppliers who over the past have proved to be reliable and good sources. The second category is the new supplier group that needs constant assistance and

guidance. PROTON establishes supplier rating schemes which track supplier performances in terms of management, financial, technical capability, quality, delivery, services, price, etc.

It was also observed that PROTON has to be very careful in the selection of suppliers and must control the quality of their suppliers in order to maintain high quality. Suppliers undergo a very high scrutinization process before being appointed as suppliers. PROTON gets to know the suppliers through its own search process and the suppliers also introduce themselves to PROTON. Some may approach PROTON through the Suppliers Development Department of the Ministry of Entrepreneurs Development (MED) or the PROTON Suppliers Association (PVA) may introduce them, but this is less common. Thus, suppliers have to be aware of and be familiar with all the requirements of PROTON before being appointed. Selection and supplier development is time-consuming taking almost thirteen months before the first trial production can begin followed by mass production. The typical lead-time from pre-selection of suppliers to mass production stage is between 15 and 27 months.

Within this production period, suppliers receive assistance from PROTON in terms of (a) Financial assistance- providing soft loans to start production, as well as commercial loans for other purposes including purchase of machinery, advances against payments and the like; (b) Technical assistance in terms of automation and modernization of machinery, upgrading of tooling and equipment, facilitating technical agreements, and the like; (c) Other related assistance including technical or product management, financial management, information technology systems, and the like. These are the types of assistance rendered to those suppliers that have been selected and appointed. For those who approach PROTON directly from the beginning, they have to present themselves and their products, which might not necessarily match the parts required by PROTON. These suppliers usually have good performance records, sufficient machinery, and experience in production of that particular product, good financial status and are technologically competent. PROTON prefers to use standard criteria as devices in the selection of suppliers. PROTON's list of criteria, according to its preferences, is as shown in Table 3.

Table 3 Criteria commonly used in the selection of suppliers

-
1. Technology (including tooling, design and development planning, and technology support;
 2. QCD (Quality, Cost, Delivery);
 3. Suppliers' reputation (including mass production capability, ISO standards possessed, financial and management (strength);
 4. Degree to build-team relationship and
 5. Overall value improvement (including R&D capability, and VA/VE practices).
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Source: Field Survey 2001, 2002, and 2006

Criterion numbers 1, 2 and 3 were given top priority and categorized as “Usually practiced” by PROTON (51-90 per cent of the time), while factors numbered 4 and 5 were categorized as “Occasionally practiced” (21-50 percent of the time). From the beginning PROTON has given much attention to QCD matters. The author asked PROTON which factor receives the most weight among the three factors i.e., QCD, trust and technology and QCD was selected as the top priority when making a deal with suppliers. This priority was interpreted in the Supplier Chain Strategy Policy at PROTON as: (a) Intense competition – 4 suppliers per part group; (b) Encourage new capable players; (c) Export 20-30% of production; (d) 3 years contract with a minimum of 3 percent per annum cost reduction (currently practiced by PROTON) on a year-on-year basis; (e) Encourage establishment of an R&D center; (f) Innovation that gives a competitive edge is rewarded. With the tight selection process and the strong emphasis on QCD, suppliers would learn that they have to be competitive. Through the recurring relationship they are exposed to and get to know the practices and procurement procedures of PROTON. They should not only comply with all of the standard requirements, but indirectly these practices and PROTON’s standard requirements could be the best aspects of an indirect lesson of organizational learning as well and could help them in winning contracts in order to remain in business.

Although supplier selection and evaluation information is useful for supplier selection and supply base reduction decisions, it is also an important information input for supplier development. Supplier evaluation, or grading, may thus be a part of supplier development efforts and should be a prerequisite to more extensive supplier development activities. However, supplier evaluation and selection in itself is not supplier development. Supplier evaluation may be deemed necessary for supplier development efforts, but unless additional steps are taken, for example communicating the results of an evaluation and providing training to a supplier’s employees, no supplier development has occurred.

Thus, supplier evaluation can help identify where supplier development activities should be concentrated (Hahn et al. 1990) and can provide a benchmark to evaluate the outcomes derived from supplier development activities (Hines, 1994). So, observations recorded indicate that PROTON needs to convey the standards for supplier selection and evaluation directly to suppliers. The current practice is that PROTON displays the monthly ranking of suppliers on a notice board in PROTON’s office using limited criteria such as late deliveries and defect rates. PROTON needs to extensively incorporate this current practice into any means of communication with suppliers (for example through a monthly briefing).

The search for suppliers who produce parts, which the automaker plans to procure in Malaysia, is the first step in the subcontracting relationship. In order to analyze this issue, six different procedures were inserted in the questionnaire for PROTON to specify how PROTON initially locates the potential suppliers and the type of production. It should be noted that the automaker could utilize more than

Table 4 Sources of Proton's agreement in each aspect derived from long-term relationships

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1. Can save time and money in investigating and screening the new supplier candidate
 2. Contributes to reducing the costs of controlling suppliers in terms of quality, price and delivery (QCD)
 3. Makes PROTON familiar with the supplier and dare to provide assistance in order to improve quality, reduce cost, improve efficiency in delivery & assist their development of technological capabilities
 4. Makes it possible to establish more flexible purchasing systems than specified by a complicated contract
 5. Can save time and cost of finding a new supplier
 6. Can make solving problems easier when a supplier cannot satisfy the requirements of the carmaker
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Source: Field Study 2001, 2002 and 2006

one procedure because it is possible for them to locate the supplier firms from just one source. In Table 4, the results show the procedures or processes preferred by the automaker according to its preference ratings.

