

**EXPLORING THE FACTORS AND STRATEGIES TO SUSTAIN
THE DEVELOPMENT OF CIVIC HYBRID CARS
FOR LOW CARBON AUTOMOBILE:
A CASE STUDY AT HONDA MALAYSIA SDN. BHD.**

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Abstract

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within two keys concept: concept of 'needs' and the idea if limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs. Hybrid vehicle is a vehicle that uses two or more distinct power sources to move the vehicle which can be conventional internal combustion engine and also high voltage electric motor. This is known as low carbon vehicles. For the automakers in this industry, there are few causes that push their mind to go further for development: customer demand, new technological possibilities and regulation. However, it also cause problem in order to sustain hybrid car in the market of sustainability when it need to compete with other types of propulsion. Hence, there are few factor that need to be considered to sustain the hybrid car: fuel efficient, green environmental and industrial growth. After the hybrid car enter the market, the company need to arrange for the strategies in order for it to sustain in the business sustainability. The company need to focus on research and development (R&D), strategic market planning in high-tech firms and customer-driven innovation. At last, researcher suggested that the environmental education should passed by all parties and delivered directly to the society. One can somehow gain more knowledge and information about the technology of hybrids and indirectly contribute back to the society, automobile manufacturers and environment through knowledge sharing.

Keywords: Sustainable Development, Hybrid Vehicle, Environmental Education

1.0 Introduction

A hybrid vehicle is a vehicle that uses two or more distinct power sources to move the vehicle. Hybrid model is generally had additional variants to the already existing line up of gasoline cars. Generally, hybrid cars get power with a combined working of the internal combustion engine, an electric motor, and hi-powered batteries in order to save fuel and reduce greenhouse emissions. Basically, the cost of producing a hybrid vehicle is more expensive than the cost of producing a non-hybrid. Honda is one of the major manufacturers of hybrid variants. When Honda decided to merge its hybrid technology into an existing passenger car, the obvious choice was the Civic. According to Christensen et al (2013), there is a relation that industries create hybrids for predictable reasons, including because the business case for the purely disruptive technology is not compelling at first to industry leaders, whereas implementing a hybrid as a sustaining innovation allows incumbents to satisfy their best customers. The internal

combustion has been used as a means of propulsion for decades. However, it is inefficient, and its byproducts are causing harm to the environment. Design engineers have introduced several alternatives, including the hybrid electric vehicle, and the use of biodiesel fuel in internal combustion engine. The hybrid electric vehicle is intended to serve as an alternative to the internal combustion engine powered vehicle, which the hybrid electric vehicle is more efficient and therefore less harmful to the environment.

2.0 Literature Review

The Brutland Report (United Nations, 1987) stated that sustainable development is development that meets the needs of the present without comprising the ability of future generations to meet their own needs. Frenken, Hekkert, and Godfroij (2004) analyze the R&D portfolios of carmakers and conclude that the current developments may lead to a premature lock-in of a suboptimal alternative propulsion technology in the future. Also, Van der Hoed et al (2004, 2007) and Hekkert & Van der Hoed (2004) emphasize the development of fuel cell and hybrid vehicle technologies to achieve sustainability. The technologies of hybrid is most likely to substitute, or least co-exist beside the internal combustion engine. According to Bohnsack et. al. (2011), the customer demand, new technological possibilities, and regulation stimulated automakers to go further in the development of low emission vehicles.

The environmental or 'green' movement is encouraging fragmentation even further, by shifting demand from more fuel-efficient cars, and new propulsion technologies such as hybrids. According to Morse et al (2007), the contributions of Battelle and Haloid constitute technological innovation, "the introduction into the marketplace of new products, processes, and services based on new technology." Struben et al (2008) assert that the automakers are now developing alternatives to internal combustion engines. Thus, hybrid vehicles offer the flexibility to widen the efficient operating range of a specific vehicle and together with advanced internal combustion engine technology, and a hybrid also is a flexible vehicle that utilizes an additional energy source to enhance behavior a conventional vehicle by Lagunoff (2008). The influence of regulation is also important to change in the automotive industry. Lee et al (2009) find that laws set that performance standards beyond the automaker's current capabilities play an important role in technological innovation and the direction of the technological change.

