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Factors Potentially Enhancing National Automotive Policy Goals and Industry Innovation

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Abstract

After nearly a decade since the implementation of the National Automotive Policy (NAP), the Malaysian automaker Proton, as well as various local automotive components and parts manufacturers, remain uncompetitive. Based on existing research, the NAP has not yet transformed Malaysian automotive industries into a globally competitive and export-oriented sector. It was generally claimed that parts and components produced locally suffer from qualitative and quantitative deficits vis-a-vis imported counterparts. Malaysia is currently ranked third in the ASEAN region, following Thailand and Indonesia, with regards to sales and production of vehicles and automotive components. However, in contrast to Malaysia, neither Thailand nor Indonesia possesses a national car project. This initial study aims to evaluate the effectiveness of the NAP to local automotive vendors. Numerous prior studies in the related literature have looked into the competitiveness of the national car project Proton, but only a limited number studies have focused on the effects of policies on automotive vendors. Factors identified in this study may form the backbone for further research in this area, and in turn contribute to the development of the automotive industry in the country.

Keywords: National Automotive Policy; policy evaluation; competitiveness performance; open innovation; components and parts industry; automotive vendors

■1.0 INTRODUCTION

The government's protection policy over the Malaysian automotive industry has garnered an exponentially increasing amount of interest from both academia and the public. However, only a limited number of studies concentrate on the effectiveness of the National Automotive Policy (NAP) in the vendor sector (Rosli, 2010), the development of which was among the prime objectives of the NAP. Dato Sri Mustapa Mohamed, who helms the Ministry of International Trade and Industry (MITI), stressed that Proton should have benefitted from the NAP, and that further government assistance will be subject to review, as local automotive vendors continue to face serious problems. In a press statement on April 1, 2016, Mustapa stated the following: "*Last year, a number of Proton vendors came to see me on a few occasions and shared their problems. Following that, MITI injected RM 100 million to provide soft loans to alleviate their burden. Even then, it has come to my attention that some of the vendors may face serious challenges if Proton continues to operate at the current level of production and sales. A few of them might be out of business in the next three to four months*".

Various studies on the regional automotive industry have reported that Malaysia remains less competitive compared to their automotive counterparts in Thailand (Natsuda, Segawa, & Thoburn, 2013; Talib, Munisamy, & Ahmed, 2012; Wad, Peter, Chandran Govindaraju, 2011). The primary objective of the 2006 NAP was to boost the competitiveness of the local automotive industry, including that of national carmaker company Proton, as well as various Bumiputera vendor companies. However, the Malaysian automotive sector was still unable to compete independently and competitively in the global marketplace. The NAP has been reviewed in another round in the years of 2009 and 2014, with the application of refined strategies.

This research investigates the innovation angle of NAP, and determines whether it provides a good competition-driven platform for vendors. In the year of 2012, the automotive industry had contributed 3.2 % of the national GD, entailing RM 5.3 billion worth of exports and RM5 billion worth in investments, and a total workforce amounting to 550,000. The industry is forecasted to contribute 10 % of the country's GDP in 2020, and is projected to create an additional 150,000 employment opportunities in the near future (MITI, 2014).

■2.0 MALAYSIAN AUTOMATIVE INDUSTRY

The Heavy Industrial Policy of the early 1980s marked the initial stage towards the construction of a nationally-owned and -controlled automotive industry. The first national automotive project, Proton, was formed in 1983 through a joint venture among the Heavy

Industry Corporation of Malaysia (HICOM), Mitsubishi Motor Corporation (MMC) and Mitsubishi Corporation (MC) of Japan. Initial strategies included an incremental increase in local content, rationalization of the industry, the achievement of economies of scale, and finally, the transformation of the local automotive industry to internationally competitive standards (Abdulsomad, 1999).

