DETERMINANTS OF MAXIMIZE SAFETY LEVEL IN CARS ACCIDENTS

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DECLARATION OF ORIGINAL WORK

I thus certify that all of the work in this thesis, Determinants of Maximize Safety Level in Cars Accidents, is unique to me, and that no part of the work in this research project proposal has been submitted in support of any other degree or qualification at this or any other institute or university of learning.

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NAME: NUR DALILLY HABRIYAH BINTI MAZLAN

DATE: 09 JANUARY 2023

DEDICATION

I want to express my gratitude for my loving family members' effort to educating and motivating me to complete my education to the degree level. In addition, I am grateful to my professor, Dr. Hazmilah binti Hasan, who is also my supervisor for my final year project, and my fellow classmates. Throughout my investigation, they have offered me complete support and counsel. This research would be impossible to complete in a timely manner without their blessing and encouragement.

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Last but not least, I like to convey my gratitude to all of the respondents who took the time and effort to complete the questionnaires. They had given me helpful input that helped me conclude my investigation. I was able to complete all of the components of a questionnaire with the help and support of the responders. Once again, I am grateful and thankful to everyone.

ABSTRACT

Several variables influence road safety, including infrastructure quality, driver behavior, including proper training, and safe vehicles. A variety of regulations (regulatory acts) apply to the safety of cars in the approval process, regulating technical standards in active and passive vehicle safety, as well as in the environment. Significant changes in technical requirements for cars and their parts occur on a regular basis, owing mostly to technological advancements. Because of the tightening, a huge number of regulatory acts are frequently updated. Manufacturers are directly affected by these regulatory acts because their manufactured automobiles must meet these requirements. The fact that, despite the fact that traffic has quadrupled in the last two decades, the number of fatal accidents has decreased due to improved road safety, demonstrates that these regulatory instruments are evolving in the right direction. Only enhanced vehicle safety has resulted in significant progress, with infrastructure improvements and upgrades accounting for only a minor portion of the cheval. I employ a qualitative methodology in which I utilise Googleform to send questions to drivers with more than five years of experience. A questionnaire consists of a list of inquiries to be put into a google form and instructions on which inquiries should come first and in what sequence. Survey studies and experimental designs are two study areas where questionnaires are frequently employed. 230 out of 250 participants that successfully completed the survey for this study.

Keyword: *Technological Requirements, Car Safety, Car Construction, Regulatory Acts, and Car Approval*

ABSTRAK

Beberapa pembolehubah mempengaruhi keselamatan jalan raya, termasuk kualiti infrastruktur, tingkah laku pemandu, termasuk latihan yang betul, dan kenderaan yang selamat. Pelbagai peraturan (akta kawal selia) digunakan untuk keselamatan kereta dalam proses kelulusan, mengawal selia piawaian teknikal dalam keselamatan kenderaan aktif dan pasif, serta dalam persekitaran. Perubahan ketara dalam keperluan teknikal untuk kereta dan alat gantinya berlaku secara tetap, kebanyakannya disebabkan oleh kemajuan teknologi. Oleh kerana pengetatan, sejumlah besar akta kawal selia kerap dikemas kini. Pengilang dipengaruhi secara langsung oleh akta kawal selia ini kerana kereta keluaran mereka mesti memenuhi keperluan ini. Hakikat bahawa, walaupun trafik meningkat empat kali ganda dalam dua dekad yang lalu, bilangan kemalangan maut telah berkurangan disebabkan oleh keselamatan jalan raya yang lebih baik, menunjukkan bahawa instrumen kawal selia ini berkembang ke arah yang betul. Hanya keselamatan kenderaan yang dipertingkatkan telah menghasilkan kemajuan yang ketara, dengan penambahbaikan dan peningkatan infrastruktur menyumbang hanya sebahagian kecil daripada cheval. Metodologi yang saya gunakan adalah kaedah kualitatif iaitu menggunakan googleform untuk mengedarkan borang soal selidik kepada mereka yang mempunyai pengalaman memandu melebihi 5 tahun. Soal selidik ialah senarai soalan yang akan ditanya kepada responden dalam borang google berserta arahan soalan mana yang perlu ditanya dahulu dan mengikut susunan. Soal selidik digunakan dalam pelbagai domain penyelidikan, termasuk kajian tinjauan dan reka bentuk eksperimen. Seramai 230 orang responden daripada 250 orang yang berjaya menjawab soal selidik kajian ini.

