

Consumers Purchasing Decision and Car Safety Rating: with Respect to ASEAN NCAP

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Abstract

Emerging as one of the developing regions in the automotive industry, countries in the Southeast Asia region are experiencing growth at a variable rate and the personal passenger cars' ownership is also increasing at a fast pace. The New Car Assessment Program for Southeast Asian Countries (ASEAN NCAP) was established with the vision of elevating the degree of motor vehicle safety standards in the region. Nevertheless, the perception of consumers on safer cars is hardly understood due to lack of studies. Thus this study aims to identify which criteria plays a significant role in choosing specific cars, as well as ascertaining whether and to what extent safety is an actual consideration. Apart from that, this study also aims to determine whether the consumers are aware of what ASEAN NCAP is, and to identify whether this information will influence their purchasing decisions. By using self-administered questionnaires, information pertaining car purchasing decisions, perception of ASEAN NCAP and demographic profiles were obtained from 660 car owners in the Klang Valley area of Malaysia. The findings obtained from this study are important for policy makers, manufacturers and other stakeholders to assist in setting priorities with regard to the promotion of car safety in the country.

Introduction

The New Car Assessment Program for Southeast Asian Countries (ASEAN NCAP) was established from a meeting point of two separate agendas i.e. the “dream” of Malaysia to have its own independent automobile safety rating and “special mention” of such initiative in the United Nation’s Decade of Action (DOA) for Road Safety 2011-2020 (WHO, 2011). Malaysia has been seriously looking into impactful intervention in road safety by setting up the Road Safety Department (JKJR) in 2004 and the Malaysian Institute of Road Safety Research (MIROS) in 2006, under the “Malaysia’s Road Safety Plan 2006-2010” (Road Safety Department of Malaysia, 2006) Framework.

One of the strategic projects initiated by MIROS in the country was what is called “MyNCAP” – Malaysia New Car Assessment Program. Since 2008, major fundamental works have begun which include benchmarking process around the world, designing the crash test laboratory and introducing the Malaysian Vehicle Assessment Program (MyVAP) as a “precursor program” for NCAP (Aqbal et al., 2009). In December 2011, MIROS and the Global New Car Assessment Program (Global NCAP) signed a Memorandum of Understanding (MoU) to establish a NCAP for the Southeast Asian region, in conjunction with the DOA objective – which turned out to be a greater initiative than Malaysia’s initial “dream”.

“Safe Vehicles Pillar” in DOA revolves around the global deployment of vehicle safety technologies for both passive and active safety, through a combination of harmonized relevant global standards, and consumer information schemes and incentives to accelerate the uptake of new technologies (WHO, 2011). The Decade of Action has outlined several specific activities to achieve this target, in which ASEAN NCAP is the manifestation of Activity No. 2 in safer vehicles pillar i.e. implementation of new car assessment programs in all the regions in the world, to increase the availability of consumer information about the safety performance of motor vehicles. It is hoped that the ASEAN NCAP will elevate the vehicle safety level in the region, in which the ultimate goal is to ensure the users are getting the best value for their money on personal transportation. Figure 1 depicts the role of ASEAN NCAP in pursuing its goal to educate consumers, as well as to encourage manufacturers (OEMs) to produce safer cars (Zulhaidi et al., 2013a).