Armed with protective measures and subsidies from government support, the first Proton cars rolled out in the year 1985. Subsequently, the government also managed to establish a small car manufacturer (Perodua) in 1993; a heavy vehicle company (Malaysian Bus and Truck (MTB)) in 1994; a motorcycle manufacturer (Modenas) in 1995; and a light vehicle commercial manufacturer (Inokom) in 1997. With the announcement of the NAP in 2006, along with its subsequent review in 2009, the Malaysian government further refined its commitment to the previous policy of developing a national automotive industry, especially in the areas of Original Equipment Manufacturing (OEM) and supplier-related industries, as envisaged in the early 1980s. The auto components and parts suppliers served vehicle makers (OEMs) and the replacement equipment market (REM). The year 2008 witnessed around 690 firms manufacturing and supplying over 4,000 automotive components and parts (MIDA, 2009) in the country. Among the total, 70% supplied OEM parts.

The components and parts sector accounted for RM 6.37 billion in sales, comprising RM 4.6 billion in imports, and RM 2.0 billion in exports, in the year 2008. Around 45 components manufacturers exported relatively low-tech products such as steering wheels, rims, brake pads, wheels, bumpers, vehicle body parts, exhausts, radiators and shock absorbers. Among the original equipment suppliers (OES), major players in Malaysia included foreign firms such as Delphi Automotive Systems, TRW, Siemens VDO, Bosch, Denso and Nippon Wiper Blades. Major local players included APM Automotive, Sapura, Delloyd and Ingress (MIDA, 2009). Some of the firms (e.g., Ingress, Hicom Teck See, Sunchirin, APM Corporation and Delloyd) also invested in automotive industries in neighboring Thailand and Indonesia.

■3.0 THE NATIONAL AUTOMATIVE POLICY

The The NAP was geared towards fostering greater efficiency in the country's automotive industry; increasing local value-added technology; and boosting the industry's competitiveness at the regional and global levels. The NAP was updated in 2009 to promote increased direct foreign investments into the local automotive sector. However, the national carmakers Proton and Perodua currently face greater competition from foreign brands that enjoy lower tariffs. Perodua, with its easy access to Daihatsu technology, has coped better compared to Proton under the pressure caused by this comparatively liberalized environment (MITI, 2009).

In 2014, the NAP underwent another revision to speed up the industry's modernization and technology transfer processes, aiming to provide quality products at a cheaper rate to domestic consumers, as well as to improve the industry's export potential (MITI, 2014). Some key revisions include tax incentives for locally-assembled, energy-efficient vehicles (EEVs) in the form of excise tax exemptions. The description of EEVs is based on international standards, and covers vehicles powered by fuel-efficient internal combustion engines, hybrids, electric vehicles and vehicles powered by alternative fuels, such as hydrogen, CNG, LPG, biodiesel and ethanol. The Boston Consulting Group (BCG) reported in 2013 that nearly half of the world's top 20 "Most Innovative Companies" were automakers. In fact, the Top 20 list included more automobile manufacturers than any other technology sector (Kim Wagner, 2013).

According to the BCG, several factors drive automotive innovation, namely, improving fuel-efficiency in conventional vehicles, the development of hybrid and electric models, more efficient power trains, and the introduction of lighter car bodies. At the same time, automakers were building safer vehicles with cutting-edge technologies such as self-braking systems and vehicle-to-vehicle communications technologies.

The automotive industry drives innovation and global technological development, with automakers continuously offering novel high-tech content in their products. Almost every aspect of modern automobile adopts a high-tech approach, employing advanced materials developed through sophisticated processes. Consequently, independent observers rank automakers among the world's most innovative companies. Investment for research and development (R&D) in the automotive industry ranks above other industries worldwide, resulting in a high registration of patents each year, as industry competition escalates. These developments, however, require a highly-skilled workforce to design and build novel products.

■4.0 INNOVATIVENESS IN THE AUTOMATIVE INDUSTRY

Innovation is imperative in maintaining a strong competitive lead in the automotive market. Innovation resolves constantly, morphing global challenges in the automotive industry, including fuel efficiency, emissions standards, safety and security, connectivity and infotainment, driving dynamics and performance, as well as comfort and flexibility. Car drivers demand sound, reliable products at affordable prices. The cost of vehicle ownership remains to be the most important buying factor. The pricing factor somewhat limits the number of successful innovations in the automotive industry.

