



Electric Car Penetration Potential in Indonesia

Kresno Budi Wicaksono^{1*}, Atik Aprianingsih²

Sekolah Bisnis dan Manajemen, Institut Teknologi Bandung
Jl. Gelap Nyawang No. 1, Bandung, Jawa Barat 40132, Indonesia

¹kresnobw@gmail.com*, ²atik.apri@sbm-itb.ac.id

*Corresponding author

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ABSTRACT

Electric Car Penetration Potential in Indonesia: Automotive industry is one of the pillars that support Gross Domestic Product(GDP) in Indonesia. Moreover, despite of the pandemic condition, unlike internal combustion engine car, the sales of electric car is found to be increasing in Indonesia and global. This signs that there may be transformation in automotive industry towards electric car. To prepare for the transformation, company must be able to understand customer. Furthermore, this study was done to know the potential of electric car in Indonesia and provide suggestions to company in the industry by understanding the customers. As a result, company needs to comprehend the factors that influence purchase intention of electric car. In this study, understanding those factors was done with Theory of Planned Behaviour(TPB). In addition, it was found that purchase intention of electric car(PI) is greatly influenced by attitude(AT). While attitude to purchase electric car(AT) is greatly influenced by environment value. To sum up, this study showed that electric car has big growth potential in Indonesia. It is also showing the factors that influence customer purchase intention towards electric car in Indonesia.

Keywords: electric car; growth potential; purchase intention; theory of planned behaviour.

ABSTRAK

Otomotif industri adalah salah satu penopang Produk Domestik Bruto(GDP) di Indonesia. Meskipun adanya pandemi, tidak seperti mobil pembakaran dalam, jumlah penjualan mobil listrik di Indonesia dan global meningkat. Ini adalah tanda yang memungkinkan perubahan pada industri otomotif ke arah mobil listrik. Oleh karena itu, perusahaan perlu mengetahui faktor yang mempengaruhi niat untuk membeli mobil listrik. Analisa ini dilakukan untuk mengetahui potensi dari mobil listrik di Indonesia dan memberikan saran untuk perusahaan yang berada dalam industri dengan cara mengerti niat membeli. Mengetahui faktor yang mempengaruhi niat membeli dianalisa menggunakan Teori Perilaku Terencana(TPB). Hasil Analisa menunjukkan bahwa niat membeli mobil listrik(PI) sangat dipengaruhi oleh sikap(AT). Sedangkan sikap untuk membeli mobil listrik(AT) sangat dipengaruhi oleh nilai lingkungan(NV). Untuk merangkum, penelitian ini menunjukkan potensi pertumbuhan mobil listrik di Indonesia. Penelitian ini juga menunjukkan faktor yang mempengaruhi niat membeli mobil listrik di Indonesia.

Kata Kunci: mobil listrik, niat membeli, potensi bertumbuh, teori perilaku terencana.

1. Introduction

Transportation vehicle has become one of the most important inventions in these future days. However, as explained by Gaikindo in [AHK \(2020\)](#) that only 13,800 cars were sold in retail on May 2020 due to Covid-19 compared to 72,200 units on May 2019 in Indonesia. However, the sales of electric car in Indonesia keeps rising. The sales of Plug-in Hybrid Electric Vehicle (PHEV) from January 2020 until October 2020 is the same as in 2019 with 685 cars. But the sales of Battery Electric Vehicle (BEV) in Indonesia has risen from 0 sales in 2019 to 250 in 2020

(Rahadiansyah, 2020). This data conveys that the increase of Electric car sales in Indonesia is resilient and strong. Especially with the existence of Covid-19 pandemic. In addition, it has been explained by Indonesia ministry of industry in Gaikindo(2020) that Automotive become one of the 5 pillars that support Indonesia economic growth. Thus, it has been clear that automotive industry is essential for Indonesia economic growth.

