

THE IMPLEMENTATION OF ECO-INNOVATION IN PROTON HOLDINGS
BERHAD

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ABSTRACT

Innovation is a crucial instrument for a company to create competitive advantage that lead to the success of the company. However, at the same time, the company also try to reduce the environment pollution resulted from their rigorous manufacturing activities through eco-innovation. This research will explore the implementation of eco-innovation in Proton Holdings Berhad, the only Malaysia's local automotive company, and the driven factors that lead toward the eco-innovation implementation within the company. From previous studies, it is found that eco-innovation can be implemented in product innovation and organizational innovation which are driven by factors of public awareness, competition and government regulations and incentives. 5 employees from managerial and executive level from the company have been interviewed through face to face and email to acquire the primary data. From the data analysis, it is found that Proton mostly implements eco-innovation through integrated eco-innovation in product innovation to improve its vehicles' powertrain and design optimization and applying alternative materials to build its vehicles. The company is also implements alternative product eco-innovations by developing alternative vehicles, but only until prototype level. Add-on eco-innovation is less prioritized by Proton in innovating its offerings. In organizational innovation, Proton implements eco-innovation through green procurement and waste management. The eco-innovation efforts implemented by Proton are mostly driven by the regulations and incentives enforced and provided by the governments, meanwhile competition and public do not consider as driven factors for Proton to implement eco-innovation. This study can contribute to the current literature regarding the eco-innovation practice and its driven factors in Malaysia's automotive industry which can be beneficial in developing efficient and productive business strategies and developing environmental policies.

ABSTRAK

Inovasi merupakan instrumen penting bagi sebuah syarikat untuk mewujudkan kelebihan daya saing yang membawa kepada kejayaan syarikat. Walau bagaimanapun, pada masa yang sama, syarikat itu juga cuba mengurangkan pencemaran alam sekitar yang disebabkan oleh aktiviti perkilangan mereka yang tidak terkawal melalui eko-inovasi. Penyelidikan ini akan menyiasat akan pelaksanaan eko-inovasi di Proton Holdings Berhad, satu-satunya syarikat automotif tempatan di Malaysia, dan faktor-faktor yang mendorong ke arah pelaksanaan eko-inovasi tersebut. Kajian-kajian terdahulu mendapati bahawa eko-inovasi dapat dilaksanakan ke atas inovasi produk dan inovasi organisasi yang didorong oleh faktor kesedaran orang ramai terhadap penjagaan alam sekitar, persaingan dan peraturan dan insentif yang dijalankan oleh kerajaan. 5 pekerja daripada peringkat pengurusan dan eksekutif dari syarikat tersebut telah ditemubual secara 'face to face' dan emel untuk memperoleh data primer. Dari analisis data, didapati Proton kebanyakannya melaksanakan eko-inovasi melalui eko-inovati berintegrasi dalam inovasi produk untuk menambahbaik enjin kuasa dan tahap optimum reka bentuk kenderaan di samping menggunakan bahan alternatif untuk membina kenderaan. Syarikat ini juga melaksanakan produk alternatif eko-inovasi dengan membangunkan kenderaan alternative, tetapi hanya sebagai kenderaan prototaip. Penambahan teknologi eko-inovasi kurang diberi keutamaan oleh Proton dalam menaik taraf kenderaan mereka. Dalam inovasi organisasi, Proton melaksanakan eko-inovasi menerusi perolehan hijau dan pengurusan sisa buangan. Inisiatif eko-inovasi yang dilaksanakan oleh Proton didorong oleh peraturan dan insentif yang dikuatkuasakan dan disediakan oleh pemerintah, sebaliknya persaingan dan publik tidak dianggap sebagai faktor yang mendorong Proton untuk melaksanakan eko-inovasi. Kajian ini boleh menyumbang kepada kesusasteraan semasa mengenai amalan eko-inovasi dan faktor yang mendorong kepada amalan tersebut di dalam industri otomotif di Malaysia yang berguna dalam membangunkan bisnes strategi yang cekap dan produktif dan dalam membangunkan polisi persekitaran.

