

## An Analysis of End-of-Life Vehicle Policy Implementation in Malaysia from the Perspectives of Laws and Public Perception

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### ABSTRACT

*End-of-life vehicles (ELV) policy implementation has long been a hotly debated issue in Malaysia. Vehicles that have become ELVs should be disposed of accordingly to prevent environmental pollution and also for the purpose of recycling useful materials, particularly metals. The automotive industry affects the earth environment through greenhouse gas emissions such as air-conditioning gas (CFC/HFC) which will increase global warming and uncontrolled use of raw materials. Even poorly managed ELV waste will cause gas emissions and toxic substances to be released to the environment. To reduce this problem, the implementation of an ELV policy should be seriously considered. In order to have a successful implementation of the ELV policy, support from the public is essential. Thus, this study aims to understand the ELV related laws and their implementation in the neighbouring countries and to ascertain public perception on ELV implementation in Malaysia. The study involves literature search on implemented ELV laws in the neighbouring countries and a survey involving 58 respondents. Results from the survey were analysed using SPSS. This paper presents and discusses the findings from the study. The study indicates that the level of public awareness and acceptance of ELV implementation are quite low. In general, it can be concluded that the implementation of ELV in Malaysia needs to be carefully studied before it is implemented in order to ensure acceptance from the public.*

*Keywords: End of life vehicle; ELV law; public acceptance*

### INTRODUCTION

Vehicles which have reached its end of useful life and can no longer be used are called end-of-life vehicles (ELVs). According to Raja Mamat et al. 2016, ELVs can be categorised into two firstly, as a natural occurrence: A vehicle that has reached the end of its life when the vehicle has been damaged or can no longer function properly. This happens when the vehicle has been in use for a long period of at least more than ten years. Secondly, as unnatural occurrence:

a vehicle that can no longer be used due to physical damage as a result of an accident, fire or vandalism. There are also vehicles that can no longer be used due to economic problems such as vehicle owners fail to renew road tax, high repair costs or lack of spare parts in the market. However, there are vehicles that are still in use despite the problems that have been mentioned. Nevertheless, these vehicles are still being used and on the road.

Vehicles that have reached their end of life naturally or unnaturally should be disposed of properly. This is to

ensure that all toxic and harmful substances are not exposed to the earth. Yet there are irresponsible users, leaving their abandoned vehicles on the roadside, in malls, parking lots and in residential areas. It has been reported that in 2018 there were 60,000 abandoned vehicles in township and cities nationwide (NST, 2018). If this vehicle is abandoned, it will have a negative impact on the public as the vehicle's toxic materials may be exposed to the earth and the release of harmful gases from air-conditioning fluids can degrade the quality of air and eventually the ozone layers. In 1980s, the refrigerants that were used then were chlorofluorocarbons (CFC) and hydrochlorofluorocarbons (HCFCs). CFCs are a family of chemicals that contain chlorine, fluorine and carbon. The chlorine content in these compounds cause depletion of the ozone layer. Although Malaysia acceded to the Vienna Convention and ratified the Montreal Protocol on substances that deplete the ozone layer back in 1989, there are tremendous areas for improvement. For example, CFC-based refrigerants can still be used in vehicles despite having a HCFC phase-out management plan in 2012.

In addition, these abandoned vehicles may also be targeted by criminals to carry out their robbery activities using abandoned cars. As Malaysia aspires to build more skyscrapers in the near future (Azman et al. 2018), more toxic pollutants are trapped in the urban areas as building density increases (Lotfy et al. 2018). Subsequently, harmful gases produced by anthropogenic sources such as automobiles, concentrate around buildings at the pedestrian level causing more health-related issues.

It is common that road accidents in Malaysia occur at a relatively high percentage and the average fatality is 18 per day. There are various factors that contribute to this rather alarming statistic on road accidents. Based on a study carried out by the Malaysian Institute of Road Safety Research (MIROS) using data from road accidents in 2011, the factors leading to road accidents are 6.2% due to vehicle condition, 80.6% due to human error and 13.2% due to road conditions (Hamzah et al. 2012a). Findings from MIROS show that new vehicles have a higher record of road accidents compared to older vehicles, however older vehicles have a higher potential for fatal accidents (Sarani et al. 2018). This shows that some kinds of management of older vehicles involving ELVs policy contribute to road safety. ELVs have the potential to suffer damage as a result of overuse. At the end of 2010, the number of vehicles in Malaysia surpassed 21.25 million, with an annual average of 12 % increase in vehicle registration per year in 5 years. If the estimation is correct, there will be 31 million or possibly more by 2020 (Azmi et al. 2013). ELV must therefore, be properly disposed of to prevent pollution and also for the recycling of useful materials, particularly metals. The first step is to remove any fluids such as fuel, lubricant oil, gear oil and air-conditioning fluids. The next

