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The Factory of ELV Management System in Jerantut

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Abstract: Vehicles represent the main key of the today society and number of vehicles in use increases from year to year. However, whole life cycle of vehicles has a considerable impact on the environment. The whole life cycle of vehicles known as End-of-Life Vehicle. In Jerantut, many abandoned cars have been seen around the workshop. This study is intended to analyze the causes and factor of the abandoned cars management in Jerantut. Survey and interview have been released to the residents of Jerantut and workshop in Jerantut. Finally, in this study, the factor of the abandoned cars management can achieve the balance ELV management system in Jerantut.

Keywords: End-of-Life, Life Cycle, Environment, Management

1. Introduction

The Malaysian automotive sector is characterised by a domestically developed manufacturing structure geared towards the production of passenger vehicles. The sector has been heavily subsidised and protected to produce national champions and automobile components and parts suppliers. Based on [1], the automotive industry has been one of the major contributors to Malaysia's economy ever since the launching of our first national car in 1983. The launch of the first regional automotive project, PROTON, in 1983 was the first effort by the Malaysian government to expand local production of automobiles. The intention was to support the industry in achieving economies of scale and to move from a pure assembly industry to internationally competitive manufacturing industry. The automotive industry plays a significant role in transforming Malaysia into an industrialised nation.

Since then, the sales and production of the Malaysian automotive industry have increased. Moreover, it is observed that the car users today have high willingness to own the so-called "non-national" cars that are essentially more expensive than the local marque, Proton and Perodua, due to the different taxing system. Though Perodua and Proton hold the biggest market share at around 47.00 % in 2014 and 2015, the domination is in a downward trend from as high as 80.00 % in the year 2000. The Malaysia Automotive Institute (MAI) reckoned that Malaysia is the second cheapest country in the ASEAN region to own a vehicle after the Philippines despite the high car prices. Malaysia's Motor

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Vehicles Sales recorded 42,623 units in January 2020, compared with 54,842 units in December 2019. The vehicles that have been categorized into types of vehicles including motorcycles, motorcars, taxis, hire and drive cars, and good vehicles.

However, the problems emerged when the vehicles in Malaysia have reached their end-of-life stage. Waste from end-of-life vehicles (ELVs) is an issue of worldwide concern, because of its rapidly increasing quantity, the special composition of hazardous substances [2], and legislative pressures [3]. Moreover, ELVs are the single largest hazardous waste category from households. The management of ELVs is currently one of the most important ecological topics [4].

Nevertheless, it is quite unfortunate that the ELV policy has never taken place in the system. The Malaysian car industry has not based its efforts on proper management of ELVs. Therefore, an ELV management system must be established in Malaysia.

2. Literature Review

End of life (EOL) is the final stage of the existence of a product in the context of the manufacturing and product lifecycles. The specific end-of - life concerns depend on the product in question and whether the manufacturer's or user's perspective is one. For the manufacturer, EOL concerns not only involve discontinuing production but also continuing to consider the market needs to be addressed by the product which could lead to the development of a new product. For the business that uses the product, EOL's concerns include responsibly disposing of the existing product, transitioning to another product, and ensuring minimal disruption.

An end-of-life vehicle (ELV) is a specified vehicle that its registered owner discards as waste or is to discard as waste. Vehicles normally end their useful lives, either due to age (typically around 12-14 years), or due to heavy accident damage. There is, therefore, no fixed age at which a vehicle can be regarded as an end-of - life vehicle.

ELVs can be divided into two major groups: normal and premature [5]. Premature vehicles have ended their useful life before their average lifespan, either due to fire, theft, flooding, vandalism, or damage from accidents. Before more sorting, such situations also have an abundance of reuse component taken out. In the meantime, natural ELVs are vehicles which end their useful life. It appears to be in a poor state of repair and component resale value is limited and sometimes a variety of health and safety concerns need to be resolved before de-pollution and further processing.

2.1 Vehicle Structure

Before ELVs treatment starts, understanding towards of the vehicle and its structure are important. Besides that, the material used must be look forward before the ELVs treatment operated. Vehicles are things used to transport people or goods, particularly on land, such as a car, a lorry or a cart. Vehicles make it easy for people to move in one place to another place, loading heavy items and many more. A vehicle has around 30,000 parts, with each part counting down to the smallest screws (Toyota Motor Corporation, n.d.). The roughly 30,000 parts use various raw materials and different production processes. Vehicle engine, chassis, body, and electrical equipment generally, such as the four basic parts of the car.

