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Factors Affecting Electric Car Acceptance in Indonesia

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Abstract: This research is conducted to evaluate the society acceptance regarding the electric car in Indonesia by examining factors that may influence consumer acceptance as well as consumer's needs and constraints. Survey questionnaire with 262 respondents from various cities in Indonesia were gathered but only 238 of responses were used in the analysis. Using exploratory factor analysis (common factor) and multiple linear regression, it was found that there are 5 factors contributing to the acceptance of electric car in Indonesia, they are: Environmental Awareness and Benefits for the Environment (EA), Attitudes toward Technology (AT), Performance Attributes (PA), Financial Benefits (FB) and Education and Promotion (EP). Analysis of open-ended questions revealed that high purchase price of electric car will become the main obstacle even though the consumers are aware of the benefits of electric cars to the environment. This study also gives some insights concerning consumer expectation of electric car attributes, consumer preference regarding the purchasing time, consumer preference of information and education channel, perceived barriers associated with buying the electric car.

Key words: Electric car acceptance, technological attitude, performance attribute, abstacle, conumers

INTRODUCTION

The Indonesian government in its National Research Agenda for Research and Technology 2010-2014 has formulated a long-term target (up to year 2025) to reduce pollution and the use of fossil fuel in the transportation SUCH as using alternative energy for private transport. Through the Low Carbon Emission (LCE) program, the government plans to encourage the production and the use of environmentally friendly cars in Indonesia (Ministry of Transportation, 2013). This can be done by giving priority to automotive companies to produce environmentally friendly cars with low carbon emissions and energy saving (Ministry of Research and Technology, 2013). One of the solutions is the development of electric car program (Ministry of Transportation, 2013). To support this program, many institutions, universities and companies in Indonesia have developed electric car prototypes successfully but they are not in the production stage yet while Mitsubishi and Tesla have produced electric cars in large scale and marketed them in several countries but have not yet entered Indonesian market. The adoption and acceptance of electric car are facing several constraints. One major constraint is that the electric car is considered inferior to conventional cars (Bockarjova *et al*., 2013; Sanitthangkul *et al*., 2012). Barriers to electric car adoption could also occur in Indonesia when the electric cars enter the market, even though in general the Indonesian society has high awareness to environmental problems. This is due to the fact that the actual environmentally friendly behaviors are rarely demonstrated in real deeds (Sari and Hasnelly, 2012). Studies have shown that, the success of electric cars in the market will be determined by a broad and sustained adoption of the society (Anderson *et al*., 2011). As electric car is relatively a new technology, to make this technology commercially successful, the target market, the customer needs and concerns must to be recognized (Anderson *et al*., 2011; Kurani *et al*.,1995; Potoglou and Kanaroglou, 2006). Hence, the objectives of this study are: to identify factors that will influence the consumer acceptance of the electric car and preferences and expectation of potential customers regarding the electric car.

Literature review: Consumer acceptance and sustainable usage are important conditions for a technological shift and the long-term success of a new sustainable transportation system (Ozaki and Sevastyanova, 2011). Consumer acceptance of electric cars is often hindered by high purchase price and driving range uncertainties as well as battery reliability. The need to charge the battery frequently will also force consumer to change their habits (Anderson *et al*., 2011; Peters *et al*., 2011). Battery-related

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things such as battery price, charging time and infrastructure support are also factors that could inhibit the adoption of electric cars. Consumer groups who understand the technology are still questioning the uncertainty associated with the electric car battery technology and the sustainability of fuel source as for the charging, fossil fuel energy sources are still used (Egbue and Long, 2012). Public skepticism towards new technology products like electric cars can also be caused by the lack of knowledge about the technology (Kang and Park, 2011). This lack of knowledge coupled with the difficulty in obtaining information may contribute to the consumer's lack of familiarity to the electric car. However, only relying on the dissemination of knowledge about the technology is not enough to make the technology accepted immediately. Support of consumers towards a technological innovation is not only influenced by their knowledge and awareness BUT also by social environment and personal background as well as the credibility of the product whether it can be trusted or not (Kang and Park, 2011). However, the "social" barriers originating from individual consumer may pose as a problem in addition to the technical problem in the development of electric cars for the consumer market (Egbue and Long, 2012). The failure of the electric car manufacturers and policy makers in identifying and addressing these issues can continue to make the acceptance of electric cars remains low despite the technical issues have been addressed (Egbue and Long, 2012).