Automotive Industry in Indonesia is crucial for Indonesia economic growth and currently undergo transformations. the assessment of

purchase intention to Indonesian market has become even more critical as it relates to the resources one company might use to cope with the change. The incapability to quickly adapt might be harmful for the company in the future. There are two research questions that needs to be addressed. First, “what is the purchase intention of Indonesian market towards Electric Car?”. Secondly, “How the companies in automotive industry should react?”. The objective is to comprehend purchase intention of electric car in Indonesia. Comprehending purchase intention of electric car can reveal the factor that influence electric car purchase. Moreover, with addition of growth potential, the proposed strategies for companies in the industry can be formulated. Moreover, it is mentioned in Indonesia-Investments (2018) that Multi-Purpose Vehicle (MPV) is the favorite car for people in Indonesia. Above all, the final objective of this research is to suggest company who are planning to sell and/or produce Electric car in Indonesia in respective industry. This research will be focused on electrical car in automotive industry in Indonesia. Moreover, this research will be focused on automotive industry in Indonesia in general and will not analyze specific company in the industry. Additionally, this research will focus on MPV electric car with battery as its power source. There are several research that has been done with correlation of electric car. These researches are used as a hypothesis for this paper.

II. Research Methodology

A. Research Time and Location

This research was done in Indonesia. This research is focusing towards automotive industry in Indonesia in general. Moreover, this research was done from February 2021 until July 2021.

B. Data Collection Method

Data for this research obtained through primary and secondary sources. Primary source in this literature refers to questionnaire, while the secondary source refers to internet sources. With regards to the questionnaire, the sampling method used is judgmental sampling or purposive sampling. Malhotra (2010) explains that this method relies on the elements that is selected to be the “filter” that can represent the population. Moreover, the “filter” is the people who wants to purchase a car.

C. Data Processing

This research is analyzed by quantitative method. Researcher obtained 220 responses from the

questionnaire. It consists of 208(94.5%) respondents pass the preliminary question and 12(5.5%) respondents do not pas the preliminary question. Then, the data is analyzed by the aid of SPSS Statistics. First, it is validated by utilizing Pearson test method and being tested by Cronbach Alpha for its reliability. Next, to detect whether the independent variable influencing each other, collinearity test is done.

For Theory of Planned Behaviour(TPB) analysis, the data is analyzed using both descriptive and multiple regression which both analysis is analyzed by the aid of SPSS Statistics. Descriptive analysis is done to describe the variable using the data obtained. While multiple regression is done to understand the impact of independent variable towards its respective dependent variable).

D. Data Analysis

First, data was analyzed using Pearson test for its validity. The passing criteria of validation test is when $r_{\text{calculated}}$ is smaller than r_{table} which has value of 0.138. Moreover, significance must be smaller than 0.05. While reliability test was analyzed using Cronbach Alpha. The value of Cronbach Alpha must be greater than 0.7 to pass reliability test. While multicollinearity test was done to know the independency of between independent variable that influence dependent variable. This is critical as to ensure independent variable is not influencing another independent variable for the same dependent variable. Moreover, multicollinearity in regression model can be assessed by the value Variance Inflation Factor (VIF). According to SPSS test (2016), there is no multicollinearity if the value of VIF falls between 1 and 10.

E. Mathematical Formula

There are several formulas that were used in this research. Those formulas are explained below.

$$MDI = \frac{\text{Current Market Demand}}{\text{Market Potential}} \times 100\% \dots\dots\dots(1)$$

$$SDI = \frac{\text{Market Share Index}}{\text{Share Potential Index}} \times 100\% \dots\dots\dots(2)$$

In Equation 1, MDI is Market Development Index. In Equation 2, SDI is Share Development Index judgmental sampling

III. Result and Discussion

In this part of research, author will describe the result from the data and explain the findings from the research.

A. Descriptive Analysis

After knowing that the data for each variable is valid and reliable, researcher continue with the analysis. This section will explain the result obtained for each variable, namely Environmental Value, Hedonic Value, Utilitarian Value, Attitude towards electric car purchase, Subjective Norm, Perceived Behavioral Control, and Purchase Intention. Moreover, the Likert scale interpretation will be done through the utilization of mean and standard deviation. This is aligned with statement of Boone and Boone (2012) where it is suggested to use means and standard deviation to report the Likert scale.

Descriptive analysis is needed to comprehend each variable's description obtained from the data. The result can be seen in Table 1.

Table 1 shows the result of the analysis done with the assistance of SPSS. It was found that the mean value of the NV is 4.13 out of 5. This means that in average, people belief in actions that highly promotes environment. Combine the result with the respondent's education level, it shows that undergraduate degree (S1) with 62.5% (130 respondents) belief in actions that highly promotes environment. In fact, Dasgupta, Hettige and Wheeler (2000) found that worker with high education have better environmental performance.