step is to remove dangerous components such as batteries and airbags. Further on, components will be disassembled from the main body. Usable components might be overhauled, remanufactured and recycled according to market demand. Once the operation is completed, the remaining waste will be taken to the car disposal plant where the car will be crushed to pieces (Santini et al. 2011). Typical materials that usually cannot be reused are cushions, plastic-based parts which is usually the main materials for dashboard. These materials can be disposed of in landfills.

As an automotive producing country, Malaysia has initiated some measures to ensure a proper handling of ELV. In 2009, the government introduced the Vehicle Lifespan Policy since there was a high average age of vehicles on the roads and a low car disposal rate. Therefore, the first step towards a full implementation of the ELV is to introduce an annual mandatory inspection as a condition for road tax reform for all vehicles aged 15 years or more (MITI 2009). However, the implementation of this law faced considerable public oppositions. It was later discovered that the legislation was enforced without proper examination (Azmi et al. 2013).

In this study, the vehicle of interest is a motor vehicle that has at least four tyres. The vehicle corresponds to the category of commercial vehicles, namely heavy vehicles such as buses and lorries and passenger vehicles such as cars. The impact of ELV waste on the environment in Malaysia is increasing in line with the number of vehicles registered. The automotive industry has had many effects on the earth including greenhouse gas emissions such as carbon dioxide and nitrogen oxide which will increase global warming, uncontrolled use of raw materials and even the waste of poorly managed ELVs will cause gas emissions and toxic substances that are harmful to the environment. This will affect humans' health, reduce productivity and quality of life.

To address this problem, the implementation of the ELV policy should be reconsidered. As a vehicle producing nation, it is crucial for the policy makers in Malaysia to consider the environmental impacts of vehicles when reaching end of life. The public must also play their role in supporting the implementation of the ELV policy. In order to ascertain public understanding on the issues of ELV, a questionnaire was distributed to the public, government and non-governmental organizations. Analysis was conducted using data from the Malaysia Automotive, Robotics & IoT Institute (MARii), Road Transport Department (JPJ) and Ministry of Science, Technology and Innovation (MOSTI). As a result of the analysis and comparison with developed countries, the suitability to implement ELV policy will be discussed.

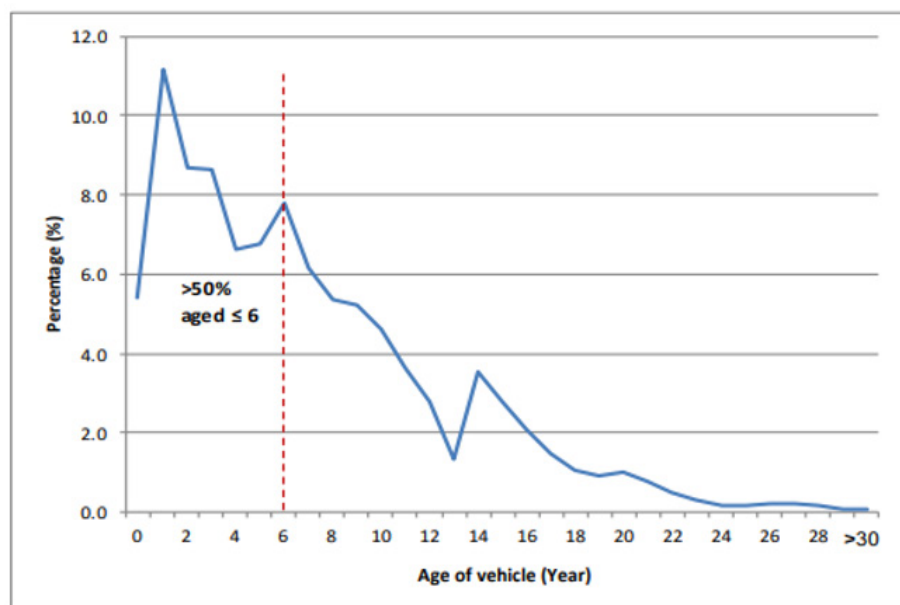


FIGURE 1. Percentage of passenger vehicles involved in road accidents according to the age of the vehicle in 2011 (MIROS 2018).

