Stakeholders' Readiness and Preferences in Embracing EV Industry in Malaysia

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Abstract: The Electrical Vehicle (EV) industry has been introduced to Malaysia for more than a decade. The main idea of this industry is to encourage the usage of EV that runs on renewable energy resources where electricity is used as the fuelling power as opposed to the conventional fossil fuel. This will lead to the reduced of carbon print, greener environment, and sustainable living. Using generic qualitative inquiry, the study has conducted semi-structured interviews with specific stakeholders throughout 2021. The results gathered show that both potential and existing stakeholders concurred in the importance of government policies especially on matters pertaining tax and subsidies for the industry. Overall, the stakeholders agreed that changing to EV is a good move in preserving the environment.

Keywords: Stakeholder, perception, Electric Vehicles, EV charging point.

1. INTRODUCTION

Electric vehicles (EV) were introduced to Malaysia since 1997 through a venture called Perusahaan Otomobil Electrik Malaysia (POEM). Under this initiative, the first model of EV named Eleksuria has the capacity to move up to 120km using single charge lead-acid batteries. Due to economic recession, the initiative was put on hold until the launch of the third National Automotive Policy (NAP 2014) where government introduced policies of tax exemption for hybrids and EV up until the end of 2017. During this time, Malaysia also underwent fuel subsidy restructuring that focused on using more of the sustainable resources such as renewable energy. This is coincided with Low Carbon Mobility Blueprint 2021-2030 that focused on developing the necessary initiative to reduce climate change risk. In effort to reduce greenhouse gases (GHGs) generated by air pollution, EV was introduced as one of green technologies (Veza, et al., 2021). This started the emergence of the first cluster of EV charging stations around the Klang Valley as well as key EV hotspots in major cities and highway stops in Peninsular Malaysia (Leggett, 2021).

2. EV THE NEW ENDEAVOUR

Malaysian EV industry is driven by several government agencies under different ministries. Malaysia Automotive Robotics and IoT Institute (MARii) is an agency established under the purview of the Ministry of International Trade and Industry Malaysia (MITI) that serves as the coordinating centre and think tank towards enhancing the automotive industry and overall mobility in Malaysia. In collaboration with MARii, MITI released the latest National Automotive Policy 2020 (NAP 2020). Among others, NAP 2020 highlighted the development of the Next Generation Vehicle (NxGV) in the areas of charging, energy management, and safety. Meanwhile, Malaysian Green Technology and Climate Change Centre (MGTC), an agency under the Ministry of Environment and Water (KASA), drives the scope of green growth, climate change mitigation, and green lifestyle. Moreover, MGTC involved actively in the areas related to clean and efficient transport in Malaysia. In collaboration with MGTC, KASA proposed the Low Carbon Mobility Blueprint 2021–2030 that involved vehicle fuel economy and emission improvement, EVs and low emission vehicle adoption, alternative fuel adoption, and GHG emission and energy reduction via mode shifts (Yusof, 2021).

To expedite the industry, government introduced various incentives such us tax reduction for locally assembled EVs up to 100% import duty and 50% excise duty for HEVs with two litres engines and below in 2009. The exemption was

continued until 2011 with 100% exemption for both import and excise duties and were later continued until 2013 (Tan, 2021). However, after 2013, no more exemption nor incentive were given for HEVs and EV which saw the decline of the vehicle purchase. In May 2021, MARii under the supervision of MITI, announced that the new EVs policies which comprises incentives regarding sales, excise and import duties for EVs (Ker, N, 2021).

Malaysia has two national vehicle manufacturers known as Proton and Perodua. Perodua has become a leading automobile provider in 2019 with market share of 38% followed by Honda, Toyota whereas Proton fell at fourth place (MAA, 2018). Malaysian Electric Vehicles Owner Club (MyEVOC) had gathered a survey about consumer concern and the highest response gathered indicated the availability of charging infrastructure followed by the cost per charging session (Halmi, 2021). This led to the current study which investigated the readiness of space owners in venturing into EV charging station business and their preferences of an ideal business model.

3. EV INDUSTRY DEVELOPMET IN MALAYSIA

Malaysia has been developing the EV industry for more than 20 years now and yet the landscape is slow and not flourishing as anticipated. Among many initiatives, infrastructure accessibility and consumer's incentive are the biggest contributors to any EV adoption. The quantity of EV charging stations in Malaysia is still considerably low (Veza, et al 2021). This can be associated with the sluggish conversion of consumers from combustion engines to electrification, which correlates to a survey conducted by a BFM radio station using Twitter po ll. Results of the survey stated indicated that 40% of respondents would not consider an EV due to the insufficient charging infrastructure in Malaysia. With sufficient charging infrastructure, higher EV adoption is expected to cause an increase in electricity usage and load in Malaysia. The increase of EV adoption may also provide an opportunity for Tenaga Nasional Berhad (TNB) to multiply their revenue and further upgrade their infrastructure and resources. This in turn will allow them to introduce new services to their consumers and expand outside their conventional scope of merely being a utility provider.