A well-planned innovation strategy is therefore crucial to ensure relatively good returns on investments. The continuous cost pressures in the automotive industry created by legislation, competition, increasing risks and stagnating customer demands, have had a strong impact on innovation management. Traditional cost-cutting measures are counterbalanced by proper planning in R&D and innovation, hence, improved efficiency keeps costs under control.

Innovation also boosts workforce mobility. The local automotive industry invests up to 4% of its revenue on R&D. Globally, the automotive sector contributes up to 16% of its revenue on R&D, ranking third, after the computing & electronics and the healthcare sectors. Overall, R&D spending by automotive companies witnessed gains by an average of 4.6% over the past 10 years.

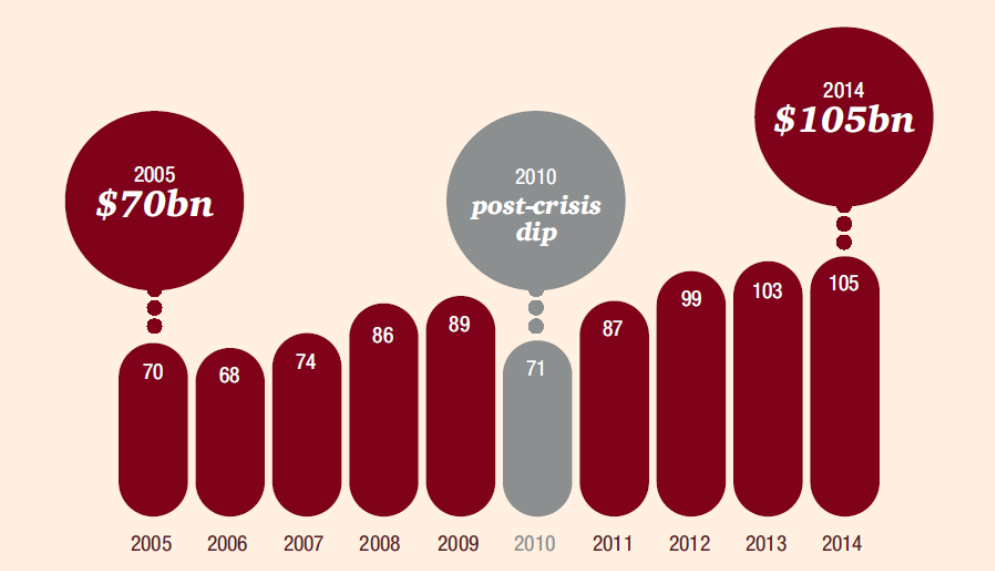

Figure 1 R&D spending in the global automotive industry from 2005-2014 (Bloomberg Data)

Although R&D is usually associated with innovation, the final product output does not necessarily correlate with R&D spending. This may be due to poor R&D planning, which does not align to innovation imperatives and overall business strategies. Automotive industry supply chains from the upstream sectors, to their downstream counterparts, provide an abundance of opportunities for innovation to take place (Figure 2). It is therefore incumbent upon the management of any automotive manufacturer to plan suitable strategies for R&D, innovation and business advancement.