Moreover, The mean value of HV was found to be 2.94 out of 5. This means that people moderately to less believes in purchasing for the sake of pleasure and the feeling of belongingness. With respect to gender on respondent's data, it is known that men have slightly higher percentage women with 58.2% and 41.8% respectively. Thus, the result of hedonic Value (HV) is slightly driven by men. Moreover, the result is supported by Agbaria, Ronen, and Hamama (2012) as they

found that men have a lower need to belong compared to women.

Next, UV has mean of 2.09. In this variable, the lower the mean, the more critical utilitarian value. In general, the result shows people believe the functionality and price of electric car are important. Besides, the interpretation is more accurately used to describes people who are willing to spend lower than 400 million rupiahs for a car (82.3% respondent).

Furthermore, AT mean lies on 3.95 out of 5. The results shows that people's assessment towards the attitude of electric car purchase is positive. Moreover, if the attitude is positive, the value of intention should also be high. The idea is aligned with respondent data where 181 respondents (87%) are interested in having electric car.

Subjective Norm has average score 3.71 out of 5. This high value shows that people perceived the norm in their surroundings to give social pressure towards the individual regarding electric car. Moreover, majority of respondents (94 people or 45.2%) are working in a private owned company. Thus, the result can be generalized as the norm in private owned company.

PB mean value was found to be 2.33. This means that the respondents currently perceived that they have a higher risk compared to the opportunity with regards to buy electric car. It can be happen because the perceived high risk, low opportunity or both to purchase electric car.

Average PI is 3.93 out of 5. This explains that respondent has high intention to purchase electric car. This result is supported by the questionnaire result as 191 respondents (91.8%) are interested to purchase electric car.

B. Correlation Among Variables

According to Mindrilla and Balentyne(2017) positive r value indicate positive correlation, while r negative value indicate negative correlation. They also add regarding its power whether r absolute value has greater correlation if it is closer to 1 and weak correlation if it is closer to 0. It has been mentioned by Mindrilla and Balentyne(2017) that r absolute value lower than 0.3 is very weak/no correlation. However, Evans (2016) in Statstutor states that r absolute value below 0.2 is very weak. Thus, researcher will combine such that r absolute value below 0.2 will be very weak/ no correlation. It is showed in **Table 2**. Moreover, a meaningful correlation can be assessed and differentiated based on the discipline utilizing the value of R-Squared (r^2). According to Jost(2017), there are 4 (four)

Table 1 Descriptive Analysis Result

Variable	Code	Average value
Environmental value	NV	4.13
Hedonic Value	HV	2.94
Utilitarian value	UV	3.91
Attitude towards electric car purchase	AT	3.95
Subjective Norm	SN	3.71
Perceived behavioral control	PB	2.33
Purchase intention	PI	3.93

disciplines, namely physics, chemistry, biology, and social sciences. This research is closely related to social sciences compared to the other disciplines. Moreover, Jost (2017) explained that the value of R-Squared (r^2) for social sciences will be meaningful or have less variation if its value is greater than 0.35. Ultimately, based on **Table 3**, both correlations which dependent variable AT and PI are meaningful and positive.

Next, the magnitude of influence from independent variable toward dependent variable is explained in **Table 4**. The result shows that purchase intention (PI), Attitude (AT) has the highest influence. While subjective norm (SN) and perceived behavioral control (PB) both have a big p-value which means that the impact is not significant towards purchase intention (PI). Additionally, attitude (AT) is greatly influenced by environmental value (NV). While hedonic value (HV) and utilitarian value (UV) both have a big p-value which means that the impact is not significant towards attitude (AT). These align with Mindrilla and Balentyne(2017) also mention that low p value(<0.05) is statistically significant.

In addition of the table above, the correlation of variable is more clearly depicted in **Figure 1**. Firstly, environmental value (NV) is the only statistically significant variable to determine the value of attitude (AT). The results shows that when NV increase by 1, the value of AT will increase by 0.918. Secondly, attitude (AT) is the

Table 2 Criteria for r Correlation Strength

R absolute value	Strength of correlation
0.00-0.19	Very weak/no correlation
0.20-0.39	Weak
0.40-0.59	Moderate
0.60-0.79	Strong
0.80-1.00	Very Strong

Source: Mindrilla dan Balentyne, 2017&Evans in Statstutor, 2016

only statistically significant variable to determine the value of purchase intention (PI). The results shows that when AT increase by 1, the value of PI will increase by 0.618.