One of the questions arisen was the suitability to participate in an industry that was rapidly changing and becoming obsolete such as the previous "slow charger' of EV. The energy supplier will be challenged to provide constant, uninterrupted, and sustainable power source to every EV charging station. Since most of the available EV charging point is operating on member fees or free of charge, this profitability of this business is unwarranted for space owners (Legget, 2021).

As for local manufacturers, the technology and expertise on EV are limited and require a huge amount of financial initiative which is most likely coming from the government. The product itself is still in development and improvement stages where EV manufacturers are working on numerous critical component issues such as battery management system (BMS), on-board charging and inverters, and electric motors (Legget, 2021; Veza, et al., 2021).

Thus, the study explores the readiness of involvement among stakeholders in the EV industry based on current scenarios and their preferred business model that could earn them higher profit

4. METHOD

Research conducted using generic qualitative inquiry which is a method that "simply seeks to discover and understand a phenomenon, a process or the perspectives and worldviews of the people involved" (Merriam, 1998, p. 11). This method does not restrict to any specific qualitative research method. For example, this study does not require any theory to be developed. This method helps in providing better explanation, understanding, and explores research subjects' opinion, behaviours, experiences, phenomenon, and others. The research method used for the current study is semi-structured interviews.

Interview questions were constructed where samples were prompted with questions set. The list of questions is structured; however, they are not open-ended as respondents were encouraged to explain their answers in detail. The four areas of interest in the interview are economic concern, environmental awareness, government policies, and intention to purchase or participate in EV charging business.

Samples were chosen from five potential and five existing space owners, and two local automobile manufacturers. The potential space owners consist of two highway operators, two petrol stations, and one mall franchise. While the existing space owners are made of three petrol stations, one home developer, and one resort apartment. The

interviews were conducted through different modes such as physically, video calling, and phone calling. Data were then analysed using Atlas.ti software to create a thematic pattern. Every interviewee was given a token of KFC voucher worth RM100.

5. RESULTS

The study has interviewed five potential space owners (two highway operators, two petrol station managers/owners, and one mall manager), and five existing space owners (three petrol stations, one home developer, and one resort apartment manager). By referring to TPB model, the study gathered information from four variables that may have the highest impact on space owners' attitudes toward purchasing the EV charging business. In our study, there are five variables under the TPB for space owners (e.g., economic concern), subjective norm (e.g., environment concern, government policies) and perceived behavioural control (e.g., EV services & facilities, purchase intention).

The interview questions were chosen to measure space owners' perceptions on EV charging space and facilities, potential economic gain, government policies on EV industry, and the impact on environmental changes. This will be used later to determine a positive attitude of the space owners towards purchasing EV charging infrastructure or participating in the EV charging service industry.

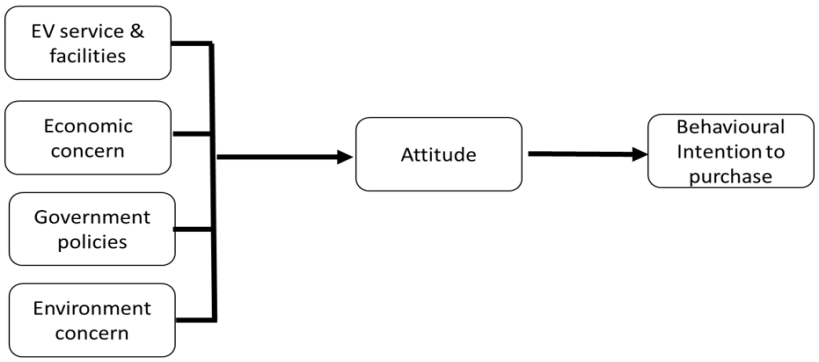

Figure 1: Variable on space owners in this study

Both potential and existing space owners prefer to opt for renting their spaces out for other charging station operators rather than being the operator themselves. Renting their spaces is a safe and strategic move where the space owners do not intend to invest in renovating their spaces or purchasing the EV charging infrastructure. The cost will be borne by the EV charging company complete with the expert and personnel who will be responsible for the charging station mechanism faulty and maintenance. Stakeholders also prefer profit-sharing business model where EV charging operator not only pay rent to them as space owners, but also share certain percentages of the profit earned by the EV charging operator over a certain period.

