Malaysian Technological Elite
Specifics of a knowledge society in a developing country

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Introduction

Concepts such as "technological society", "information society", "risk society", "postindustrial society" and "knowledge society" suggest a common understanding that contemporary western societies are ruled by knowledge and expertise (Knorr Cetina 2001: 27). Given the divergent paths toward a knowledge society, what forms do knowledge and expertise take on in "developing" societies?[1]

This paper illuminates the culture of knowledge acquisition, creation, and utilization in Malaysia, a so-called developing society. It consists of five main sections. In the first, I describe the contexts for knowledge work within Malaysia which, with a GNI per capita of US$ 3,780.00, is classified by the World Bank (2004) as an upper middle income developing country. I focus in particular on two components of the Malaysian modernization project, Perusahaan Otomobil Nasional Berhad (PROTON) and the Multimedia Super Corridor (MSC). In the second section, I suggest a framework based on Alfred Schutz and Thomas Luckmann's (1973) social distribution of knowledge and Karin Knorr Cetina's (1999) concept of epistemic cultures to examine the principles that inform practices and relations within the Malaysian automotive and information technology (IT) industries. In the third and fourth sections, I describe the actors that comprise the Malaysian "technological elite" in these two industries and present forms and practices of knowledge which give insights into how activities of the technological elite become infused with knowledge. In conclusion, I discuss the implications of the Malaysian model of knowledge work on technological development in so-called developing countries, and on indigenous and non-technical forms of knowledge.

Knowledge and society in Malaysia

The state in a knowledge society

The most common understanding of knowledge society is that it is a particular economy. The emphasis here is on the way the economy is transformed with knowledge displacing capital and labor as the main element of production. One of the earlier notions of knowledge society is Daniel Bell's (1973: 12ff) idea of a postindustrial society. In a postindustrial society, new technologies and knowledge workers are assumed essential, and knowledge is being exercised by

knowledge workers such as scientists, technologists, and other experts. Malaysia, which provides information technology-based infrastructure to develop knowledge workers and become a globally competitive producer of knowledge-based services, is among the countries aiming to become a postindustrial society.

The emergence of Bell-like labor forces in the Malaysian automotive and information technology industries is but a continuation of a process of modernization began in the late 1970s, and which has been attributed to the leadership to Tun Dr. Mahathir Mohamad.[2] As a modernization project launched in 1985, PROTON has several social transformative features. One feature is its role in the creation of heavy industries in Malaysia, which would make the country join the ranks of so-called industrialized societies which have its own heavy industries. Another is its role in the creation of Malay capital though participation from private enterprises. To develop local automotive suppliers, inexperienced Malaysian businesses received technical assistance from Mitsubishi Motors Corporation through its Japanese vendors. During this period, the Malaysian government subsidized loans and guaranteed foreign loans (Tham 2004).[3]

In February 1991, Mahathir introduced "Vision 2020" or the vision that Malaysia would become a fully developed country by the year 2020. The country's strategy for growth in the context of Vision 2020 is to focus on science and technology, particularly on high technology and knowledge intensive activities in areas such as information and communication technology, microelectronics, biotechnology and life sciences, advanced manufacturing, advanced materials, food, environment, and energy (Ministry of Science, Technology and the Environment 2003: 5). To support the vision to become a fully developed nation by 2020, Malaysia developed the National Information Technology Agenda (NITA) in 1996. The NITA outlines how the country can become a knowledge society and the foundation that supports this knowledge society is the MSC which encompasses the Kuala Lumpur City Center, the Kuala Lumpur International Airport, Petaling Jaya, Technology Park Malaysia, Universiti Putra Malaysia-MTDC, Putrajaya and Cyberjaya (Multimedia Development Corporation [MDC] 2003).

