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Assessing the Public Opinion on Autonomous Vehicles in Malaysia

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Abstract – *Public perception is an important measuring tool to determine a country's readiness to adopt the Autonomous Vehicle (AV). However, depending on the respondents' locality, the perception of a new technology will normally vary; hence it is important to evaluate the response of individuals from a specific background. This paper will focus on the Malaysian populace and assess their opinions on the AV or self-driving car. A Google online survey was carried out to discover the opinions of Malaysians on this matter. The finding suggests that the general public does have a positive opinion on AV. A majority of them would trust the technology to safely drive them to their destination. However, when presented with three different safety-related situations, the results showed a high number of respondents were very concerned with the probable outcomes. Finally, respondents were open to the idea of the disabled operating an AV but were apprehensive by the thought that youngsters/non-drivers could mishandle the technology.*

Keywords: Autonomous Vehicle (AV), self-driving car, Malaysia, public opinion, trust, concern, comfort, disabled drivers

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1.0 INTRODUCTION

There has been a growing interest from various parties to introduce the Autonomous Vehicle (AV) in Malaysia (Hashim and Omar, 2017). KPMG International (2019) in its annual report stated that the market of public opinion is partly an important factor for an entire nation to prepare for adopting the AV or self-driving car. The technology for self-driving car has steadily grown and the environment around such a technology should be prepared to handle the scenarios that the AV would ultimately bring forth. For instance, studies in Singapore by Taeihagh and Lim (2018) were conducted to determine ways to properly govern the emerging technology. Singapore is considered one of the most advanced countries in terms of government policies on autonomous vehicle. To align with its plan of achieving a developed

nation status by the year 2020, Malaysia also needs to step up in addressing technological advancement such as the autonomous vehicle.

1.1 Public Concern about the New Technology

Schoettle and Sivak (2014) were among the pioneers to conduct surveys to gauge the public opinion on AV. Their survey was undertaken in three different countries, namely USA, UK, and Australia. The general findings of their survey indicated positive opinions on self-driving cars. However, when presented with several specific situations around the AV, there were concerns raised by the respondents.

In terms of age group, Abraham et. al., (2017) discovered that elder people did not favour the inclusion of new technology in their vehicles. Although they may consider using some form of lower automation levels, they were not yet willing to fully surrender their control to the self-driving technology.

Bansal et. al., (2016), on the other hand, conducted a survey on the use of Connected and Autonomous Vehicles (CAVs) from the perspective of residents in Austin, Texas. The survey found that the respondents' major concern was the possible equipment failure in the AV. Other findings of the study included how much they were willing to pay for AV capabilities to be installed in their private vehicles. Results of the survey also suggested that respondents agree that there are benefits to using AVs such as lowering the rate of vehicle crashes.

1.2 Differing Opinions on AVs

Cunningham et. al. (2018) conducted a survey among the population in Australia and New Zealand. Several crucial topics were included in the survey such as awareness of AV, concerns towards its problems, as well as opinions on the benefits. It was discovered that both Australia and New Zealand populace have differing views regarding AV awareness, benefits, and concerns.

The findings led to the belief that countries must be assessed individually to ascertain the public perception of Autonomous Vehicles. This notion was further strengthened by Nordhoff et. al., (2018) as they produced the results of their multinational study whereby respondents' perception significantly varied depending on their locality. Although the difference was small, it could be implied that a country with a healthier GDP would be more accepting toward AVs.

Hulse et. al., (2018) conducted a study to understand the correlation between perception of AV and road user demographics including age, gender, and risk exposure. The study concluded that the level of perceived risk depended on the road user's perspective. If the road user was the AV passenger, he saw himself at a greater risk. However, if the road user was a pedestrian interacting with an AV, he saw himself at a lower risk compared to the AV passenger.

Another study by Penmetsa et. al., (2019) explored the acceptance of AV from the perspective of vulnerable road users, specifically motorcycle and bicycle riders. The study separated respondents that have and have not interacted with an AV. The takeaway from the survey proved that the respondents were more accepting of AVs if they had prior interaction with the new technology. Recommendations from the study included calling for policymakers

to allow public testing of AVs with a real pedestrian environment to effectively gain more public acceptance.

1.3 Perception of Autonomous Vehicles among Malaysians

Jamil et. al., (2019) recently conducted a similar study to gauge the Malaysian public perception of self-driving cars. Their study hoped to gain an understanding of various issues regarding AV such as benefits, concerns, awareness, as well as opinions towards owning a private self-driving car. The researchers stated that respondents agree that there would be environmental advantages in using self-driving cars including lower fuel emissions. However, the biggest concern revolved around safety issues due to equipment failure. The study recommended further research to be conducted to explore the different perspectives of varying road user types.