In the Malaysian context, previous researchers have not addressed ELV management and scenario in much detail. Hamzah et al. (2012b) proposed a reverse supply chain framework for the Malaysia automotive industry based on a review of ELV management practises in other countries such as Japan, China and USA. However, insights of the current scenario in Malaysia has not been investigated. A survey carried out by Raja Mamat et al. (2016) presented key success factors in establishing ELV management system for Malaysia. The study did not focus on the performance level of the local ELV management. A study by Jawi et al. (2017) evaluated public responses to a probability of an ELV policy implementation only and do not include any study on the current Malaysian ELV practises. Most previous studies on ELV management have focused on public awareness and not on ELV scenario by practitioners (Wahab & Fadzil, 2014 and Mohamad-Ali & Ghazilla, 2019).

There are as many technical-legal aspects as to the commercial side of ELV policies. The economic values of the remanufacturing processes starting from value chain to selling the recovered and recycled parts are estimated to be worth RM10 billion per year i.e. 1% of a trillion-ringingit Malaysian economy.

The main components in the reverse supply chain for ELV management consist of networks of stakeholders that jointly add value to ELV. These connections within networks are formed by material, information, and financial flows. The stakeholders in the chain have different functions, e.g. take-back, de-pollution, dismantling, logistics, shredding, recycling, energy recovery, disposal, marketing, etc. (Cruz-Rivera & Ertel, 2009). These

processes focus on operators that carry out take-back activities and form part of the collection networks of ELV. The variables involved in this study is limited to the geographical location of facilities to carry out take-back activities, thus the capacity and extensions of the facilities are not part of this work. A licensed authorised automotive treatment facility (AATF) conducts 4R activities (reuse, repair, recycling and remanufacturing) according to the relevant regulatory requirements. This includes material and core recovery, processing and handling of motor vehicle parts and components for the 4R activities. These 4R activities are aligned to the Circular Economy concept that aimed to close the loop in handling end-of-life products through product life cycle extension. Recycling enables recovery of material such as metal, plastics, rubber, glass and fluids. Remanufacturing on the other hand, aims to recover reusable parts and components for repair and restoration so that once reassembled and tested, the product can be used again for the same functionality and performance. This value added and resource efficient recovery strategy has been formulated as one of the roadmaps of the National Automotive Policy (NAP) 2020 with the aim to promote green and sustainability among the local automotive industry (MITI 2020).

There are two objectives in this study, namely is to identify and compare ELV acts or policy in several countries and propose the appropriate implementation of ELV policy.

## METHODOLOGY

The research methodology involved an extensive literature review and a public survey. The first step was to explore whether there is any ELV related policy in Malaysia. Next, an extensive literature review was conducted to identify the current ELV Laws in the neighbouring countries. For the second objective, a set of questionnaires was developed. The questionnaire was reviewed with a representative from MARii, who is in-charge of ELV and after-market activities. The review was aimed at obtaining feedback on the questionnaire and information regarding the management of ELV in Malaysia at present. The targeted group for the questionnaire was working citizen and mostly middle-class people who normally own a vehicle / vehicles in Malaysia. The survey was conducted face-to-face with manual forms.

A total of 58 respondents participated in the survey. The survey questionnaire contains a total of 14 close-ended question including 2 demographic-related questions. Among the questions asked are whether a respondent owns a vehicle; numbers of vehicles owned; knowledge about ELV; if ELV law is implemented would respondents be willing to pay vehicle disposal charges; would respondent agree if a mandatory inspection is to be carried out every two years to ascertain vehicle safety for a vehicle that has its warranty expired; and would respondents agree if the Malaysian Government implements ELV laws. Survey results are collected manually into a database and after that statistical analysis are performed.

## RESULTS AND DISCUSSION

## CURRENT LAW ON ELV

Based on an extensive search on current ELV law among neighbouring countries, it was found that China, Taiwan, Singapore, South Korea and Japan have established their own law to manage ELV. Malaysia has yet to establish an ELV law despite being a producer of automotive vehicles since 1986.