Aside from a seemingly coherent vision and policies, implementation and financing mechanisms ensure that most government pronouncements affect the course of action in Malaysian social life.[4] Through the Economic Planning Unit (EPU) and the Implementation and Coordination Unit (ICU), which are both units under the Prime Minister's Office and which work closely with the Treasury, plans are taken seriously by government agencies. To encourage companies to undertake design, research and development (R&D), and production of automotive component modules or systems, the Malaysian government provides incentives such as tax exemption for a period of five years or relief of capital tax for five years (Malaysian Industrial Development Authority 2003: 18). Promoted automotive activities and products which are eligible for these incentives include systems modules or integrators such as front cross member modules, brake systems, tire and wheel modules, and body in white modules. The modular system which replaced the conventional one-piece system in automotive manufacturing was

introduced in PROTON with the production of its Waja model in 2000. Under this system, the system integrator/tier one supplier is responsible for the design, development and sourcing of components, and manufacturing the whole component. As modules are comprised of several subcomponents, a Tier One company manages subvendors (i.e., Tier Two, Tier Three vendors). Similar tax incentives are also provided for companies to invest in the MSC and in knowledge-intensive activities. The trajectory of an idea to the market is conceptualized as a four-point dynamics involving conceptualization, pilot project, prototype development and product rollout. Each of these phases is being supported by government-funding mechanisms. A program such as the Intensification of Research in Priority Areas (IRPA) supports the development of an idea. To pilot the idea, a proponent may seek assistance from the MSC Development Grant Scheme (MGS). In the commercialization stages of prototype development and the product rollout, a proponent may rely on the Commercialization of Research and Development Fund (CRDF).

Grounded realities at PROTON and at the MSC

The contexts created by the Malaysian state for the development of knowledge and expertise, however, remain inadequate. Malaysian expenditures for R&D as percentage of the Gross Domestic Product comprise only 0.4 percent (World Bank 2003). Moreover, government programs do not make sense to all technological actors. PROTON continues to be viewed as a project that requires huge capital investment, employs too few Malaysians, and depends heavily on foreign expertise (see Rasiah 1996). On account of competitive production costs, PROTON vendors have no long-term plans of designing, prototyping, and manufacturing their own products.

Similarly, while the MSC attempts to congregate all information technology activities in one place that provides access to innovation networks, a number of Malaysian information technology professionals find the arrangement artificial and have chosen to operate their companies outside of the MSC and Kuala Lumpur. As of April 2004, there were 1,016 MSC-status companies (MDC 2004: 62). Malaysian companies, which did not apply for an MSC status, point out that the costs are higher than the benefits. New companies which are not making enough profits to benefit from a tax holiday, companies which do not need to hire expatriates, and companies which do not plan to be publicly listed in the New York technology stock exchange, Nasdaq and other stock markets, therefore do not need to have an MSC status.

Nevertheless, despite existing valid criticisms on the PROTON project and the MSC, I view PROTON's recent demonstration of its ability to design and manufacture a car engine – the most complicated component of a car – as evidence of Malaysia's resolve to develop technological innovation and creativity. In February 2004, PROTON launched Gen 2, which PROTON claims uses an engine entirely developed in Malaysia.[5] Similarly, Tim Bunnel (2004: 8) observes that the MSC is essentially a move to rescale state power to Malaysia's main urban region in contrast to an earlier export processing zone (EPZ) model of regional development.

Unlike the EPZs, the MSC forms part of state attempts to move from low-value added manufacturing to more high skill activities and to create an environment conducive for innovation.

There is, however, at least one difference between PROTON and the MSC. While PROTON was launched for the development of Malay capitalism, the MSC carries within itself the rationalities for reworking ethnic-based governance in Malaysia (Bunnel 2004). The goal of the MSC is to attract "world class" Malaysians and non-Malaysians from high-tech locales such as Silicon Valley and Singapore. In the light of the *bumiputera*-first policy and the recognition that many such "world class" Malaysians are non-*bumiputeras*, there is therefore the possibility that the agenda to become a knowledge society/developed country by 2020 will see continuing negotiations between "non-racial" rationalities and their translation to policy and practice.

Framework for understanding knowledge work in Malaysia

I maintain that looking at the Malaysian knowledge society exclusively as information technology-based is inadequate given the phenomenon that the creation of products in certain areas of the industrial sector also involves the acquisition and utilization of knowledge. Likewise, I want to maintain that looking at the Malaysian knowledge society exclusively as a knowledge economy is inadequate. The examination of a knowledge society will yield richer insights by taking into account the practices of acquisition and application of knowledge and the context in which knowledge activities take place. Thus, I use the concept of knowledge society in terms of: (a) the variety of individuals who possess knowledge and expertise which are distributed unevenly in space, and (b) the epistemic culture which governs the activities of knowledge production by these select individuals.