There are few factors that help to sustain the hybrid cars:

1) Fuel efficient

Gerstenfeld et al (2010) identify as consumers search for more fuel efficient vehicles, they are presented now with many choices. Hybrid electric vehicles have been available to consumers for many years now, and electric vehicles gaining popularity once more, consumers have more options now than they have ever had to pick a vehicle with higher fuel economy. Hybrid electric vehicles tend to be slightly higher priced than their standard counterparts, but provide a significant boost in fuel economy. One of the benefits of hybrid electric vehicles compared to electric vehicles is that there is a wide range of choices for consumers to choose from. Hybrid electric vehicles provide most consumers with a more fuel efficient model of whatever type of vehicle they wish to purchase. According to Espey (2006), the price of an automobile is a function of the vehicle's combination of attributes. Statistical analysis can be used to estimate the contribution of each vehicle attribute to the total price of an automobile, and also can be used to estimate the value of an incremental change in a particular attribute such as acceleration or fuel economy. In researcher opinion, researcher agrees that the price of an automobile is a function of the vehicle's combination of attributes due to provide significant boost in fuel economy.

2) Green Environmental

According to Chow and Chen (2009), in the 21st century, green has evolved to have a deeper meaning related to environmental issues. It is a common understanding that behaving in an environmentally sound way will be essential to the future. The Earth may no longer be a sustainable living environment for any creature if we do not reduce the rate of amount of toxic waste, such as carbon, nitrogen, and sulfur dioxide, which we release as emissions into our air, land, and water. Chow and Chen (2009) mention that the sustainability of a green environment can be accomplished through three main approaches which are social responsibility, environmental protection and economic progress. Researcher agrees with two of three approaches which are environmental protection and economic progress. These are supported by related existing theories. Friedman (2010) states hybrid electric vehicles attempt to reduce the emissions of these harmful chemicals by reducing the use of the internal combustion engine in an automobile. While, Lagunoff (2008) acknowledges a hybrid is a flexible vehicle that utilizes an additional energy source to enhance behavior a conventional vehicle.

3) Industrial Growth

Sengupta (2012) clarifies industry growth is an interactive process. Firms grow and contribute to industry growth. Economy grows and it provides the impetus to industry growth. When firms reach equilibrium through an optimization process, it may or not be consistent with industry equilibrium. When it is consistent, the number of firms in industry equilibrium reaches its optimal level. This determines the short run framework. Any dynamic change in this framework can occur through new technology and innovations, or external shock through different sources such as the overall economy or the globalization of markets. When the firm's equilibriums are not consistent with industry equilibrium, market fluctuations occur, and various adjustments follow. From researcher opinion, researcher agrees with the interactive process and firms grow with contributing through the new technology and innovation to industry growth. According to Dooman et al (2010), another technology that has been honed by hybrid car designers is traction and stability control. While these technologies are not new, the hybrid car designers are making sure that the hybrids are equipped with the newest versions of the technology, giving their drivers an advantage over the majority of other vehicles on the road. The improvements to current generation hybrids are a huge selling point that should be more widely advertised alongside the fuel economy rather than having fuel economy overshadows the other features of these cars.

The way company strategize the car:

1) Focusing on Research and Development (R&D)

Zhang et al (2008) mentions the new product development planning and strategy identifies the portfolio of products to be developed. To assist technology managers in identifying core technologies, product development objective, and right technical strategy, the core technological decision frame, objective decision-making method, and technical strategy analyzing method incorporating different tools. The methods make the decision of core technologies, objective decision-making process operable, and can get enterprises to focus on right technology strategy, and take the corresponding innovation strategy update, consequently speeding up core technology's maturation. Researcher supports the methods making in decision of core technologies to focus on right strategy and indirectly speeding up core technology's maturation.

2) Strategic Market Planning in High-Tech Firms

Mohr et al (2008) describe strategic market planning is the process by which a company formulates its strategic plan. Serving as a road map for the company's future, a company's strategic plan guides its resource allocation decisions in specific technology development projects, specific market segments, and other projects and opportunities. Cooper and Lee (2000) explain the purpose of strategy is to create competitive advantage, a position where a firm is able to create more value for customers than its competitors. Competitive advantage exists when the firm possesses resources and competencies that are valuable, rare, durable, and difficult for competitors to imitate. Effective high-technology marketing is built on a foundation of resources and ideas that result from the strategy formulation process by Mohr et al (2008). Researcher supports the strategic market planning as a road map for the company's future where the company's strategic plan guides them to focus on high-technology development then the company able to create more value to the customer.