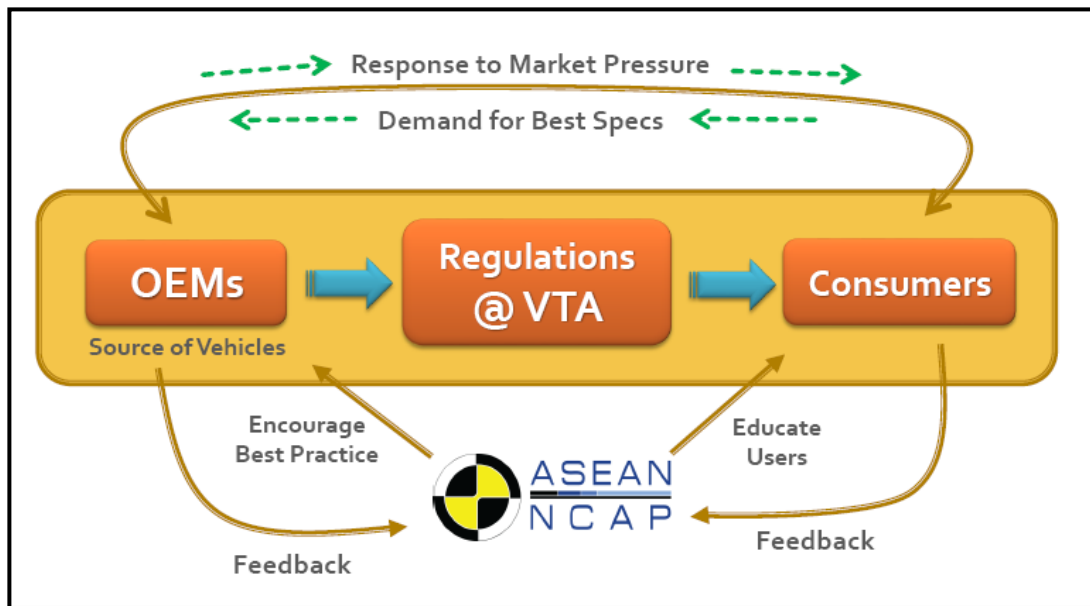


Figure 1: Role of ASEAN NCAP in “automotive ecosystem”

ASEAN is comprised of ten countries with a total population of approximately 600 million people, which is nearly 9 percent of the world’s population. It is notable that the main problem in ASEAN road safety is the high number of motorcycles, which leads to the high number of casualties involving motorcyclists in most ASEAN countries (WHO, 2013). Looking at the bigger picture, ASEAN road safety can be described as a football team formation – 3-5-2 (defenders-midfielders-forwards) – whereby this concept is applicable to both overall road safety situation and automobile safety concern (Zulhaidi et al., 2013c).

The “forwards” – Brunei and Singapore – are two small countries that seem to have a better chance at reaching what is referred to as “zero fatality vision”. Brunei only recorded 46 fatalities in 2010 from a population of 400,000 people, while Singapore recorded 193 deaths in the same year out of five million populations. The “defenders” – Laos, Cambodia and Myanmar – experience a low number of road deaths, but have a relatively high index of fatality based on 100,000 populations. These five countries also have no domestic car industry, thus have less exposure in terms of vehicle numbers.

The rest which are the “midfielders” – Malaysia, Thailand, Indonesia, the Philippines and Vietnam – which are also referred to as the “Big 5” have the following characteristics:

They are among the world’s most populous countries (except Malaysia); combined population of more than 500 million people.

Categorized as middle income countries (MIC).

Own domestic car industries and the most sales of vehicles; Total Industry Volume (TIV) of approximately 3.5 million units in 2012 (AAF, 2012).

Recorded high number of fatalities; combined road deaths were 70,000 in 2010 (WHO, 2013).

Therefore, it is hoped that the ASEAN NCAP will act as a countermeasure in the road safety situation in ASEAN, particularly for more complicated road traffic systems in the “Big 5” countries. Currently, the ASEAN NCAP performs one crash test per

selected model and produces two separate ratings i.e. adult (AOP) and child occupant protection (COP) (ASEAN NCAP, 2012). AOP measures how effective a car is in protecting adult occupants in the event of a frontal collision, and COP shows how a car may protect child occupants if the Child Restraint System (CRS) is used. The ASEAN NCAP has now reached the final stage of its pilot status – conducted in three phases – in which crash test results for the first and second phases have been published through various mediums e.g. press conferences and releases, interviews, the social media platforms, proceedings, journals and many others.