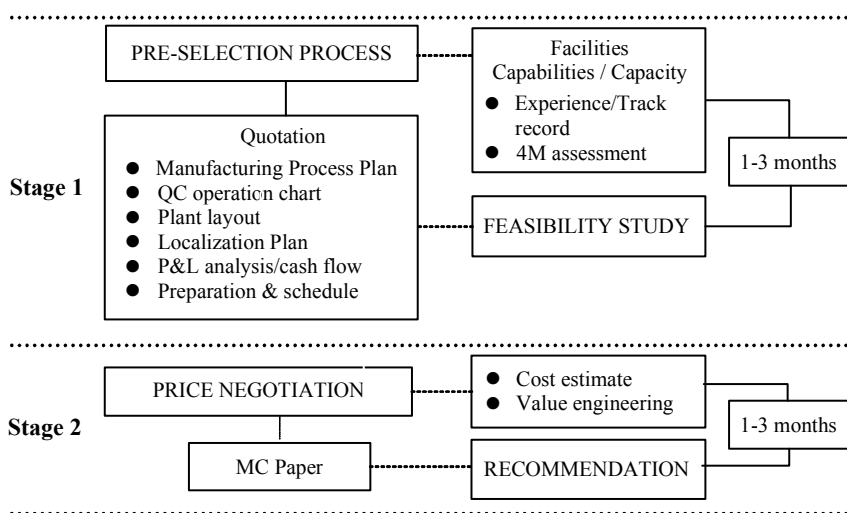
The results show that PROTON prefers to search for suppliers through its own mechanisms or processes. It is easy to observe this process because PROTON has to update their information about market environments such as import prices and new suppliers, in order to evaluate whether the parts' prices are reasonable. Further, PROTON has opportunities to meet new suppliers who are more specialized than those currently existing.

Additionally, PROTON also gets to know of suppliers because the suppliers themselves contact PROTON to introduce their products or services in order to generate orders. PROTON does not necessarily know that there are efficient firms or suppliers who produce good quality parts. It is therefore, important for suppliers to present themselves and their products, which may not necessarily match the parts required by the automaker. This process is not just the first time the potential supplier attempts to establish a supply relationship with PROTON, but the same approach should be done consistently-particularly when the supplier wants to introduce new parts and components to be supplied for each model introduced. Then, PROTON might make a decision to outsource from this supplier in the future or begin a supplying relationship.

Appointment of Suppliers

In order to ensure that PROTON can meet its requirement in searching for a potential supplier, a pre-selection process is implemented. Usually it takes about one to three months to conduct the feasibility study. PROTON carries out an audit or

inspection on various factors such as plant and production capabilities, experience in production or track record, and the assessment of the 5M⁷ factors. At this very first stage, the potential supplier has to have a full plan or a full fledged production plan such as plant lay out including manufacturing process plan, quality control chart, schedule, and the like (Figure 2).



Source: Author

Figure 2 Stage 1 and 2 of supplier selection: Appointment and development

Suppliers are subjected to a very highly scrutinization process. Interestingly, this procedure is a combination of appointment and development. Suppliers are subjected to a feasibility study evaluation process before they can be selected. This feasibility study evaluation of suppliers covers eight aspects:

- (a) Parts sourcing-to know the source of raw materials and work-in-progress (WIP) parts to produce a certain parts for example, in-house-production, outsourced from others and imported parts in terms of CKD.
- (b) Lead-time development is a process to calculate the schedule to provide a part from parts design and development up to mass-production.
- (c) Suppliers also have to identify their technical supporters if they have any.

⁷ i.e. Manpower, Machinery capability, Material (sources of materials), Method (production/QC(technical provider/partner,etc.)) and Market plan (global, regional, local).

Table 5 Supplier feasibility study and evaluation

	Vendor Name	Points
1. Parts Sourcing	1) Local (%) - In House - Sub Con 2) Import (%) - CKD - CBU	5
2. Lead Time/Development Schedule (Months)	1) Design & Development 2) Tooling 3) 1 st Prototype Sample 4) Testing 5) Mass Pro	5
3. Technical Support	1) Joint Venture 2) Technical Assistance	5
4. R&D Capabilities	1) No. of Designers & Engineers (CAD/CAM, CATIA SYS) 2) Experiences (Current and Past Projects/Customers) 3) Testing Facilities & Equipment	5 5 5
5. Product Tech. Spec. Process, & Special Features		5
6. Globalization	1) Export Program 2) Out Sourcing	5
7. Development Costs	1) Tooling (RM) 2) Testing (RM) 3) Proto Cost (RM/PC) 4) ETC (Pre-op/Equip/Facilities) (RM) Total (Per Item)	5
8. Part Price -Part number -Target	1) Landed to Proton (RM/PC) (Incorporation of armotization costs) 2) FOB / CIF (RM/PC) (If applicable)	5
9. Others (If any)	1) Bumi Participation 2) Financial Strength 3) Quality System/ISO 4) Management Strength 5) Manufacture Experience 6) Service 7) ETC	5
Total Points		55

Notes: (1) Points: Good – 5, Fair – 3, Poor – 1; (2) The bold items are quality-related aspects and represent 35 points out of the total 55 points.