Social distribution of knowledge

As conceptualized by Bell, a postindustrial society is marked by a job shift from mass to elite labor forces. To further make a distinction among the many groups that comprise the so-called elite labor forces, I link Bell's idea to the notion of a social distribution of knowledge. A social distribution of knowledge, manifested as distinctions between the knowledge possessed by the layperson, the well-informed, and the specialist or expert (Schutz and Luckmann 1973: 306-318), implies that members of any society possess dissimilar knowledge. Specialists or experts are individuals who possess the relevant special knowledge needed to solve particular problems. This means that in relation to a particular problem of type A, there are specialists and everyone else (laypersons). Moreover, this means that there are specialists for problems of type B, in relation to which everyone else, including the specialists of the problems of type A, are laypersons (Schutz and Luckmann 1973: 323).

I refer to knowledge that is neither specialist in terms of technical scientific knowledge nor lay as informed knowledge. Possessors of informed knowledge lie in-between: having an analytical overview, they possess more than general knowledge but not the theoretical and practical details that characterize specialist knowledge. Individuals who possess rare, specialist, technical scientific knowledge, and individuals who possess informed knowledge comprise the "technological elite". This group includes, but is not limited to, car engineers, information technology professionals, and technopreneurs who consume, process, and repurpose standard products for local consumers. Thus, while the new international division of labor identifies a pattern where design and fabrication of products take place in developed countries and the final assembly of these products are being done in developing countries, there are areas in developing countries where high-skill work, as opposed to routine assembly work, is being done (Saloma 2002: 21ff).

Epistemic cultures

The other important aspect of an emerging knowledge society is the culture of knowledge or epistemic culture in that society. Karin Knorr Cetina and Alex Preda (2001: 31-32) argue that the knowledge economy viewpoint is inadequate as areas of economic and social activities are themselves embedded in epistemic practices. "Epistemic culture", which refers to the arrangements and mechanisms in which knowledge and objects are created (Knorr Cetina 1999: 11ff), become the emphasis of inquiry.

Following Knorr Cetina, I examine how Malaysian automotive and information technology professionals perform epistemic work as they undertake practical activities. The data for this paper is obtained through direct observations of workplaces and collection of professional biographies and narratives via interviews and conversations with 18 information technology professionals and technopreneurs based in the MSC and nine car engineers and managers from PROTON and its Tier One vendors. For data contextualization, I conducted secondary analysis and expert interviews with 11 government planners and academicians. The research period was from November 2003 to August 2004.

Malaysian Technological Elite

Malaysian technological elite in the automotive industry

Malaysian PROTON engineers have to learn how to modify a car engine and other components. Engineers who are involved in the various aspects of the design and fabrication of cars are the following: (a) R&D and design designers who research and provide the concept for the car, (b) the quality and assurance engineers who determine whether products conform to specifications or not, (c) the production or process engineers who perform capacity and time

study and design tools to optimize production processes, and (d) the logistics engineers who engage in production planning and control and coordination of the more than 10,000 components of a car. I refer to this group of engineers as the technological elite in the automotive industry. The social distribution of car manufacturing knowledge is skewed with a small group of engineers vis-à-vis the assemblers and mechanics who comprised the majority. In 2004, there are 9,500 workers in PROTON, about 17 percent or 1,600 of whom are R&D and production engineers who are working in PROTON's R&D department (Shah Alam), Lotus Engineering (Norwich) and Lotus Engineering (Kuala Lumpur). PROTON's R&D department (Shah Alam) has 400 engineers.[6]

Malaysian technological elite in the IT industry.

According to Knowledge Worker eXchange (2004), an MSC-based online recruitment company, the most needed skills in the MSC are skills in software engineering skills and customer technical support. The distribution of skills sets and compensation structure in the information technology industry show that certain skills are not easily available in Malaysia. This indicates that the industry's technological elite are composed of individuals who possess difficult-to-find skills in Java, C++ programming, Oracle, XML and MS.Net development, third generation mobile communications and web security, and individuals who have extensive experience in project management, software programming and quality assurance, mobile communications and web security.

Forms of knowledge and expertise in the Malaysian automotive and IT industries

Knowledge from technological flows

PROTON and Tier One vendor engineers learn about making cars by reading technical documents and sample references initially provided by Mitsubishi Motors Corporation. While on the job, engineers learn from colleagues who came back from on-the-job-trainings in Japan and from foreign counterparts. With the establishment of new R&D structures in November 2003, PROTON engineers get materials from automobile shows in Europe, North America, and Asia, and learn British technology and styling. Among PROTON Tier One vendors, direct hiring of technology experts who report to local staff, as well as contracting third party designers and prototype developers have generally replaced technology transfer agreements.