C. MDI and SDI Analysis

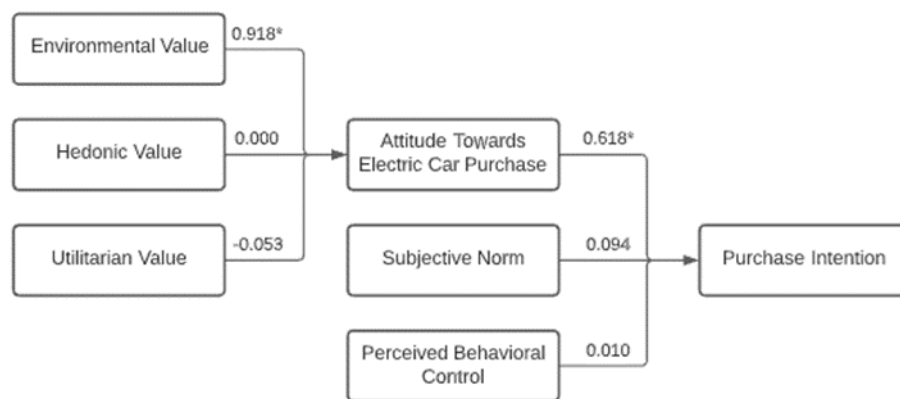
Based on data from Rahadiansyah (2020) that the sales of BEV in Indonesia increased from 0 in 2019 to 250 in 2020. It was found that current market demand is 250 electric cars. On the other hand, the market potential reached 12,649,731 cars. This was obtained by utilizing maximum number of purchase, customer buying ceiling, purchase rate, purchase quantity and product price. Thus, using formula number 1, Market Development Index(MDI) was found to be 0.002%. According to Best (2013), MDI value lower than 33% shows a big potential growth. Moreover, 0.002% indicates that electric car's growth potentials in Indonesia are significant.

Table 3 Variable Correlations for Dependent Variable AT and PI

Independent Variable	Dependent Variable	r value	R ²	Result
NV	AT	0.817	0.667	It is meaningful and the correlation is very strongly positive
HV				
UV				
AT	PI	0.799	0.639	It is meaningful and the correlation is strongly positive
SN				
PB				

Table 4 Independent Variable Coefficient for Dependent Variable AT and PI

Independent Variable	Dependent Variable	Coefficient Unstandardized B	p-value	Result
NV	AT	0.918	0.000	Statistically significant
HV		0.000	0.996	Statistically not significant
UV		-0.053	0.166	Statistically not significant
AT		0.618	0.000	Statistically significant
SN	PI	0.094	0.089	Statistically not significant
PB		0.010	0.813	Statistically not significant



* statistically significant

Figure 1 Variable Correlation Result

Market share index can be deducted from share performance matrix which shows the current market share of electric vehicle in Indonesia. This data is obtained from the questionnaire done. Moreover, Market Share Index was found to be 1.15%. According to Taufiek Bawazier in Sandi(2021), Indonesia will expect at least 20% electric car to be adopted in 5 to 10 years. This value can change and developed based on the condition of the market. Thus, the current Share Potential index was found to be 20%.

This shows that currently, using formula number 2, Share Development Index(SDI) electric car only have 5.75% of the current potential market share. The maximum market share is shown by SDI equal to 100. Thus, there is a big potential to widen market share.

D. Hypothesis Analysis

H1: Environmental Value Relation with Attitude Towards Electric Car Purchase (NV to AT) is positive (Supported). It has been found in this thesis that there is a statistically significant positive correlation between NV and AT. Thus, the hypothesis is held. Moreover, the correlation of NV towards AT is the only statistically significant. This findings correlates with the finding by Degirmenci and Breitner(2017) where environmental has strong correlation with attitude.

H2: Hedonic Value Relation with Attitude Towards Electric Car Purchase (HV to AT) is positive (Not Supported). The hypothesis of the correlation among these variables is positive. However, it is found in this study that there is no correlation between those variables. The constant value is rounded to 0.000 and the p value is 0.996. This means that the null hypothesis is accepted and no correlation between HV and AT. This might occur due to not many people own electric car in Indonesia. Kazakeviciute and Banyte

(2012) mention that consumers with hedonic value tend to perceive necessity to belong in one group. Since currently there are not many electric cars in Indonesia, the impact of the feeling is not significant.