Regarding battery range and charging time, one of the solutions is through battery swap or battery exchange. With battery swap, consumers can quickly replace a depleted battery with a fully charged at a battery swap station (Egbue and Long, 2012). The time required is approximately equal to the time it takes to refuel a conventional car. In this case, the battery ownership will be separated from vehicle ownership, meaning that the initial price of electric car may decrease but consumers would then pay for monthly battery subscription (Egbue and Long, 2012). Studies of acceptance of electric cars show that there are several factors influencing a person's acceptance. According to Zhang *et al*. (2013) in their study on consumer acceptance of Battery Electric Vehicle (BEV) and Plug-in Hybrid Electric Vehicle (PHEV), those factors could be divided into psychological needs, environmental awareness, financial benefits and performance attributes. Willingness to buy environmentally friendly cars is influenced by consumers' psychological needs or psychological motivations (Kang and Park, 2011). But, consumer's desire to be seen as someone who is concerned with the conservation of the environment can lead the consumers to try the vehicle (Kang and Park, 2011; Zhang *et al*., 2013). The psychological needs are norms and social pressures as well as expression of oneself (Ozaki and Sevastyanova, 2011). Norms and social pressures show that a technology or innovation can be accepted by a person because the individual wants to be associated with a particular image as well as to be accepted and aligned with the norms of a group. In addition, social norms can also make a person wants to be responsible in their social environment (Erdem *et al*., 2010). Besides social norms and pressures, the needs to express personal identity as stylish and fashionable are obviously important for consumers (Ozaki and Sevastyanova, 2011). If compliance with the norms of the group is important and innovation is one of the norms of the group, then adoption of innovation and new technology will be easier for the group member (Ozaki and Sevastyanova, 2011). Factors related to individual awareness or concern for the environment and environmental benefits are studied by scholars. The higher a person's attention to global warming, the chance that he or she is willing to pay high for electric car is also higher (Erdem *et al*., 2010). Other than that, environmental benefits can be seen in terms of emissions produced, effect on global warming and petroleum consumption (Zhang *et al*., 2013; Erdem *et al*., 2010). Consumer's consideration towards sustainability also influence them in determining the choice when to purchase a vehicle (Sanitthangkul *et al*., 2012).

Sustainability can be attributed to the conservation of natural resources while maintaining the quality of the environment or in other words the use of resources with zero net impact so it does not threaten the environmental conditions in the future. Negative perceptions of the sustainability of the electric car can be caused by the assumption that charging for electric cars is still using fossil fuels and this will increase the use of fossil fuels in power plants and people may perceive that it is just moving the greenhouse gas effects from the road to power plants. Therefore, these people need to be convinced that electric cars are not just 'trading one problem for another' (Egbue and Long, 2012). The financial benefits can be divided into two, namely the economic benefit from the vehicle and economic benefits from government policies related to the electric car. Financial benefits or economic benefits of the vehicle can be the savings in fuel costs (Kang and Park, 2011; Ozaki and Sevastyanova, 2011). Government policy such as incentive for car purchase price will increase the adoption of electric cars (Gallagher and Muehlegger, 2011; Thiel *et al*., 2012; Zhang *et al*., 2013; Kurani *et al*., 1995) while the higher the fuel price and the lower the electric