Source: Personal Interview/Field Survey, 2001, 2002, 2006

- (d) R&D capabilities, including number of designers or engineers, software (CAD/CAM, CATIA system) as well as previous experience.
- (e) Product technology specification.
- (f) Globalization plans including export and outsourcing programs.
- (g) Development costs including costs for tooling, testing, cost, ETC and others.
- (h) Parts costing and costing planning targets including cost reduction and other aspects in terms of ISO and managerial strength.

The maximum points total is 55, and if a supplier can obtain 35 out of 55 points, particularly on the technical aspects, the probability of winning and being selected as a supplier for PROTON is high. Feasibility studies of suppliers will take about three months and it is the first part in the route to the appointment and development of the suppliers prior to selection. To establish a supply chain relationship is not an easy job and they have to present adequate capital and technical capability to produce parts and components as required by PROTON.

During the interviews with PROTON, the author asked PROTON why some suppliers introduced other suppliers to PROTON since those firms would be their rivals. PROTON disclosed that some suppliers introduced other suppliers only when they could not produce the required parts and components by themselves. Additionally, if PROTON agreed to select a supplier introduced by other suppliers, the latter could gain some portion of the business given to the former in terms of supplying raw materials or providing other services that may be needed. The introducer may also have a close relationship with the supplier being introduced.

From this sub-section, it can be summarized that PROTON identifies the supplier or searches for potential suppliers using its own methods and processes. In addition, the suppliers also approach PROTON in their own way to obtain a certain contract or business. However, PROTON is supported by related government ministries which introduce potential suppliers for selection. This support could make the cost of searching for suppliers easier and faster.

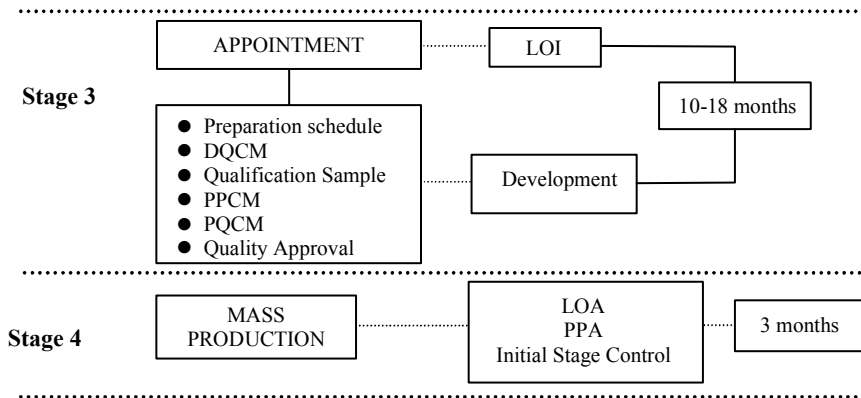
Additionally, the PROTON Suppliers Association (PVA) also introduces its members to PROTON as potential suppliers. In practice, PROTON usually gives preference to suppliers that been introduced by PVA. Search for potential suppliers through exhibitions and business seminars is seldom practiced. The reason behind this is that PROTON makes full use of its own procedures and processes to identify potential suppliers. Through these channels PROTON gets to know its potential suppliers more effectively rather than through governmental agencies and the PVA. This study also observed that most of the suppliers that approached PROTON directly to introduce themselves and their products are highly confident and capable of presenting their technical capabilities in producing parts and components. This is perceived as a good sign of their ability and puts them in a relatively better position to do business with PROTON.

Supplier chain management process:

(1) The Standard requirements imposed on suppliers

Once PROTON has identified the standards and performance for suppliers' production or services, it will select potential suppliers from potential candidate firms. In the Malaysian automobile industry context, this process is known as supplier appointment and development (Stage 3 and 4 Figure 3). The potential suppliers usually need to acquire relatively good performance or track record, sufficient machinery, adequate experience in the production of particular parts and components, be supported by adequate and reliable technical providers or collaborators or the supplier must itself be capable in terms of the required technical aspects. All of these factors infer a degree of trust and confidence in the supplier firm. The firms which have better and more appropriate machines to produce the particular parts required by the automaker, and who are in a good financial position, will be treated with a higher degree of trust and confidence than the others.

This study expected that the most preferred requirements of the automaker would be Quality, Cost and Delivery (QCD). Thus, the following steps of the analysis will present the results of the field survey with this expectation in mind. As mentioned in the theoretical and conceptual framework, PROTON has its own standards for evaluating the performance of suppliers in order to guarantee the quality of the products and to ensure the smoothness of the production process. For this purpose, the questionnaire scale is based on the criterion 5-almost always



Notes: QC: Quality & Cost; DQCM: Design Quality Conformation Meeting; PPCM: Production Preparation Confirmation Meeting; PQCM: Production Quality Confirmation Meeting; LOI: Letter of Intent; LOA: Letter of Agreement/Appointment; PPA: Principle Failure Agreement

Figure 3 Stage 3 and 4: Vendor appointments and development processes

(91-100 per cent of the time); 4-Usually (51-90 per cent of the time); 3-Occasionally (21-50 per cent of the time); 2-Seldom (1-20 per cent of the time) and, 1-Never (0 per cent of the time). PROTON was requested to answer the question: 'How commonly are these criterion used in the selection of suppliers?'.