3) Customer-Driven Innovation

Mohr et al (2008) explain customer-driven innovation taps the collective wisdom of a community, customers or otherwise for product improvements and innovations. Customer-driven innovation requires a radical rethinking of how innovation process works, with input from marketing and customers used as a guide, to active co-creation of innovation with customers themselves. At least three factors explain the interest in customer-driven innovation. There are technology tools to facilitate it, the economics of product development costs and high failure rates, and the third, customer's expectations (society beliefs) about the role of customers in business strategy. Researcher supports the third one that is society beliefs about the role of customers in business strategy. According to Dooman et al (2010), now that hybrid cars have become main stream, the majority of hybrid consumers are looking for an environmentally friendly form of transportation, with the possibility of saving money the long term. With respect to the latter, customers are increasingly concerned about the environmental impact of the products that they buy and the safety of the products they use. By participating in generating ideas for sustainable, safe products, customers receive psychological and social benefits, including a heightened sense of social responsibility. With user-led innovation, customers seem to be willing "donate" their ideas freely according by Mohr et al (2008).

3.0 Methodology

The topic of this research is about exploring the factors and strategies to sustain the development of civic hybrid cars for low carbon automobile. Honda Malaysia Sdn. Bhd has been chosen as a main location for this research. The researcher can collect all data and high quality information from the respondents that consist of two categories which are fifteen from management side and other fifteen from technical side. In-depth interview with the respondents can assist the researcher to be more understood in order to gather all the data collection and information that is much related to the research objectives, research questions the topic discussed.

The main strategy to conduct this research is by doing case study. They are four steps of methodology that used in this case study. Firstly, by generating the literature review in order to

help the researcher understands the theory of new product development of Civic Hybrid. By deeper generating of literature review will be helpful and vital for the research process to keep proceed. Secondly, the researcher needs to study more through the primary and secondary data. Primary data which is obtained through interviewing the respondents provided a rich source of information; Secondary data can be acquired from company records or archives, industry analyses offered by the media, websites and others. Thus, these supportive methods really helpful to the researcher more understand about the background and scenario.

Thirdly, the mixed method was adopted in this research. The researcher starts to interview the selected respondents through qualitative study and give them the questionnaire based on the structured questions given that is much related to their departments as quantitative methods are associated with the scientific and experimental approach and are criticized if not providing in depth description. Qualitative study will provide high validity data whereas quantitative study will illustrate the more precise data. Fourth, data analysis by using qualitative and quantitative methods is applied. These four steps of methodologies work as catalyst due to guide the case study research successfully done.

Besides that, the researcher get the data which based on the journal and articles from internet and also from 30 respondents from Honda Malaysia Sdn. Bhd. that the researcher will contact in order to get more explanations in this research. First category consists of the management associates who are included executives and clerks. Fifteen respondents are selected for this category. Second category consists of technical associates who are included engineers and technicians. Fifteen respondents from second category are targeted. The methods that the researcher used to choose during the distribution of questionnaire are based on data collection, and also cooperation with respondents from Honda Malaysia Sdn. Bhd by interviewing and getting further response or feedback. These methods will not interrupting the process due to the researcher will be there with the respondents during interviewing session. Based on the methods stated, the researcher will use the mixed method for this research. The complementary and generalizability of the research is the reason why mixed method has been chosen. It is because mixed methods tend to adopt a combination of qualitative and quantitative approaches that allow statistically reliable information obtained from numerical measurement and enriched by information about the research respondents' explanations.

4.0 Results and Discussions

During the interviewing session for qualitative questions, total of five respondents helped the researcher to answer the questions about the hybrid in more depth. They consist of engineers and experts on the field of hybrid technology. While for quantitative, questionnaire has been distributed to twenty-five respondents that consist of non-executives; associates, and technician to observe the trends of sustainability on this hybrid technology in order to protect the Hybrid cars in for business sustainability and to sustain in the market.

