

# Assessing Proton and Vendors Design Capabilities towards Internationalization

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**Abstract**—After twenty five years in operation, Proton, the first automotive company in Malaysia has to strengthen new product development (PD) activities to penetrate global markets. Vendors' participation determines the final product and suppliers design capabilities (DC) has been identified as part of the automakers' competitive advantage. However, Proton Malaysian suppliers are just starting to develop DC. Some strategic planning are required to speed up the development process like technical assistance (TA), joint venture (JV) and also external support from buyer and government. This paper discusses on Proton product development (PD) practices, especially on suppliers' involvement in the product development (SIPD) process and their performance. The findings will be used to initiate model for DC development for Malaysian automotive suppliers.

**Keywords**-Proton, product development (PD), design capabilities (DC), supplier involvement in product development (SIPD)

## I. INTRODUCTION

Global competition and increasing customers demand have made manufacturing enhancement saturated.

Manufacturers have to find new ways of increasing their competitiveness. Currently, leading automakers have moved development process upstream into product development (PD) stage. PD offer more opportunities for greater competitive advantage that enable automakers to determine customer-defined value, make strategic investment and minimizing cost, compared to manufacturing's ability is limited to quality and productivity only [2].

In the mean time, a car requires for more than 20 000 parts [3], which is impossible to be manufactured by the automaker alone. Suppliers account for a big amount of the

total cost production; over half [4]; more than 60% [3]; about 75% [1]. Consequently, products supplied by vendors have direct impact on cost, quality, technology and time to market of new products [4], thus influence on final price and quality of the product [3]. There are big number of suppliers involved and this has make automotive industry as one of complex supply network structure [3]. Innovation never happened in isolation; it is dependent on an entire network to improve or create a new product. Network innovation happened when there is participation of suppliers with distinct knowledge bases from different companies combined for specific PD project [5]. Previous practice showed that automakers had dominant roles in product development (PD); design, testing and assemble. However, to improve the process, those important roles have now been outsourced to suppliers [3, 6].

Suppliers' involvement in PD (SIPD) has significant impact on the products performance; cost, quality, technology[4] and project performance as well as time to market [7]. SIPD has direct influence on automaker's competitiveness [8], since suppliers has been identified as one of the important resources [4, 9] and also competitive advantage to the automakers [3]. By sharing with suppliers, automakers can reduce the cost of technology investment and a practical way to have innovative technology with minimum technological risk [10]. Thus, the risk is minimized when costs are shared with suppliers. Through outsourcing, fewer parts were done in-house[11], therefore automakers can focus on their core competencies.

Suppliers design capabilities (DC) become necessary since it is able to vitalize the collaboration [3]. Design capabilities can be the suppliers' competitive advantage [4, 12-14], uniqueness (difficult to imitate by competitors [12]) and pre-requisite to be successful suppliers [15, 16]. DC is dynamic [12] since it empowered the companies to dynamically fulfil customers' needs. Customers' favour always increase market demand and bring in more profit [2]. DC enable the suppliers to determine price of the product, ability to design allow them to design according to customers' target prices [17, 18]. The capabilities also facilitate the suppliers to scale up business volume [3] and capabilities enhancement also allow them to make more businesses and improve their status to be Original Design Manufacturer (ODM) [3].

However, a study on the experiences of directors and project managers found mixed results of SIPD [10]. SIPD can lead to longer development time, worse product performance and increase PD cost. Prior study found that Malaysian suppliers were unable to perform adequately because they lack the capability [1]. Therefore, many automakers especially, the Japanese paid serious attention to

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their suppliers development program [19]. The Malaysian automotive industry also following the trend recently [1].

The Malaysian automotive market is going to reach saturation point at 700, 000 to 800, 000 output units [20]. Total vehicle sales in Malaysia for 2010 has already reached 605, 156 units and expected to grow about 1% to 1.3% in the following years [21]. All national automakers are urged to penetrate overseas market. To achieve internationalization, Proton has to emphasize on technological capabilities development and be innovative to reach exportable brand [22]; innovate and adopt of new technologies [23]. Proton with suppliers has to move together to accelerate the DC development. Collaboration between automakers and expert suppliers in PD, like pooling together organizations would create bigger assets investment, combined resources and shared knowledge, consequently the outcome would be “supernormal profit” [24].