Kata kunci: *Keperluan Teknologi, Keselamatan Kereta, Pembinaan Kereta, Akta Kawal Selia dan Kelulusan Kereta*

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CHAPTER 1

INTRODUCTION

1.1 Introduction

In Malaysia, traffic deaths are one of the most serious social issues. Injuries are uncommon and unforeseen that occasionally qualitative approach is required, but that is often unattainable. The number of vehicle accidents in a poor nation has risen year after year. This may be owing to an increase in vehicle usage over time, or it could be related to the fact that certain sorts of accidents are actually more prevalent now than they are now ten years ago. In several developing nations, rising population and the fleet size has resulted in an increase in road deaths on road systems that were never constructed for the amounts and varieties in transportation that they are now expected to handle.

Every car on the road must first be certified. The car registration document serves as proof of approval. There must be no harm to road safety, human health and life, or the environment from an approved vehicle, and there must be no pollution or road deterioration. The cars must meet a number of technical conditions before being allowed to operate on the road. Because of ongoing technological advancements, the field of technical criteria for cars and their parts is always changing. The fact that, over the last two decades, the number of fatal accidents has reduced although the volume of traffic has tripled is indication that these regulatory measures are moving in the correct direction. This tremendous development has been made possible by increased cars safety and, not least, infrastructure upgrades and improvements.

In Malaysia, road accidents are one of the most serious social issues. Accidents are uncommon and unpredictable, sometimes it requires firsthand observation, which is difficult. Road accidents have increased year after year in a growing country. This could be owing to an increase in vehicle occupancy over time, or it could be related to the fact that certain sorts of accidents are significantly more common now than they were ten years ago. In many developing countries, increased urbanization and automobile ownership has resulted in an increase in traffic accidents on roads that were never constructed for the numbers and types of traffic that they now must carry.

The Malaysian government has made road safety one of its societal obligations. A variety of entities dealing with road safety have been founded in government ministries, commercial sector agencies, and voluntary organizations since the country's independence. There was a greater emphasis on road safety. The government elected a Cabinet Committee on Road Safety, chaired by the Prime Minister, in the aftermath of the catastrophe. By the year 2000, the organization had set a target of lowering mortality by 30%. A comprehensive National Road Safety Plan was created, with a focus on safety scientific studies, changing road usage patterns, road construction and safety inspections, medical services, and safety governance.

Road in Malaysian are categorized according to their functions or authorities. According on various purpose, roads are classified as primary, secondary, or minor roads. According on the sovereignty, roads are classified as Tolled Expressway and Highway, Federal, State, and Municipal roads. Roads are also separated into two types: rural and urban. Country roads or those who are located 51 miles outside of the Municipality's borders and outside of the Municipality's limits. However, all roads inside that Municipality gazette borders or a borough with a number of 10,000 or more are considered urban roads.

1.2 Problem Statements

Road accidents are a big issue in our country and around the world (World Health Organization, 2004). Any accident involving at least one road vehicle occurs on a road, according to the National Institute of Statistics and Economic Studies (Insee, 2016). Persons may die in an accident, while automobiles, property, and other items may be damaged. Injured people are accident victims who have experienced trauma and require medical treatment, including hospitalization. A road accident occurs when cars collides with another vehicle, a pedestrian, an animal, or any fixed object such as a tree, pole, or a structure. Injury, death, and property loss are all common outcomes of road accidents.

The following are the causes of road accidents are distracted driving occurs when a driver's attention is diverted from the road, frequently by eating or reaching for a moving object within the vehicle. Then, when a driver disregards the speed limit and drives anyway. Next, drunk driving: When a driver drinks, he or she loses the capacity to focus and perform correctly, which is extremely dangerous when driving. Every day, alcohol-impaired driving causes accidents. After that, driving while under the influence of drugs might damage your capacity to completely function as a driver because getting behind the wheel while your mind is clouded and you don't have entire control over your body can result in a major cars accident. Lastly, design flaws automobiles have hundreds of parts, and any one of them can cause a major car accident. Many cars have been plagued by design flaws.