Table 1: Variables included in the study

Variables	Measured variable*
Compliance to group norms, values (Ozaki and Sevastyanova 2011; Zhang *et al*., 2013)	V1
The desire to be responsible and care to the social environment (Erdem *et al*., 2010)	V2
The desire for self-actualization to be appreciated by others and seen as 'different' or 'stylish' and to improve social status (Ozaki and Sevastyanova, 2011; Zhang *et al*., 2013)	V3
The desire to be seen as people who care about the environment (Kang and Park, 2011; Zhang *et al*., 2013)	V4
Reducing the effect of global warming (Zhang *et al*., 2013; Ozaki and Sevastyanova, 2011)	V5
Reducing air pollution caused by emission of carbon (Zhang *et al*., 2013; Ozaki and Sevastyanova, 2011)	V6
Reducing dependence to petroleum (Zhang *et al*., 2013; Ozaki and Sevastyanova, 2011)	V7
Sustainable technology (Egbue and Long, 2012)	V8
Helping the conservation of the environment (Zhang *et al*., 2013; Ozaki and Sevastyanova, 2011; Erdem *et al*., 2010; Sanitthangkul *et al*., 2012)	V9
The reduced purchase price because of the incentives for the purchase of electric cars (Kang and Park, 2011; Zhang *et al*., 2013; Ozaki and Sevastyanova, 2011; Thiel *et al*., 2012)	V10
Reduced of fuel cost (Kang and Park, 2011; Zhang *et al*., 2013; Ozaki and Sevastyanova, 2011; Thiel *et al*., 2012)	V11
Free access to toll road (Ozaki and Sevastyanova, 2011; Erdem *et al*., 2010)	V12
Free parking (Ozaki and Sevastyanova, 2011; Erdem *et al*., 2010)	V13
Driving comfort (Zhang *et al*., 2013; Ozaki and Sevastyanova, 2011; Peters *et al*., 2011)	V14
Safety (Zhang *et al*., 2013)	V15
Ease of operation (Zhang *et al*., 2013; Ozaki and Sevastyanova, 2011; Peters *et al*., 2011)	V16
Design (Zhang *et al*., 2013; Ozaki and Sevastyanova, 2011)	V17
Brand (Ozaki and Sevastyanova, 2011)	V18
Interest in technology (Ozaki and Sevastyanova, 2011)	V19
The desire to become a pioneer in the technology (Ozaki and Sevastyanova, 2011; Erdem *et al*., 2010)	V20
Educate or inform others about the type of new vehicle (Ozaki and Sevastyanova, 2011)	V21
Sharing knowledge about new technology with others (Ozaki and Sevastyanova, 2011)	V22
Education, campaigns, and dissemination of information through mass media and social media (Egbue and Long, 2012; Anderson *et al*., 2011; Peters *et al*., 2011)	V23
The opportunity to try (trial) (Ozaki and Sevastyanova, 2011; Peters *et al*., 2011; Anderson *et al*., 2011)	V24
The presence of an electric car demonstration at events such as exhibitions, test drive, and other automotive events (Anderson *et al*., 2011; Peters *et al*., 2011; Thiel *et al*., 2012)	V25
The use of electric cars by leaders, experts, institutions, as well as public transport (Anderson *et al*., 2011)	V26
The hope that electric cars will come soon (Kang and Park, 2011; Zhang *et al*., 2013)	Y1
Willingness to recommend electric car to friends (Kang and Park, 2011; Zhang *et al*., 2013)	Y2
Interest to have an electric car (Kang and Park, 2011; Zhang *et al*., 2013)	Y3

*V for independent variables while Y for independent variables

car price will make market penetration of electric car becomes easier (Egbue and Long, 2012; Diamond, 2009). Other financial benefits are free access to the city center (Ozaki and Sevastyanova, 2011), free access to pass through toll road and free parking are considered to increase the acceptance of environmentally friendly cars (Erdem *et al*., 2010). One important factor related to the performance attributes attached to the electric is the suitability of the car to the consumer practical needs to drive the car such as the size of the car, comfort, quality, safety, design and ease of operation (Ozaki and Sevastyanova, 2011; Zhang *et al*., 2013). Other factors such improvements in the safety and convenience of electric cars can also change consumer perception to the electric cars so that they are not considered inferior to conventional car (Peters *et al*., 2011). Affective factors such as brand and statement about the reliability of the products will influence the purchasing decisions about environmentally friendly cars (Ozaki and Sevastyanova, 2011). Positive attitude or high interest toward new technology will also cause the adoption of electric cars to increase. In addition, having an electric car can also influenced by the desire to become a pioneer in the technology, to educate or inform others about a new type of vehicle as well as sharing new knowledge about technology (Ozaki and Sevastyanova, 2011). Table 1 summarizes all the variables included in the study based on literature review.