The results show that, PROTON considered three standard factors as the most important when imposing its standard requirements on suppliers:

- (a) Technology consideration-particularly tooling, design and development planning, and technology support,
- (b) Quality, cost and delivery (QCD), and
- (c) Suppliers' reputation in the industry (for example, technical capability for mass production, financial, and International Standard Organization (ISO) particularly related to production and management.

This study found that PROTON gives less consideration to building long-term relationships and overall value improvements. This study is of the opinion that both of these factors should be nurtured and be an on-going practice as long as a particular supplier is supplying to PROTON. However, this result shows that in practice PROTON also gives consideration not only to QCD, but the overall ability for mass production including the firms' previous track record and certification achievement with regard to International Standard Organization (ISO) certification. In order to ensure that the suppliers complete these standard requirements, the suppliers must undertake stage three of the selection process implemented by PROTON (Figure 3 Appointment and Development Stage Process).

At this stage, a supplier who has undergone 1-3 months of feasibility studies can be recommended as a formal supplier and price negotiations take place. During this process, a more detailed and thorough examination of expectations is conducted by PROTON before the supplier is recommended. This process takes another 1 to 3 months. In the third stage a supplier is appointed and a Letter of Intent (LOI) is submitted by PROTON to represent its interest in that supplier to produce and supply a certain type(s) of part and component. Then the development phase begins. This development stage takes about 10 to 18 months followed by about 3 months to prepare for mass production. After a trial of an initial stage of mass production, then the real contract in terms of a Letter of Appointment (LOA) is submitted to the suppliers. This development process involves a few steps taken in preparing the task for product development and mass production as follows:

- (a) Preparation schedule for all trial and actual product development and mass production.
- (b) Design Quality Conforming Meeting (DQCM), at this stage a recurrent process happens in terms of plant and production process auditing where both the

- automaker and supplier exchange staff, conduct meetings, inspections/examinations, and the like-particularly for product development;
- (c) Ensuring and inspecting the qualification sample;
 - (d) Production Quality Confirmation Meeting (PQCM) where again the technical staff from the automaker make a visit and inspect the supplier's premise for the production operations, and
 - (e) Quality approval of the parts and components after all the procedures are compiled and has fulfilled all the required standards and practices of the automaker.

After this, they proceed to Stage Four where they will launch into mass production.

These processes and stages are summarized in Figure 3.

The monitoring and evaluation process is a necessary step to ensure that PROTON can outsource to appropriate supply firms. PROTON must evaluate all the candidates from the ranks of potential suppliers in order to screen them, and match their needs with all the supplying firms. All the potential suppliers are sent a drawing or specification, and the estimation of the amount of subcontracted parts required in order for the supplier firms to submit a cost estimate and quote a price. Then, the automaker will order pretest parts to verify the quality and specification of the parts produced to ascertain if it has attained the required standards. Generally, the automaker is strict about deadlines because this is an indication of the suppliers' sense of responsibility and their capability to submit shipments on time. Thus, if the supplier does not submit the pretest parts by the given deadlines, their chance of becoming a PROTON supplier is slim or nil. Even if the suppliers can submit pretest parts to the automaker on time, it does not necessarily mean that the automaker will accept them as a supplier firm, because these parts need to be approved by the automaker. The reason is because these items are very important and to make sure that good quality parts are incorporated into the final product (the car).

During the interviews, the author asked the respondents to describe how they evaluated the suppliers. Even though the answers disclosed by the managers were not exactly the same, the overall details were quite similar. PROTON has stated that the objective for evaluation mainly focuses on QCD. In addition, the remaining requirements will be evaluated along with the three major QCD standards, i.e., uninterrupted supply, proximity and technology.

After the pretest parts have been approved, PROTON will then compare the quality and the cost estimates. If they think the cost is not suitable or too high, they will negotiate further. When all the requirements are satisfied, PROTON will inform the chosen supplier of the approval. The audit of the supplier's firm is defined as the evaluation process for the parts, which are now approved. After audit, the next