Specific products are used to create vehicles. In addition to future trends, the main materials used to make cars, parts and components are steel, aluminium, magnesium, copper, plastics, and carbon fibre. The main factors for material selection, particularly for the car body, are numerous and include thermal, chemical, or mechanical resistance, ease of manufacture and durability [6]. Table 1 shows the summary of current automotive application with the mode of application, advantage, and drawbacks.

Table 1: Summary of current automotive application with mode of application, advantage and drawbacks [7]

Materials	Steel	Aluminum	Magnesium	Copper	Composites and Plastics
Mode Of Applications	BIW, chassis, power trains, bumpers and engine parts	engine blocks, body panels, power train, pistons & cylinder heads, etc.	inner door structure, steering wheel core, steering column, car seat frame, transfer case, etc.	Electromechanical applications, automatic transmissions and ABS braking systems	Passenger cell, Roof compartment cover, trunk lid, Wheel rims, Cabin, floor, roof, pillars, hood, etc.
Advantages	Strong and stiff, corrosion resistant, impact energy absorptivity properties, good formability and joining capability.	Light weight, corrosion resistant, recyclable, energy efficient, safer.	lightest of all the engineering metals thus contribute fuel economy	Good electrical conductivity makes it suitable in electrical accessories and components in automobiles.	High strength to weight ratio and good stiffness, good corrosion and chemical resistance.
Current draw backs	Very heavy compared to other auto materials	Intolerance to heat	Low melting temperature (650°C), highly reactive metal and has inherently poor corrosion and wear resistance	Limitation to application in automotive parts	Very expensive, not recyclable, hard manufactory process and etc. (composites).

2.2 Treatment of ELVs

ELVs are classified as hazardous waste and have the potential to pollute the environment unless properly managed [8]. They are the single largest category of hazardous waste by households [9]. Intensive work on the ELVs management issue is required to address this increasingly rising environmental threat more effectively. It is crucial for the preservation of the environment, the circular economy and sustainable development. This cycle is not all about income. Sound management of ELVs has become the main issue of sustainability in most countries around the world and therefore requires sophisticated decision-making tools to optimize its effectiveness.

When the vehicle achieved its end-of-life, it must go through many procedures and then be handled accordingly. The ELV recycling operation has been done in at many countries around the world such as China, Malaysia, and many other countries. The ELV recycling operations have undergone many stages in the China industry, outlined in Figure 1, involving ELV owners, recycling organizations, dismantling plants and unique reuse, recovery, and recycling operations [10].

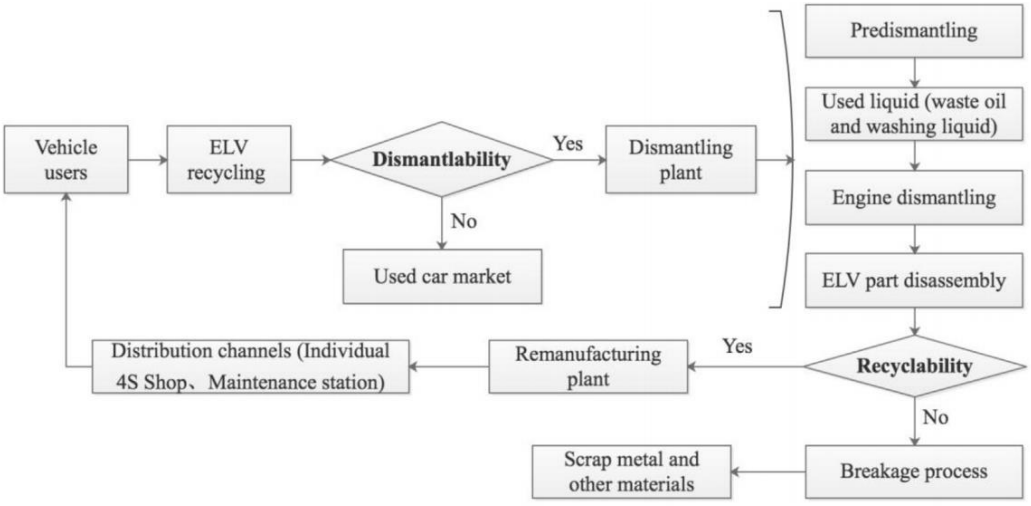

Figure 1: ELV recycling operation in China market

As shown in Figure 2, because of the incidence of used vehicles, the ELVs are obtained from specific buyers including car-users and vehicle-owners. Both are the providers of ELVs, and some subsidies would be made by local governments. The responsibility for ELV processing rests with car