Little study has emphasised on Malaysian automotive industry especially on DC. Therefore this study intends to close the gap by fulfilling the following objectives:

- i. Investigating on current Proton DC practice.
- ii. Determining Proton suppliers’ performance.

This study focuses on PD activities in Proton and also its tier-1 suppliers due to several reasons. Proton is the first Malaysian automaker with 12 000 employees that covers the whole value chain of business from design until after sales service [25]. Thus, Proton has full capabilities to conduct the whole PD process. Since DC is also an expensive investment, tier-1 suppliers can afford it.

## II. RESEARCH METHODOLOGY

To fulfil the objectives of the study, primary and secondary data were collected.

### A. Primary Data

Case-study via in-depth interviews was employed. This is an appropriate approach for this study, as there are limited prior studies conducted. In-depth interview will extensively able to explore on the actual scenario and latest progress that occurs in the industry [9, 26]. The flow of the interview process adapted from [27] is shown in Fig. 1.

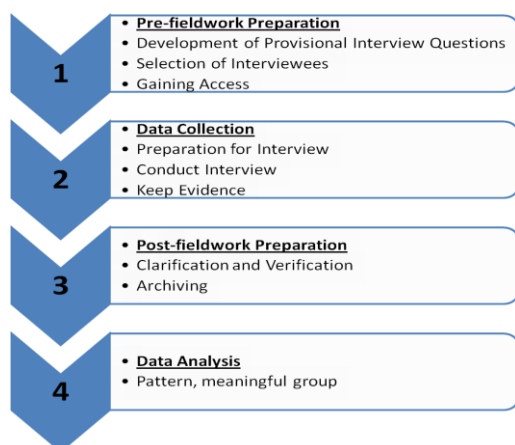


Fig. 1. The interview process flow.

During the pre-fieldwork preparation, instrument of this study was developed from literature review. Prior research gave the overview of design activities and collaboration of

PD between automaker and vendors which has been used to structure the interview questions. All informants were given the same set of questions, to ensure consistency between interviews. At the same time, all questions developed were open-ended type, allowing for ample flexibility to explore new findings.

Four officers from managerial level were selected from Proton. Two were from Engineering Division (ED) that are directly involved in Proton PD and another two interviewees were from Group Procurement (GP) responsible to manage Proton suppliers. Background of interviewees that already involved in design activities with different roles enable the study to obtain richer ideas and insight from practitioners [26]. Proton as a buyer, enable them to give fair view about performance of the whole suppliers. The interviewees’ profile is shown in TABLE I.

TABLE I  
INTERVIEWEES’ PROFILES

Interviewee	Position	Department
WA	General Manager of Engineering Division	Engineering Division
AN	Head of Product Service Engineering	
MA	Section Manager of Strategic Supplier Management	Group Procurement
BP	Section Manager of Vendor Management Development	

Arrangements for the interview session were set earlier, to ensure availability of the interviewees. Objective of the interview and questions for interview session were given in advance to interviewees via e-mail. The interviews were conducted between February until March 2010 in three different sessions and average time taken for each session is about two and half hours (2<sup>1</sup>/<sub>2</sub> hours). The interviews conducted face-to-face. The sessions were recorded and transcribed, to ensure reliability and traceability of information [28]. In addition, each transcript once completed was sent to respective interviewees for content validation. Interviewees responded on any mistakes, improved and clarified to ensure validity and reliability of the information [28]. Interview transcripts were analyzed; direct and indirect answers were determined, and those answers that have similar meaning were grouped together. The most appropriate terminologies were used to represent the meaning.

### B. Secondary Data

Secondary data collected include company annual reports, progress reports, press releases, electronics websites and research publications. Basically, the secondary data were used to enhance or sometimes to support primary findings.