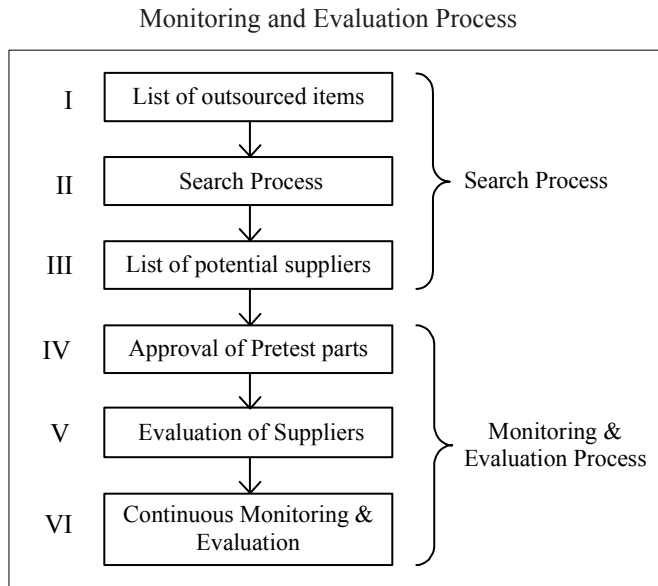
step is running a trial before mass production; which can be defined as quality and production validity. Some might ask why the automaker would still evaluate and monitor the suppliers' plant even if the parts produced have already been approved. This is because PROTON wants to inspect the production process at the supplier's firm in order to ensure the good quality of the parts produced as well as the performance of the supplier's firm. This procedure is known as the plant and production audit.

In general, the monitoring and evaluation processes are the responsibility of two divisions, the Quality Control Division (QCD) and the Purchasing Division (SST department). Evaluation and monitoring is focused on QCD in order to ensure good quality of the subcontracted parts, punctuality of delivery and reasonable prices. The purchasing division is responsible for evaluating the cost competitiveness and purchasing plan of suppliers, which refers to the capability of the suppliers to submit the shipment punctually. In more detail, the duty of the QC division is to evaluate and ensure their continued capability to produce good quality parts. The factors that the QC division will monitor are the QC section, the production processes and the machinery and equipment of the suppliers' firm. PROTON wishes the suppliers to have QC standards not only in the production process, but also incoming and outgoing QC. Incoming QC refers to the sampling procedure to test the quality of raw materials before they enter the production line in order to ensure the quality of final parts produced. The cause of defects might be derived from low quality raw materials. In short, the evaluation procedure involves the hardware-machinery, tools and equipment and also the software (number and qualifications of the people in the suppliers' firm). PROTON often chooses to deal with suppliers who have a formal QC section, good quality testing equipment, experienced staff, good maintenance of equipment and moulds. A summary of the monitoring and evaluation process is shown in Parts IV to VI of Figure 4.

(2) The long-term relationship

PROTON has been working towards a long-term close relationship with its suppliers. For example, today the same supplier as ten years ago supplies its tires, (DIMB and Goodyear (M) Bhd.). The same thing is true of its brakes and clutch pedals, (supplied by Tracoma Sdn.Bhd.). In terms of closeness, every month there is a visit by PROTON staff, which is a social and working visit, which would include plant and production auditing, besides providing information on changes of models and delivery schedules⁸.

⁸They are very helpful in the development of new products. They give technical know-how in solving mould problems, and normally we have joint investigations into any defect. (PVD Manager, Tracoma Sdn.Bhd.) We ourselves often go to PROTON, and they come to us once every 6 months for stock auditing, but they also pay public relation visits to us once a week (OE Manager, Dunlop Industries Malaysia, (DIMB)).



Source: Author

Figure 4 The Summary of monitoring and evaluation process

PROTON sends its staff to nurture their social and public relationships with suppliers on a periodic basis. The same practice takes place at Mitsubishi Motor Corporation, whose R&D staff are engineers and technicians borrowed from Mitsubishi Electric and Mitsubishi Heavy Industries (Fruin, 1992, p157). According to the PVA (PROTON Suppliers Association) President, PROTON provides continuous assistance to its newly created suppliers in all areas, right from sourcing, production, quality audit, maintenance, engineering work and personnel, to securing long-term markets and offshore market penetration, and giving advance information to suppliers on long range product plans. There are also special services such as acting as co-coordinators for QCD. PROTON also acts as an advocate or adviser to PVA, as a matchmaker from introduction stage to matchmaking implementation program as well as an initiator for the government technical assistance scheme.

The results of the field survey attest to the practice of long-term relationship building between PROTON and its suppliers and to the fact that on-going or long-term relationships could reduce transaction costs, which are the costs of registration on price and the cost of controlling the suppliers' quality and delivery. Moreover, PROTON still states that long-term relationships and regular orders make them more flexible than trying to implement a complicated contract. PROTON is very

sure that through this kind of relationship it could save the money and time needed to investigate and screen new supplier candidates. It could also reduce the cost of controlling the suppliers in terms of QCD. Through these relationships PROTON becomes familiar with the supplier; and is confident enough to provide them with assistance in order to improve quality, reduce costs, improve efficiency in delivery and assist their development, technically. Supplier chain management through long-term relationships involves risks for both the buyer and the supplier, provided that both are willing to invest resources and time in dedicated assets, for example purchasing a big die and mould machine, CAD/CAM equipment and the like for pay-off that may only occur over a relatively long time period.

The interesting point is that these long-term relationships make PROTON more willing to provide assistance to its suppliers in order to improve the quality of the parts and to reduce the cost of production. Evidence of a long-term perspective is that commitment cannot be sustained without undertaking genuine risks. This research found that PROTON asked for cost reductions of about 3 to 5 per cent annually. The present practice shows that PROTON is cutting the price 3 to 5 per cent per year automatically. Table 6 shows the list of PROTON's agreements on each aspect derived from long-term relationships.