production factories and green organizations. The demolition operations set the groundwork for subsequent recycling operations: reuse, recycle; and remanufacture. Besides, the processing quality on how the ELVs can be fully decomposed is perfect. Those surplus pieces that can be re-manufactured can flow to the remanufacturing facility, and other valuable pieces may be recycled in a sustainable way utilizing renewable resources or recovering electricity. The China automotive industry has seen the remanufacturing channel as the most efficient way to improve sustainability.

3. Results and Discussion

A research method is often used to analyze the effect and key factor for the ELVs management system in Jerantut. For this study, questionnaire, and interview to analyze the respondents' perspectives. Figure 2 shows the methodology flowchart for this project.

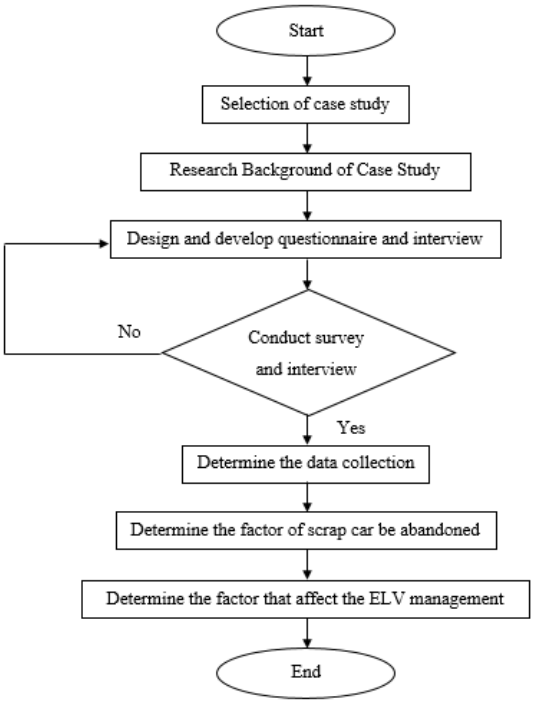

Figure 2: Flow chart of research methodology

3.1 Online Survey

The online survey will be used because it is quite flexible. These can be administered in many formats such as an e-mail with an embedded sample, e-mail with a link to a sample URL, access to a website by an internet surfer who is then asked to take part in a survey, etc. Online surveys can be administered in a time-efficient manner, minimizing the amount of time it takes to get a survey into the field and to gather data. Completing online surveys, tabulating, and analysing their responses is relatively simple for respondents.

The online survey is performed by submitting a connection with a few questions outlining the intent of the study, chosen date of submission and the student in charge's interaction with the targeted respondents. The online survey's platform that has been used is Google Forms. The Google Forms is a cloud-based data processing platform used to create and build questionnaires focused on the internet. This method is developed by Google Inc. to use and build browser-based questionnaires and is publicly accessible on the internet.

A sample of the Google Forms is available for this survey. The link given will automatically lead the targeted respondents in a different window or tab to the online questionnaire. The selected respondents will click the "Submit" button at the bottom of the page until done.

3.2 Interview

The interview is a dialogue to collect details. The study interview includes the moderator, who guides the discussion mechanism and poses questions, and the interviewee, who addresses certain questions. Interviews can be conducted face-to-face or by telephone. The Internet is also emerging as a tool for interviewing people.

Interviews are an effective approach because there is a need to collect in-depth knowledge regarding people's beliefs, emotions, perceptions, and feelings. Interviews become helpful as the focus of the interview applies to topics involving detailed interrogation and significant analysis. Face-to-face interviews are necessary because the target audience becomes more equipped to connect via face-to-face interactions than by written or phone calls (e.g., infants, elderly, or impaired persons).

4. Result and Analysis

4.1 Interview

For the interview session, I have used the content analysis because the content analysis is always used to collect data from documentary sources. In the interview, I have interviewed 5 different owners of the workshop in Jerantut. From five owner of the workshop, two of them that I used face to face interview and three at rest I used a telephone interview. Both of interview methods give the author the accurate data for the research. For face-to-face interview, I got more data than a telephone interview method.