## III. PROTON

Proton is abbreviation for Perusahaan Otomobil Nasional, the first Malaysian automaker. Proton is a national agenda and was set up in 1983. Local suppliers or synonym as vendors in Malaysia are also established to support the national automaker. Malaysian government has implemented rules and policies to secure local companies in automotive industry. For instances Localization Policies, Mandatory Deleted Items (MDI), Local Material Content Policy

(LMCP) that to ensure certain percentage of the vehicle are using local content [29].

Fig. 2 shows achievement of localization program since it was launched in 1985. The trend has shown progressive increment especially in 1992 onwards for both subjects, especially on number of local parts produced. The data significantly showed that the localization program has been successfully implemented. Recently, Proton has introduced a new vendor tier system. The new system require vendors to choose their own lower tier vendors according to the local quota as stated in localization program assisted by Proton. Even with the new vendor tier system, Proton still manages to pursue government localization program.

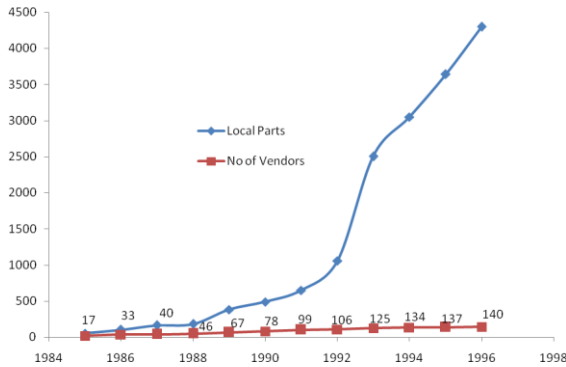


Fig. 2. Proton's localization program achievement [1].

Evolution of auto parts and component development has begun gradually from the first Saga model launched. At the beginning, localization activities concentrated on MDI. Growing numbers of localized parts and components has groom Malaysian automotive industry to be one of the key development indicators. Likely, the National Automotive Policy (NAP) and national car project has successfully industrialize the nation. As shown in Fig. 3 more exclusive propriety for parts/ components development was produced since *Iswara* model onwards.

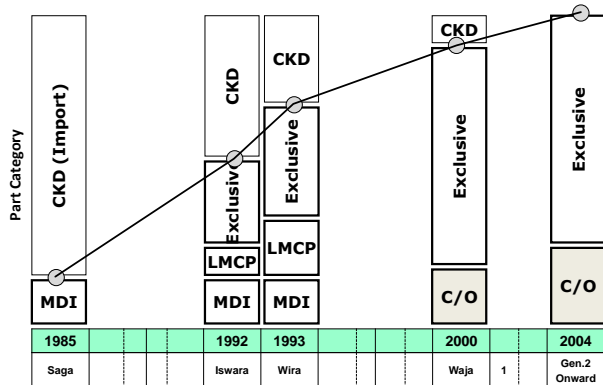


Fig. 3. Evolution of auto parts and component development (source: Proton). CKD=Complete Knocked Down, MDI=Mandatory Deleted Items, LMCP=Local Material Content Policy, c/o=corporate.

The involvement of vendors in PD is still new to Proton. Unofficially, SIPD in Proton started from *Wira* model in 1993. Since SIPD has shown positive results, the practice has been continued. In 2007, Proton manages to improve and develop proper SIPD program named as Early Vendors

Involvement (EVI). EVI is an expansion from the initial SIPD concept. EVI has long lead time, which normally takes more than 6 to 9 months development for each project. The selected vendors worked with Proton from the beginning of design process (concept design) until completion. The vendors' roles have now moved beyond manufacturing responsibility, when Proton started to involve vendors in PD (summarized in Fig. 4). More critical responsibilities are now outsourced to vendors that indicate Proton confidence on vendors' capabilities. The EVI promote innovation on ideas and technologies to design new item. Based on the interviews conducted, there are some benefits received by Proton from EVI program have been identified. The benefits are summarised as;

- Able to shorten development time.
- Improved product quality.
- Minimize risks of failure.
- Improve organization for more structured and better management since direct vendors via Proton supervision are responsible to choose and manage their own lower tiers vendors.
- Reduce number of staff allocated per project.
- Reduce Proton responsibility on the after sales service for the outsourced modules.