1.4 Research Objective

The main objective of this study is to determine the public opinion of AV or self-driving cars in Malaysia. Several topics shall be explored, specifically the respondents' general trust in AV and their concerns with its ability to handle various traffic situations. Finally, the study shall assess the respondents' openness to the idea of allowing individuals unable to drive (non-drivers) to use a self-driving car.

2.0 METHODOLOGY

A Google Docs survey was uploaded on different social media sites for Malaysian respondents to answer. A RM50 cash reward was offered as a token to 20 respondents through a lucky draw method to attract more people to participate. The survey was adapted from several studies conducted in other countries. Results of those studies were also compared and analysed. Another method of getting respondents was by contacting them using their work email address obtained from the directory of their respective organizations.

Data were collected using a free software provided by Google services namely Google Drive, Forms, and Excel. From the data, information was then extracted and screened, and incomplete responses would be eliminated. The survey was carried out by sending potential respondents the links to the Google Docs survey form starting from January 2019 until March 2019. Qualitative extraction of data was done at the later stage. The resulting information shall be tabulated in the later section of this paper.

2.1 Demographics of Respondents

Table 1 shows the demographics of respondents who answered the survey questions. The total number of respondents taking part in the survey was 482. The respondents' demographic backgrounds were analysed and distributed according to categories of interest as shown below.

Table 1: Demographic background of respondents (n = 482)

1. Age (years)	**Min.**		**Mean**		**Max.**
	16		33.8		64
2. Gender	**Male**			**Female**	
	293 (61%)			189 (39%)	
3. State of Residence (Top 5 – two states shared the fifth place)	**Selangor**	**Kuala Lumpur**	**Putrajaya**	**Pulau Pinang**	**Johor / Negeri Sembilan**
	204 (42%)	73 (15%)	32 (7%)	24 (5%)	23 (5%)
4. Highest Educational Background	**SPM**	**Diploma (or equivalent)**	**Degree**		**Masters/PhD**
	52 (11%)	100 (21%)	254 (53%)		76 (16%)
5. Employment Status	**Government**	**Private/GLC**	**Business**	**Retired**	**Unemployed***
	217 (45%)	106 (22%)	19 (4%)	25 (5%)	115 (24%)
6. Marital Status	**Single**		**Married**		**Separated**
	225 (47%)		245 (51%)		12 (2%)
7. Monthly Household Income (MYR)	**Under MYR 3,000 (B40)**	**MYR 3,000 – 6,200 (B40/M40)**	**MYR 6,200 – 13,00 (M40)**		**Over MYR 13,000 (T20)**
	176 (36%)	134 (28%)	120 (25%)		52 (11%)
8. Vehicle Owned	**0**	**1 Unit**	**2 Units**	**3 Units**	**4+ Units**
a. Motorcycle	214	184	56	12	7
b. Car	40	210	152	42	32
c. Pickup	435	35	0	0	0
9. Daily kilometre-age (0 km for public transport)	**Min.**		**Mean**		**Max.**
	1 km (6 persons)		32.1 km		300 km (2 persons)
10. Mode of transport to work	**Car**	**Motorcycle**	**Pickup**		**Public Transport**
	308 (64%)	107 (22%)	6 (1%)		61 (13%)

** the majority of whom are still studying or just graduated*

3.0 RESULTS & DISCUSSION

Overall, Malaysians have a positive opinion on self-driving cars, with 53% of the respondents providing a positive feedback while 15% gave a negative feedback. In KPMG's annual publication, AVRI, it is stated that a positive public perception denotes that the country is ready to accept autonomous vehicles in their road ecosystem. The survey therefore proves that Malaysia has the degree of acceptance to allow the technology to further develop at a more rapid pace.