Two of the workshops manage the scrap car that are Affendy Abdul Jalir Workshop and Perodua Semantan Otomobil Sdn. Bhd. For the rest of the workshop that are Lai Workshop,Hup Seng Brothers Workshop and Tam Workshop did not handle scrap car in Jerantut.

For the workshop that I used face to face interview, I have got all answers for my interview questions because the workshops used to manage the scrap car. For the rest of the workshop, I did not get all answer for the questions because the workshop did not manage the scrap car at all. For Affendy Abdul Jalir Workshop and Perodua Semantan Otombil Sdn. Bhd that used manage scrap car, there has a lot of difference between the workshops because Affendy Abdul Jalir Workshop was semi-organized workshop while Perodua Semantan Otombil Sdn. Bhd was a fully organized workshop. For Perodua, they have a target to achieve for the scrap car that is 30 cars per month, but Affendy Workshop only depends on the customer for the scrap car. All workers that involve in scrap car area for Perodua get the training to handle the scrap car properly and according to the step that has been set in the rule and different for the Affendy Workshop that only manages the scrap car using the basic training based on the internet and training.

Perodua gave hope to have the collaboration with others workshop to handle the scrap in Jerantut because Perodua has their place for the scrap car management. For the other four workshops hope,the government have to build a specific place for the scrap car in Jerantut for the easier process and matter.

4.2 Questionnaire

Section A discusses the background of the respondents. Four (4) items were constructed to provide the background of the respondent. Among the items are occupation, age, gender, and current location.

In general, this questionnaire study was conducted on 92 respondents from various levels of gender, age, occupation, status, and race. Based on the analysis in Table 2 which has been done by 14.10 % or 13 respondents was students, 52.20 % or 48 respondents work with government, 8.70 % or 8

respondents works at their own, 21.70 % or 20 respondent works in the private sector and only 3.30 % or 3 respondents did others job. Table 2 and Table 3 show a list of the distribution of 92 respondents with different types of occupation.

Table 2: Occupation of respondents

		A1. Occupation			
		Frequency	Percent (%)	Percentage valid	Accumulated percentage
Valid	Student	13	14.1	14.1	14.1
	Government	48	52.2	52.2	66.3
	Self-employed	8	8.7	8.7	75.0
	Private	20	21.7	21.7	96.7
	Others	3	3.3	3.3	100.0
	Total	92	100.0	100.0	

The age distribution of respondents was identified through data collection in Part A which is the demographic analysis of the background of the respondents. Table 2 shows the frequency distribution and percentage of respondents according to age variables in demographic data. From this table most respondents aged 15 to 25 years represent the highest age distribution with a value of 30 or 32.60 % of the total. Besides, 20 respondents from 169 people or 21.70 % aged 26 to 35 years, respondents aged 36 to 45 years recorded 26.10 % and last age group 46 years and above with a value of 18 or 19.60 %. From this analysis, most of the respondents, the residents who know more about End-of-Life Vehicles in Jerantut between the ages of 15 to 25 years.

Table 3: Age of respondents

		A2. Age			
		Frequency	Percent (%)	Percentage valid	Accumulated percentage
Valid	15-25 years	30	32.6	32.6	32.6
	26-35 years	20	21.7	21.7	54.3
	36-45 years	24	26.1	26.1	80.4
	46 years above	18	19.6	19.6	100.0
	Total	92	100.0	100.0	

Based on the analysis in Table 4 which has been done by 38.00 % or 35 male respondents compared to the rest is the number of female respondents which is 62.00 % or 57 people. Table 4 show a list of the distribution of 92 respondents between males and females.

Table 4: Gender of respondents

		A3. Gender			
		Frequency	Percent (%)	Percentage valid	Accumulated percentage
Valid	Men	35	38.0	38.0	38.0
	Women	57	62.0	62.0	100.0
	Total	92	100.0	100.0	

Section B will investigate the respondents' perception of End-of-Life Vehicles in Jerantut. This division wants to test the awareness of residents in Jerantut about the End-of_life Vehicles. The data shows the Likert-scale from the questionnaire that starts from 1 to 5. 1 shows the respondent is strongly disagreed for the question and 5 means that the respondent strongly agrees with the question.