Institutional road safety management has been weak worldwide, particularly in LMICs, resulting in failure to minimise road traffic accidents in these nations (T. Bliss, J. Breen, 2009). The majority of individuals are ignorant of the global scale of the problem of unsafe traffic operations. Because of the devastating consequences of traffic accidents, they are now on par with war or drug usage as examples of irresponsible social behavior that must be changed. This lack of awareness and accountability may be a contributing factor in the deaths of over 500,000 people each year, or nearly one person every minute, and the injuries of over 15 million people globally as a result of road accidents. Tens of thousands of those injured are

permanently disabled. According to prior accident data, more than 1.17 million people die every year in road accidents around the world. Unless urgent action is taken, at least 6 million more people will die and 60 million will be harmed in poor countries during the next ten years. Road accidents cost between 1% and 3% of a country's annual Gross National Product (GNP) (Mohamed Abdallah, 2004). Therefore, the researcher would like to investigate what level of vehicle safety is currently required in order to minimize the rising number of accidents.

1.3 Research Questions

The research question is the essential process where it provides the focus and framework about the direction of the study. Research question is fundamentally the key components as it can guide and provide a concise and more understanding guideline of this study.

This research attempts to provide answer to the following question:

1.3.1 What safety tool available in cars?

1.3.2 What are the important safety tools in cars?

1.3.3 Which are the best safety tools to have in cars?

1.4 Research Objectives

The objective to examine the maximize safety tools in car. Thus, a research studied has developed in order to stay focus and guide throughout the study.

The objective of this research are as follow:

1.4.1 To investigate availability safety tools in cars.

1.4.2 To identify the important safety tools in cars.

1.4.3 To recommend the best safety tools to have in cars**.**

1.5 Scope of study

This research is focused on the maximize safety tools in cars. The scope of this study is big as it is covered in Malaysia. The study was conducted by car users with more than 5 years of driving experience. The limitation of the study is that time and cost of the researcher have a limit of time and need to reduce cost as low as it can since the researcher do not have any donation or sponsor to expand the study for the whole nation.

1.6 Limitation and Key Assumption of the Study

There are assumptions that made purposely for this study. First, this research is assuming all the respondents are answering with honestly. Second, this study was only focuses on respondents behaviour and assume that the respondent willing to share their knowledge and opinion about the minimum safety features in cars.

1.7 Importance of the Study

This study aims to create awareness to all parties involved in producing a safer and reliable environment of users in specific and all road users in general. In our

society, people will tend to put the blame on the drivers or road users when a traffic accident occurs, although in fact that driver's carelessness might be caused by other factors that interrupt driver's attention.

1.8 Summary

This chapter is structure as the introduction of the whole research. It introduces the topic of the study including background, the problem statements, the research questions and research objectives, scope, limitation and key assumptions of the study as well as the importance of the study.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The number of cars has been growing rapidly in cities. Meanwhile, the number of total fatalities every year caused by traffic accidents is almost the largest in the world. Drivers' driving behaviours are largely responsible for accident. Road accidents may be defined as a human tragedy, associated with the major health problems, negative socio-economy growth and poverty road accidents involve high human suffering and monetary costs.

Car accident (or vehicle accident if the road vehicle involved is a truck, bus, motorcycle, etc.) is a euphemism for a road traffic incident which usually involves at least one road vehicle being in collision with another vehicle, another road user, or a stationary roadside object, and which usually results in injury or property damage. If the injury is only to a person not in a vehicle and consists of no other property damage other than (potentially) the vehicle that stuck them, it is then known as a pedestrian accident (the implication is that the accident involved a vehicle). The term would also exclude incidents exclusively involving vehicles which are non-powered such as bicycles. Road incidents results result in the deaths of an estimated 1.2 million people worldwide each year, and injure about forty times this number (WHO, 2004).

2.2 Road Safety

Road safety is a shared responsibility that necessitates the participation of government, civic society, and public and private sector organisations. It necessitates a well-thought-out strategy and accompanying plan. Despite the negative impact of inadequate road safety on societies and economies around the world, which results in yearly GDP losses of 2%–5%, only a small number of nations pursue coordinated methods to road safety management.