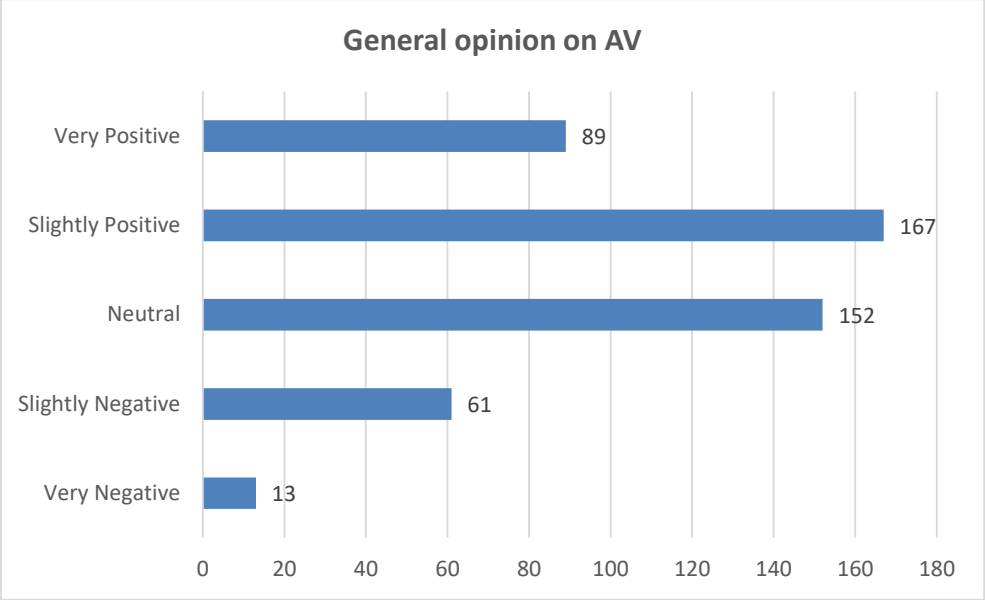

Figure 1: Public general opinion on AVs (n = 482)

In terms of the interest level of using an AV, the majority of respondents displayed moderate interest (34%) compared to high interest (24%) (Table 2). A high level of interest from the general public can guarantee that there will be future demands for a product. As for the ease-of-use, most respondents agreed (39%) with the statement that using the AV would be more convenient than their current mode of transport. Having confidence in the AV safety alongside other road users also produced mixed reactions with the majority of respondents (35%) staying neutral on the issue. This is understandable because most Malaysians are still not exposed to self-driving cars. In addition, studies have shown that people with interaction with AV prior to questioning will have greater confidence in the safety of the technology.

When asked if they prefer to have control over their AV, an overwhelming number of respondents (86%) agreed with the statement. This can denote that the respondents have not yet reached the point where they can fully surrender their control to the technology of self-driving cars. This is also understandable as transitioning to a new system has to be a gradual process, or in this case, transitioning from human driving to autonomous driving.

Results for the topic of public confidence showed that over 40% of the respondents trust autonomous vehicles to safely drive them to their destination as opposed to 18% who disagreed. When posed with the question “Is AV safer than your current mode of daily transport?”, 34% of the respondents agreed that AV would be safer while 23% disagreed. The majority of respondents (42%), nevertheless, remained neutral.

The next part of this study focussed on three different scenarios that may occur while travelling in a self-driving car. Respondents were asked about their degree of concerns in the event of these situations. The findings suggest that all the presented problems, namely equipment failure, reliability in bad weather, and the system getting confused with road obstacles, are a major cause for concern among the respondents (Table 3). Hence, AV manufacturers and researchers must address such issues and improve the system to alleviate these concerns.

Table 2: Interest, ease-of-use, trust and interchangeability (n = 482)

Interest to use AV	**No interest**	**Slightly interested**	**Neutral**	**Moderately interested**	**Very interested**
	47 (9%)	94 (19%)	60 (12%)	164 (34%)	117 (24%)
Is AV easier to use than your current mode of transport?	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
	20 (4%)	66 (13%)	134 (27%)	191 (39%)	71 (14%)
Do you trust the AV safety even with the presence of other road users?	**Strongly distrust**	**Distrust**	**Neutral**	**Trust**	**Strongly trust**
	25 (5%)	129 (26%)	169 (35%)	139 (28%)	20 (4%)
Would you want your car to be interchangeable between human driving and self-driving mode?	**Yes**		**No**		
	413 (86%)		69 (14%)		
Do you trust the AV to safely bring to your destination?	**Strongly distrust**	**Distrust**	**Neutral**	**Trust**	**Strongly trust**
	19 (4%)	69 (14%)	197 (41%)	170 (35%)	27 (6%)
Is AV safer than your current mode of transport?	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
	19 (4%)	95 (20%)	204 (42%)	136 (28%)	28 (6%)

Table 3: Respondent concerns with specific AV issues and problems (n = 482)

	Not concerned	**Slightly concerned**	**Neutral**	**Moderately concerned**	**Very concerned**
Concern with the AV getting confused by different obstacles	8 (2%)	116 (24%)	60 (12%)	121 (25%)	177 (24%)
Concern with the AV reliability in bad weather	15 (3%)	82 (17%)	70 (15%)	109 (23%)	206 (43%)
Concern with the AV equipment failure	10 (2%)	71 (15%)	57 (12%)	95 (20%)	249 (52%)

Already, there have been attempts to address these concerns by researchers. Trust in AVs can be fostered by manipulating the type of autonomous car a person is exposed to beforehand as proven by Körber et. al. (2017). Positive self-driving news that a person is exposed to will increase his chances of relying on the technology rather than making him apprehensive and cautious. However, it is important to note that the self-driving features that companies currently offer in the market still require the occupant to be alert of the vehicle's surrounding and be prepared to take over controls when needed. For example, the Tesla autopilot feature and Uber self-driving cars have been documented to make mistakes as the occupant was not paying attention while the unexpected events unfolded.