Nevertheless, whether the consumers are aware of the existence of the ASEAN NCAP and utilize the vehicle safety ratings in their purchasing decisions is poorly understood. Apart from that, it is also essential to understand how the consumers consider safety when purchasing a vehicle and its contributing factors e.g. driver characteristics. According to recent studies, factors such as age and gender have been shown to influence consumers who rate safety as one of their main priorities during the purchasing process (Clark et al., 2012; Vrkljan and Anaby, 2011; Koppel et al., 2008). This information is very important for the ASEAN NCAP in their future branding and promotion, influencing policy makers, manufacturers and other stakeholders to assist in setting priorities with regard to the promotion of car safety in the region. Thus, this study intends to achieve the following objectives:

To determine how consumers conceptualize vehicle safety and to what extent this factor affects the purchasing decisions of their cars.

To examine the influence of gender and age towards consumers' purchasing decisions with regard to safety.

To determine the consumers' awareness level of the ASEAN NCAP and identify whether the safety ratings information would influence their purchasing decisions.

Methodology

2.1 Development of Questionnaire

The questionnaire was developed and adapted from previous studies which investigated factors that influence vehicle purchasing decisions among consumers (Clark et al., 2012; Vrkljan & Anaby, 2011; McCartt and Wells, 2010; Koppel et al., 2008). In addition, the questionnaire was constructed in both English and Malay in order to ensure that respondents with different first languages could understand all the items. It comprised three main parts:

Section A: Information about present cars including the decision makers. All respondents were also asked to rank the importance of 13 vehicle features they considered when purchasing their present cars using a 5-point scale, where 1 indicated "very unimportant" and 5 indicated "very important". There is also an open-ended question on how the consumers conceptualize or interpret "vehicle safety".

Section B: Consumers' awareness and source of information regarding the ASEAN NCAP, and whether ASEAN NCAP safety ratings influence their purchasing decisions.

Section C: Demographic profiles including age, gender, marriage, income, driving experience and previous accidents.

The questionnaire was then checked for face and content validity. Face validity was conducted by selected five research officers, whereas content validity was reviewed by two experts in the field of vehicle safety. A pilot study of 40 respondents was also conducted in order to determine the reliability of the instrument. The Cronbach's

alpha coefficient for 13 items in Section A was measured at 0.882, and this is considered acceptable.

2.2 Participants and Settings

Klang Valley, a highly populated area in Malaysia, was selected for this study. Five districts from the area were randomly selected e.g. Petaling, Hulu Langat, Gombak, Kuala Langat and Hulu Selangor. Realizing the possibility of obtaining high responses from the public, shopping malls were chosen as the study locations and randomly selected for each district. Furthermore, a systematic sampling method was adopted in the study to select the sample respondents. Every 10th person entering the shopping malls was approached. If the approached person refused to participate, the next person entering the premise would be approached and so on.

The respondents were also informed about the objectives of the study and were assured that the information obtained would remain confidential. To ensure the reliability of the information obtained from the respondents, the enumerators were recruited through an interview process and trained for data collection. The data collection was completed within a three-month period (from November 2013 to January 2014).

2.3 Statistical Analysis

Out of the 700 respondents surveyed, only 660 respondents who met the inclusion criteria (own a car and were the main or joint decision maker when purchasing their present car) were included and used for analyses in order to avoid any hypothetical bias, as indicated by Koppel et al. (2008). A number of descriptive analyses (mean and percentage) were performed to determine the respondents' demographic characteristics, importance level of vehicle features and consumers' understanding about vehicle safety. A One-Way Analysis of Variance (ANOVA) with post-hoc analysis using the Tukey method was performed to determine whether there was a difference in the level of importance attributed to the vehicle features.

For the top three features identified as the most important (including safety aspects), a Two-Way ANOVA was conducted using the following design: 2 (gender) x 4 (age groups). As suggested by Vrkljan and Anaby (2011), the Effect Size (ES) was calculated and interpreted based on Cohen's classification (Cohen, 1977) where ES=.01 is considered a small effect, ES=.06 as medium, and ES=.14 as a large effect size. All of the analyses were performed using the Statistical Package for Social Sciences (SPSS) version 16.0.