In Taiwan, this matter has gained attention due to the increase in the number of cars, environmental pollution and other pollution issues caused by improper handling in the disposal of motor vehicles. Motor vehicles contained various materials such as lubricants, liquid acids and refrigerants which may pollute the environment if improperly discarded. In addition, wild animals may use abandon vehicles as shelter that can cause environmental issues (Chen et al. 2010). Prior to 1994, ELV recycling in Taiwan was carried out by the related industrial operators. Since the enforcement of the Waste Disposal Act under the Environmental Protection Administration (EPA) in 1994, ELV recycling became more structured (Harraz & Galal 2011). Under the Environmental Protection Administration (EPA), the Recycling Fund Management Board (RFMB) was formed in 1998 to collect recycling fees from recycling companies. Since then, recycling, processing equipment and techniques to treat ELVs have improved significantly.

TABLE 1. Classification of ELV in China

Type of Vehicles	ELV Requirement
Mini-size commercial vehicles	Mileage more than 300,000 km
Light commercial vehicles	Mileage more than 400,000 km
Heavy, medium commercial vehicles	Mileage more than 400,000 km
Passenger vehicles	Mileage more than 500,000 km
Other vehicles	Mileage more than 450,000 km
Mini-size commercial vehicles, including trailers and taxicabs*	Service period more than 8 years
Light commercial vehicles and others	Service period more than 10 years

\* taxicabs for 19 passengers or less, light and mini-size commercial vehicles could prolong their service period up to half of the fixed number of years if they pass inspection for compliance with national vehicle exhaust standards.

Source: (Azmi et al. 2013)

A decade ago, China was seen as a new auto sale region of rapid growth. The number of vehicles used in China would have reached 32 million by the end of 2006 and the number of ELV by the end of 2005 would surpass 1.5 million (Che et al. 2011). The 2011 report indicates that China's vehicle market set a new record with sales of 13,791,000 million units in 2009, bringing the total vehicles to 6,288 million units (Xiang & Ming 2011). Although China auto vehicle sale did not keep its rapid 2008-2010 growths, it maintained remarkable positive annual growths

until 2017 as can be seen in Figure 2. This data was retrieved from an online report provided by the Paris-based Organisation Internationale des Constructeurs d'Automobiles (OICA) which tracks production and sales of autos. China auto sales surpassed that of US in 2008, i.e. during the world's financial crisis. In 2019, auto sales in China was 25.8 million units which is the highest in the world, followed by the US at 17.5 million units. In South East Asia, auto sales in Thailand and Malaysia have plateaued in the past decade at 1 million and 0.6 million

units respectively in the last one decade. Contrastingly, Indonesia has seen its auto sales to double in the same period.

According to the Ministry of Transport, Malaysia, there were about 31.21 million vehicles registered in Malaysia as of December 2019 (JKJR 2020). This data represents an average increase of around 1.2 million new vehicles annually in the past two and half years. The latest data also show an increase of vehicles registered in

Malaysia over the past 10 years (2010-2020), where the average of 18.67% increase in vehicle registration for each year over the period of 5 years.

A year after the European Union adopted the ELV Directive in 2001, Statute 307 Law on ELV in China was enacted by legislators. The key aspect of Statute 307 is the declaration of ELVs depending on the mileage and the service length as shown in Table 1. Table 2 depicts six countries that have their own law on ELV except Malaysia.