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LIST OF ABBREVIATION & SYMBOL

3R	Reduce, reuse and recycle
ACCC	Australian Competition and Consumer Commission
ANCAP	Australasian New Car Assessment Programme
CAFÉ	Corporate Average Fuel Economy
CBU	Complete Built Unit
CFC	Chlorofluorocarbon
CKD	Complete knock-down
CO₂	Carbon dioxide
COMOS	Cohesive Mobility Solution
CVT	Continuous Variable Transmission
EEV	Energy-Efficient vehicle
EFTA	European Free Trade Association
EICC	Electric Industry Code of Conduct
ELV	End-of Life Vehicle
EMAS	Eco-Management and Audit Scheme
EMS	Environmental Management System
EPA	Environmental Protection Agency
ETAP	Environmental Technologies Action Plan
EU	European Union
EV	Electric Vehicle
FCEV	Fuel Cell Electric Vehicle
FDI	Foreign direct investment
FTV	Fleet Test Program
GDI	Gasoline Direct Injection
ICE	Internal combustion engine

LIST OF ABBREVIATION & SYMBOL

ITRE	Industry, Research & Energy
KeTTHA	Kementerian Tenaga, Teknologi Hijau dan Air
MAA	Malaysian Automotive Association
MAI	Malaysian Automotive Institute
MIDA	Malaysia Investment Development Authority
MITI	Ministry of International Trade and Industry
NA	Normal aspirated
NAP	National Automotive Policy
NCAP	New Car Assessment Programme
NKEA	National Key Economic Areas
OECD	Organization for Economic Cooperation and Development
OEM	Original Equipment Manufacturer
P2	Pollution prevention practice
PPA	Pollution Prevention Act
R&D	Research & Development
REEV	Range Extended Electric Vehicle
SARFIT	Structural Adaptation to Regain Fit model
SIRIM	Scientific and Industrial Research Institute of Malaysia
SME	Small-Medium Enterprise
SSM	Suruhanjaya Syarikat Malaysia
SQCDM	Safety, Quality, Cost, Delivery and Morale
TGDI	Turbo-Gasoline Direct Injection
TIMWOOD	Transportation, Inventory, Motion, Waiting, Over processing, Overproduction and Defects

LIST OF ABBREVIATION & SYMBOL

UK	United Kingdom
US	United States of America
VAT	Value added tax
TPS	Toyota's Production System

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter starts with an introduction of the background this research. This is then followed by an explanation of the problem that is to be investigated. Succeeding this are sections that emphasize the objective and the questions to be answered in this research. The scope of the research and also the limitation of the research are also discussed.

1.2 Background of Study

“Innovation is the specific instrument of entrepreneurship...the act that endows resources with a new capacity to create wealth” (Drucker, 1985). This quote is said by Peter Ferdinand Drucker, who is contributing in writing the philosophical and practical foundation of the modern business corporation. Drucker (1985) emphasizes that innovation is one of specific instrument that lead to the success of a company. Through innovation, a company able to create new things, such as product, that will drive the company in creating wealth. Then, the wealth will allow the company to improve and establish itself becoming a strong company and able to compete fairly with other established competitors in an industry.

Take Apple Inc. innovation strategies for example. Apple is widely known as an innovative company in the world (Kotelnikov, 2016). The company has done several types of innovation at once when creating new products under an innovative business model led by the late Steve Jobs. While focusing on the product innovation on the iPhone and iPod products, Jobs also wanted the company to concern on the new way to create, deliver and capture the value of the customers. From the effort, the iPhone and iPod are able to integrate with iTunes and Apps Store, giving valuable experience to the customers. With such dare move, the company's products become well-received by the customers all around the world (Faas, 2011; Frommer, 2011). From the example, it provides a clear picture of how important an innovation effort for an organization, especially organization that having a fierce competition among its rivalries within the industry.

