INTERNATIONAL CONFERENCE STIAMI

The Sustainability Advantage Of Electric Vehicle Industry Influenced By Innovation And Marketing Interface

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ABSTRACT

The purpose of this study is to determine whether there are significant (partially or simultaneously) effect of innovation and marketing interfaces on sustainability advantage of the electric vehicle industry. This study used survey method by using closed questionnaire type. The population consist of electric vehicle dealer in Jakarta. The sample of research is 35 managers of marketing division at 10 electric vehicles dealer in Jakarta through the spreading of questionnaires in November and December 2022. The research results indicate that innovation has a significant positive effect on Sustainability Advantage of electric vehicle which means if electric vehicle innovation was applied it will encourage the increasing sustainability advantage in the electric vehicle. Marketing Interface has a significant positive effect on Sustainability Advantage which means that the application of Marketing Interface will encourage the improvement of Sustainability Advantage in the electric vehicle. Simultaneously Electric vehicle Innovation and Marketing Interface had a positive and significant effect on Sustainability Advantage in Electric vehicle.

Keywords: Innovation, Marketing/R&D Interface, Sustainability, Electric vehicle.

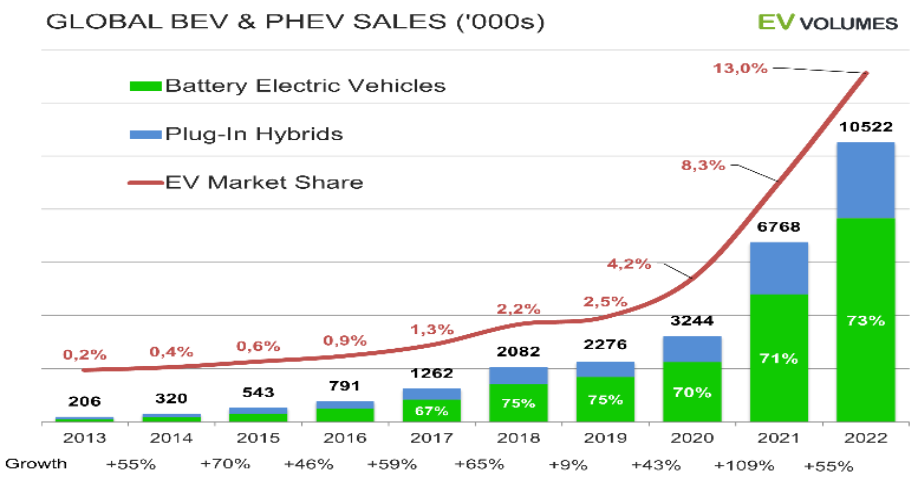
INTRODUCTION

The emerging of electric vehicle, has increased the acceleration and competition in research, invention, innovation, patents and the commercialization in the global marketplace. The development of new products and services is an important process to achieve success, organizational sustainability especially in the face of competition. The general expectation of electric vehicles investment is a shift from internal engine vehicles to electric ones (Luè *et al*., 2012). Energy consumption and pollution have been greatly influenced by the use of energy sources in the environment. The significant energy consumption and pollution variables resulted in a large proportion of coal-fired energy. Plug-in Hybrid Electric Vehicles have been promoted by providing Vehicle-to-Grid infrastructure as a possible solution to reduce greenhouse gas and other emissions by utilizing energy instead of oil for effective environmental management (Zhao, 2021). Global factors such as energy consumption and environmental issues encourage the utilization of electric vehicles as alternative energy sources besides transportation. Recently, the development of virtual power plants integrated with clean energy sources has also enhanced the role of EVs in the transportation industry (Inci, 2022).

In the case of Japan, the success of Toyota and Honda in domestic competition, which has nurtured firms with a strong product development capability (Pohl & Yarime, 2012). Electric vehicle innovation including fasten integration of battery pack innovation in commercial Electric Vehicles (EV) through massive digitalization: a seamless process detailed for battery design, battery safety, and battery management (Bordes, 2022). The stakeholder engagement system may contribute to stakeholder synergy and resource optimization hence for electric vehicle industry sustainable development (Jidi, 2021). Various stakeholders, including e-businesses and digital marketing, can play a positive role in

providing relevant information and promoting the use of EVs for the greater good (Mohammed, 2022). The development of Electric Vehicle will supported by innovation, regulation and technology (Pilkington, 2000)

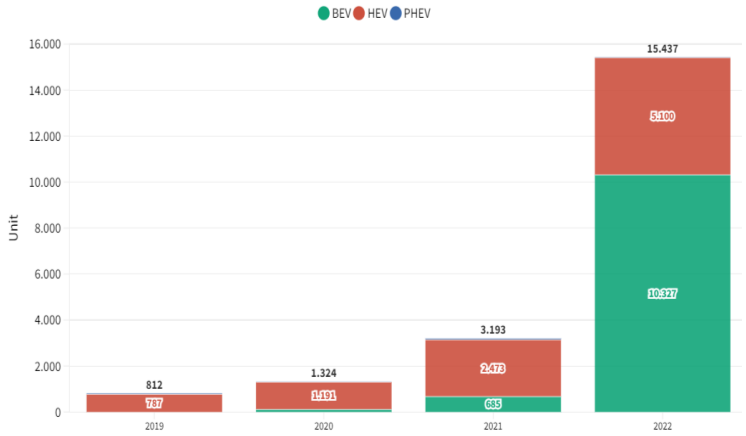
Figures1 Global BEV and PHEV Sales



Source: https://www.ev-volumes.com/

Global sales of electric vehicles (EVs) increased by 55% in 2022 from the year before, according to data from the EV Volumes sales database. China remains the world's largest EV market, with 59% of global sales. World Economic Forum estimates annual EV sales need to increase 18-fold by 2030 to meet global emissions targets.