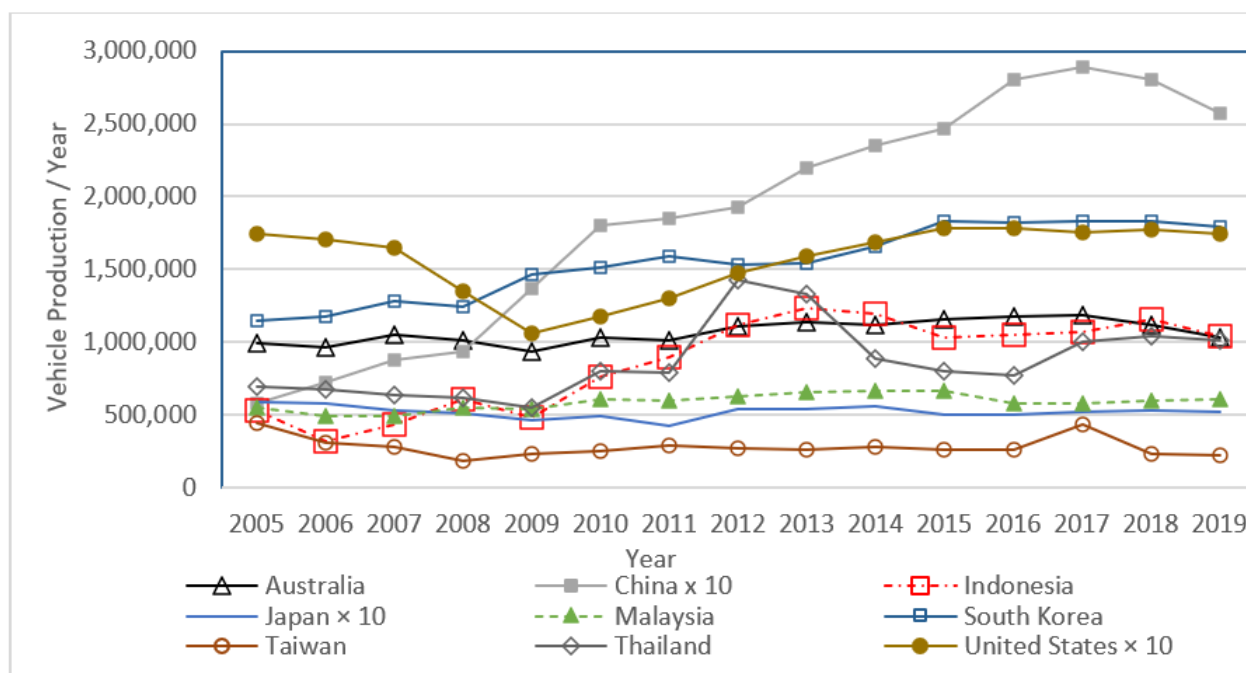


FIGURE 2. Auto sales in selected country in the world (OICA, 2019)

TABLE 2. Comparison ELV management between countries

	Malaysia	China	South Korea	Japan	Singapore	Taiwan
Government Involvement / Act:	No Law	Statute 307 Law on ELV	The Act for Resource Recycling of Electrical/ Electronic Products and Automobiles	ELV Recycling Law	Vehicle Quota System	Waste Disposal Act
ELV age:	10 years	10 years or 500,000km	Not Specified	Min 3 years, inspection once in 2 years	10 + 5 or 10 years	10 years
+ 10 years	10 years					
Recycling Fees paid by:	Market Driven (Collector pay last owner)	Market Driven (Collector pay last owner)	Market Driven (Collector pay last owner)	First owner, upon purchase	Market Driven (Collector pay last owner)	Manufacturer & Importer pay when purchased
Operator Size:	209 Recycling Operators, 0 Shredding & Sorting Plant	367 Recycling operators, 1 pilot recycling center	226 Recycling operators, 7 shredding & Sorting plants	5000 Recycling operators, 140 shredding & Sorting plants	-	303 Recycling operators, 5 shredding & Sorting plants
Effectiveness: (Recovery rate)	None	90%	85%	85%	-	95%

Source: (Azmi et al. 2013)

South Korea enacted The Act for Resource Recycling of Electrical/ Electronic Products and Automobiles in January 2008. Car manufacturers are required to sign contracts with recyclers to process ELV. In general, of the 14 million vehicles registered annually, South Korea produces 0.5 million ELVs. The recycling rate at the dismantling process is about 44% on average, while at the shredding process is around 40.2% (Kim et al. 2004; Wong et al. 2018).

Japan's automotive industry is one of the world's leading and largest industry. Since Japan has many automotive industries, it increases the rate of vehicles that fall into the category of ELV. Total car ownership alone in Japan has reached 62.03 million until 2019 (JAMA 2019). Japan has a shortage of industrial waste disposal capacity, confirmed to be only 176.39 million m<sup>3</sup> of its existing area (MOE 2011). Vehicle waste disposal was then a major issue for Japan.

The Japanese government's introduce ELV Recycling Law in 2002 in an effort to reduce waste from vehicles (Simic & Dimitrijevic 2013). It came into force in January 2005 and car manufacturers and importers are required to collect and recycle chlorofluorocarbons/hydrofluorocarbons (CFC/HFC), airbags and automotive shredder residue (ASR) produced from ELV recycling process. The objective of the ELV Recycling Law is to develop a new system for the processing and disposal of ELV and their efficient use as a resource (Zhao & Chen 2011). The target

for ASR recycling has been set at 50% by the end of 2010 and 70% by the end in 2015 (Vermeulen et al. 2011). From January 2005, Japan had clearly stipulated that the cost of recycling must be paid when one buys a car. Prior to 2005, the buyer would have to pay at the first periodic inspection of the car. If the public wants to dispose of their vehicle without going through periodic inspections, payment must be made to the ELV collector when handing over the vehicle (Zhao & Chen 2011). The amount of payment to be charged is determined by the manufacturer and importer depending on the type of vehicle. This creates a competition between the vehicle's producer and importer to lower recycling costs. These recycling fees cover the costs of gas generators, treatment of fluorocarbons and ASR management costs and information systems (Hiratsuka et al. 2014).