Manufacturing industry is also not left behind in innovation activities. According to Economy Watch (2010), manufacturing industry can be defined as an industry that heavily related with manufacturing and processing products savouring in either the creation of new commodities or in value addition. To this moment, the industry is still able to maintain its position as the most critical economic income for both developed and developing countries (Manyika et al, 2012; Mittal & Sangwan, 2014). In developing countries, manufacturing industry leads to improvement of living standards of the people through subsistence agriculture. Simultaneously, the same industry also consistent as the most important source of innovation and competitiveness in advanced countries, resulting in marginal contribution towards research and development, exports and productivity growth (Manyika et al, 2012; Mittal & Sangwan, 2014). In Malaysia, the manufacturing industry is expected to grow at faster rate due to higher shipment for regional and global trade of electrical and electronic products, such as integrated circuit and photosensitive semiconductor (Wan, 2016). Likewise, there are growth expectations for domestic-oriented production due to increasing consumption and investment in local industry and also construction-related materials as projects under the 10th Malaysian Plan and National Key Economic Areas (NKEAs) are gaining momentum (Wan, 2016).

However, dramatic acceleration of foreign direct investment (FDI) by huge multinational companies in developing countries has sparked the changes in

relationship between the developed and developing countries. Originally, the objective of FDI is establishes operation branches in developing countries to serve the demand of main headquarters in developed countries, but now it has shifted to serve the market in the respective developing countries too. This global value chain can be advantageous to both countries, in which the developing countries can improve their knowledge and capabilities in manufacturing industry while the companies can focus knowledge-intensive jobs and value-added activities in home country. (Biesebroeck & Sturgeon, 2010).

Automotive industry is one of many branches in the scope of manufacturing industry. Bureau of Labor Statistics informally defines automotive industry for analysis purpose as an industry that involves production, wholesaling, retailing and maintenance of motor vehicles (United States Department of Labor, 2016). It has a complicated and diverse value-chain, starting from creating and manufacturing new vehicles equipped with latest technologies until the end sale services of the vehicles, such as maintenance and financial services (Ruff, 2014). At this era, where the industry is competing in global scale, it has become saturated and volatile, leading to intense competition and cost pressure which can be achieved through innovation (Apak & Atay, 2015; Atalay et al, 2013; Ili et al, 2010; Ruff, 2014). According to Oliver Wyman in Car Innovation 2015 study, he says that all the executives from the automotive companies interviewed by him agreed that innovation is an important success factors to maintain their position in the fierce auto market competition. Besides, innovation can also be considered as the key to solve most of the challenges faced by the automotive industry in global scale. Without it, they believe the entire concept of individual competitive advantages that each automotive company hold are put at risk (Dannenberg & Burgard, 2007).

While innovation has become more focused to improve companies' sustainability in the competition however, the accumulation of manufacturing activities in global automotive industry badly affecting the nature (Cheng, 2016). This is due to which the industry utilizes more energy and other resources which lead to emission of greenhouse gases from manufacturing plants in large amount which contribute to environmental problem such as climate and global warming (Abu Seman et al, 2012; Mittal & Sangwan, 2014). According to United States Environmental

Protection Agency (EPA), public has increasingly blamed automotive companies for their environmental misbehaviours within their operational level which lead to such disasters (Caniels et al, 2013). Because of such accusation, automotive companies are having great pressures to convert their production processes to be less harmful to the environment in order to improve public's perspective toward their brand image (Environmental Protection, 2008; Sezen & Cankaya, 2013; Sofia, 2010). Combine with efforts from various government around the world which are striving to solve the emission of the gases and climate change problems, this has increased the number of automotive companies that are interested in taking environmental initiatives (Bjorkdahl & Linder, 2015; Doran & Ryan, 2012; Haanaes et al, 2011; Keeble et al, 2005; Mazzanti et al, 2015). All the initiatives can be combined into one term known as 'eco-innovation'.