MATERIALS AND METHODS

Data were collected through online questionnaire survey using purposive and judgmental sampling in July 2014. Respondents are those who own a car, usually drive the car and have a car driving license. With these requirements the respondents are assumed to be familiar with the use of a car, know how to operate a car, how to refuel and familiar with its performance so that they can understand the questions and able to give valid answer. The number of questionnaires returned was 262 BUT only 238 (90.84%) included in the analysis. Questionnaires rejected were due to the unqualified respondents (not having a car), the existence of multiple responses or the existence of extreme data (outliers). The questionnaire consists of four sections. The first section contains questions about the profiles of the respondents. The

second part consists of open-ended questions regarding the preferences of electric car attributes. In this part, respondents were also given a brief description of the attributes of electric car such as range, charging time, purchase price, etc. The third part consists of close-ended questions, in which the questions were composed of variables derived from literatures (Table 1). For these variables the respondents were asked to give their opinion using a Likert-type scale (1 = strongly disagree, 7 = strongly agree). Answers to these variables were analyzed using factor analysis and multiple linear regression analysis to obtain factors that influence the acceptance of electric car in Indonesia. The fourth part consists of open-ended questions regarding the timing to purchase an electric car, information channel for electric car, electric car development in Indonesia, consumer's barriers for adoption as well as respondents' concerns and questions about electric cars. Data processing for the first, second and fourth part of the questionnaire was performed descriptively to obtain a broader picture of the acceptance of electric cars in Indonesia which consists of interest in electric cars, preference of electric car attributes, the time to purchase electric car, information channel about electric car and consumers' perceived barriers.

RESULTS AND DISCUSSION

Respondents profiles: From the 238 respondents, majority are males (66%), aged 21-25 years (56%), work as employees (52%), entrepreneurs (11%), student (30%) and others (7%), resided in Bandung and Jakarta (73%) with income less than Rp. 5.000.000 about 49% and between Rp. 5.000.000 to Rp. 15.000.000 about 33%. Most of them have a bachelor degree (66%) with daily travel between 0-20 km (64%), know and understand about electric car technology (62%) and also are aware of the development of electric cars in Indonesia, although, most of them don't know the progress of the electric car in Indonesia (73%). Therefore, the respondents can be considered quite representative and valid since the majority have an understanding about the electric car technology.

Results of factor and regression analyses: To determine the structure of both latent variables of the dependent and independent variables, common factor analysis was used with 0.4 as a lower bound for factor loading and eigenvalues of >1. From 26 manifest variables identified, five factors emerged as independent variables. Meanwhile, the 3 manifest variables for the dependent variable formed one factor as the dependent variable. The result of extracted factors for the independent variables is presented in Table 2. For the independent variables, factor 1 is called environmental awareness and Environmental Benefits (EA). This factor shows concern for the environment through the benefits of an electric car as well as the concern for the environment (environmental and social environment) consisting of 7 variables: the desire to be responsible and care to the social environment (V2); the desire to be seen as people who care about the environment (V4); reducing the effects of global warming (V5); reducing air pollution caused by emissions of carbon (V6); reducing dependence on petroleum (V7); sustainable technology (V8); helping the conservation of the environment (V9). Factor 2 is called attitude towards technology (AT) WHICH shows the interest and attitudes of respondents to electric car consisting of 5 variables: the desire for self-actualization to be appreciated by others and to be seen as different or stylish as well as improving social status (V3); interest in technology (V19); the desire to become a pioneer in the technology (V20); educate or inform others about the type of new vehicle (V21) and sharing knowledge about new technology with others (V22). Factor 3 is performance Attributes (PA) which represent the affective performance of electric cars, consisting 4 variables: driving comfort (V14); safety (V15); ease of operation (V16); design (V17). Factor 4 is Financial Benefits (FB) WHICH represents the economic benefits of electric cars and the policy-related benefits for consumers, consisting of 3 variables: the reduced fuel costs (V11); free access to toll (V12); free parking (V13). The last factor is Factor 5 is the education and Promotion (EP) which represents the educational