Both space owners and manufacturers agreed that to make the transfer and adaptation of EV smooth, the government has to play an integral role in imposing relevant and practical policies that will encourage space owners to participate in the EV industry. Space owners for example are looking forward to the increase of the number EV purchase. At the moment, the number is not promising enough for stakeholders to invest into installing the EV charging point. Hence, a more encouraging initiative and campaign from the government is crucial in enabling the transition.

On the manufacturer's side, government policies on tax reduction alone are insufficient to smoothen the adoption of EV industry. Manufacturers require further assistance on the aspect of research and development capacity, as well as financial initiative in developing EV for domestic market. Both stakeholders are looking forward to government's direct intervention in improving the current policies of EV adaptation, regulation, and promotion. They anticipate collaborating or partner with the local automobile manufacturers in the EV industry along with government's future intervention.

After looking at the four themes that lead to behavioural intention to purchase, government policies, and environmental concern were preferred by space owners in determining whether or not to purchase or participate in EV charging service industries. Space owners agree that environmental concern is a collective responsibility, and their organisations acknowledge the same perception. They have been doing numerous efforts to support greener

environment. Space owners also look forward to participating in EV charging service industry through several mechanisms such as space rental and/or profit sharing. Space owners and manufacturers both concurs that in order to materialise this idea further, government's policies, initiatives, and encouragement are crucial in boosting EV industry in general

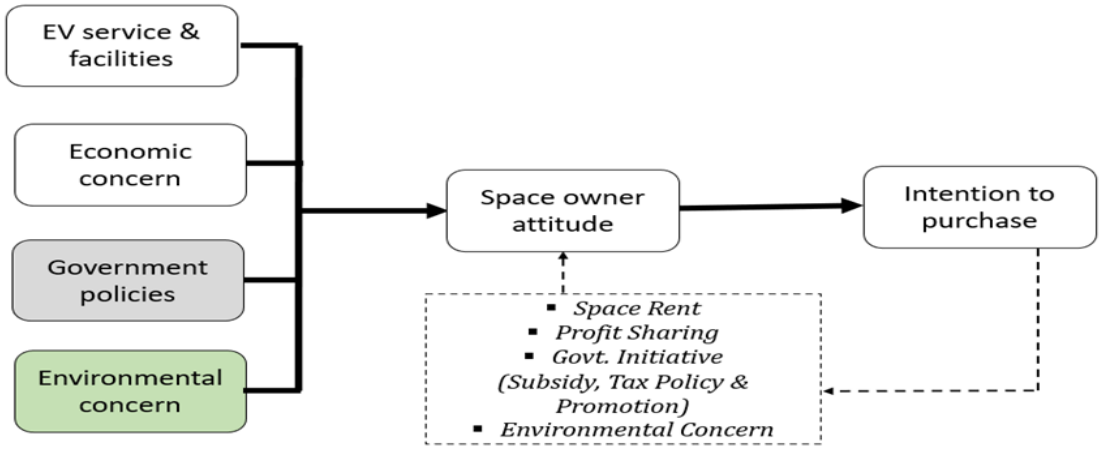

Figure 2: Space owner and manufacturer preferences

6. LIMITATIONS OF THE STUDY

The public was given the impression that EV car is not only expensive, but the maintenance of the vehicle can also be very costly. Common EVs registered in Malaysia are mostly from the high-end range such as Mini Cooper Electric, BMWi3s, Porsche Taycan, and Lexus. Middle range EV are Nissan Leaf, Hyundai Ionic, and Honda Jazz. These are not the type of cars that are commonly being purchased by the majority of the public (Leggett, 2021). Apart from the price and maintenance, aftersales workforce transition such as service and repair of EV will be another issue that is not being properly look into especially found in this study. This can be true with the issues of EV charging infrastructure. The lack of expertise may also hinder the process of transition to EV technology. Another limitation of this study is about the preferred business model. Although the study samples indicate that profit-sharing is the preferred business model for them to participate in the EV industry, it is not being tested, and there are no previous samples to be compared or referred to.

7. DISCUSSION AND RECOMMENDATION

Government and all stakeholders should be the main enablers in creating the infrastructure and environment that allow the public from all social economic backgrounds to participate. Introducing new business idea of EV rental with incentives for example, may be appealing for users who want to live a greener and more sustainable life that does not impose the burden of expensive EV mortgage and high battery replacement cost. Producing a local brand for EVs that is safe, reliable, and affordable is something that may bring more excitement in the nation's automobile and EV industry. That can be something that public will anticipate. Upgrading the country's car of choice such as Myvi to EV or PHEV might be able to attract the young and new generation to purchase an EV. It is hoped that the situation can be improved to meet the users' desires and preferences, the EV industry and EV manufacturers' business needs to achieve the government and global goal of sustainable development.