Results

3.1 Demographic Profiles

The demographics of the survey respondents are shown in Table 1. Of the 660 respondents, 338 (51.2%) were male and 322 (48.8%) were female. The respondents' age were recorded at an average of 32 years, with higher percentage reported within the range of 26 to 35 years old. A majority of the respondents had received tertiary education (60.9%), followed by secondary education (38.3%), and the least were primary education (0.8%). The majority of respondents reported having a monthly income of less than RM5000. More than half of the respondents were married; with 48.2% of them having at least one child. Out of the 261 respondents who had been

ticketed previously, speeding was reported as the top traffic offence. About 34% of the respondents had been involved in road crashes.

3.2 Factors Contributing to Car Purchasing Decisions

Respondents were asked to rate the level of important factors they would look for when purchasing their present cars. According to Table 2, certain features are rated as more important than others when deciding to purchase their present vehicles. Further analysis using ANOVA technique indicated that there was significant difference amongst all features reported by the respondents [$F(12, 8567) = 33.934, p < .0001$]. Post-hoc analyses revealed that price had the highest importance rating as compared to other features, followed by safety ($p < .0001$), comfort ($p < .0001$) and fuel economy ($p < .0001$). The least importance features were design or style of the car ($p < .0001$) and resale value ($p < .0001$).

Table 1: Demographic information of the respondents

	N (%)	Mean (SD)
Gender		
Male	338 (51.2)	
Female	322 (48.8)	
Age group		32.0 (10.2)
16-25 years old	206 (31.2)	
26-35 years old	269 (40.8)	
36-45 years old	103 (15.6)	
More than 45 years old	82 (12.4)	
Level of education		
Primary	5 (0.8)	
Secondary	253 (38.3)	
Tertiary	402 (60.9)	
Income		3,809.56 (3455.33)
Below RM 5000	484 (73.3)	
Above RM 5000	176 (26.7)	
Marital status		
Single	281 (42.6)	
Married	379 (57.4)	
Driving experience		
Less than 10 years	456 (69.1)	
More than 10 years	204 (30.1)	
Experienced of being summoned		
Yes	261 (39.5)	
No	399 (60.5)	
Involved in road accident?		

Yes	227 (34.3)
No	433 (65.6)

Further analysis regarding the top three factors using a two-way ANOVA indicated that there was a significant interaction effect between gender and age groups on the rating of safety and comfort. Post-hoc analyses revealed that, female drivers in the youngest age group (16-25 years old) and male drivers aged older than 45 years rated safety and comfort as more important than the other age groups. For the feature of price, a main effect was found only between genders with no interaction effect with age groups. In other words, gender is independent of age groups in terms of price. Across all age groups, female drivers tended to rate the importance of price higher than male drivers. The ES for both the interaction effects (safety and comfort) and main effect (price) is considered low or small effect, as shown in Table 3.

Table 2: Factors considered by the respondents when purchasing their present cars

Factor	N (%)					Mean	SD
	1	2	3	4	5		
Price	1.2	3.9	1.7	50.3	42.9	4.30	.790
Safety aspects	2.0	2.1	16.7	29.2	50.0	4.23	.936
Comfort	1.4	3.3	12.9	39.7	42.7	4.19	.881
Fuel economy	1.5	3.0	16.5	41.7	37.3	4.10	.887
Cost of maintenance/service	1.5	3.0	13.3	51.5	30.6	4.07	.833
Reliability	1.5	2.9	18.8	46.7	30.2	4.01	.861
Interior/luggage space	1.4	6.2	16.2	45.2	31.1	3.98	.919
Performance (including power & handling)	1.4	5.6	19.4	45.5	28.2	3.93	.905
Warranty coverage	3.2	4.7	22.3	39.2	30.6	3.89	.997
Vehicle size (sedan, hatchback, SUV, etc.)	2.4	8.0	23.6	42.4	23.5	3.77	.978
Style / design / colour	3.5	9.1	20.5	46.2	20.8	3.72	1.005
Resale value	2.9	10.0	23.6	43.3	20.2	3.68	.998
Brand	3.2	12.7	16.7	48.0	19.4	3.68	1.026