Table 2: Factors and factor loadings

	Factor				
Variables	1	2	3	4	5
V2	0.507	-	-	-	-
V3	-	0.426	-	-	-
V4	0.564	-	-	-	-
V5	0.800	-	-	-	-
V6	0.800	-	-	-	-
V7	0.802	-	-	-	-
V8	0.534	-	-	-	-
V9	0.726	-	-	-	-
V11	-	-	-	0.401	-
V12	-	-	-	0.785	-
V13	-	-	-	0.806	-
V14	-	-	0.603	-	-
V15	-	-	-	0.754	-
V16	-	-	-	0.744	-
V17	-	-	-	0.518	-
V19	-	0.843	-	-	-
V20	-	0.889	-	-	-
V21	-	0.671	-	-	-
V22	-	0.628	-	-	-
V24	-	-	-	-	0.726
V25	-	-	-	-	0.758

Eliminated variables: V1, V10, V18, V23, V26

and promotion efforts for electric cars to increase consumer experience and understanding consisting of 2 variables: the opportunity to try (trial) by one's self (V24); the presence of an electric car demonstration at events such as exhibitions, test drive and other automotive events (V25). There are 5 variables eliminated by the factor analysis and considered not significant, they are: compliance with group norms and values (V1); the reduced purchase price because of the incentives for the purchase of electric cars (V10); brand (V18); education, campaigns and dissemination of information through mass media and social media (V23); the use of electric cars by leaders, experts, institutions as well as public transport (V26). Common factor analysis also performed for the dependent variables and result showed that they form 1 (one) factor and this factor is called AEC (acceptance of electric car). Multiple linear regression analysis showed that all of the independent variables from factor analysis have positive and significant impact to the dependent variable: the Acceptance of Electric Cars (AEC). Environmental awareness and environmental benefits (EA) becomes a factor with the most significant effect with a coefficient of 0.509, followed by Performance Attributes (PA) with a value of 0.236, attitudes toward Technology (AT) with a value of 0.233, Education and Promotion (EP) with a value of 0.228 and the smallest is Financial Benefits (FB) with a coefficient of 0.145. These results differ from the study in China where the attribute performance the most significant factor whereas environmental awareness is the least significant one (Zhang *et al*., 2013). Regression equation of this research is AEC= 0.509EA+0.236PA+0.233AT+0.228EP+0.145FB. With F-value (44.194) $>F_{table}$ (<2.25) and the value of Sig. = 0.000<0.05, it can be concluded that the resulting regression equation can be used to predict the acceptance of electric cars.

Interest towards electric car: In this study the interest to have an electric car is assessed using a scale of 1 (strongly disagree) to 7 (strongly agree) for the statement "If the electric car is available in Indonesia, I am interested in having an electric car for daily commute". The results showed that as many as 81.5% of respondents expressed their interest in having an electric car (scale 5-7), 13.5% neutral (scale 4) and only 5% said that they are not interested in having electric cars (scale 1-3). Cross tabulation analysis using Chi-square between the interest to have an electric car with demographic data of respondents found that the interest toward electric car were significantly different among the age groups (Qp = 16,459; Sig. = 0.026<0.05) but they all showed their interest to the electric car (choose a scale of 5-7) with the highest percentage on the 36-45 years group. On the other side, disinterest for the electric car only shown by group of respondents aged between 21-25 years. There were also significant difference between male and female respondents (Qp = 8.171; Sig = 0.017<0.05). Male respondents showed more interest in the electric cars than female respondents.