H3: Utilitarian Value Relation with Attitude Towards Electric Car Purchase (UV to AT) is positive (Not Supported). Hypothesis of these variables is positive. It has been explained by Afroz et al (2015) that utility for electric car customer is important. However, it was found that there is no statistical significance for UV to influence AT. This happens as most of the transportation in Indonesia is internal combustion engine (ICE), which the utility and function already developed and trusted. Even though it is known that utility is important, there might be some uneasiness for people to acknowledge the utilization trustworthiness of a new electric car. As Mitchell (2018) states that “consumer trust creates loyalty”, which aligned with the reason why utilitarian value has not significant impact towards attitude.

H4: Attitude Towards Electric Car Purchase with Purchase Intention (AT to PI) is positive (Supported). The hypothesis of variable attitude and purchase intention is positive. This hypothesis agrees with the finding in this thesis where the correlation was found to be positive. Moreover, this finding also resonates with the finding by Huang and Ge (2019) where there is positive correlation between attitude and purchase intention of electric car. Moreover, attitude is the strongest influence towards purchase intention compared to subjective norm and Perceived Behavioral Control.

H5: Subjective Norm Relations with Purchase Intention (SN to PI) is positive (Not Supported). Correlation hypothesis of subjective norm and purchase intention was positive correlation. This

hypothesis is not supported by this research where it was found that there is a no statistical significance. This might happen due to the low user of electric car. As a result, the pressure from the colleagues might not be perceived as the norm in a bigger society.

H6: Perceived Behavioral Control Relations with Purchase Intention (PB to PI) is positive (Not Supported). The hypothesis for PB and PI correlation was positive correlation. However, there was no statistical significance found to underline the correlation of both variables. Thus, it was found that there is no correlation between PB and PI. This might happen as not many people in Indonesia has the experience to own and drive electric car. Thus, they would not have the proper idea on the opportunity and risk of electric cars. As a result, PB has no statistical significance towards purchase intention.

E. Recommendation for Companies within Automotive Industry Indonesia

Returning to the main business issue due to the fast transformation in Indonesia Automotive Industry, company must be able to adapt quickly to the change and follow customer needs.

It is shown that electric car in Indonesia has a big potential in the future. Thus, it is one option for company to invest in this sector. Moreover, utilizing the findings above, author will provide suggestions to the company who want to sell and/or produce electric car in Indonesia. There are two suggestions are as follows:

First Suggestion is to produce or sell an affordable electric car. Firstly, the questionnaire data suggest that 82.3% people want to purchase car below 400 million Rupiahs. This shows that majority of people are willing to purchase a car if it is lower than 400 million rupiahs. This information points that price must be adjusted for Indonesian market. Moreover, economical condition in Indonesia is starting to improve after pandemic, while the legal is improving towards electric car transformation and the condition of surrounding environment is helping to produce and operate electric car. These external conditions is still developing, which will provide time for electric car producer and prepare Indonesia citizen of electric car. Besides, according to Antara(2021), Avanza had been the most demanded car in Indonesia for 15 years, however, in 2020 Brio become the most demanded car. One of the similarities between those cars are the price. The price of Avanza is around Rp 200,000,000,- while, Brio has lower price around 170,000,000,-. Therefore, author

suggested for company to produce or sell cars that are reasonably priced. Based in the first three results obtained and the fact explained above, the price of electric car must be adjusted to be at least lower than 400 million rupiahs which shows where the majority of respondents willing to purchase car. According to Rasyidin (2021), currently there is no electric car that is lower than 400 million rupiahs. Currently, the most economical is Nissan Kicks with 449 million rupiahs. Thus, it is suggested to develop, produce, and sell electric car that is lower than 400 million rupiahs to attract majority of potential customer. There are several actions that can be done for this suggestion. Firstly, designing and testing affordable electric car. This step is focusing on the development and testing of a new electric car. The specification can be developed as required by the customer which focus on price and car utility. Secondly, marketing emphasizing on the affordable price and utilization. This step is focusing on the early marketing of the new affordable electric car with the aim to increase awareness, customer anticipation, and curiosity. This will potentially boost the launching of the product. Thirdly, production of affordable electric car. The mass production of electric car to fulfil customer anticipation. It means that during this phase, major infrastructure such as charging station and electric car maintenance should starting to become more common. This is to improve customer acceptability. Next, selling emphasizing on the affordable price and utilization. This step is the step where the selling begun after the launching of the product. The selling of electric car emphasizing in price affordability and car utility.