Knowledge work in the information technology industry can also be categorized as modification and adaptation of standard global products to various needs. The variety of fields in the information technology industry and the variation within it however implies that the activities vary from relatively low-end customer services provision to high-end design of hardware and software technologies. Within customer service centers are higher-end activities of technical

customer support engineers, application developers, and network security engineers. One of the ways in which new Malaysian companies develop knowledge and expertise is also though partnerships with foreign technological companies. A Cyberjaya-based multimedia company, which develops online learning materials initially partnered with a Japanese technology company which bought 60 percent of the company's shares. In this partnership, the company's principals, being educationists, provided the ideas and content for the products while the technology partner provided online technology and marketing resources. After working with the technology partner for over a year, the principals bought back their share and now fully own the company.

Knowledge of the enabling landscape

The idea that technological development is a "seamless web of technological, social, economic and political aspects" (Bijker, Hughes and Pinch 1987: 4) also informs knowledge practices in the Malaysian automotive and information technology industries. Tier One vendors and a number of information technology companies spend considerable time developing relevant economic knowledge on state-sponsored mechanisms for technological development. For example, tax exemption and investment tax allowances for industries are included in the annual budget announcement. Tier One PROTON vendors claim they no longer rely on government grants. Instead, companies employ text readers whose job is to look at news which would have an effect on the company, such as government pronouncements that it can take advantage of.

Similarly, a "smart taxi" project which is funded by the Demonstration Applications Grant Scheme (DAGS)[7] requires developing relevant knowledge on government funding mechanisms for information technology projects. Smart taxi has three components, namely, training and accreditation of taxi drivers (e.g., English language skills, operational skills in information and communication technology), information system (e.g., call center with GPS ([global positioning satellite])-radio services, media management and e-commerce engine), and taxi equipment (e.g., GPS receivers, info-kiosks and payment terminals, and taxi). As a DAGS project, the project is required to involve the government (i.e., Ministry of Entrepreneurial and Cooperative Development or KPUN, DAGS secretariat), the private sector (i.e., technology providers of the project's three components) and the community (e.g., drivers cooperative). Using a business model based on ICT, the project aims to solve taxi drivers' problems with low income, danger, accidents, roaming around for passengers, and poor knowledge of Kuala Lumpur.

Informed knowledge

In general, the knowledge possessed by the technological elite in the automotive industry is of two types. The first type is localized knowledge. In the production of simple products like switches, foreigners are no longer involved and knowledge has been localized, with the design and manufacturing being done by Malaysians. The second type is informed knowledge which

allows its possessor to have an analytical overview of the entire product development. In manufacturing components for complicated products such as safety related products and products that have moving systems (e.g., brake system, engine), Tier One vendors still rely on expatriate knowledge. The possession of informed knowledge by the Malaysian technological elite is essential in the management of knowledge derived from expatriates.

A Tier One vendor which is developing a fuel tank hires a design consultant from South Korea to train the company's CAD (computer-aided design) engineers. Since the decision to develop the fuel tank is based on the company's assessment of its manufacturing capacity vis-à-vis the new product, these CAD engineers have some work experience that prepares them for the new product development. For example, the company has an existing stamping line and fuel tanks require a stamping machine. However, while the engineers can communicate with designers and can tell when a design is wrong, they cannot sit down and design the product. In fact, the knowledge of the Tier One vendor engineer as to what material is suitable for the product comes partly from PROTON which specifies the product's universal characteristics (e.g., universal characteristics of antilock braking systems). Aside from this form of technical assistance, engineers build their knowledge from experience, by reading, and from the material suppliers whom the engineers believe to be specialized in their (supplier's) own products.

Likewise, the principals of a Cyberjaya-based multimedia company do not possess technical knowledge on the technologies of producing online learning materials (e.g., back-end or hardware technologies, middleware or software technologies). What they have is specialist knowledge on the logic of education - what is to be learned, how it is to be learned, what is the message, and what the message should look like. In addition, they also possess informed knowledge about online technologies. Since the principals do not have specialist knowledge in the field of hardware and software, they have to invest on workers who know about these fields. Yet, while the principals cannot do tasks related to hardware and software, they know more than what laypersons do. As they cannot do programming they cannot tell the programmers "this is what you need to do". However, they can ask, "why is a program not working?" and understand when programmers reply that, "the software is not suitable or it is not compliant".