Note: 1=Very Unimportant, 2=Unimportant, 3= Neither, 4=Important, 5=Very Important

Table 3: Two-Way ANOVA of features identified by the consumers as the top three most important factors considered when purchasing their present cars

	Gender		Age group		Gender * Age Group	
	F	ES	F	ES	F	ES
Price	4.007*	0.0061	1.327	0.0061	0.171	0.0008
Safety	0.817	0.0013	0.675	0.0030	3.512*	0.0160

Comfort	0.604	0.0009	0.442	0.0020	3.648*	0.0163
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* $p < .05$

3.3 How do the Consumers Conceptualize Vehicle Safety?

In the current study, respondents were asked to list up to three factors that they believed would make vehicles safe. A lot of responses were obtained from the respondents which were grouped into different relevant categories, as illustrated in Figure 2. Most of them listed braking system e.g. Antilock Braking System (ABS) and Electronic Stability Control (ESC) as the most important safety features in comparison with passive safety technologies e.g. airbag and seatbelt. It is interesting to note that none of the respondent associated vehicle safety with “crashworthiness ratings or safety results”.

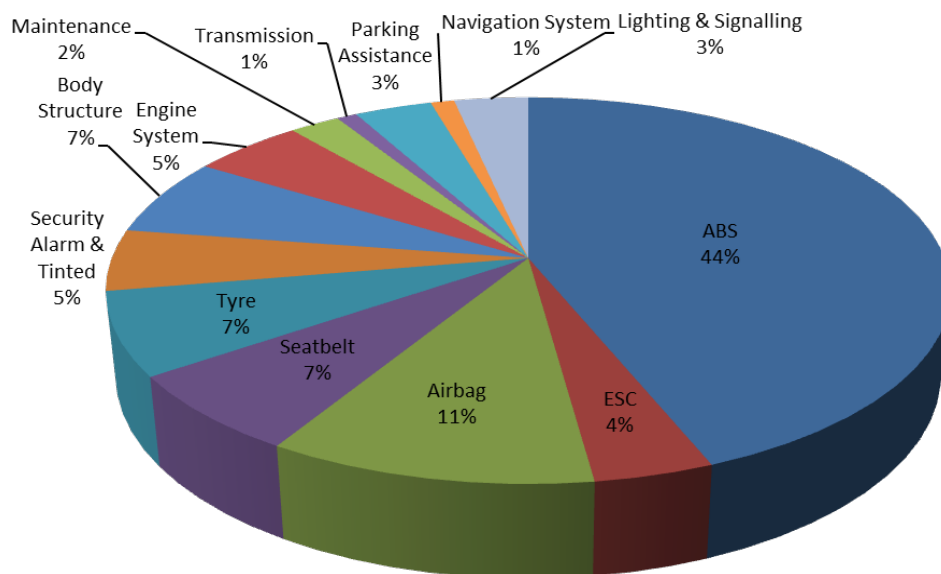


Figure 2: The most important factors that consumers believed would make cars safer

3.4 ASEAN NCAP

Out of the 660 respondents surveyed, only 15.5% (102) of them knew about the ASEAN NCAP, primarily from their friends and family members, as shown in Figure 3. The ASEAN NCAP website which contains most of the information on the tested vehicles was not regarded as the main source of information to refer to. In fact, only about 10% of the respondents learnt about the ASEAN NCAP via its website.

Furthermore, 43 respondents could name the safety rating of their present cars whereas the remaining 59 respondents were either uncertain or did not know that their vehicles have been rated by the ASEAN NCAP. Of the 43 respondents who knew that their cars have been tested by ASEAN NCAP, 51.2% percent of them said such information has greatly influenced their purchasing decisions. Those who responded “No influence at all” (N=4) purchased their cars before the ratings were announced.