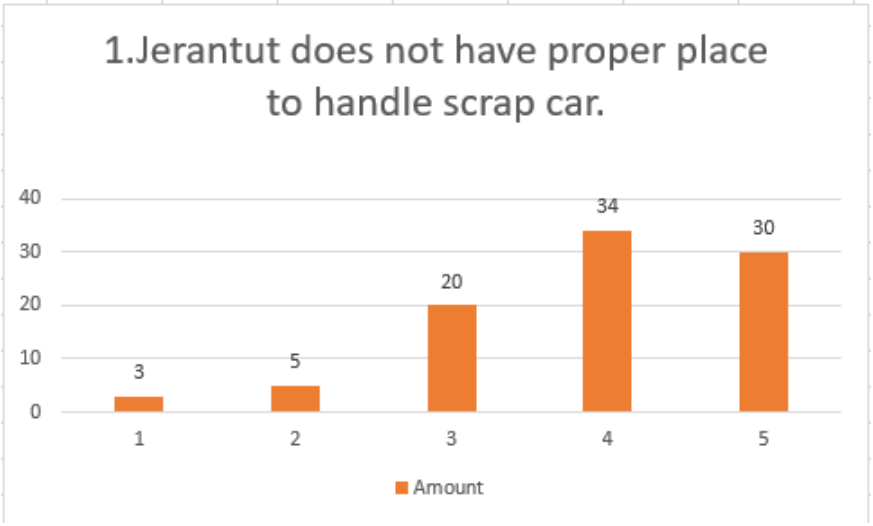

Figure 3: Summary result of Question 1 of the questionnaire

Figure 3 shows the respondents agree that Jerantut does not have a proper place to handle scrap car. 34 respondents from 92 that is 37.00 % do agree with that statement.

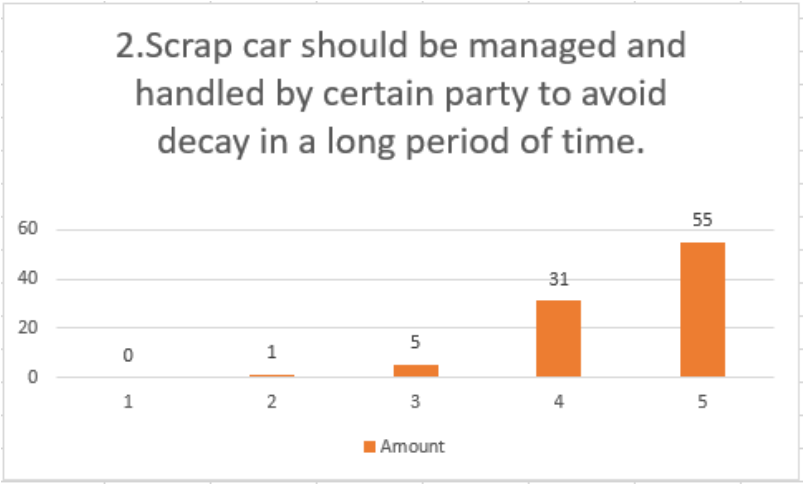

Figure 4: Summary result of Question 2 of the questionnaire

The highest percentage of respondents' pick that 55 respondents (60.00 %) are 5. Most of the respondents are strongly agree that scrap car should be managed and handled by a certain party to avoid decay in along of time. Only 1 respondent disagree about the question.

Figure 5: Summary result of Question 3 of the questionnaire

63 respondents (64.00 %) from 92 respondents strongly agree that scrap car left on the sidewalks can disturb the tourism sector in Jerantut. Only one respondent disagrees with the statement that is scrap car left on the sidewalks can disturb the tourism sector in Jerantut.