Tu and Yang's (2019) study found that the highest influence on the consumers' behavioural intention is their control over the resources required to be EV users such as the cost of charging. Their results agree to the overall results of the current study. Besides their own perceptions and experiences, other people's opinions also affect consumers' behavioural intention to purchase an EV and eventually using the EV charging services. In a recent study conducted by Lashari et al. (2021), among 1500 respondents in South Korea, they found that the strongest predictor for an EV purchase is the attitudinal attributes which relates to behavioural intention in the current study. Two other strong predictors are environmental concerns and economic perceptions regarding the use of an EV. These three points are found similar to our study. Higueras-Castillo et al. (2021) conducted an empirical study with 404 potential consumers

in Spain to determine their beliefs, attitudes, and purchase intentions in Spain. According to their findings, range, reliability, and incentives are the most dependable predictors of purchase intention.

8. CONCLUSION

In sum, both potential and existing stakeholders perceived that government policies and intervention especially on matters pertaining tax and subsidies for the industry are essential to motivate their participation in the EV industry. They agreed that switching from the conventional vehicles to EVs is a crucial move preserve the environment and to warrant a sustainable future. Hence, the current research highly recommend that the government will consider inventing or improvising an EV related policy for different stakeholders participate actively in preserving the environment especially in Malaysia.

9. REFERENCES

[1] Elena Higueras-Castillo, Alberto Guillén, Luis-Javier Herrera & Francisco Liébana-Cabanillas (2021) Adoption of electric vehicles: Which factors are really important?, International Journal of Sustainable Transportation, 15:10, 799-813, DOI: 10.1080/15568318.2020.1818330

[2] Lashari, Z.A.; Ko, J.; Jang, J. Consumers' Intention to Purchase Electric Vehicles: Influences of User Attitude and Perception. Sustainability 2021, 13, 6778. https:// doi.org/10.3390/su13126778

[3] Merriam, S. B. (1998). Qualitative research and case study applications in education. San Francisco: Jossey-Bass.

[4] Tu, Jui-Che & Yang, C. 2019. Key Factors influencing consumers' purchase of electric vehicles. Sustainability. 11 (4) 3863; https://doi.org/10.3390/su11143863

[5] Ker, N. MARii: Malaysia's EV Policy to Offer "Handsome" Tax Incentive to Accelerate Development. 2021. Available online: https://soyacincau.com/2021/05/21/marii-malaysia-ev-policy-handsome-tax-incentives-to-accelerate-development/

[6] Tan, P. NAP Review's Hybrid Car Incentives. 2009. Available online: https://paultan.org/2009/10/29/the-nap-reviews-half-baked-hybrid-car-incentives/ (accessed on 8 September 2021).

[7] Halmi, S.; (Malaysian Electric Vehicle Owners Club, Kuala Lumpur, Malaysia). Personal communication, 2021.

[8] Malaysian Automotive Association. Market Review for 2018 and Outlook for 2019. Kuala Lumpur. 2019. Available online: http://www.maa.org.my/pdf/Market_Review_2018.pdf

[9] Malaysian Automotive Association. Ministry of International Trade and Industry. National Automotive Policy 2020. 2020. Available online: https://www.miti.gov.my/miti/resources/NAP2020/NAP2020_Booklet.pdf

[10] Yusof, A. Low Carbon Mobility Blueprint to Drive Larger Participation of EV Players: New Straits Times. NST Online. 2021. Available online: https://www.nst.com.my/business/2021/04/683754/low-carbon-mobility-blueprint-drive-larger-participation-ev-players

[11] Legget, D. (2021) Malaysia's EV drive and lessons from the past. https://www.just-auto.com/comment/malaysias-ev-drive-and-lessons-from-the-past/

[12] Veza, I.; Roslan, M.F.; Said, M.F.M.; Latiff, Z.A.; Abas, M.A. Physico-chemical properties of Acetone-Butanol-Ethanol (ABE)-diesel blends: Blending strategies and mathematical correlations. Fuel 2021, 286, 119467.

[13] eCharge4Drivers: a questionnaire on electric vehicle (EV) use and charging. Online Survey Software | Qualtrics Survey Solutions

[14] Adam Junid. 2016. An Effectiveness Study of Electric Vehicle Charging Station Installation Progress in Malaysia. Diploma in Automotive Technology Thesis. University of Michigan.

DOI: https://doi.org/10.15379/ijmst.v10i1.2688