Generally, eco-innovation is a kind of effort taken by companies that are capable to reduce the negative impact of manufacturing activities toward the surrounding environment (European Commission, 2016a; Kemp & Pearson, 2007; Reid & Meidzinski, 2008; Rennings, 2000). The green initiative is not limited only to product, but can be implemented at all stages of manufacturing operations from top to the lowest level (Bleischwitz, 2009). Some examples of eco-innovation activities that have been implemented by various industries are the infamous Toyota's Production System (TPS) which integrating Jidoka and Just-In-Time technique, telepresence wall developed by France Telecom, a new Group Environmental Division and Green Management 2005 founded by Sony for its own and Deep Innovation in housing area, proposed by EU (Bleischwitz, 2009; Keeble et al, 2005) All examples above are able to negate harmful effect to the environment by reducing the usage of natural resources which produce less harmful gases and environmental wastes that will pollute the air and soil. When this is happened, the accumulation of chemical gases and wastes can be managed and reduced (Rosen, Ibrahim & Kanoglu, 2008).

Fortunately, as environmental pollution keeps growing up without any sign to stop, developing countries have awoken to start concerning about the adoption of green movement within their business environment along with the developed countries, resulted from continuous commitment from the community regarding to the issues (Chen and Chai, 2010; Govindan et al., 2013; Jansson, Morell & Nordlund, 2010).

Internal forces of the companies allow the planning and the implementation of environmental friendly efforts to the greatest extent lead to efficient, safer and sustainable businesses (Apak & Atay, 2015; Diabat & Govindan, 2010; Luthra, Garg & Haleem, 2016). In Malaysia, for instance, the number of companies that applied ISO 14001, an internationally environmental management standard, increased from 38 to 83 companies from year 1998 to 1999 due to insistence from top management rather than customers' demands (ISO, 2014; Tan, 2005).

Meanwhile, important external stakeholders such as consumers and local governments that are heavily imposed great pressures for those companies to implement and visualize their environmental friendly business activities, and thus directly contribute towards healthier environment to the community (Abu Seman et al, 2012; Caniels, Gehrsitz & Semeijin, 2013; Govindan, Diabat & Shankar, 2014; Zailani et al, 2015). Malaysia citizen want to purchase new technological and environmental-friendly products for their households in order to reduce negative contributions to the environment from their consumptions (Afroz et al, 2013). Meanwhile, Malaysia's government has enacted Environmental Quality Act 1974 to stringent the control of industrial pollution and aid green project implementations related to clean areas, sewage and industrial activities (Rao, 2004). This evolution can be enabled by yielding substantial environmental improvements through the combination of technological and non-technological changes (OECD, 2009a). A thorough study is needed to determine what factors that really drive the implementation of different types of eco-innovation within business practices in automotive industry.

Eco-innovation is not only capable to improve life quality of the people by preserving the nature, but at the same time, it is also able to escalate the performance of the companies that are involved directly and indirectly by improving their operations' efficiency (Bleischwitz, 2009; United Nations Environment Programme, 2016). Sezen & Cankaya (2013) suggest that eco-innovation can be an important strategic tool in acquiring sustainable developments in automotive industry due to increase of environmental pressure. It has positive impact on both a firm's environmental performance and competitive capabilities in the market by differentiating themselves that lead to escalation in market share (Dong et al, 2014). The application of eco-innovation also enables the improvement of eco-efficiency by

improving the labour productivity and reducing the usage of resources and creating less waste and pollution (Wan et al, 2015). According to Tan (2005), Malaysian companies that fully adopted ISO 14001 are able to achieve cleaner and more efficient operations and market expansion due to greener companies' images. Besides, Malaysia's Promotion of Investments Act 1986 allows companies with R&D status will have 5-year income tax exemption while government's contract R&D companies are complied to receive 100% investment tax allowance on qualifying capital expenditure for 10 years for their involvement in eco-innovation products (PricewaterhouseCoopers, 2010). All benefits mentioned above are capable to improve the financial performance and revenue growth of the automotive companies that implementing eco-innovation in their business practices (Lee & Min, 2015). All these findings will escalate the importance of this study to determine how eco-innovation can give impact to the business performance of automotive companies so that the more companies whether for automotive industry or other industries are likely to join the effort in the future.

1.3 Problem Statement

It is generally acceptable that eco-innovation plays a crucial role for sustaining the environment and creates competitive advantage to improve business performance for a company (Bleischwitz, 2009; Gilli et al, 2013; Doran & Ryan, 2012; Rennings, 2000). Many organizations are starting to concern about environmental sustainability and shifting their organizational goals toward green business environment. They have realized that the adoption of eco-friendly technologies within their business operations will provide them greater advantages, which are also influenced suppliers and customers (Abu Seman et al, 2012).