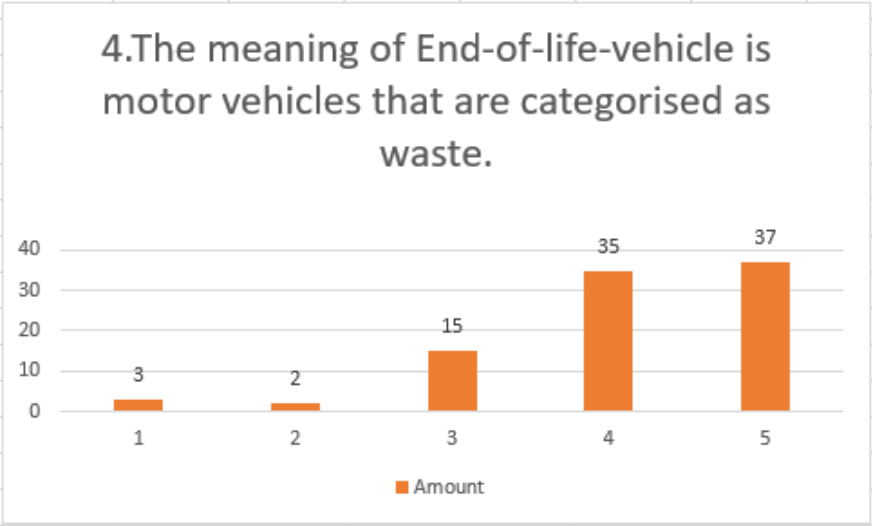

Figure 6: Summary result of Question 4 of the questionnaire

35 respondents (38.00 %) agree and 37 respondents (40.00 %) are strongly agree about the meaning of ELV is motor vehicles that are categorised as waste. 3 respondents only strongly disagree about the meaning.

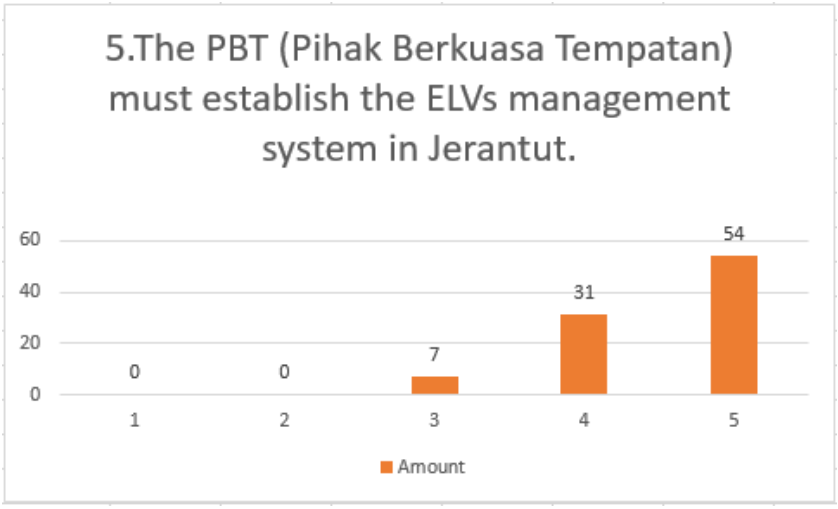

Figure 7: Summary result of Question 5 of the questionnaire

58.00 % from the respondents strongly agree that the PBT must establish the ELVs management system in Jerantut to avoid the scrap car from being abandon.

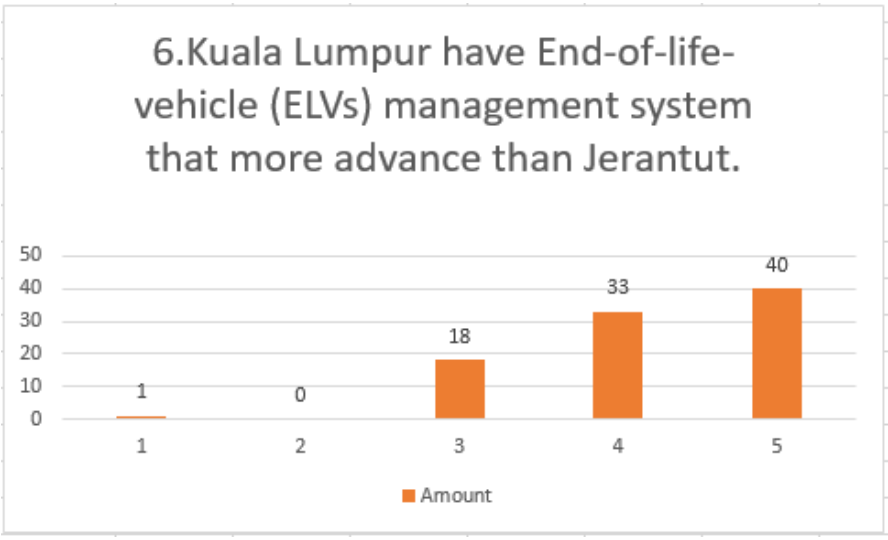

Figure 8: Summary result of Question 6 of the questionnaire

Most of the respondents strongly agree and agree that Kuala Lumpur has ELVs management system that more advance that Jerantut that 40 respondents (43.00 %) are strongly agree and 33 respondents (36.00 %) agree from 92 respondent about the statement.