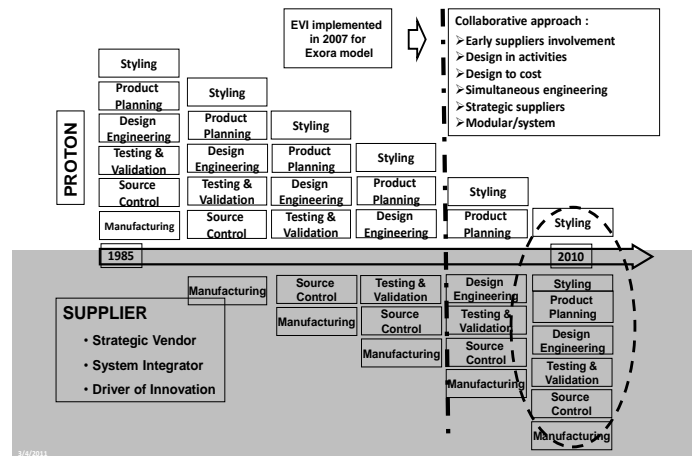


Fig. 4. Sharing roles and responsibilities in Proton SIPD.

Proton has all level of vendors, *white, gray and black*, from both local and abroad. However, Proton has different reasons in determining needs of vendors' participation in PD. TABLE II shows a summary of vendors' collaboration in PD. As mentioned during interview session, Proton if possible, prefers to have more *white* level vendors, so as not to relinquish control over design. However, due to limited capabilities, Proton has to outsource to vendors like power train system. Proton has outsourced many critical parts to vendors especially on the first *Saga* model (launched in 1985). At that time, Proton was still new and had no capability to develop high technical parts. Therefore, Proton had outsourced to vendors from abroad and relies on joint venture partner, Mitsubishi Motor Corporation (MMC). Proton also encourages local vendors to have joint venture (JV) and technical assistance (TA) from established companies to speed up the development process.

TABLE II  
VENDORS' PARTICIPATION IN PROTON PD

Level	Description	Specifications provided	Product complexity
<i>White</i>	- Discussions are held with suppliers about specifications/requirements but Proton makes all design and specifications decisions. -Proton provides detail of part drawing and specification. -IPR belongs to automaker.	Complete drawing	Simple parts and components e.g. BIW parts, floor and center console
<i>Grey</i>	-Joint development effort between buyer and supplier -May include information and technology sharing and joint decision making regarding design specifications - Background IPR belongs to supplier, Foreground IPR belongs to automaker.	Proton provide specification and supplier may enhance if necessary	Simple assembly e.g. exhaust system, window regulator, control cables
<i>Black</i>	- Proton has limited know-how, rely on supplier. -The supplier is informed of customer requirements and then is given almost complete responsibility for the purchased item. -Items are off shelf from supplier product range for other OEM with or without modification to suit Protons' specific needs. - IPR belongs to supplier.	Supplier provide design and technical specifications	Complex assembly e.g. Brake system, air bag system, steering system, suspension system

Normally vendors from *black box* level own sufficient level of capability and capacity to develop complex assembly. However, modular suppliers' roles are greater than that, which include managing lower tier vendors under them. A few capable modular suppliers are assigned to be in charge on whole modules or systems development. They are also responsible on service or warranty of the products.

Proton vendors' tier system improved structure and vendors' network management [25]. Tier-1 vendors are also known as direct vendors, who are working directly to Proton, responsible on part structure especially on big parts, assembly, complete subsystems or specific modules. All tier-1 vendors from *white* till *black* are involved in design, either direct or indirect involvement. Even vendors from *white* box category, who do manufacturing work based on detail part drawing and specification, Proton still consults them during design stage to ensure manufacturability of the design. Towards supporting vendors' strategic development several of tier-1 vendors also act as one stop production, developed testing facilities and R & D facilities. Thus, it is able to reduce Proton responsibility especially in managing lower tier vendors and optimize Proton resources as well.