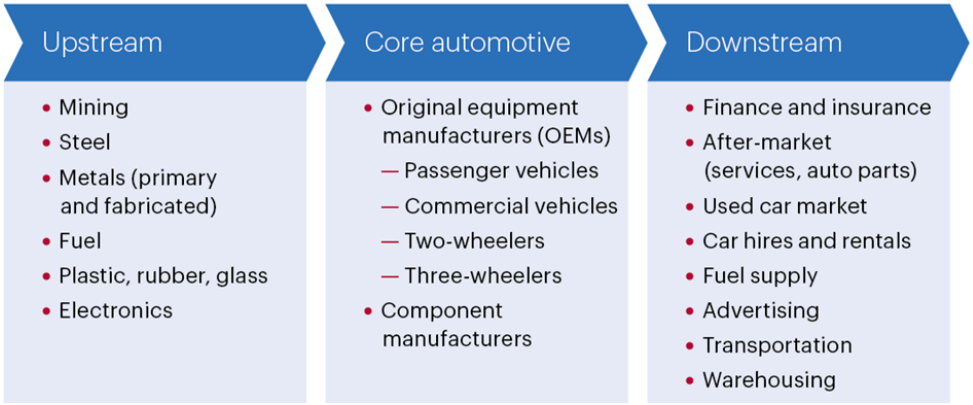

Figure 2 The core automotive industry's upstream and downstream industries

Managing R&D to accelerate innovation and business growth, and integrating technology planning with business strategies, are some of the core challenges the automotive sector currently faces. High-octane competition leaves automakers little choice but to innovate. The innovation process varies with respective target markets, segments and niche areas. According to Chesbrough (2003), high-end technology firms have fundamentally changed the manner in which they 'innovate'. These firms have transformed their innovation strategies from a Closed Innovation model to an Open Innovation model. Since this transformation, numerous researchers have paid significant attention to this paradigm transformation to an open innovation model (Herzog, 2011). The Closed Innovation flowchart is illustrated in Figure 3.

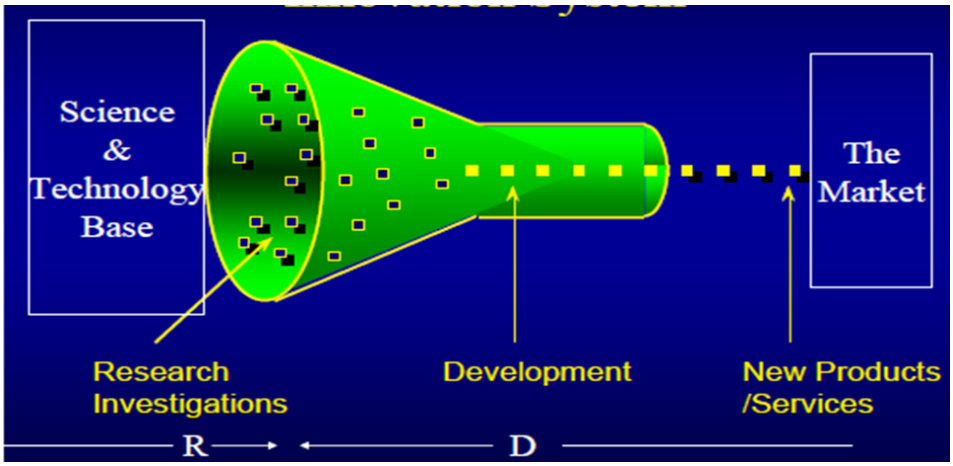

Figure 3 Closed Innovation flowchart (Chesbrough, 2003)

Several factors are attributable to bringing the open innovation model to the surface. First of all, numerous beneficial ideas are widely spread these days. Also, innovation is no longer being carried out within a single firm, but rather within networks of firms. Finally, firms are unable to employ all of the highly skilled employees in the existing market (Chesbrough, 2003). The contrasting principles of closed to open innovation are displayed in Table 1.