4.1 Factor to Sustain the Hybrids Car

The first objective of the topic research is to investigate the factors to sustain Hybrid cars when it needs to compete with conventional cars. According to Bohnsack et al (2011), the customer demand, new technological possibilities, and regulation stimulated automakers to go further in the development of low emission vehicles. The technology of hybrid is most likely to substitute, or at least co-exist beside the internal combustion engine. Thus, the factors that occurred in order to sustain the hybrid cars in the market sustainability will be mainly discussed which including three main factors; Fuel efficient, Green environmental and Industrial growth.

1) Fuel efficient

According to Lagunoff (2008), a hybrid is a flexible vehicle that utilizes an additional energy source to enhance behavior a conventional vehicle. During interviewing session for qualitative method, five respondents consist of engineers and experts on the field of hybrid technology chosen 'fuel efficient' as the best factor that can influence the sustainability of Hybrid cars in the automobile market compared to green environmental and also industry growth for objective question. The researcher assumes that the main features of emerging hybrids technology consumes less energy and releases less emission than the conventional cars. Besides, Gerstenfeld et al (2010) identify as consumers search for more fuel efficient vehicles, they are presented now with many choices. The technology of hybrid is most likely to substitute, or at least co-exist beside the internal combustion engine. *"As we all know, cars that use the hybrid technology is actually very economical in terms of fuel efficiency used throughout the driving (Expert Engineer, 2014)."* The researcher concludes that the main attraction of hybrid cars because of the more fuel efficient produced throughout the driving and also can enhance the behavior of conventional vehicle.

The question that mentioned in the questionnaire regarding fuel efficient as below:

Question 4: I am purchasing Hybrid car because of the technology of hybrid into an existing passenger car.

The result had shown that total of 21 respondents answered agree, 3 respondents answered neutral and 1 respondent answered strongly agree for the question given. As for disagree and strongly disagree are zero. According to Lagunoff (2008), hybrid vehicles offer the flexibility to widen the efficient operating range of a specific vehicle and together with advanced internal combustion engine technology and renewable fuels it is a powerful path to direct action. This showed the technology of hybrid that featured in conventional cars has got demand in the automotive industry among buyers.

Question 8: I will use Hybrid car from Honda no matter how much it costs.

Result from the survey had shown that total of 5 respondents answered agree, and 20 respondents answered neutral for the question given. This implies that customers of hybrid do not necessarily buy the hybrid car that manufactured by company of Honda only. A few companies that are offer hybrid cars such as Nissan and Toyota, and Honda is one of the major manufacturers of hybrid variants. The researcher assumes that customers will purchase a car according to their own needs and satisfaction against something beneficial to them. Besides that, the researcher assumes also perhaps these staffs are not buying hybrid cars from Honda because they are not directly involved in the production and during Research and Development processes. So, they are unable to support hybrid car from Honda thoroughly even though they are Honda's own staffs. Besides, there is also discount provided to the Honda staff. Hence, still not many will support the Hybrid cars.

Question 9: Hybrid is a flexible vehicle that utilizes an additional energy source to enhance behavior a conventional vehicle.

Result had shown that total of 2 respondents answered agree, and 23 respondents answered neutral for the question given. Schwarz (2008) highlights a combination of customer demand for personalization where the right product for their specific use at the right time, and manufacturer conquering new customer segments is causing automakers to grow up their product offerings. The researcher assumes that most of the car users on the

road still have faith in the conventional cars that are available in the automotive market. Besides that, the researcher also considers why many respondents answered neutral for this question because the conventional cars also can be on par with the hybrid cars. Even though hybrid offers advantages such as greener and fuel efficient, but the cost of hybrid cars still higher than conventional cars and are less able to be bought by some buyers.

Question 10: Consumers search for more fuel efficient vehicles which could be found from hybrid cars.

The result had shown that total of 22 respondents answered agree, and 3 respondents answered neutral for the question given. Gerstenfeld et al (2010) identify as consumers search for more fuel efficient vehicles, they are presented now with many choices. Based on the pie chart above, the researcher believes that hybrid vehicles offer the flexibility to widen the efficient operating range of a specific vehicle and together with advanced internal combustion engine technology and renewable fuels it is a powerful path to direct action.