Unfortunately, the country's most in need of growth are the ones who suffer the most. According to the (World Health Organization's, 2015) Road Safety Report, Malaysia had 25 deaths per 100,000 people, which is among the highest in the world, compared to a regional median of 17.9 deaths per 100,000 people. Since 2004, this has had detrimental social and economic consequences, with an estimated economic loss of RM 79 billion (Road Safety Department, 2014). Furthermore, institutional road safety management has been weak worldwide, particularly in LMICs, resulting in failure to minimise road traffic accidents in these nations (T. Bliss, J. Breen, 2009).

The road safety or the prevention of an accident is affected by many interrelated factors there are transport infrastructure such as construction of roads (motorways, expressways), technical condition of the roads, the quality of the road surface and traffic signs (condition and level, new features, variable signing). Next, the road safety or the prevention of an accident is affected by many interrelated factors for the vehicle safety are by technical requirements for vehicle, active and passive vehicle safety, level of information technology used in the vehicle and outside the vehicle and early warning system. The road safety or the prevention of an accident is affected by many interrelated factors for the driver safety are quality of driver 's training, level of driver's theoretical and practical skills, the impact of preventive and educational habits, the level of driver's health and mental abilities, new driver's tests, aggressive behaviour and violation of traffic rules. In addition, the road safety or the prevention of an accident is affected by many interrelated factors for the organization of transport are such as redirect traffic during rush hour, Intelligent Transport Systems, flyover junction's layout and introducing elements of combined and intermodal transport. Lastly, the road safety or the prevention of an accident is affected by many interrelated factors for the safety and road traffic smoothness control such as providing the service,

ensuring the flow of traffic during rush hour, repression, objective liability, financial penalties, legal and technical environment and lastly the quality of laws and technical standards.

As seen from the above, vehicle safety is only one of many factors affecting road safety.