Since EVI able to reduce Proton's employees allocated for each project, Proton is able to optimize the manpower usage and focus on their focal point development. The collaboration also gives opportunity for Proton to learn from expert. Since expert vendors are already established and have comprehensive capabilities. At the same time, Proton also received technology transfer from expert vendors who are more advance on latest technology developed. Sometime, it is more economical for Proton to outsource rather than develop own capability.

Modularity contributes noteworthy advantages in automakers framework, since it is an efficient way to manage vendors' networks [30]. For modular practice, Proton has different way of implementation from other automakers. As part of modular suppliers' responsibilities, is managing lower tier suppliers. However, for lower tier supplier selection in Proton, the strategic decision is done by Proton. This is due to vendors' lack of experience in handling modular task, lack of networking to find capable lower tier vendors and in-competent management capability to handle bigger organization structure. Except for the well established vendors, who independently own their recognized vendors' network and well experienced in running lower tier vendors. Proton only needs to monitor and ensure the localization quota is followed.

The accomplishment of SIPD requires close supervision from automakers. Proton through GP and ED are worked together to manage collaboration with vendors in PD. The success of collaborations has bolster up Proton capability to improve lead time, reduce manpower and also enhance local capabilities. *Waja* (launched in 2000) was the first model be developed in house took 36 months compared to *Exora* (launched in 2009)with only 18 months. *Exora* also developed by 250 local engineers, 75% manpower reduction compared to *Waja* that involved 1000 manpower including some experts from Japan and Europe [31]. Through strategic development, Proton has gradually reduced dependency on abroad experts, replace by local ones.

#### IV. VENDORS

In Malaysia, vendors have different definition based on their status. According to Malaysian Companies Commission Malaysia (SSM), a local company is defined as company who is registered and operated in Malaysia. Local company can be divided into three categories; Bumiputra, non-Bumiputra and foreign. Majority share (>50%) determine the status of the company. Foreign vendors are also considered as local due to the majority of manpower hired are Malaysian citizen. TABLE III shows Proton vendors according to status as recorded in February 2010 (provided by Proton GP).

TABLE III  
PROTON VENDORS ACCORDING TO COMPANY STATUS  
(SOURCE: PROTON)

	Status*	Quantity	Percentage
<b>Malaysian</b>	Bumiputra	78	58%
	Non-Bumiputra	75	
<b>Non-Malaysian</b>	Foreign	57	22%
	Oversea	54	20%
Total		264	100%

} Local

As reported in 2008, half of Malaysian vendors are solely supply to Proton [29], with 62.7% of them are SME [32]. In terms of market share, the majority are non-SME [29] to cater for high technology base parts, since SMEs vendors have limited capabilities [33]. Through interviews there are several barriers identified that prevents Malaysian vendors to develop DC and can be summarized as;

- Limited financial capabilities that bound technology development.
- Difficulties to retain experience workers.

- Lack of management commitment, reflect by allocation/investment on R & D activities.
- Lack of focus in the field, diversify to other businesses.

However, competition and stringent demand from automakers have pushed vendors to move ahead. Since Proton has implemented EVI, vendors also need to have sufficient level of DC to ensure success of PD project. In addition, DC also brings more opportunities for Malaysian vendors to be;

- *Black box* vendors that own full capabilities to develop parts/ components/ system
- Able to design tools and equipments for manufacturing for *white* and *grey box suppliers*

Proton also supports vendor DC development through some activities namely;

- *Guest Engineer* program is similar to what Toyota did. A number of engineers representing suppliers awarded with EVI are working together, full time in Proton R & D office for specific project. Throughout the project, participated vendors' engineers will get first-hand experience and "real base" problem training, guided by experts from Proton.
- *Advance Product Quality Planning* (APQP), is a framework of procedures and techniques used to develop quality products. APQP also required them to be audited and registered to ISO/TS 16949.