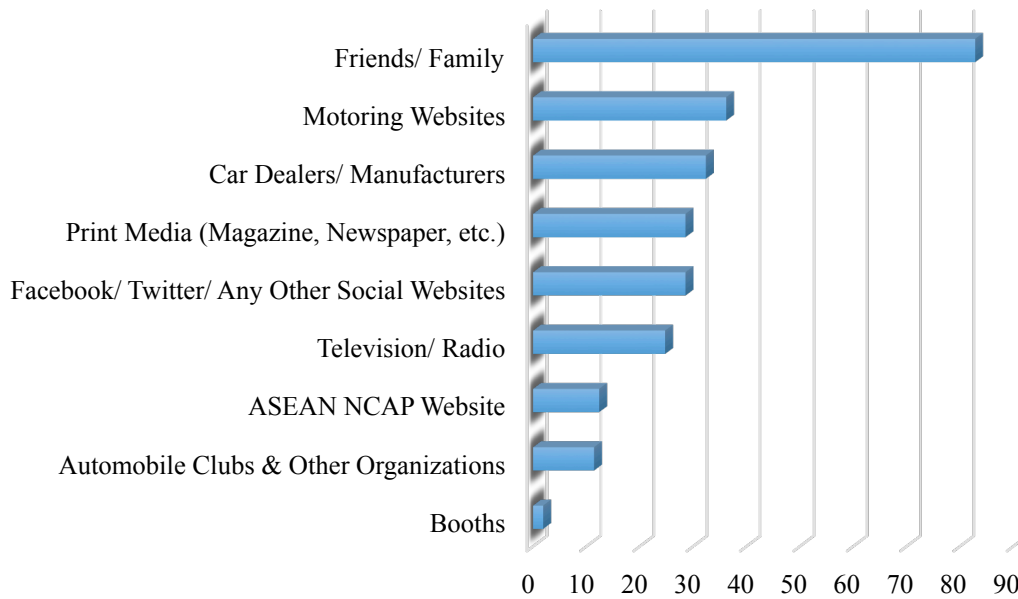


Figure 3: Source of information used by respondents who have heard about ASEAN NCAP

Discussions

The first aim of this study was to determine whether safety plays an important role in the vehicle purchasing process, relative to other factors. The findings of the current study are consistent with previous studies conducted in different western countries, namely France, Germany, Great Britain, Italy, Portugal, Czech Republic, and Poland (MORI, 2005), Sweden and Spain (Koppel et al., 2008), United States (McCartt and Wells, 2010), and Canada (Robertson et al., 2013). In these studies, safety is rated as one of the most important factors to consider when purchasing a particular vehicle model. This is in contrast to several studies which suggest that safety is not always the main priority for consumers when deciding which vehicle to purchase i.e. safety has been shown to be consistently outranked by price, appearance and reliability (DesRosiers Automotive Reports, 2002; Vrkljan & Anaby, 2011; Clark et al., 2012).

Another essential finding from the current study is that consumers typically associate “safer vehicle” with safety items, particularly active safety (e.g. braking system) rather than the overall safety performance (i.e. crashworthiness ratings); with the same situation reported in other studies (MORI, 2005; Koppel et al., 2008). Although active safety is considered highly important in the event of a crash which acts as “preventive” measures, the condition of the occupants if their vehicle is involved in a crash (“mitigation” measures) is also essential. To address this issue, most of the NCAPs incorporate both aspects. For example, to qualify for a 5-star rating in the ASEAN NCAP, the tested vehicle must be equipped with ESC as pre-requisite in addition to the minimum AOP of 14 points (ASEAN NCAP, 2012).

When examining the interaction effects between age and gender, those who rated safety gradually increased by age for male drivers. This could be due to the lifestyle changes where more safety features such as child restraints to transport children would be used (Vrkljan & Anaby, 2011). Nevertheless there are inadequate evidences to support this claim. This finding also suggested that young male drivers viewed

safety as less important than other age groups. This requires further attention as this particular male age group has been shown to be over-represented in road crash statistics i.e. higher risk of collision (WHO, 2013).