Table 6 Sources of Proton's Agreement in Each Aspect Derived from Long-term Relationships According to Preference

1.	Can save time and cost needed to investigate and screen new supplier candidates
2.	Contributes to reduced costs in controlling the suppliers in terms of quality, price and delivery (QCD)
3.	Makes Proton familiar with the supplier and dare to provide assistance in order to improve quality, reduce costs, efficiencies in delivery & assist in-the development of technological capability
4.	Makes it possible to establish more flexible purchasing systems than specified in a complicated contract
5.	Can save the time and cost needed to find a new supplier
6.	Can make solving problems easier when the supplier cannot satisfy Proton's requirement

Source: Field Study 2006

Long-term relationships are also very significant in developing further efforts in technology transfer through intra-firm and inter-firm relationships between PROTON and suppliers. Rashid (2002) found that inter-firm relationships are more prevalent in nurturing technology transfer between PROTON and its suppliers. PROTON is observed to be more willing to provide some types of assistance in order to improve the cost and production of the parts and components it procures by improving productivity as well as requesting the suppliers to reduce the price to increase and maintain competitiveness.-The willingness of PROTON in terms of

cooperation and collaboration in R&D is observed to be higher towards these groups : (1) PROTON's associate suppliers⁹ and (2) Non-associate suppliers¹⁰ This is because PROTON is presently developing its new models of passenger cars. These new models are still at the development stage and will increase the utilization of local content as the volume and models increase.

In addition to this, all of PROTON's associate suppliers and non-associate suppliers are direct suppliers of PROTON. The research found that 90 percent of the respondents depend about 90 to 100 percent on the annual sales to PROTON. By cooperating with them in terms of product development and R&D collaboration, PROTON is strengthening its own suppliers. This is a good sign for the partnership model. As for non-associate suppliers, almost eighty percent of them were nurtured by PROTON through its Suppliers Development System initiated in 1988.

In addition to that, since 1999 PROTON has appointed about twenty new suppliers and most were originally non-associate suppliers. This is because PROTON has about twenty six associate suppliers and only about six or eight of them are parts and components makers, the rest of them are car distributors or joint venture firms in other countries such as PROTON subsidiaries in Europe and North America. So PROTON has to select from non-associate suppliers. PROTON does not show much consideration to independent suppliers that are subsidiaries or affiliates of foreign firms even though they are local Malaysian firms. This is because they have their own parent firm to conduct product development. Their local subsidiaries or affiliates in Malaysia are just a production plant catering for the local or regional ASEAN markets.

The study revealed that PROTON exhibited greater willingness to dispatch its manpower in order to solve production problems for all categories of suppliers (including independent suppliers in which PROTON has no equity and is not listed as direct suppliers). PROTON was also observed to exhibit a comparatively greater level of willingness to assist its subsidiary/associate suppliers as compared to the other two categories.

To some extent PROTON transfers the production of certain parts and components to them after they are qualified and capable of producing it (Rashid, 2002)). This willingness to assist is prevalent in plant establishment, providing raw materials, loaning machines, dispatching manpower and product management. PROTON outsources most of its critical components (high-tech parts and components critically important in the assembly of the engine and transmission, and classified as sub-assembly components).

The monitoring and visits are aimed particularly at the new and problematic suppliers. For these suppliers, PROTON dispatches its staff : (1) on a weekly basis

⁹PROTON has equity and as listed as its direct supplier.

¹⁰PROTON has no equity

Table 7 Proton executives transferred to vendors

Company	Per cent of direct sales to Proton	Per cent of shares owned by Proton	Executives transferred from Proton	Major Products
Hasu Ind. Sdn. Bhd.	60	Nil	3	Wire harness
Amalgamated Parts	60	Nil	5	Wire harness
Mfrs. Sdn. Bhd.	80	Nil	1	Head, clearance, RR comb lamps
Malaysian German Auto Equip. Sdn. Bhd.	100	Nil	3	Splash shield, Cover
Usra Industries Sdn. Bhd.	60	Nil	3	Fixture, Rein, I/panel, striker glove box, PP set
Metal Former Sdn. Bhd. TRW Steering & Suspension (M) Sdn. Bhd.	85	Nil	3	Tie Rod
HICOM Engineering Sdn. Bhd.	80	Nil	30*	Exhaust manifold, Flywheels, Engine bracket
Tong Yong Ind. Sdn. Bhd.	70	Nil	2	Plastic bumper, Radiator grille, I/Panel
APM Plastics Sdn. Bhd.	20	Nil	3	Run channel
EP Polymers (M) Sdn. Bhd.	80	Nil	1	Body side molding
Bertool (M) Sdn. Bhd.	100	Nil	2	High mounted stop lamp, License plate lamp, Switches, etc.
Average	74.5%		4.9	Wheel nut

Source: Field survey, Proton (April-May, 2006).

Note: * including production workers

(2) on one-month stays at the supplier's plant, and (3) for three-month stays¹¹. For example, PROTON dispatched their staff to these 15 suppliers. Table 7 suggests an average of 3 staff (normally engineers) dispatched to suppliers to monitor and solve current problems. For example at Malaysian German Auto Sdn. Bhd., they found that water condensation in the rear lamps was due to a lack of pressure, inconsistent sealant, poor quality sealant, and a lack of testing points. There was one case where PROTON took over the entire operation of the supplier for three months, and returned it when the operations had been rendered efficient. As for HICOM Engineering, PROTON shifted the whole group of one production line to help the supplier overcome its problems and stayed there for almost one month.