Even formal EVI has been implemented in 2007, there are some achievements recorded (shown in TABLE IV and V). In general, Malaysian vendors have shown significant progress. TABLE4 shows Malaysian vendors have been awarded 40% to 50% of total *black box* modules. However, the achievements in all aspects compared to foreign vendors show that Malaysian are still in developing stage (based on interviews summary with Proton as shown in TABLE V). Especially on the new model introduced *Exora* (Proton first seven –seaters model). Modules that used to be awarded to Malaysian vendors for sedan models, now have switch to foreign vendors, like suspension system, braking system, ABS and instrument panel module. Seems that Malaysian vendors are not establish the technology yet and unable to bid foreign indicative cost.

TABLE IV  
SUMMARY OF PROTON'S *BLACK BOX* VENDORS  
(SOURCE: PROTON)

Model	Persona	%	Saga	%	Exora	%
<b>Module Vendor</b>	13*		13*		14	
<b>Overseas</b>	2	13	1	6	1	7
<b>Foreign</b>	7	47	7	44	8	57
<b>Malaysian</b>	6	40	8	50	5	36

\*Total number of vendors is greater than modules indicate that some modules are shared by more than one vendor.

TABLE V  
PROTON VENDORS' PERFORMANCE BASED ON  
INTERVIEWS SUMMARY

	Foreign Vendors	Malaysian Vendors
<b>Skills and knowledge</b>	-Well experience and expert.	-Develop skills, for low complexity parts and components already catch up the path
<b>Facilities</b>	-Established current facilities and technology.	-Owned basic DC, except for advance testing facilities that sometime need to hire certified third party.
<b>External support</b>	-Assist by parents company.	-Need for TA to venture new technology and knowledge.
<b>SIPD</b>	-Able to work independently.	-Need close supervision.

## V. DISCUSSIONS

Proton internationalization strategy needs a pool supports from all vendors. Internationalization has stringent expectation that look for innovation and quality for each single part of product. At the same time, Proton is also tied with localization policy. Without sufficient level of vendors' capabilities, the mission will be hard to accomplish. Consequently, Proton has to multiply its effort in developing own DC and also that of other Malaysian vendors. Proton's national obligation to develop Malaysian vendors seems to delay the mission. Proton also received ample privilege by government in securing the local position. However, Malaysia also has commitment with other ASEAN countries towards developing a free trade area that appears to be dateline for the development process. Data have showed that Proton and Malaysian vendors have developed significant progress in DC. However, they have to move faster to catch up with other established automakers in the international arena.

For certain critical components related to engine and transmission Proton is still dependent on foreign experts [1]. The driver of upgrading process can be countered by efficient suppliers [34]. Proton has chosen some reputable foreign vendors to join EVI projects. Their contributions undeniably have speed up the development process [33]. Initiative from some of the Malaysian vendors like Ingress (M) Sdn. Bhd. and Delloyd (M) Sdn. Bhd. to have TA or develop JV with other established multinational companies has expedite capabilities transfer and also create bigger export market.

In addition, the reviewed NAP policy also emphasized on the whole Malaysian automotive industry [35]. NAP aims to attract more established automakers to invest in Malaysia. At the same time, NAP also encourages local participation via localization and offers more customers' proliferation, since before this many of Malaysian vendors solely depend on Proton. It tends to provide more opportunities for Malaysian vendor to received technology transfer from foreign investee [23]. As a return, Malaysian vendors' valuable experience working with other established automakers also can be applied with Proton through EVI programme.

## VI. CONCLUSIONS & FUTURE WORKS

As a conclusion, Proton and vendors have shown significant progress in developing DC. Gradually, Proton manages to reduce dependency on foreign vendors, at the

same time Malaysian vendors are also improving their capabilities to replace foreign vendors. Some Malaysian vendors have successfully expanded even at international market. Most of tier-1 Malaysian vendors have basic capabilities to conduct design. However, without established DC, it is difficult to produce advance and innovative products. Therefore, a comprehensive and practical framework is required to speed up the DC development among Malaysian vendors.

By knowing Proton DC and vendors' performance, the author will be able to construct DC development model for vendors that align with Proton roadmap. The framework is expected to be able to initiate the development process for those who just started or enhance the DC for those who already developed the capabilities. In the mean time, Proton also can use the framework to evaluate vendors' performance.

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