Figure 2. Sales of Electric Vehicles in Indonesia 2019-2022



Source: Gaikindo, 2023

Sales of electric cars in Indonesia totaled 15,437 units throughout 2022. The number shot up 383.46% compared to the previous year (2021) which amounted to 3,193 units. Based on the Gaikindo report, sales of electric cars in Indonesia totaled 23,154 units in the first half of 2023. In fact, the number of electric car sales in the first half of 2023 has exceeded last year's 15,437 units. Electric vehicle marketed in Indonesia include Toyota, Honda, Mitsubishi, Nissan, Lexus, Hyundai, Tesla, BMW, Renault, Wuling, DFSK and Chery. The other brands that will compete include Mazda, Subaru, Kia, Maxus,

GWM and Neta. Indonesia has the fourth largest population in the world which is a potential market for the electric vehicle industry.

The development of electric vehicle sales provides an overview of the prospects for the development of the industry in the future. Through the development of innovation, R&D and new processes and marketing interface concerning with the ability to meet the needs, wants and consumer expectations as a booster presence of electric vehicle in the future increased market share of products based on electric vehicle will increase rapidly.

The necessity of creating sustainable development, firms worldwide are intentionally developing strategic plans to make their companies competitive sustainably. The search for sustainable competitive advantage is a priority for firms that operate in a complex global environment, to ensure the capacity to create value in the long term (López, *et.al*, 2007). The emergence of advanced manufacturing technologies, coupled with consumer demands for more customized products and services, are causing shifts in the scale and distribution of manufacturing (Ford & Despeisse, 2016).

Observing the above phenomenon shows that electric vehicle application in global and domestic electric vehicle ideally will be able to improve marketing ability and competitiveness of electric vehicle, both in serving domestic market and reality of industrial and trade globalization. Through the development of electric vehicle will show the effect of electric vehicle innovation and marketing interface on sustainability advantage in the electric vehicle. This research was conducted to examine whether electric vehicle innovation and marketing interfaces (partially or simultaneously) influence on sustainability advantage in the electric vehicle industry.

METHOD

This study used survey method. The population in this research consist of electric vehicle dealer in Jakarta. The sample size should be 10 times greater than the number of variables research (Uma Sekaran & Roger Bougie, 2013). The sample of research is 35 managers/staff of Marketing through the spreading of questionnaires in November and December 2022 at 10 Electric vehicle dealers in Jakarta.

Research Hypothesis

H1: There is a significant effect Electric vehicle Innovation on Sustainability Advantages of electric vehicle industry.
H2: There is a significant effect Marketing Interface on Sustainability Advantages of electric vehicle industry.
H3: There is a significant effect Simultaneously Electric vehicle Innovation and Marketing Interface on Sustainability Advantages of electric vehicle industry.

RESULTS AND DISCUSSION

Based on the result value on the test validity of Electric vehicle Innovation result is positive and bigger than r-table 0,666, then the whole item of question of variable of Innovation are all valid. Innovation reliability Test with r-table 0,666, while Alpha 0,971 so it can be concluded that Alpha positive and bigger or 0,971> 0,666 then instrument of variable of Innovation is Reliable. The next value the test of the validity variable of Marketing Interface, the result is positive and bigger than r-table 0,666, then the whole item of question of variable of Marketing Interface, totally valid. Test Reliability of Marketing Interface variable, with r-table value 0,666, while Alpha value 0,975 so it can be concluded that r Alpha positive and bigger or 0,975> 0,666 hence variable research instrument of Marketing Interface is Reliable. Furthermore, the result value of the validity test of Sustainability Advantage variable is positive and bigger than r-table 0,666 so that the whole question in Sustainability Advantage variable

is valid. Test Reliability variable Sustainability Advantage with r-table value 0.666, while the value of Alpha 0.947 so it can be concluded that Alpha positive and greater or 0.947> 0.666 then the research instrument variable Sustainability Advantage is Reliable.

The result of the normality test of Innovation, X2 value is 17,943, while X2table value at significant level and degrees of freedom (df)=16 is 26,296. X2 count is smaller than X2table. This means the frequency of observation scores for the variables of Innovation, normally distributed or not deviating from the expected frequency. The result of normality test of Marketing Interface value equal to 8,800 while X2table value at significant level and degrees of freedom, this means that the frequency of scores/observed data for Marketing Interface variables are normally distributed or not deviate from the expected frequency. In test of normality of variable of Sustainability Advantage, obtained value X2 count equal to 15,857 while value X2 table at significant level □ = 0,05 and degrees of freedom (df) = 15 is equal to 24,996. X2count is smaller than X2table. This means that the frequency of scores/observed data for the variable Sustainability Advantage is normally distributed or not deviate from the expected frequency.