In Singapore, even with the introduction of high tax value for vehicles, it has not succeeded in reducing the number of vehicles on the road. To overcome this problem, in 1990, the Vehicle Quota Scheme (VQS) was introduced by the Singapore government. The system operates through the open auction of Certificate of Entitlement (CoE) for various types of vehicles. Vehicle buyers need to have a CoE before being allowed to purchase a vehicle (Tan 2001). Vehicle Quota System classifies vehicles into 5 CoE categories as shown in Table 3.

TABLE 3. Vehicle classification according to COE

Category A	Car exceed 1600cc & 97kW (130bhp)
Category B	Car exceed 1600cc & 97kW (130bhp)
Category C	Commercial vehicles and bus
Category D	Motorcycle
Category E	Open except motorcycle

Source: Onemotoring 2019

The Land Transport Authority (LTA) will announce how many CoE quotas are available to bid for each category. After getting the certificate, the vehicle can be purchased and registered for 10 years. The certificate has to stick to the vehicle even if it is sold before the ten-year duration expires. After 10 years, the owner can choose to cancel

the registration or resume the certificate by paying the Prevailing Quota Premium for the vehicle category. Once the vehicle has reached a statutory lifespan, the vehicle is no longer allowed to renew the CoE. Table 4 shows the statutory lifespan for each vehicle category.

TABLE 4. Statutory lifespan for each vehicle category

Vehicle	Statutory lifespan
Car	No statutory lifespan (except car that registered under a company have 10 years statutory lifespan)
Motorcycle	Register before 1 July 2003: Statutory lifespan ended 30 Jun 2028 Register during and after 1 July 2003 or vintage motorcycle: No statutory lifespan

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Omnibus	17 years
Buses	20 years
Commercial vehicles	20 years
Taxi	8 years

Source: Onemotoring 2019

Malaysia has yet to implement acts or laws on ELV. Previously, there were attempts made by the Government under the National Automotive Policy which was reviewed in 2009. As a preliminary step towards the full implementation of the ELV Policy, a vehicle that is 15 years and older is required to go through an annual mandatory inspection (MITI 2009). However, this policy was strongly opposed and withdrawn shortly. To date, ELV recycling in Malaysia has been carried out by 209 operators registered under the Malaysian Automotive Recycling Association (MAARA) a non-profit organization. There are some operators who carry out their activities without following the environmental law while performing depollution activities. For example, the engine coolant is freely released into the drainpipe and the air conditioning gas is freely released into the air. These practices will have an adverse impact on the environment.

#### QUESTIONNAIRE ANALYSIS

In this study, SPSS was used to analyse the survey results. Prior to the survey, the reliability of the questionnaire was ascertained using the Cronbach's alpha test. The alpha coefficient,  $\alpha$  has a range from 0 to 1 and 1 indicates the highest reliability value. The following Table 5 shows the scale used to determine the reliability of the questionnaire.

TABLE 5. Cronbach's alpha range

Cronbach's alpha	Reliability
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
<b><math>0.8 &gt; \alpha \geq 0.7</math></b>	<b>Acceptable</b>
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$\alpha > 0.5$	Extremely poor

From the questionnaire, several questions were tested for reliability. From the result, it was found that the alpha coefficient for the questionnaire was equal to 0.704. According to table 6, the alpha coefficient is in the acceptable category meaning the reliability of this questionnaire is acceptable.

Table 6. Reliability statistics

Cronbach's Alpha	Cronbach's Alpha according to questions	N of questions
0.704	0.709	3

The first question is regarding the multiple ownership of vehicles. From Table 7, the ownership of vehicle varies from 1 up to more than 3 vehicles per respondent. Total respondents with more than 2 vehicles is as high as 81.1%.