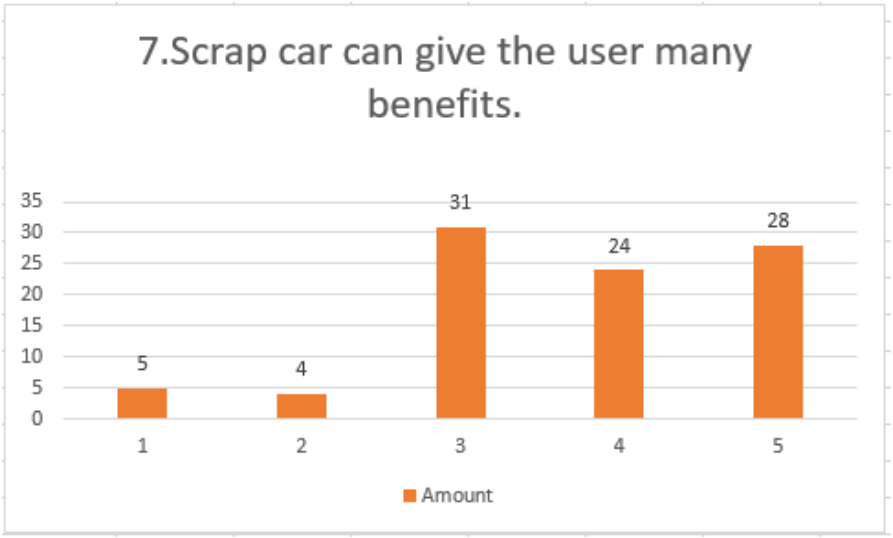

Figure 9: Summary result of Question 7 of the questionnaire

31 respondents (34.00 %) from 92 respondents neither agree nor disagree that scrap car can give the user many benefits because the user did not have been exposed about the benefits of scrap car to the user.

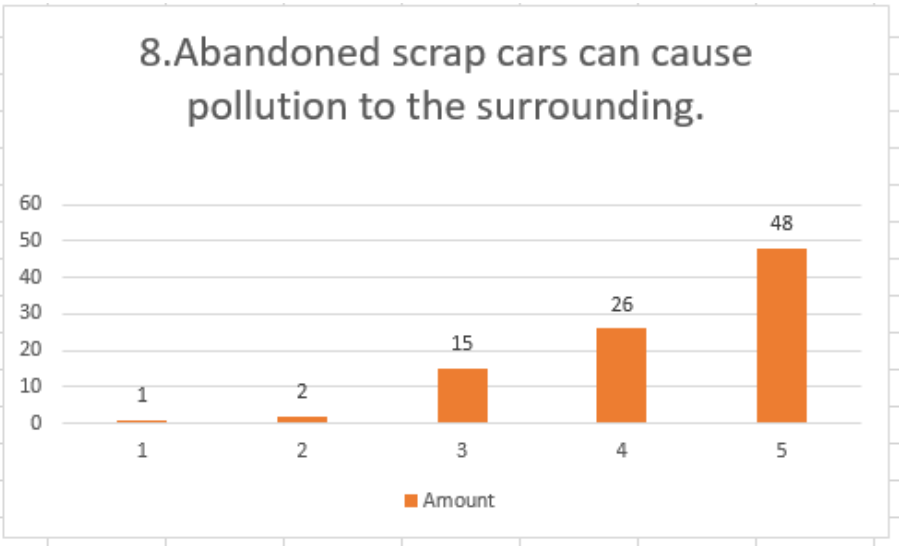

Figure 10: Summary result of Question 8 of the questionnaire

Most of the respondents that are 48 respondents (52.00 %) are strongly agree that abandoned scrap cars can cause pollution to the surrounding. Only one respondent strongly disagrees, and 2 respondents disagree with the statement.