The comparison of d values with the critical values of Durbin-Watson statistics table on 35 of Respondents, with the number of independent variables 2 being=1.5838. While the value of DW arithmetic obtained value=2.014, where the value is greater than DW table. It can be concluded there is no autocorrelation.

The coefficient of partial correlation (r) variable of Electric vehicle Innovation of 0.845 indicates that between variables of Electric vehicle Innovation with positive Sustainability Advantage variable, at very strong relationship level, which means that higher variable of Electric vehicle Innovation the higher the variable Sustainability Advantage. The contribution of coefficient of determination variable of Electric vehicle Innovation equal to 71,4% to variable Sustainability Advantage and the rest 28,6% caused by other factors.

Partial correlation coefficient obtained value of 0.910 so it can be concluded that the variable Marketing Interface with variable Sustainability Advantage is positively correlated and very strong, which means that with the variable Marketing Interface will further increase the variable Sustainability Advantage. The coefficient of determination (KD) variable Marketing Interface of 82.8% contribution to Sustainability Advantage and the remaining 17.2% caused by other factors.

The value of r = 0.935 has a positive value and the relationship is very strong, while the r Square value of 0.874 or 87.4%, shows the simultaneous influence of variables Electric vehicle Innovation and Marketing interface to variable Sustainability Advantage of 87.4%.

Based on the data process the value of the multiple linear regression equation as follows: Y = 12,850 + 0,252 X1 + 0,557 X2. The equation can be explained that Variations of Electric vehicle Innovation and Marketing Interface have positive coefficient direction toward Sustainability Advantage. The value of the intercept constant of 12,850 indicates that if the Electric vehicle Innovation and Marketing Interface variables increase 1 unit, the Sustainability Advantage variable will increase by 12,850. The Electric vehicle Innovation Coefficient gives a value of 0.252 which means that if the Innovation variable increases 1 unit then the Sustainability Advantage variable will increase by 0.252 assuming the Innovation variable, considered constant. This means that if the Electric vehicle Innovation gets better with the assumption that other variables are fixed then Sustainability Advantage will increase. The coefficient of Marketing Interface gives a value of 0,557 which means that if Marketing Interface variable increase 1 unit then variable of Sustainability Advantage will increase equal to 0,557 with assumption variable of Innovation is considered constant. This means that if the Marketing Interface is better with the assumption that other variables are fixed then Sustainability Advantage will experience improvement.

Hypothesis Test

That the results of hypothesis testing Electric vehicle Innovation shows the value of t arithmetic of 0.252 with the value of t-count greater than t-table, which means that the hypothesis in this study reject Ho and accept Ha. Thus, Electric vehicle Innovation has a significant positive effect on Sustainability Advantage. The calculation results seen that the results of hypothesis testing Electric vehicle Innovation shows the value of t arithmetic of 0.557 with the value of t-count larger than t-table, which means that the hypothesis in this study rejected Ho and received Ha. Thus, Marketing Interface has a significant positive effect on Sustainability Advantage.

The test of influence of independent variable simultaneously to the dependent variable is done by using F test (ANOVA). The calculation result shows the value of F arithmetic=110,706 with the significant level of 0.000 where the value 0.000 <0,05, means to accept the hypothesis stating that the variables of Electric vehicle Innovation and Marketing Interface variables simultaneously affected positive and significance on the variable Sustainability Advantage of electric vehicles industry.

CONCLUSION

Electric vehicle innovation has a significant positive effect on Sustainability Advantage which means if electric vehicle innovation is applied it will encourage the increasing sustainability advantage in the electric vehicle. The coefficient of determination shows Electric vehicle innovation contributes 71.4% to the change of Sustainability Advantage and the remaining 28.6% is caused by other factors. Marketing Interface has a significant positive effect on Sustainability Advantage which means that the application of Marketing Interface will encourage the improvement of Sustainability Advantage in the electric vehicle. The coefficient of determination shows that the contribution of Marketing Interface influence of 82.8% against Sustainability Advantage and the remaining 17.2% caused by other factors. Simultaneously Electric vehicle Innovation and Marketing Interface have a positive and significant effect on Sustainability Advantage in Electric vehicle. The contribution of Electric vehicle innovation and Marketing Interface is 87.4% to Sustainability Advantage in electric vehicle and the remaining 12.6% caused by the other factors.

This research offers an input in responding to the development of electric vehicle innovation especially in electric vehicle, through continuous effort in orientation of electric vehicle innovation can be followed by corporate strategy, including of interface between Marketing Department with Research and Development (R&D) to optimize market information up-date and its follow up.

Some of the limitations of this study were the diversification of variables, population coverage and number of samples. The further research should be developed the scope of marketing interface with the other departments.

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