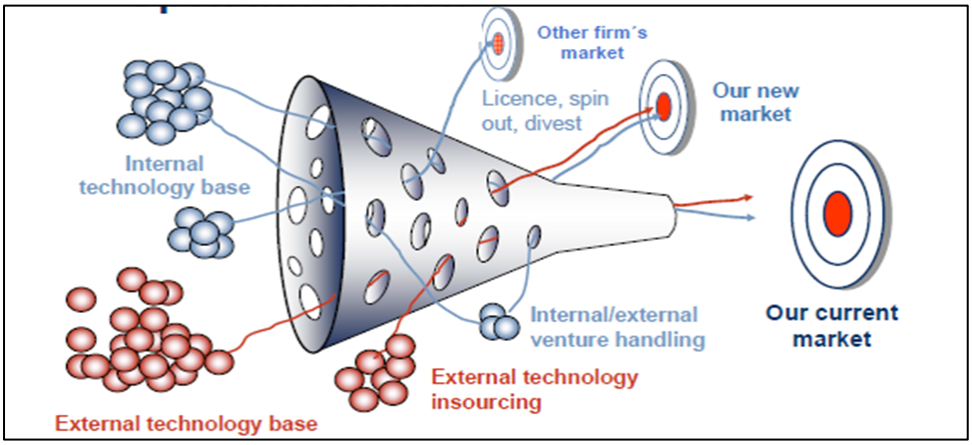

Figure 4 Development of Open Innovation (Chesbrough, 2006)

Nowadays, Open Innovation, as illustrated in Figure 4, is among the primary drivers of innovation management. The basic pre-condition of open innovation lies in the disclosure of the innovation process. It is generally defined as: "the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and to expand the markets for external use of innovation, respectively." (Chesbrough et al., 2006).

Table 1 Contrasting principles: Closed vs Open innovation (Chesbrough, 2003)

Closed innovation principles	Open innovation principles
The smart people in the fieldwork for us.	Not all the smart people in the fieldwork for us. We need to work with smart people inside and outside the company.
To profit from R&D, we must discover it, develop it, and ship it ourselves.	External R&D can create significant value: internal R&D is needed to claim some portion of that value.
If we discover it ourselves, we will get it to the market first.	We don't have to originate the research to profit from it.
The company that gets an innovation to the market first will win.	Building a better business model is better than getting to the market first.
If we create the most and the best ideas in the industry, we will win.	If we make the best use of internal and external ideas, we will win.

In the case of General Motors (GM), the Open Innovation process was introduced to rejuvenate the company. The process was adapted to a "sense-respond-learn" approach (Figure 5), which differentiates it from the "forecast-make-sell" business model that was traditionally employed in industry.

The "sense-respond-learn" approach works the following manner:
• Data was gathered from customer clinics and marketing surveys. This information was combined with formalized assessments of new technologies. These analyses were then used to guide vehicle and feature concept studies, which are occasionally critically reviewed to determine appropriate responses to emerging markets and business opportunities.
• A response can take the form of non-action in the case the idea does not yield real value to the customer, but typically leads to action which can take two independent pathways.

The first path is the "get it into the product now" avenue. This route is taken if the technology is ready and the product is just a matter of final development and vehicle integration. In this case, it is targeted for a production date and becomes part of the product plan.