AV for the elderly: As observed in Table 4 below, several deductions can be made. First, when presented with the idea of the elderly people using autonomous vehicles, the consensus from the respondents did not gravitate towards either side of being uncomfortable, nor comfortable. The resulting answers were more towards a 50/50 split. 42% of the respondents were comfortable with the idea, while another 37% were uncomfortable with it; with the 5% difference deemed negligible.

AV for non-drivers (children): Next, the respondents were asked if they would allow children and youngsters, without any driving experience, to handle an autonomous car. The majority of the respondents felt apprehensive by the idea. Although 31% were comfortable with the idea, another 44% were not comfortable with it. Thus, a 13% difference in the responses was considered a significant value.

AV for people with disabilities: In contrast to allowing youngsters handle an AV, the respondents were more open to the thought of disabled people handling the AV. 50% of them were comfortable with the idea, while 28% were cautious to it. The difference of 22% was thus considered a significant find in this study. The results of this survey were comparable to a study by Piao et. al. (2016), in which the level of concern was also great in all the presented AV situations. The situations included equipment failures (66% very concerned), and outdated software (48% very concerned).

Table 4: Public opinion with the idea of allowing people unable to drive using the AV

Opinion / Category	**Elderly**	**Youth / Non-Drivers**	**Disabled**
Uncomfortable	64 (13%)	101 (21%)	53 (11%)
Slightly Uncomfortable	118 (24%)	112 (23%)	81 (16%)
Neutral	96 (20%)	118 (24%)	106 (22%)
Slightly Comfortable	135 (28%)	105 (21%)	149 (31%)
Very Comfortable	69 (14%)	46 (9%)	93 (19%)

4.0 OVERALL DISCUSSION AND CONCLUSION

In the end, plenty of deductions that can be made from the responses garnered through the survey. Overall, the Malaysian public does have a positive opinion on the new technology, namely AV; with 53% positive feedback compared to 15% negative responses. This can be explained through the rising number of discussions on social media with renowned companies including Google and Uber continuously showcasing their progress in the development of AV. Positive opinions on the technology will definitely contribute to the future adoption of AV in the country as stated by KPMG. The study proves that the public perception of Malaysians towards self-driving cars is generally positive and this will surely open the pathway for the technology to be introduced on local roads in the future.

The safety ability of the self-driving car was also trusted by most respondents (40% trusted the system, while 18% did not trust the system). The present environment where many technologies are rapidly changing could be one of the influencing factors for such an acceptance. Simple examples include the evolution from traditional telephones to smartphones that many people own today. The public believes that the change from conventional vehicles

to self-driving cars will be inevitable in the future. This begs the question as to when will the transition take place.

"Interchange" refers to the ability to switch between different modes of driving, namely self-driving and human-controlled driving. A question was asked on whether the respondents want their vehicle to be interchangeable. 86% of the respondents agreed that they would like to have this ability while another 14% did not agree. This shows that currently, the public is unwilling to fully surrender the control of the vehicle to the autonomous driving technology.

A high degree of concern regarding the self-driving car was observed for all the probable situations. 62% of the respondents were moderately or greatly concerned with the AV getting confused of road obstacles. 65% were moderately or severely concerned with its reliability in bad weather conditions while 71% of the respondents were moderately or severely concerned with the possibility of AV equipment failure.

The final topic explored was respondents' opinion of allowing youngsters, non-drivers and disabled driver to handle AV. This study discovered that most respondents were unwilling to allow youngsters and non-drivers to handle self-driving cars (31% were comfortable, but 44% were cautious to such a prospect). This could be due to the fact that unskilled drivers may not make the correct decisions in the wake of an emergency situation while handling the AV.

On the other hand, respondents were more accepting of the disabled handling the AV (50% were comfortable, as opposed to 28%). At present, it is common to see the disabled driving conventional vehicles with modifications to the vehicle system. This factor could explain the general acceptance of the respondents towards allowing the disabled to operate an AV.

4.1 Limitations and Improvements in the Study

The respondents of the survey have a skewed demographics value and were not evenly distributed in certain aspects. For instance, the largest portion of the survey respondents, (30%) are aged 20 to 25 years old whereas the median age of Malaysians is 28.6 years. Next, a combined majority of respondents are residing in Selangor and Kuala Lumpur (57%) as opposed to other towns in Peninsular Malaysia, Sabah and Sarawak.

One of the ways to improve this study is by preparing a focus group to answer the questionnaire. Specifically, the respondents could be segregated into age groups and locality. This is because one's locality will have an influence on his perception of AV. However, the current survey does not have a focus group and the opinions expressed are applicable to all Malaysians in general.

Other than that, opinions of different age groups regarding AV presented varying results. Elder respondents were more inclined to resist having new technologies such as the self-driving car, whereas the younger generations who grew up exposed to new technology were more likely to accept such a progress.

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