Question 14: Hybrid cars tend to be slightly higher priced than conventional cars, but provide a significant boost in fuel economy.

The result had shown that total of 5 respondents answered agree, 19 respondents answered neutral and 1 respondent answered strongly agree for the question given. According to Espey (2006), the price of an automobile is a function of the vehicle's combination of attributes. Statistical analysis can be used to estimate the contribution of each vehicle attribute to the total price of an automobile, and also can be used to estimate the value of an incremental change in a particular attribute such as acceleration or fuel economy. In researcher opinion, researcher agrees that the price of an automobile is a function of the vehicle's combination of attributes due to provide significant boost in fuel economy. Besides that, the researcher also considers why many respondents answered neutral for this question because the cost of making hybrid cars are more expensive due to new engine technology used in hybrid car itself. While the conventional cars offer affordable prices depending on the manufacturers by look at the brand, quality and functionality itself.

Question 16: Hybrid is more efficient and therefore less harmful to the environment.

Result above had shown that total of 21 respondents answered agree, 2 respondents answered neutral and 2 respondent answered strongly agree for the question given. According to Dooman et al (2010), now that hybrid cars have become main stream, the majority of hybrid consumers are looking for an environmentally friendly form of transportation, with the possibility of saving money the long term. The researcher believes nowadays many people search for fuel economy vehicle and they are also concerns about environmentally.

2) Green Environmental

The other subjective question for qualitative is the important of hybrid for green environment. The internal combustion engine is a major factor that causes air pollution. The exhaust gas from an internal combustion engine contains many chemicals that attribute to the much of the air pollution on the planet. According to Friedman (2010), the hybrid electric vehicles is intended to serve as an alternatives to the internal combustion engine powered vehicle, with the hope that the hybrid electric vehicle is more efficient and therefore less harmful to the environment. *“Hybrid will consume less fuel, and will reduce CO₂ emission to*

environment (Engineer, 2014). The researcher thinks it is a common understanding that behaving in an environmentally sound way will be essential to the future.

The question that mentioned in the questionnaire regarding fuel efficient as below:

Question 12: Customers are increasingly concerned about the environmental impact of the products that they buy.

Result showed that total of 3 respondents answered agree, 21 respondents answered neutral and 1 respondent answered strongly agree for the question given. According to Buliveau et al (2010), advertisements have led people to believe that hybrid cars pollute less will save money and reduce dependence on natural fuel sources. Everyday large amounts of pollutants are released into the atmosphere leading the greenhouse effect and global warming. The researcher concludes based on the figure above, that production of hybrids consumes more energy and releases more emissions than the production of conventional cars. However, people still assume that a conventional car able to compete against the hybrid cars and the researcher also considers why many respondents answered neutral for this question perhaps also because customers are less exposure to goodness of hybrid cars. Here, the government can take the initiative with a campaign to protect the environment by increasing the use of hybrid cars in the future. Indirectly, it also intended to protect the environment together.

Question 15: Hybrid emit less tail-pipe emissions which help decrease air pollution and mitigate global warming concerns.

The result had shown that total of 20 respondents answered agree, and 5 respondents answered neutral for the question given. According to Chow and Chen (2009), in the 21st century, green has evolved to have a deeper meaning related to environmental issues. Chow and Chen (2009) mention that the sustainability of a green environment can be accomplished through three main approaches which are social responsibility, environmental protection and economic progress. Researcher agrees with one of three approaches which is environmental protection, by acknowledges that hybrid can save fuel and reduce greenhouse emissions.

3) Industrial Growth

According to Dooman et al (2010), in many cases hybrids are actually less protective in a crash. All the technology used to squeeze out extra gas mileage can compromise handling, acceleration, and stability on the road in less than ideal driving conditions. The answer given for this qualitative question of expectation from the Hybrid cars selling; *“Our Company expects the sales of hybrid cars will increase in the automotive market in Malaysia. This is because percentages of sales for the latest statistics indicate that sales of Hybrid cars also get a high demand like conventional cars in Honda Malaysia Sdn. Bhd. (Engineer, 2014).”* The researcher believes that Honda Malaysia Sdn. Bhd. can achieve their targets because of the successes achieved so far in the history of the automotive industry.

Question 5: I used to get the further information about Honda cars from internet.