2.3 Road Accident Statistics by State (2017-2021)

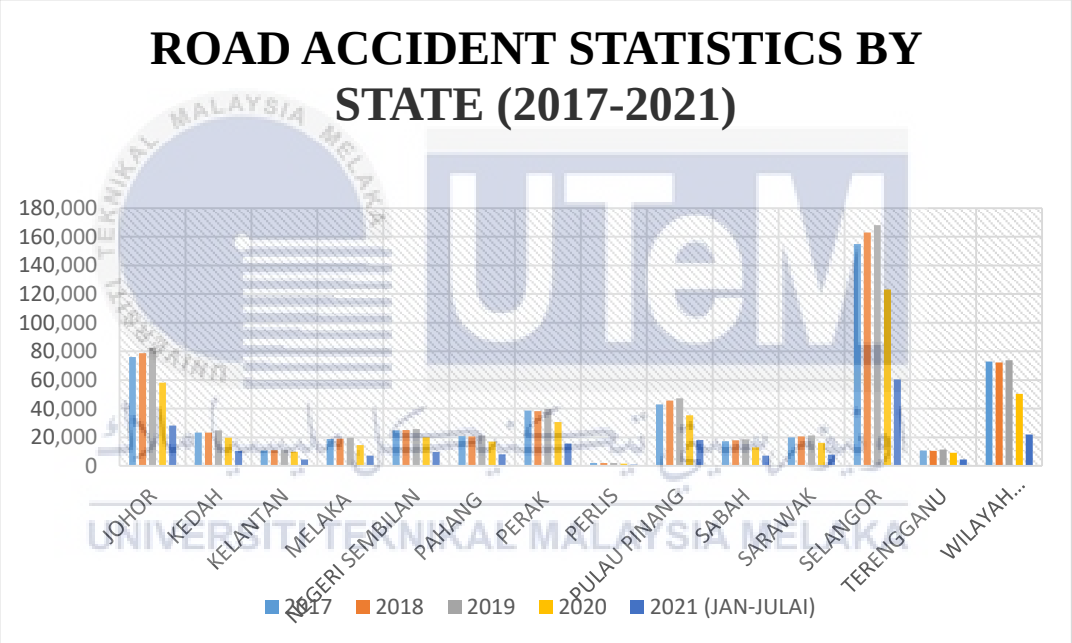

Figure 2.1: Road accidents statistics by state

Source: PDRM, 2018

According to data, Selangor has the highest number of traffic accidents each year when compared to other states. According to the head of the Selangor Traffic Investigation and Enforcement Department (JSPT), (Superintendent Azman Shariat, 2022), carelessness and disdain for the issue of safe driving resulted in the probability of an accident. "Apart from the vehicle's safety, negligence, other than not paying attention while driving, is one of the main causes of accidents, according to the report. Among these, talking on the phone while driving is the most common, resulting in a loss of concentration and an increased risk of accidents. 2022) (Sinar Harian).

Aside from that, the lack of safety features not seen on today's automobiles, such as braking assist, forward-collision warning (FWC), and others, must be considered in order to limit the number of road accidents. "All data and total information will be provided later, whether there is an increase or decrease in cases," the official stated (Sinar Harian, 2022). To avoid accidents, he believes that road users must follow all restrictions. "Road rules have been established, and it is up to road users to follow them at all times. Let us not underestimate the significance of careful driving, which results in accidents "he exhorted Selangor has had the highest number of fatal accidents, according to Deputy Inspector-General of Police (Datuk Razarudin Husain, 2022). "

2.4 Car Safety

When designing new cars, the importance of meeting safety regulations is highlighted. Customers' needs, as well as relevant regulatory acts, determine these standards. Automobile manufacturers are creating a number of safety features aimed at improving the safety of their vehicles. The primary goal of car safety is to protect the lives and health of the vehicle's occupants, as well as other road users. In general, the purpose is to reduce the likelihood of an accident and, if one does occur, to guarantee that health and life are protected. Different aspects that might be referred to as automotive safety can be used to attain this goal. The terms "vehicle safety" refer to two different types of safety are active and passive.

2.4.1 Active Safety for Cars

Active safety is the consequence of a harmonic chassis design that considers wheel guiding, suspension, steering feedback, and break stability to prevent an accident. It manifests itself in the vehicle's best dynamic behaviour when avoiding obstacles as well. Steering control should notify the driver about the power required to operate according to the state of the road surface, rather than simply transferring

steering wheel movement to the wheels (for example, the slippery surface). Breaks stability ensures that one-foot braking is maintained not only on straight roads, but also around curves.

There are four active safety component are travel safety, perceptual safety, conditional safety and operator safety. Travel safety is the result of a harmonious approach to conducting wheel chassis, suspension, steering and brakes. It is visible in optimal dynamic behaviour of the vehicle. Then, perceptual safety. The level of safety, which increases the perceptual security, focuses on lighting equipment, audio warning devices, direct and indirect view of a vehicle.

Next, mental stability (of the driver) influences conditional safety, which is influenced by comfort, eyesight, noise, sound, and climate affects. The clearer a motorist sees the surrounding traffic circumstances, the lesser the probability of an unexpected event. The vibration then affects the driver, resulting in a disturbance (into frequency range of 1-25 Hz stuttering, tremors etc. falls also vibrations). When driving safely, the noise manifests as an audible disruption. It might originate from within the vehicle (engine, gearbox, shafts, and axles) or from the outside (tyres, road and wind noise). Due to vibration have an impact on the driver's focus and resistance. Noise levels are reduced by great sound isolation but a well spring cab, which decreases the crash risk. Finally, air temperature, humidity, air movement, and air currents are high temperatures. Even on long drives, a pleasant atmosphere in the automobile maintains the driver in good shape and prepared. Heater, ventilating, and central air are critical for maintaining high vehicle safety requirements.

Finally, there's the operator's safety. A comfortable driver (one who is not stressed while driving) as well as a good standard of driver safety necessitate an optimal configuration for the driver's surrounds in terms of comfort. In many ways, safety and comfort are intertwined. A driver whose normally sits, has a decent posture, and uses ergonomic equipment and controls that are easy to read, comprehend, and reach can better handle and react on traffic situations. This drivetrain plays a vital role as well. A vehicle with good management capabilities, such as electronic performance tuning or gear box, relieves the driver of anxiety.