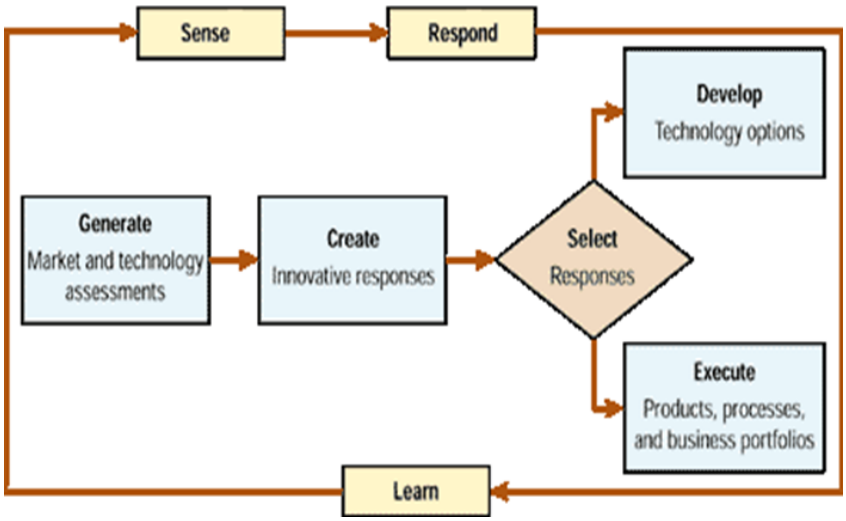

Figure 5 GM R&D's sense–respond–learn model

In the case a certain technology is not yet mature, it takes the second pathway. It then becomes the responsibility of the R&D Center to develop it to a point where it is ready for integration into a future product. This process ensures a steady stream of product and technology options is developed on the basis of the company's sense of market direction. These response options enable organizations such as GM to capitalize quickly on new opportunities. The process is designed to be dynamic, with new information and ideas moving continuously through the system. Each time the company completes an innovation cycle, it gains knowledge and discovers new pathways for subsequent product and technology development.

The GM global product plan is envisaged to deliver a global product portfolio that may deliver an additional 50% of innovation in its cars and trucks over a five-year period. Additionally, the remaining half of GM's mainstream products must offer innovative product features or technologies that provide significant customer benefits, as well as reinforce a vehicle's brand character (i.e. its product image). There are several techniques that can be applied to create innovation in the automotive market: redefine existing products and market segments, create new ones, and attack competitor strongholds.

Using materials technology innovation from its R&D Center, GM has attacked one particular stronghold: full-sized pickup trucks. Typically, truckers tend to toss things onto the bed of their vehicles, but they do not like it when the bed gets scratched or dented. GM offers an all-composite pickup box (i.e., a cargo bed) that eliminates the need for a bed liner, and can handle greater abuse compared to conventional sheet metal beds. This novel lightweight composite box is offered as an option on the extended-bed Fleetside Silverado, while significantly enhancing Silverado's "Like a Rock" brand image.

■5.0 COMPETITIVENESS OF AUTOMATIVE VENDORS

Competitiveness is a multi-dimensional and relative concept that can be applied to an individual firm, industry, or country. In a firm-level analysis, Ramasamy (1995) perceives competitiveness as the ability of a firm to augment market share, profit and growth in value-added terms, and at the same time, remain competitive in the long run. According to Rosli and Kari (2008), competitiveness is the ability of a firm to deliver outcomes as required by its owners, stakeholders or managers, in order to achieve desired profit, goals and strategies.

In one vendor competitiveness study in Indonesia, automotive suppliers discovered that they needed to improve product development skills, meet superior QCD standards and maintain the trust of customers, in order to survive in a competitive industry (Baba and Gemba 2000). Trust seals optimal performance between manufacturer and vendor, as both parties must understand their particular requirements. To understand two separate entities with different philosophies may take years of mutual operational experience. Trust was noted as an influencing factor in a successful buyer-seller relationship leading to innovation (Rozenan, Abidin, and Ab 2004).

Buyer-seller relationships are further augmented by long-term relational elements such as authority, loyalty, and trust, which are deemed necessary preconditions for successful partnerships (Lundvall, 1998). Thus, policymakers should understand that innovation never occurs in isolation, but involves multiple stakeholders (such as the government, the private sector and education) and complementary activities (such as organizational change, in-house training, testing, marketing and design).

In a comparative study between the performance of Proton's local and foreign automotive parts suppliers by M. M. Rosli (2010), the differentiating factors identified were quality and ownership structures, which significantly influenced the competitive position of auto parts enterprises. In a roughly similar electronic manufacturing competitiveness study, the vendor innovation capability was measured in terms of quality offered, speed of delivery and operational flexibility in meeting fluctuating demands and competitive pricing (Perunović et al. 2016).

Based on such findings, this paper views competitiveness and performance as an inseparable construct. Therefore, innovation and firm performances can be contextualized to measure vendor competitiveness.

Table 2 List of constructs/dimensions among competitive vendors

Author (Year)	Vendor Competitive Factors
Ramasamy (1995)	Augment market share, profit and growth.
Baba and Gemba (2000)	Product development skills, QCD standards and trust of customers.
John Hagedoorn and Myriam Cloodt (2003)	R&D inputs, patent counts, patent citations, and new products.
Rosli (2010)	Quality and ownership structure.
Tai and Ku (2013)	Export capabilities, product costs and manufacturing capacity.
Perunović et al. (2016)	Cost, quality, delivery and flexibility.