Concluding remarks

I have so far broadened the concept of knowledge society by looking not just at information technology-based activities in Malaysian society but at an "old" sector of the industrial economy, the automotive industry. I have likewise emphasized the cultural aspects of knowledge work in the automotive and information technology industries as a way of complementing the more common knowledge society-as-a-knowledge economy analysis. Two observations on the Malaysian model of knowledge acquisition and creation are possible.

First, in the Malaysian automotive and information technology industries, local technology is less likely to be an indigenous technology but more likely to be an adapted version of an earlier global technology. This fact preempts some malfeasance arising from encounters such as technology transfer arrangements, and allows a more positive view of technological flows. Such a view understands the epistemic work of automotive and information technology professionals to be about the mixing of local elements with global technologies. The forms of knowledge in the Malaysian automotive and information technology which have, as a major component, the knowledge of the local (e.g., knowledge of the enabling environment, informed knowledge in terms of sourcing available expertise) are neither second-rate nor unworthy of attention. At its fullest potential, this type of mixing does not simply suggest an outside influence that is imposed or is willingly absorbed. Nevertheless, criticisms against PROTON and the MSC can only be sufficiently answered if automotive engineers and information technology professionals can apply their knowledge and expertise of the local to global conditions.

The second observation lies in the tendency of the planners of the Malaysian knowledge society to mainly associate this form of society with science and technology developments, and more narrowly, with information technology. This tendency implies the neglect of other forms of knowledge. A knowledge society, however, relies not only on knowledge work that is centered in universities or laboratories of science but also on knowledge work found in research institutions, industries, business. Thus, automotive engineers, information technology professionals and other holders of scientific technical knowledge are not the only inhabitants of a knowledge society. Evers (2001:25) identifies critical journalists, innovative social scientists, NGO activists, and creative artists as similarly important. Other groups may be suggested here: the various holders of indigenous and not-yet codified knowledge.

In studies of technology and society, the model of broadening can be applied to the conceptualization of a knowledge society where all forms of knowledge are seen as equal to one another. It may feel that the empirical data presented in this work runs counter to this argument. I however do not see any contradiction; the empirical data in this work is meant to show that information technology is not the only form of knowledge in the emerging Malaysian knowledge society, and that in fact, knowledge workers in the industrial production economy (e.g., automotive industry) also comprise the knowledge society on account of the epistemic embeddedness of their work. By contrast, the suggestion that all forms of knowledge are equal is intended to show that knowledge and expertise in automotive and information technologies are not the only kind.

References

Abdul Rahman Embong. 2002. *State-led Modernization and the New Middle Class in Malaysia*. Hampshire and New York: Palgrave.

Bell, Daniel. 1973. *The Coming of the Post-Industrial Society: A Venture in Social Forecasting*. New York: Basic Books, Inc. Publications.

Bijker, Wiebe and Trevor Pinch. 1987. The Social Construction of Facts and Artifacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other. W. Bijker, T. Hughes and T. Pinch (eds). *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. Massachusetts and England: The MIT Press, pp.17-50.

Bunnel, Tim. "Reconfiguring the 'political' (from) beyond the west: Globalization, governmentality and Malaysia's Multimedia Super Corridor." Paper presented at the 4th International Malaysian Studies Conference, University Kebangsaan Malaysia, 3-5 August 2004.

Economic Planning Unit. 2003. *Mid-term Review of the Eight Malaysia Plan 2001-2005*. Malaysia: Economic Planning Unit, Prime Minister's Department.

Evers, Hans-Dieter. 2001. "Towards a Malaysian Knowledge Society." IKMAS Working Paper 20. Institute of Malaysian and International Studies, Universiti Kebangsaan Malaysia.

Institute for Management Development. *World Competitiveness Yearbook 2004*. http://www01.imd.ch/wcy/ranking/pastresults.html. Date accessed: 6 September 2004.

Knorr Cetina, Karin. 1999. *Epistemic Cultures: How the Sciences Make Knowledge*. Cambridge and London: Harvard University Press.

_____ and Alex Preda. 2001. "The Epistemization of Economic Transaction." *Current Sociology* Vol. 49(4), 27-44.

Lachenmann, Gudrun. 1994. "Systeme des Nichtwissens: Alltagsverstand und

Expertenbewußtsein im Kulturvergleich" R. Hitler und A. Honer (eds). *Expertenwissen*. Opladen: Westd. Verlag, pp. 285-305.