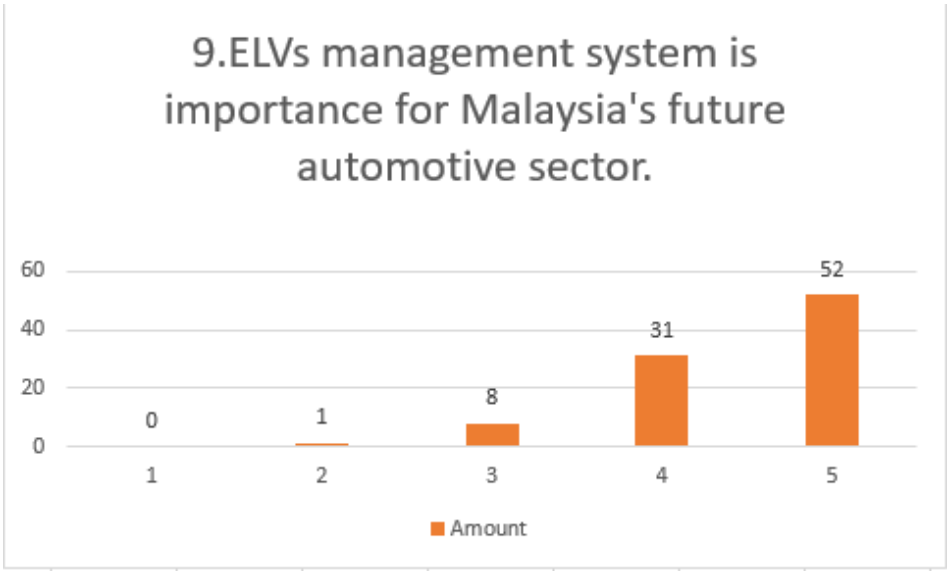

Figure 11: Summary result of Question 9 of the questionnaire

52 respondents (57.00 %) from 92 respondents strongly agree that the ELVs management system is important for Malaysia's future automotive sector.

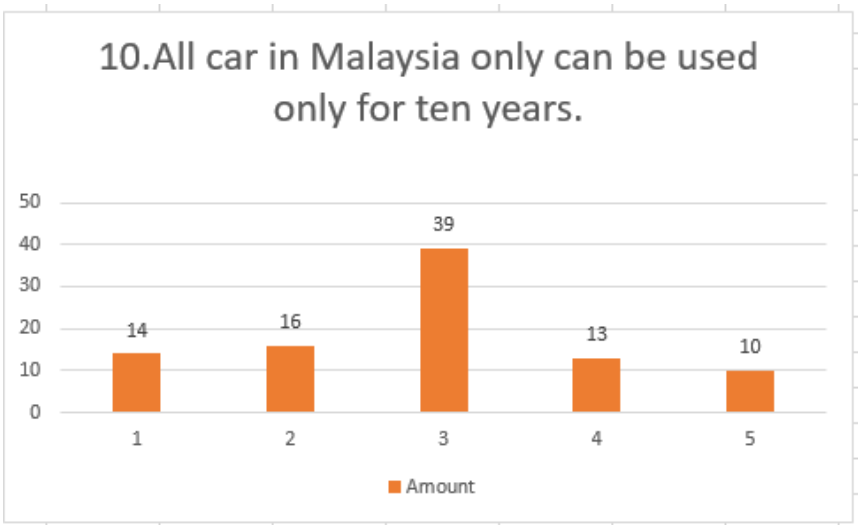

Figure 12: Summary result of Question 10 of the questionnaire

39 respondents (42.00 %) from 92 respondents neither agree nor disagree with the statement that all cars in Malaysia only can be used only for ten years.

5. Conclusion and Recommendation

In conclusion, this analytical study was conducted using the boring distribution method of the survey to the respondents of ninety-two people living in Jerantut. Conclusions can be made based on the objectives of the study that have been stated at the beginning of this research. The purpose of the conclusion for this study is to ensure that the research study conducted meets the objectives and scope of the study that has been set.

For the recommendation, the overall problem is related to the management of ELV in Jerantut. However, some of the views and issues discussed in this study are not so in-depth for each problem that occurs. Therefore, to achieve the level of understanding among residents in Jerantut about ELV, there a few suggestions that can be utilized for government in future. Therefore, the researcher hopes that

future researchers can approach and see every problem that arises from the management of ELV in Jerantut are in good condition and need to go deeper especially issues related to management, quality and facility.Several further considerations have been suggested in this study to ensure that residents are satisfied with the management of ELV in Jerantut. The following are some suggestions. First, the government or the party that in-charge about abandoned cars in Jerantut must make some campaigns for the residents in Jerantut to raise awareness about the advantage and disadvantage of ELV. Second, the government must build a place for the specific place for abandoned cars in Jerantut that can make easier for all the workshop that has a lot of cars that achieve total loss condition.

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