Despite its crucial role however, there are lots of additional & unobserved variables which are likely influence the determination of any decision regarding to the implementation of eco-innovation at firm-level in automotive industry (Caniels, Gehritz & Semeijin, 2013; Govindan, Diabat & Shankar, 2014; Triguero, Mondejar & Davia, 2013). Some of those variables are public awareness regarding the

environmental problem (Lee, 2008; Al-Amin et al, 2016), competition in automotive industry (Wad and Govindaraju (2011) and the roles of Malaysia's government in promoting eco-innovation (Mohammad, 2011). Factors that drive automotive companies in implementing eco-innovation can be differed between companies in different countries which make them heterogeneous in eco-innovation implementations (Govindan, Diabat & Shankar, 2014, Zailani et al, 2014). Driven factors that are investigated in previous studies may not be applicable to all companies due to different countries have different challenges and opportunities in their markets. Rennings (2000) mentions that more researches are needed in developing a framework as a guideline to analyse the driving forces of different characteristics and phases, to identify promising data as well as the less relevant one, and also to develop some ideas on transferring to data to other companies and industry. More time series and cross-section information from different companies within same industry should be conducted in acquiring the unobserved driven factors of eco-innovation which are relatively constant over time (Triquero, Mondejar & Davia, 2013).

In addition to the lack of stimulation causes of eco-innovation implementation, there is also lack of researches regarding to the issue in automotive industry in developing countries. In worldwide level, there are uncountable researches that discover the eco-innovation trends at a national level. However, most of the researches are conducted in and concerned developed nations in Western with an exclusion of Asian countries, especially in Malaysia (Jayaram and Avittathur, 2015; Jo et al, 2015; Ozga, Seddon & Popkewitz, 2013). Due to this problem, researcher finds that it is difficult to find studies that are relate to the factors of automotive company in Malaysia implement eco-innovation. Govindan, Diabat & Shankar (2014) highlights the need of study of the future path of eco-innovation in developing countries so that the common drivers of eco-innovation can be widen. Lee & Min (2015) also recommends conducting researches on both single country & comparative study among countries as different countries face different situations and pressures that drive the automotive companies to implementation eco-innovation. Due to the studies limitation and recommendations, the researcher is driven to conduct a study regarding to the issue in Malaysia context.

Most of global carmakers have implemented the eco-innovation within their processes in various ways (OECD, 2009a). Unfortunately, there is lack of information regarding on eco-innovation implementation from the context of developing countries (Mitra and Datta, 2014). It is important to understand clearly what and how to implement the eco-innovation guided by the driven factors identified. The companies need to implement eco-innovation that is able to fulfil the demand from the driven factors identified by the companies. A study reveals that industries in developing countries are really interest in improving environmental performance. However, those industries are still struggling in focusing the environmental performance over economic performance (Govindan et al, 2014). Gilli et al (2013) argues that macro performance boost of eco-innovation is heavily rely on various reasons related to the changing of firm structure and innovation. However, there is lack of study that investigates the contribution towards the achievement of sustainable economic development (Gilli et al, 2013). Lee (2009) suggests more studies are required so that the determination on how negative sustainability impacts can be reduced through eco-innovation practices within companies can be done. This achievement can be beneficial in terms of methodological and theoretical insights of other disciplines of the industry.