■6.0 RECOMMENDATIONS

The NAP is a sound fundamental platform for the rapid development of the Malaysian automotive industry. However, ineffective implementation strategies and the lack of a well-structured roadmap may have hindered consistency in innovation, as well as the local industry's ascent as a major global automaker. The national automotive industry not only provides local employment and national revenue, but its presence is a keystone in the technological development of the nation. There is a need to establish a well-planned industry roadmap for medium- and long-term, and to identify the required factors, in order to achieve critical targets. In the near future, a national council can be formulated to evaluate industry performance and provide necessary support to the industry.

Continuous R&D should be aligned according to customers' needs, ensuring the sustainability of the automotive industry. The Vendor Innovative Framework (VIF) model outlined in Figure 6 may guide future research in evaluating the effectiveness of the NAP.

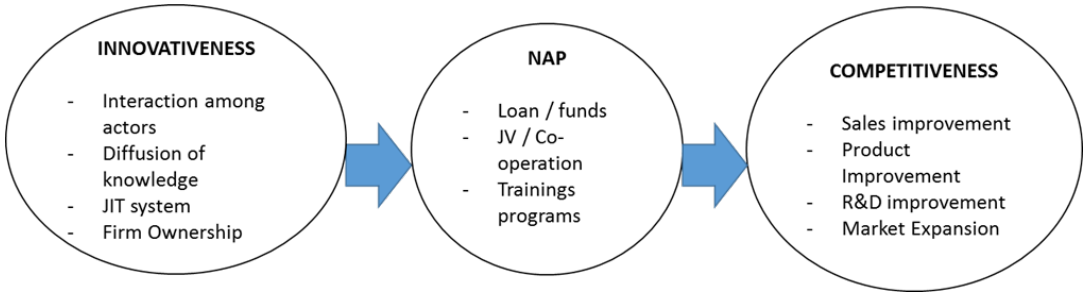

Figure 6 Vendor Innovative Framework (VIF) model

The VIF investigates the relationship between innovative vendors, and vendor performances. Recent studies have shown that there is a direct causal relationship between the three variables in the conceptual model in Figure 6 (Henriksson 2012; OECD 2013; Zeng et al. 2010). Vendor performance may predict significant changes that need to be explored further during the innovation process. The predictor variables (i.e. vendor innovation) can be segmentalized in this study. The conceptual model shown in Figure 6 can be further explained by the following consequences:

1) NAP as an intervention policy has a positive moderating effect between innovative vendors and vendor competitiveness.
2) NAP has a negative moderating effect between innovativeness and vendor competitiveness.
3) NAP has no moderating effect between innovativeness and vendor competitiveness.

It is possible to determine whether the NAP acts as a positive moderator or as a negative moderator between innovation and vendor performance in further research. To date, there are numerous mixed views on the NAP as a government intervention policy. It is predicted that the role of the NAP can be further refined through additional empirical findings on automotive players in Malaysia.

■7.0 CONCLUSION

The Malaysian automotive industry has expanded in terms of sales, production, employment and local content. However, it has failed in terms of industrial innovation and international competitiveness. This failure can be attributed to (a) a lack of political commitment to a "high challenge-high support" environment; (b) low technological and marketing capabilities; and (c) limited participation in the global value chain. New transformation is required to push the industry beyond its current performance through a more strategic productive coalition with multiple stakeholders including trade unions.

Industry transformation may take place on the condition these three factors are addressed. All activities and development in the industry must be customer-oriented, as the market is becoming more complex. Regulatory requirements for safety and fuel economy must be satisfied with full compliance, up to the global level. All these initiatives require intensive data collation and research. Automakers need to enhance their capabilities in data handling and information management to provide the best sets of options for decision makers. The automotive industry will continue to advance globally, but if automotive players fail to innovate over time, they will no longer be relevant to the national economy.

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