Preferences for electric car attributes: Using open-ended questions, results of electric car attributes expected by the respondents are obtained. The average driving range desired is 234 km with average slow charging time of 3 h and 13 min with fast charging and average desired price of Rp. 188 millions. Majority of respondents (88%) like the idea of battery swap. With this, depleted battery is exchanged at battery swap station (for approximately 1-5 min), meaning that there is significant time savings as they don't need to charge the battery. However there are still 9% of respondents who do not like the idea. With the battery leasing where the ownership of the car and the battery are separated so that consumers only need to pay for the car price but pay battery subscription (lease) per month or per year as many as 58.4% of respondents were attracted to the idea of battery subscription (lease) monthly or annually while 22.3% neutral and the remaining 19.3% not interested. Regarding the model of electric cars when they are available, results showed that the most desirable model is hatchback or city car (120 respondents), followed by sedan (103 respondents), SUV/crossover (97 respondents), wagon (92 respondents), sports (53 respondents) and minivans (42 respondents). When asked about the choice of when to buy an electric car if it has been launched in Indonesia, more than half of respondents (127 or 53.36%) stated that they will buy the electric car if the price was affordable. On the other hand the number of respondents who said that they will buy the electric car as early adopters or pioneers was only as much as 7.98%. However, number of respondents who really did not want to buy an electric car was very low, only 2 respondents (0.84%).

Information channel: Another important factor in encouraging the acceptance of electric cars is the existence of promotion and education about electric cars, due to the new technology possessed by the electric car which is different from a conventional car. When asked about the media for promotion and education of electric cars that are suitable for them, the most appropriate medium is television, followed by social media and printed media. In addition, one factor that may encourage the acceptance of electric cars is the existence of a reference or whether the electric car has been used by others so

that the advantages and disadvantages can be seen and observed. Based on the survey, the most influential reference for respondents was family and friends. On the other side, more than half of respondents stated that the availability of electric vehicles as public transport (e.g., electric bus) will make them interested in having an electric car.

Consumer's perceived barriers: Responses to the statement "I hope the electric car can be launched soon in Indonesia" indicated that as many as 85% agree that an electric car should be released soon in Indonesia while the remaining 13% neutral and 2% disagreed. However, open-ended questions showed that there are still some barriers for respondents to adopt the electric car. Based on answers from 170 respondents, the top eight of barriers for consumers to adopt the electric car are: the high purchase price; reservation about quality and performance (such as battery, travel distance, comfort); inadequate charging infrastructure; increasing congestion and problems on the road when the electric car enter the market; sustainability of energy sources (charging still using energy from fossil fuel); availability of maintenance and after-sales facilities; change in user habits and society readiness (such as the need to adjust to frequent charging); lack of support from government, inadequate regulations and lack of information both from government and manufacturers.

CONCLUSION

Result of regression analysis showed that environmental awareness and environmental benefits have powerful effect based on the regression equation. Therefore, information or messages about environmental benefits of electric cars must be conveyed properly to potential consumers. For instance, designing a campaign which proves that electric cars are eco-friendly could boost consumer trust or a campaign that by having an electric car the user will become part of the local and global movement to improve the environment. These information and the messages can be delivered effectively through television, social media and printed media. This study also found that financial benefits such as reduction in fuel costs, free parking and free toll fee are significant variables so these variable could considered in developing a policy for the electric car. Also lower electricity rates when used for charging the battery can be a consideration. Result of open ended questions suggested that the provision of adequate charging infrastructure is important for the acceptance of electric car. This can be done by designing and building a network of charging infrastructure at various strategic places such as at petrol station, malls, restaurants, offices, local governments and others as operators or service providers of fast charging. Other options are battery swapping and leasing. Other findings from this study to make electric car more attractive and could be accepted are among others: the need to identify group of early adopters, early majority and establishing community for electric car owners so that they can be utilized as a means to each out wider community and act facilitators for the promotion and education for the electric car; the need to develop an image that electric car is an advanced and innovative green technology as well as 'different'; provision of a trial program that could enhance consumer experience through automotive events for demonstration and opportunity for test drive should be available widely; the need to socializing the electric car development plans in Indonesia to raise public awareness and to increase acceptance.