For the long term, as "ongoing assistance" PROTON has introduced several productivity improvement programs to assist its component parts manufacturers (suppliers) in developing efficient operation systems to improve their productivity. The measures emphasized by PROTON include: factory layout; equipment and process; process control; production planning and control; utilization of manpower; materials handling and inventory; and most important is product quality. The results achieved are in the forms of efficient delivery, reduction of manufacturing cost, shorter lead times, better management of inventories and better quality of products. Among the programs implemented are Quality, Cost and Delivery (QCD Programs), Manpower, Material, Machine and Method (4M program), and Target Cost Achievement (TCA program).

The author carried out a study at 4 selected supplier firms to find out the results achieved from the productivity improvement program conducted by PROTON at these supplier firms. The results are tabulated in Table 8.

(3) Effective two-way, multi-functional communication

Presently, the cases of collaborative arrangements may be reduced due to the upgrading of the vendors' capabilities. However, a different pattern is emerging. The focus may also differ from previous practices. The result of this study shows that strict attention was paid to production matters. Figure 5 shows that PROTON's engineers were frequently dispatched to two main departments: PVD (Procurement and Vendors Development) department, and the R&D and/or production department of vendors. This is because these entire departments carry out very important tasks related to production, quality control, procurement and purchasing, and the like. By doing so, PROTON could deal with managers and engineers really related to production, product improvement and product development, control and implementation of mass production.

¹¹According to the SST manager of PROTON, suppliers are categorized into three groups: problematic, normal and excellent.

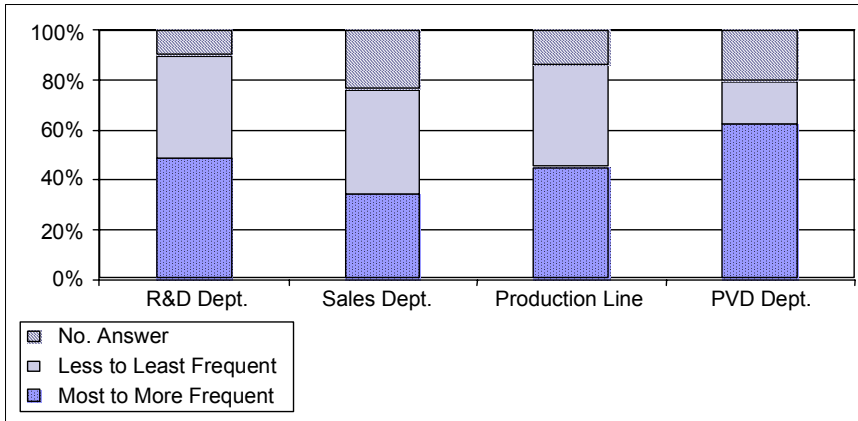
Table 8 Productivity improvement programs conducted at 4 selected supplier firms

Cases/Company	Improvement Activities	Results of the Improvement		
		Items Improved	Before Improvement	After Improvement
Company AA	<ul style="list-style-type: none"> ■ Production Method ■ Dies Improvement ■ Modification of Jigs ■ Relay out Production Line 	<ul style="list-style-type: none"> ■ Manpower ■ Cycle Time ■ No of Process ■ Working Area 	<ul style="list-style-type: none"> 15 Persons 58 Seconds 15 Processes 63m² 	<ul style="list-style-type: none"> 5 Persons 55 Seconds 8 Processes 36m²
Company BB	<ul style="list-style-type: none"> ■ Scrap Reduction ■ Productivity Improvement 	<ul style="list-style-type: none"> ■ Monthly Cost ■ Saving/Month 	<ul style="list-style-type: none"> RM44,4000 	<ul style="list-style-type: none"> RM39,180 RM5,220
Company CC	<ul style="list-style-type: none"> ■ Review test method ■ Revise Specification ■ Revise Procedures (SOP) 	<ul style="list-style-type: none"> ■ Rejection Rate 	<ul style="list-style-type: none"> 90% 	<ul style="list-style-type: none"> 1%
Company DD	<ul style="list-style-type: none"> ■ Production Method ■ Eliminated Deburring ■ Modify jigs ■ Relay out Production Line 	<ul style="list-style-type: none"> ■ Deburring ■ Tag Weld ■ Tapping Nut 	<ul style="list-style-type: none"> 9 Processes 	<ul style="list-style-type: none"> 5 Processes (Reduced processing time by 35%)

Source: Author, field research 2006, 2007. Note: Exchange Rate: 1USD =Appro. RM2.80 as April 2008. Due to confidentiality, the company's name is not mentioned in this study.