The result also indicated that a relatively low number of respondents were aware of or have heard about ASEAN NCAP and its website. Language barrier might be one of the main reasons leading to the low ASEAN NCAP awareness level, where the medium of language used to disseminate most of the information on ASEAN NCAP is currently English. This may also affect other ASEAN countries where English is not a first language (Zulhaidi et al., 2013). The Euro NCAP also faced the same situation although the consumer safety program has existed for decades. As reported by Koppel et al. (2008), safety information is not the first choice for consumers to refer to as compared to other sources (e.g. friends, families, vehicle dealers, etc.) although safety tops their list of selections when deciding on which vehicle to purchase.

This study has potential implications for ASEAN NCAP's road maps and future strategies. It is recommended that a specific working group under the ASEAN NCAP is formed to objectively look into marketing and branding strategies. The working group is responsible – among others – in finding better ways for communication and dissemination of information on the ASEAN NCAP, in focusing on understanding consumers' needs, as well as enhancing existing safety information and improving awareness and use of ASEAN NCAP ratings.

Together with media campaigns to reach a wider spectrum of consumers, the working group is also responsible in engaging government agencies and private corporations by proposing the inclusion of ASEAN NCAP ratings into their fleets' vehicle purchasing policy. This will create a "vehicle safety" culture in the fleet industry which is hoped to reach the consumers at large. This has been introduced by the Australia NCAP for the Department of Transport, Energy and Infrastructure (DTEI) since 2008, where this policy has reduced the number and severity of crashes involving DTEI fleet vehicles after two years (Leyson, 2010).

In addition, engagement with established organizations and related stakeholders by way of utilizing their Corporate Social Responsibility (CSR) initiative is vital in elevating the visibility of the ASEAN NCAP program and its rating. This can be further explored through media campaigns as well as technical and academic seminars, which could pave the way forward and spark a bright future for the ASEAN NCAP promotion.

After the ASEAN NCAP was established in 2012, several manufacturers have responded well by incorporating safety features into the development of new models. However, the outcome of the commendable efforts by manufacturers will be more effective if the consumers are well aware of the incorporated safety items. For that, it is the responsibility of ASEAN NCAP to encourage the manufacturers to include the ASEAN NCAP safety information into their advertisements as part of their selling points.

Injury severity of car occupants in a crash is part of the liability coverage for auto insurance compensation, other than vehicle damage repair. With the improvement of overall vehicle safety standards, the insurance industry will directly benefit from this

by means of lower national pay-out to crash victims. It is therefore imperative for the insurance industry to incorporate ASEAN NCAP results into their insurance premium package, by allocating special discounts on insurance premium for vehicles with higher safety ratings.

Limitations

There are several limitations identified in this study. Firstly, the respondents surveyed were from the city areas only. The study location, Klang Valley, which is also called the Greater Kuala Lumpur, comprises mainly the capital city of Malaysia (Kuala Lumpur) and its suburbs, and adjoining cities and towns in the state of Selangor. Therefore, it is not possible to generalize these findings to the whole of Malaysia or ASEAN population. However, it is expected that the population in rural or suburban areas may have a lower exposure to the ASEAN NCAP.

Future studies shall include respondents from the rural areas in Malaysia and other ASEAN countries. Secondly, the number of respondents who knew that their cars have been rated by the ASEAN NCAP was very small. This could be partly due to the small number of cars that have tested so far (19 models). Further analysis will be conducted in the future after more samples are added.

Conclusions

The results of the present study suggest that safety is one of the main factors considered by the consumers when purchasing their present cars, with most of them listing the braking system as the most important feature. Both gender and age have been shown to be associated with safety. Although the number of respondents who were aware of the ASEAN NCAP and would use the safety information to purchase cars is still low, it is still a positive and impressive finding considering that the ASEAN NCAP was just established recently. It is hoped that the recommendations highlighted in this study will be useful to the stakeholders, policy makers and related agencies in promoting safer vehicles to the consumers in the region.

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