From the context of Malaysia, Previous studies regarding the implementation of eco-innovation in most of companies in Malaysia is difficult to be found due to lack of information regarding environmental performance initiatives (Abu Seman et al, 2012). Fernando & Wah (2017) found that there is lack consensus on what the level of eco-innovation practices is and their impacts on environmental performance. Besides, the current studies of adoption behavior of eco-innovation do not address the specific issue faced in Malaysia due to lack of participation of Malaysian during data collection phase (Khorasanizadeh et al, 2016). Abdullah et al (2015) find that lack of information regarding green technologies and market prevent companies from finding the most appropriate eco-innovation initiatives to reduce pollution and the lack of expert staff that knowledgeable regarding eco-innovation implementations are barriers that lead to the failure of Malaysia's manufacturers to bring new green products and processes to the market. This has led to dismal number of companies that are registered with ISO 14001 certification at the end of 2014, which are 2,284 companies, comprise only 4.64% of number of companies that are registered with Suruhanjaya Syarikat Malaysia

(SSM) in 2014, which are 49, 203 companies (SSM, 2014; ISO, 2014). Due to this, Ili et al (2010) encouraged further researches regarding eco-innovation implementation at firm level in automotive industry in developing countries, including Malaysia. Fernando & Wah (2017) has also suggested future researchers to investigate on how eco-innovation can be implemented via greener and cheaper green products and services within Malaysia.

Moreover, Zailani et al (2015) found that there is a literature gap regarding the determinant of eco-innovation for firms in automotive industry as the only factor that drive the eco-innovation implementation is market demand based on their knowledge. There is also no consensus regarding the key factors that capture the concept of eco-innovation initiatives acceptance in Malaysia, making the conceptual foundations of the green initiatives have not been fully developed until now (Kardooni, Yusoff & Kari, 2016). Khorasanizadeh et al (2016) suggested the essential of studying the factors that drive the implementation of eco-innovation in Malaysia to understand the potential of green initiatives in the Malaysian context since nationality and culture exert different influences on how the people adopting and consuming recent technologies.

1.4 Research Objectives

1. To explore the implementation of eco-innovation in Proton Holdings Berhad
2. To explore the driven factors of eco-innovation implementation in Proton Holdings Berhad.

1.5 Research Questions

1. How eco-innovation is implemented in Proton Holdings Berhad?
2. What are the driven factors of eco-innovation implementation in in Proton Holdings Berhad?

1.6 Research Scope

This research is conducted to investigate the eco-innovation implementation in Proton Holdings Berhad, an automotive company originated from Malaysia and fully owned by the Malaysian. To investigate the eco-innovation implementation in the company, several topics will be considered, which are how Proton implement the eco-innovation in its company and the driven factors that encourage Proton to implement the eco-innovation throughout the years since its foundation. The selected topic will be looked into mainly from the perspective of managerial level, with some input come from executive level.

1.7 Research Significance

From academic perspective, this research gives an implication on the existing literature by adding a value and knowledge to the study of eco-innovation practice. In the problem statement, it has been highlighted that there is lack of studies that investigate the implementation of eco-innovation and its driven factors in Malaysia. From the findings of this research, it will be a significant endeavour in motivating the employees in implementing green practices in the workplace. This study will also be beneficial to the business industry in strategic management and corporate strategies by informing them in the area of marketing, research and development and production on how to integrate the value of protecting the environment within organizational activities.

Moreover, this study will be helpful to the policymaker in developing effective policies and regulations to promote environmental protection and preservation. And importantly, this research can be served as a future reference for researchers about eco-innovation in other subject of areas whether from the same industry or different industries.

1.8 Summary

Most of the companies agreed that innovation can provide them competitive advantages in their fierce competitive market that they pursue. However, they also implement the eco-innovation not only because of their concern towards the global environmental issues, but also to improve their business performance. This research is aimed to investigate on how Malaysia's only local automotive company, Proton Holdings Berhad, implement the eco-innovation and also to investigate what factors that drive Proton to implement the eco-innovation within its company. These investigations will be looked upon from the perspectives of managerial level and some input from the executive levels. At the end of this research, it is assumed that this investigations can contribute in providing information regarding eco-innovation implementation in Proton Holdings Berhad as the sole Malaysia's automotive company fully owned by Malaysian, which can be considered as representative of local automotive industry, providing assistance in directing local automotive industry to implement the right eco-innovation initiatives based on the external factors faced by the industry, and provide information to Malaysia's government to evaluate the effectiveness of its regulations and incentives in preserving the environment of the country and promoting eco-innovation in local automotive industry and guiding the government in developing more suitable regulations and incentives to improve its effectiveness toward local automotive industry.

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