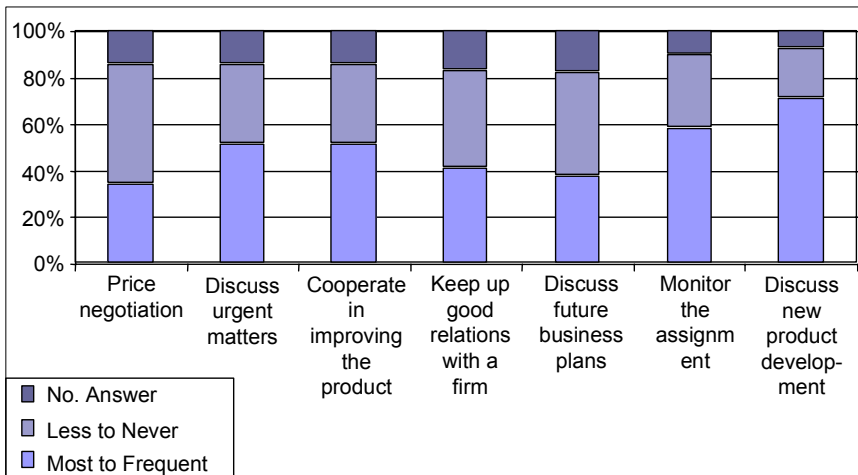
The reasons for the visits vary from price negotiation to discussing new product development, as shown in Figure 6; the most frequent visits are for new product development. This is a sign of changing patterns in the buyer-supplier relationship observed in the Malaysian automobile industry where automakers increasingly give suppliers more responsibilities with regard to the design, development and engineering of components.

However, the place of the meeting is not limited to the suppliers' main plant but also held at the automaker's office and testing lab (the author participated in a new product development/problem solving meeting held between a press-stamping vendor T and PROTON's engineer at the PROTON testing lab of the PROTON main plant in Shah Alam during the field survey in April 2002). The visit to discuss new product development with suppliers is aimed at gaining better leverage between



Source: Author

Figure 5 PROTON's staff visits to vendors



Source: Field survey 2005, 2006

Figure 6 Purposes of PROTON's visits

the suppliers' technological capabilities and expertise and product development efficiency and effectiveness. The main reason is because PROTON is currently increasing its production volumes and has started to develop various new models

to be launched in 2003, 2004 and 2005 (The model names will not be disclosed here).

The other two most frequent visits were to improve the product and for problem solving. Product improvement is a time consuming activity including cost reduction activities, Kaizen activities, VA/VE (Value added/ Value engineering) activities and the like. -In terms of efficiency, this visit may be able to directly encourage suppliers' involvement and that could lead to the reduction of development costs and the reduction of development lead-times. This would be achieved mainly by preventing, reducing or introducing design changes earlier by means of early and intensive communication with suppliers ("First time right development"). In terms of effectiveness, supplier involvement may lead to a reduction in product costs and an increase in product value. This can be achieved by mobilizing and leveraging supplier expertise regarding Design for Manufacturing (DFM), the quality and reliability of component design, alternative materials and possibilities for component standardization.

CONCLUSION

The research conducted focused on the supplier chain management framework with the objective of obtaining better understanding of the current practices in the supply system of the Malaysian automotive industry. The conclusion is that PROTON has played a significant role in developing and extending comprehensive support to its suppliers particularly in the form of appointment, selection and development, and that it nurtures long-term relationships.

Supplier development represents an initiative by the buyer firm to increase the performance and/or capabilities of their suppliers and is described as an integral part of many relationships between Japanese manufacturers and their suppliers. The same practice was found to have been implemented by PROTON. However, the emphasis on price-cutting and unilateral implementation by PROTON represents the common practice of many US buying firms.

A supplier development effort represents an initiative by a buying firm which can help the firm to meet strategic organizational objectives. A Buying firm that initiates supplier development efforts should recognize that special attention should be paid to the buyer-supplier relationship. Buying firms must be willing to invest in the relationship with a long-term perspective. The results suggest that effective two-way communication, long-term commitment, and on-going assistance as well as a collaborative posture may be critical to the success of supplier development efforts.

Suppliers are often only as good as they have to be and the buying firms often deserve what they get from suppliers because they do not ask for more. -Expecting more from suppliers, communicating those expectations, and being willing to

participate in supplier development efforts can buy firms the hope of developing supply bases that will help them compete in global markets.

The need to address the adoption of a better buyer-supplier relationship is perceived as an immediate concern that must be addressed by both PROTON and its suppliers. In order to see a change in this relationship, the procurement practice is the key to effect the type of supplier relationship to be established. In contrast to arms-length supplier relations, a supplier partnership is characterized by joint decision making between the buyer firm and supplier. They make relation-specific investments such as sharing strategic planning and production information and utilize each other's expertise in product and process design, thereby creating synergies between the buyer and suppliers firms. Whereas a supplier's role in arms-length transactions is limited to supplying well-specified products under well-defined terms, the suppliers' role in the partnership is complex and multidimensional where the parties jointly negotiate the broader aspects of their respective roles and resolve contingencies and uncertainties as they arise.

However, the suppliers' internal forces and efforts to improve themselves are the most important factors in supplier development discussions. Additional investment, particularly in soft technology accompanied by hard technology, would enhance their efforts towards increasing competitiveness. Technological internalization through continuous R&D, cost reduction activities and continuous value-added and value-engineering (VA/VE) would be valued assets in retaining markets. New strategies such as finding a new partner for technology and a niche market should be explored sufficiently in order to penetrate into new markets by opening and liberalizing markets at both the regional and global level.

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