The result had shown that total of 5 respondents answered agree, and 20 respondents answered neutral for the question given. According to Khalelabadi (2008), Honda’s strategy has consistently emphasized “innovation”, “independence”, and “environmental friendliness”. Its corporate social responsible (CSR) and environmental vision stretches through the value chain. The researcher assumes many assume that in order to get information about Honda cars, they can go to the showroom to get the information clearer and more precise.

Question 6: I am using Honda cars because of its well-known brand.

The result had shown that total of 24 respondents answered agree, and 1 respondents answered neutral for the question given. Honda is one of the major manufacturers of hybrid variants. When Honda decided to merge its hybrid technology into an existing passenger car, the obvious choice was the Civic. Here, the researcher concludes that the success of Honda released the conventional cars that look luxurious, sporty and so make the customers believe that when Honda produces Hybrid cars necessarily it is more technologically advanced.

Question 7: I am using Honda cars because of quality achieved.

The result had shown that total of 22 respondents answered agree, and 3 respondents answered neutral for the question given. According to Khalelabadi (2008), Honda's strategy has consistently emphasized "innovation", "independence", and "environmental friendliness". The researcher concludes that Honda is capable to produce high-tech cars according to their own way to make sure their customers remained loyal to the product of cars that produced by Honda.

Question 11: The hybrids are equipped with the newest versions of the technology, giving drivers an advantage over the majority of other vehicles on the road.

The result had shown that total of 3 respondents answered agree, 2 respondents answered neutral and 20 respondent answered strongly agree for the question given. According to Dooman et al (2010), another technology that has been honed by hybrid car designers is traction and stability control. The improvements to current generation hybrids are a huge selling point that should be more widely advertised alongside the fuel economy rather than having fuel economy overshadows the other features of these cars. The researcher affirms that implementing a hybrid as a sustaining innovation allows incumbents to satisfy their best customers.

Company Strategize the Hybrid Cars

1) Focusing on Research and Development (R&D)

According to Dooman et al (2010), with the recent increase in people wanting to buy hybrid cars to help the environment, save money, or for whatever other reason they see fit, the government has given tax breaks to people buying hybrid cars in effort to push the environmental turn around. There is positive implication by producing Hybrid cars in Honda Malaysia Sdn. Bhd. *"Honda Malaysia Sdn. Bhd. carrying out a good relationship with the government. When the government requires car manufacturers in Malaysia to produce Hybrid cars, then our company will produce it. Indirectly, good relationship with the government, make it easy in order to negotiate the hybrid cars tax charges (Expert Engineer, 2014)."* The researcher believes through the good relationship with the government would beneficial to the both parties that are working together.

Question 2: The cost of producing a hybrid car is more expensive than the cost of producing a non-hybrid car.

The result had shown that total of 21 respondents answered agree, 1 respondents answered neutral and 3 respondent answered strongly agree for the question given. Struben et al (2008) assert that the automakers are now developing alternatives to internal combustion

engines. The researcher concludes that by introducing a new technology, the cost will be a major issue because a technology is already known by others that are very costly and expensive. Through the resources of the internet, the price of a Civic hybrid car is RM119,994 while the price of a Civic conventional car is RM112,096. This clearly indicates the price of a hybrid car is more expensive than a conventional car.

2) Strategic Market Planning in High-Tech Firms

Competitive advantage exists when the firm possesses resources and competencies that are valuable, rare, durable, and difficult for competitors to imitate. Effective high-technology marketing is built on a foundation of resources and ideas that result from the strategy formulation process by Mohr et al (2008). There is specific department that is responsible in planning the new product development of Hybrid cars in Honda Malaysia Sdn. Bhd. *“The department that is responsible in planning the new product development of Hybrid cars in Malaysia is New Model Centre (NMC) while in designing the new product development of Hybrid cars is in Japan. Japan will issue the certificate if there is a new design (Expert Engineer, 2014).”*

Question 3: Honda is one of the most competitive automobile manufacturers which producing hybrid car.

The result had shown that total of 4 respondents answered agree, 1 respondents answered neutral and 20 respondent answered strongly agree for the question given. According to Mytelka et al (2008), technological development at Honda progressed in accordance with the general trends in the Japanese auto industry, with a particular focus on their own fields of strength. Competitive advantage exists when the firm possesses resources and competencies that are valuable, rare, durable, and difficult for competitors to imitate. Indirectly, the researcher believes that Honda has its own strength in producing cars that can meet customer needs, wants and satisfaction.