Second suggestion is to do market campaign emphasizing in electric car for environment. Based on research result, PI is greatly influenced by Attitude (AT) and it has statistical advantage. On the other hand, PB and SN are not statistically significant towards the dependent variable (PI). As a result, this suggestion will be focused on AT. Moreover, it is known that the value of AT was determined by environmental, hedonic, and utilitarian value. However, environmental value (NV) was found to be the only variable that has statistical significance towards AT. Thus, this suggestion will focus on utilizing environmental value (NV). In order to sharpen the focus even further, analyzing the questions which constructed the environmental value (NV) is necessary. There are 5 (five) questions from NV1 to NV5, and author focus on the question that have the highest mean value as it has the biggest contribution to the overall mean of the variable.

Furthermore, NV3(Purchasing electric car worthwhile) with score 4.24 has the highest mean value. It shows that people believe that purchasing electric car is useful for environmental concern. Thus, the next suggestion for company is to do a marketing that is emphasizing on electric car usefulness especially for environmental issue. It is suggested for the company to market the product to raise a specific topic regarding environment. The target will be the people who want to buy car. This suggestion will focus on the marketing of the electric car. Firstly, build a social media and website account to promote electric car for environment. This phase is to develop audiences and introduce electric car to the community. The social media and website are focusing on the advantage of electric car towards environment. As a result, community recognize electric car as the best way to save environment. Secondly, increase community environmental awareness through education. This phase is done to increase environmental awareness of community. Not only students, but also employees and community at large. Education can be done while working together with specialist such as environmentalist. Thirdly, moving one place to another to introduce electric car capability to improve environmental condition. This step is focus on the impact of electric car towards the environment. This can be done through research demonstration or validation. Moving from one place to another place is critical to develop a common ground among the society regarding electric car benefit.

IV. Conclusion

Understanding the factors that influence purchase intention of electric car in Indonesia is necessary for company in Automotive Industry to be agile. This problem was addressed using the Theory of Planned Behavior. This study analyses 3 (three) variables that potentially influence electric car purchase intention, namely attitude (AT), Subjective Norm (SN), and Perceived Behavioral Control (PB). Those variables has a meaningful correlation towards purchase intention (PI). However, attitude (AT) is the only variable that has statistical significance correlation with purchase intention (PI). On the other hand, perceived behavioral control (PB) and subjective norm (SN) have “no correlation” with electric car purchase intention. Thus, purchase intention (PI) of electric car is greatly influenced by attitude (AT). In more detail, attitude (AT) was influenced by three variables namely environmental value (NV), hedonic value (HV),

and utilitarian value (UV). In addition, environmental value (NV) has the biggest impact towards attitude (AT) to purchase electric car and the only variable that can significantly influence the value of AT. To sum up, purchase intention of electric car in Indonesia is greatly influenced by environmental value of the community.

The second issue is the recommendation for the companies within Automotive industry Indonesia in facing the transformation towards electric car. This problem is addressed using the findings in this research which explained in the previous question. There are 2 (two) suggestions given by the author to the companies in automotive industry. First, producing or selling an affordable electric car. Currently, there is no electric car that is lower than 400 million rupiahs, so, it is suggested to develop, manufacture, and sell an affordable electric car. Secondly, it is suggested to do marketing campaign emphasizing in electric car for environment. This is suggested as it is known that environmental value (NV) is the biggest variable that influence attitude (AT). While attitude has the greatest value that influence electric car purchase intention (PI).

V. Suggestion

This research is done to increase knowledge and information of the readers. Any actions in the company might need to be modified with respect to the capabilities and aim of the company as this research did not focus on one specific company. This research is examining the condition and influence for the company in industrial level in general.

Secondly, in order to improve the research, author suggest that to do analysis in more depth for different types of company in the industry. As a result, it would be more detail and applicable especially the suggestion for the company considering its capabilities and goals.

Thirdly, author propose for next research to have a broader sample after electric car become more common to complement the discovery of this research. This will ensure the transformation of the mindset of the customer after the transformation.

Lastly, it is also suggested for future research to be more specific and obtain more data from the people who already owned electric car or the people who already drive the car. This will brought to light the benefit of electric car and their perspective that most people in Indonesia has not had the opportunity to do so.

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