TABLE 7. Ownership of vehicles

	Frequency	Percent %
1	11	19.0
2	24	41.4
3	11	19.0
> 3	12	20.7
Total	58	100.0

This finding is in agreement with previous finding or statistics which shows multiple ownership of vehicles in Malaysia. According to a study by Nielsen (2014), car ownership among Malaysians is not only the highest in ASEAN but also the highest incidence of multiple car ownership. It was reported that 54% of Malaysian households own more than one car.

The second question is about respondents' knowledge on ELV laws. As shown in Table 8, 81.0% of the respondent gave the answer no, indicating the lack of exposure on ELV. The finding certainly shows that it is imperative for ELV law to be planned accordingly prior to its implementation to ensure public awareness and acceptance.

TABLE 8. Exposure on ELV laws

	Frequency	Percent %
Yes	11	19.0
No	47	81.0
Total	58	100.0

The respondents were then asked whether they are willing to pay vehicle disposal charges should ELV laws be implemented. A similar procedure has been implemented in Japan and Taiwan. In Japan the purchaser has to pay the fee upfront while in Taiwan, the manufacturer or importer has to pay the fee.

From Table 9, 69.0% of the respondents are not willing to bear the payment. This could be due to the high price of cars in Malaysia, thus the public are not willing to pay more on the disposal fee. Malaysia is thriving to be a developed nation, however this finding is against the practices in most developed countries. The recycling fee is necessary for activities such as disassembly to be carried out. Go et al. (2011) noted that most developed nations

require users to pay recycling fees. European Union, Japan, USA, and Australia laws require manufacturers to take back their products at the end of their useful life and recycle them. In order to enhance the recycling rate of the vehicle, disassemblability of the automotive components is a major concern. In the chain of end-of-life, except for landfill and incineration, components of economic value destined for reuse, remanufacture, or recycling have first to be disassembled from the ELVs.

TABLE 9. Agree to pay fee

	Frequency	Percent %
Yes	18	31.0
No	40	69.0
Total	58	100.0

The next question was related to the Japanese law on ELV regarding mandatory inspection. Car owners are required to conduct a mandatory inspection every 2 years after a car is purchased. Table 10 shows that more than half of the respondents agree on the need to conduct mandatory inspection to maintain the safety of vehicles while on the road. Furthermore, findings from MIROS show that older vehicles have a higher potential for fatal accidents (Santini et al. 2011).

TABLE 10. ELV mandatory inspection

	Frequency	Percent %
Yes	39	67.2
No	19	32.8
Total	58	100.0

The final question was on whether the respondents agree if ELV law is to be implemented in Malaysia. Table 11 shows the result of the said question.

TABLE 11. Implementation of ELV

	Frequency	Percent %
Yes	27	46.6
No	31	53.4
Total	58	100.0

From the table above, the majority is hesitant with implementing ELV laws in Malaysia. Only 46.6% of the respondent agreed on the implementation of ELV while 53.4% chose against it. This can be due to several factors. Firstly, from the first question, the total ownership of vehicles among respondent can affect this decision. This is because, respondent with a high number of vehicles might think that they need to dispose their vehicles when it reaches end of life. Thus, reducing the number of vehicles that they owned while they work hard to pay for it. This can also be due to the lack of exposure on ELV laws. From

the second question, 81.0% of respondent lack exposure on ELV laws. As a result of respondents' lack of exposure to ELV, they do not know what ELV laws lead them to and they feel that ELV laws do not benefit them.

## CONCLUSION

A study on the implementation of ELV policy has been conducted based on two main objectives, namely, to identify and compare the act of ELVs in several countries and suggest the appropriate implementation of ELV policy in Malaysia after considering public opinion on the policy.

Based on the first objective, as a result of the comparison of ELV policies it can be seen that these countries are taking similar steps in solving the problem of ELVs in their countries. Compared to Malaysia, so far Malaysia only requires commercial vehicles to conduct inspections every 6 months at the Pusat Pemeriksaan Kenderaan Berkomputer (PUSPAKOM). For private vehicles, it is not mandatory to conduct inspection unless the road tax is not renewed for 12 months. The initiative to improve the licensed AATF is also newly implemented in 2020 aim at treating abandoned vehicles.

Results from the study has also shown that the ELV policy should not be implemented in a haphazard manner. It is reflected from the study that the respondents are not willing to pay recycling fees, therefore it is necessary to get public feedback from all income groups. This is because the implementation of the ELV policy affects all Malaysians.

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## DECLARATION OF COMPETING INTEREST

None.

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