3) Customer-Driven Innovation

By participating in generating ideas for sustainable, safe products, customers receive psychological and social benefits, including a heightened sense of social responsibility. With user-led innovation, customers seem to be willing “donate” their ideas freely according by Mohr et al (2008). Instead of Hybrid, Honda also had their plan to produce other more green vehicles. *“Yes we have our plan to produce others green vehicles. But it is still in the planning. We still do a lot of research to make sure the vehicle that is based on H₂O (water vapor) successfully released later (Expert Engineer, 2014).”* The researcher believes that Honda will be able to produce the vehicle that is based on water vapor because Honda will necessarily review profusely before being released. According to Howell (2008), the H₂O technology involves assembling together, homemade contraptions, which use barely a spark or two of electricity out the vehicles battery, to separate water, into a gas. Some of the benefits of H₂O are burns beautifully and clearly and provides in the process a near zero hydrocarbon, clean energy source and there are systems out there on running the car on hundred percent based on water.

Question 1: Honda Malaysia Sdn. Bhd. Is one of the automobile manufacturers which producing the Hybrid cars.

The result had shown that total of 5 respondents answered agree, 1 respondents answered neutral and 19 respondent answered strongly agree for the question given. According to

Christensen et al (2013), there is a relation that industries create hybrids for predictable reasons, including because the business case for the purely disruptive technology is not compelling at first to industry leaders, whereas implementing a hybrid as a sustaining innovation allows incumbents to satisfy their best customers. The researcher concludes that Honda will be the successful manufacturer because Honda is one of the major manufacturers of hybrid variants and companies that offer hybrid cars are very few.

Question 13: Customers are increasingly concerned about the safety impact of the vehicles that they buy.

The result had shown that total of 24 respondents answered agree, and 1 respondents answered neutral for the question given. According to Dooman et al (2010), now that hybrid cars have become main stream, the majority of hybrid consumers are looking for an environmentally friendly form of transportation, with the possibility of saving money the long term. With respect to the latter, customers are increasingly concerned about the environmental impact of the products that they buy and the safety of the products they use. The researcher assumes that hybrid car is more efficient and therefore less harmful to the environment.

Innovative Solutions to Remain the Hybrid Cars

The third objective of the topic research is to investigate the innovative solutions in order to remain the Hybrid cars for business sustainability. According to Bohnsack et al (2011), the customer demand, new technological possibilities, and regulation stimulated automakers to go further in the development of low emission vehicles. The technology of hybrid is most likely to substitute, or at least co-exist beside the internal combustion engine. To achieve the third objective, the innovative solutions has been investigated by distribute qualitative questionnaire and make in-depth interview. Besides that, the researcher also referring on secondary data for details of innovative solutions.

Like the preconceived notion that a hybrid car is better for the environment than a comparable internal combustion engine vehicle, hybrid cars are marketed claiming that the lower amount of energy that use will equate to a financial savings to the consumer. Again, the realization of this saving is dependent upon the number of miles driven over the life of the car because the initial capital investment of the more expensive hybrid vehicle must be offset by the savings in energy costs (Lagunoff, 2008). *“For the benefit of all parties, the community should have an awareness of the environment. Through transport, there is now a hybrid car if we look from different angles, hybrid indirectly contributed to the reduction of air pollution. Here, I want to recommend that environmental education should be pressed by all parties and delivered directly to the society among us (Expert Engineer, 2014).”* The researcher believes this suggestion is very useful to all society. People need to be aware of the environment. Although hybrid cars are very costly compared to conventional cars, but it is also have their own advantages. The advantages of hybrid such as are greener and less oil consumption. The hybrids vehicles help protect non-renewable sources of energy like gasoline. Gasoline is created from fossil fuel and is not recyclable. It shows that they can be replaced and the earth contains a finite amount of fossil fuel resources.