Malaysian Industrial Development Authority (MIDA). 2003. *Status of the Automobile Industry*. Malaysia: Transport and Metal Industries Division.

Ministry of Science, Technology and the Environment (MOSTE). 2003. *The Second National Science and Technology Policy and Plan of Action.* Malaysia: MOSTE.

Multimedia Development Corporation. *"MSC Info"*. MSC.comm, October 2003a, Cyberjaya: Multimedia Development Corporation, Pp. 53-54.

_____. 2003b. *IT shared services and contact centers (guidebook).* Cyberjaya: Multimedia Development Corporation.

_____. *"Employment Outlook Survey 2004"*. MSC.comm, April 2004, Cyberjaya: Multimedia Development Corporation, Pp. 18-21.

_____.*"MSC status companies"*. MSC.comm, April 2004, Cyberjaya: Multimedia Development Corporation, Pp. 62-65.

Rasiah, Rajah. 1996. "Rent Management in PROTON." IKMAS Working Papers 2. Institute of Malaysian and International Studies, Universiti Kebangsaan Malaysia.

Saloma, Czarina. (forthcoming). *Doing IT in the Philippines: Globality, Gender, Knowledge and Information Technology*. Quezon City: Ateneo de Manila University Press.

Schutz, Alfred and Thomas Luckmann. 1973. *The Structures of the Life-World.* Vol. I. Evanston: Northwestern University Press.

Tham, Siew-Yean. 2004. "Malaysian policies for the automobile sector: Focus on technology transfer." R. Busser and Y. Sadoi (eds). *Production Network in Asia and Europe: Skill formation and technology transfer in the automobile industry*. London and New York: RoutledgeCurzon, pp. 51-70.

World Bank. World Development Report 2004 [http://econ.worldbank.org/wdr/wdr2004/text

30023/]. Date accessed: 6 September 2004.

World Bank. "ICT at a glance." [http://www.worldbank.org/data/countrydata/countrydata.html]. Date accessed: 6 September 2004.

Zainah Anwar. 1992. *Islamic Revivalism in Malaysia: Dakwah among the students*. Kuala Lumpur: Pelanduk Publications.

Endnotes

[1] The World Bank classifies economies according to their GNI (Gross National Income) per capita. Based on 2003 GNI per capita, economies are classified into: *low income*, US$765 or less; lower middle income, US$766 - $3,035; upper middle income, US$3,036 - $9,385; and high income, US$9,386 or more. Low-income and middle-income economies are sometimes referred to as developing economies. The World Bank clarifies that the classification by income does not necessarily reflect development status.

[2] During that time, Islamic revivalism in the form of the *dakwah* movement, which was once moderate, had taken a radical turn with the return of the earliest groups of Malay students from England (Zainah 1992). Prime Minister Mahathir had to put a break to radicalism and accusations that he was not Muslim enough by exhorting Malaysians to modernize. Thus, the modernization project was accompanied by the Islamization policy in 1982 which worked towards inculcating Islamic values and establishing Islamic institutions. Yet, the modernization project assumed a distinctly pro-business character because the state believes that the future of the Malay community lies in the development of Malay capitalism (Abdul Rahman 2002).

[3] Critics of the arrangement point out that the government held the equity and therefore the losses while the Japanese walked off with lucrative supply and building contracts that made up most of their cost.

[4] There are, of course, policy pronouncements that barely take off the ground. One example is the government idea to have a population of 70 million in order to expand the domestic market in the age of trade protectionism. Malaysians did not take the pronouncement seriously because it had no strong implementation mechanism (e.g., tax rebates were not substantial).

[5] Gen 2 is the second-generation car designed in Malaysia, following the PROTON Waja model which was launched in 2000. Unlike the Waja, PROTON claims that Gen 2's engine was entirely developed in Malaysia, with assistance from UK-based Lotus Group International Ltd.

[6] As a point of comparison, Korean carmaker Hyundai employs 5,000 engineers.

[7] Launched in April 1998, DAGS is one of the many R&D funding mechanisms for ICT. It is designed to fund community-driven projects that enhance e-economy, e-community, e-public services, e-learning, and e-sovereignty. It has RM 100 million-fund allocation under the 8th Malaysia Plan.