Budget allocation for research and development in electric car technology is also important and need to be increased both by the government and the private sectors. This study showed that there is a strong interest for the adoption of electric car by respondents and the most influential factor for the acceptance of the electric car is Environmental Awareness and Benefits for the Environment (EA) while the least significant factor is Education and Promotion (EP). Therefore, the ultimate key to the acceptance of the electric car is a strong messages and prove that that electric car is environmentally friendly so that the user can be characterized as someone who cares about the environment, both the green environment and the social environment. Although that there are strong interest and support for the electric car to be launched in Indonesia as soon as possible, there are still some issues and barriers that need to be addressed. The high purchase price and charging infrastructure (battery life time) are the main issues but other important issue emerged from this study is the sustainability issue, i.e. whether the source for electricity generation is still from fossil fuel or from renewable energy sources.

REFERENCES

Anderson, A., R. Kocher, G. Matson and D. Oothoudt, 2011. Driving adoption of electric vehicles to the early majority. Portland State University MBA Capstone Project, Portland, Oregon. https://otrec.us/files/OTREC_EV_Early_Majority_Report_Nov_2011.pdf.

Bockarjova, M., P. Rietveld and J.S.A. Knockaert, 2013. Adoption of electric vehicle in the Netherlands-A stated choice experiment. Tinbergen Institute, Amsterdam, Netherlands. www.econstor.eu/bitstream/0419/87297/1/13-100.pdf.

Diamond, D., 2009. The impact of government incentives for hybrid-electric vehicles: Evidence from US states. Energy Policy, 37: 972-983.

Egbue, O. and S. Long, 2012. Barriers to widespread adoption of electric vehicles: An analysis of consumer attitudes and perceptions. Energy Policy, 48: 717-729.

Erdem, C., I. Senturk and T. Simsek, 2010. Identifying the factors affecting the willingness to pay for fuel-efficient vehicles in Turkey: A case of hybrids. Energy Policy, 38: 3038-3043.

Gallagher, K.S. and E. Muehlegger, 2011. Giving green to get green? Incentives and consumer adoption of hybrid vehicle technology. J. Environ. Econ. Manage., 61: 1-15.

Kang, M.J. and H. Park, 2011. Impact of experience on government policy toward acceptance of hydrogen fuel cell vehicles in Korea. Energy Policy, 39: 3465-3475.

Kurani, K.S., T. Turrentine and D. Sperling, 1995. Testing electric vehicle demand in hybrid households using a reflexive survey. The University of California Transportation Center, Berkeley, California.

Ministry of Research and Technology, 2013. Indonesian innovation: The new era of electric vehicles. Ministry of Research and Technology, Jakarta, Indonesia.

Ministry of Transportation, 2013. Program mobil murah dampak dan solusinya. Ministry of Transportation, Ontario, Canada. http://www.tribunnews.com/tribunners/2013/09/24/program-mobil-murah-dampak-dan-solusinya.

Ozaki, R. and K. Sevastyanova, 2011. Going hybrid: An analysis of consumer purchase motivations. Energy Policy, 39: 2217-2227.

Peters, A., R. Agosti, M. Popp and B. Ryf, 2011. Electric mobility-a survey of different consumer groups in Germany with regard to adoption. ECEEE. Summer Study, 4: 983-994.

Potoglou, D. and P.S. Kanaroglou, 2006. Household demand and willingness to pay for alternatively fuelled vehicles. Centre for Spatial Analysis Working Paper Series, McMaster University, Hamilton, New Zealand.

Sanitthangkul, J., A. Ratsamewongjan, W. Charoenwongmitr and J. Wongkantarakorn, 2012. Factors affecting consumer attitude toward the use of eco-car vehicles. Procedia Soc. Behav. Sci., 40: 461-466.

Sari, H. and Hasnelly, 2012. Factors determining green companies performance in indonesia: a conceptual model. Procedia-Social Behav. Sci., 57: 518-523.

Thiel, C., A. Alemanno, G. Scarcella, A. Zubaryeva and G. Pasaoglu, 2012. Attitude of European car drivers towards electric vehicles: A survey. MSc Thesis, Institute for Energy and Transport European Commission, Petten, Netherlands. http://s1.downloadmienphi.net/file/downloadfile4/192/1390990.pdf.

Zhang, X., K. Wang, Y. Hao, J.L. Fan and Y.M. Wei, 2013. The impact of government policy on preference for NEVs: The evidence from China. Energy Policy, 61: 382-393.