According to Buliveau et al (2010), advertisements have led people to believe that hybrid cars pollute less will save money and reduce dependence on natural fuel sources. Everyday large amounts of pollutants are released into the atmosphere leading the greenhouse effect and global warming. The production of hybrids consumes more energy and releases more emissions than the production of conventional cars. *“The government should enforce the law more stringent. Every car manufacturers will produce varying cars. The use of gas and liquid for each car that used*

should be filtered to ensure the release of fumes can still be controlled. The world government agency that really cares about environmental issues is United Nations Economic Commission for Europe (UNECE) (Expert Engineer, 2014)." The researcher concludes among the advantages of hybrid is to contribute to the reduction of air pollution and save fuel. As we know, a lot of fuel emissions produced by conventional cars. The presence of hybrid cars in the automotive market, indirectly, is seen to reduce air pollution. For example, a hybrid car will emit 25 to 90 percent less than a 100 percent gas engine car. Because hybrid vehicles use less gasoline and create lower levels of carbon based emissions, the air will be cleaner and contain higher levels of breathable oxygen.

According to Dooman et al (2010), with the recent increase in people wanting to buy hybrid cars to help the environment, save money, or for whatever other reason they see fit, the government has given tax breaks to people buying hybrid cars in effort to push the environmental turn around. The researcher suggests calling for government to subsidize the hybrid car usage especially for manufacturers of hybrid cars and also customers. Based on interviews conducted, one of the engineers mentioned that Honda Malaysia Sdn. Bhd. carrying out a good relationship with the government. When the government requires car manufacturers in Malaysia to produce Hybrid cars, then our company will produce it. The researcher concludes through the good relationship with the government would beneficial to the both parties that are working together. The researcher agrees that government should support the manufacturers of hybrid cars and customers to subsidize the hybrid car usage in order to encourage people to buy hybrid cars.

According to Morse et al (2007), the contributions of Battelle and Haloid constitute technological innovation, "the introduction into the marketplace of new products, processes, and services based on new technology." Struben et al (2008) assert that the automakers are now developing alternatives to internal combustion engines. Thus, hybrid vehicles offer the flexibility to widen the efficient operating range of a specific vehicle and together with advanced internal combustion engine technology, and a hybrid also is a flexible vehicle that utilizes an additional energy source to enhance behavior a conventional vehicle by Lagunoff (2008). The researcher suggests the manufacturers of hybrid cars can enhance their performance like acceleration of the hybrid car so that it will have the similar capacity like ordinary petrol and diesel cars. The researcher thinks that such problems are not encountered with the Civic Hybrid. By take a look of the ordinary Civic, it only switches off its engine when the vehicle comes to a complete stop and the driver has their foot on the brake pedal. The second brake pedal is released and the engine comes back to life and powers the vehicle. Not because the battery had a massive capacity, more so because the battery only ever came into use when the driver had a heavy right foot. The battery did not seem to power the vehicle unless the driver required a bucked load of power in a hurry.

5.0 Conclusions

The three sub points identified which is fuel efficiency, green environment, and industrial growth as the factors to sustain the Hybrid cars can be accepted by many people. Each factor is seen to have a distinctive advantage, such first factor that is fuel efficiency which can provide energy saving to the hybrid users, second factor is green environment by acknowledges that hybrid can save fuel and reduce greenhouse emissions, and the last factor is industrial growth when the automotive industry evolved, people will start thinking about the benefits of something like hybrid technology which indirectly can make environmental greener. The three sub points identified which is focusing on Research and Development (R&D), strategic market planning in high-tech firms, and customer-driven innovation as the factors to sustain the Hybrid cars can be accepted by many company. Each strategize is seen to have a distinctive advantage, such first strategize that is focusing on Research and Development (R&D) which by identifying core technologies like hybrid then focus on strategy can make a technology developed will be

successful, second factor is strategic market planning in high-tech firms that with commits a strategic plan, the organization which runs a high-tech firm will get many benefits like being able to predict profits that will be achieved, saving money transaction's firm can be controlled and so on, and the last factor is customer-driven innovation when some communities have begun conscious about environmental sustainability and because of a demand from customers, hybrid cars extracted and sold in the automotive market. Through further study in this respected field, one can somehow gain more knowledge and information about the technology of hybrids and indirectly contribute back to the society, automobile manufacturers and environment through knowledge sharing. There are always gaps for new technology to be filled which one can obtain through the study of new product development concepts.

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