ACCIDENT CAUSATION FACTORS, RISKY DRIVING BEHAVIOUR AND ROAD SAFETY MANAGEMENT TOWARD ROAD ACCIDENTS

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DECLARATION

I declare that this thesis entitled *"Accident Causation Factors, Risky Driving Behaviour and Road Safety Management toward Road Accidents"* is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature : .....

Name : SITI HAWA BINTI HARITH

Date : 3 AUGUST 2020

DEDICATION

This thesis is dedicated to my father, who taught me that the best kind of knowledge to have is that which is learned for its own sake. It is also dedicated to my mother, who taught me that even the largest task can be accomplished if it is done one step at a time.

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ABSTRACT

Road accident involving young drivers and riders in Malaysia is increasing over the years, contributing to the loss of lives and property. In order to address this issue, the contributing factors that include five individual factors (drivers' attitude, moral norm, perceived behavioural control (PBC), sensation seeking, past behaviour) and one social factor (group norm) were investigated. This study seeks to answer several gaps. Firstly, a practical-knowledge gap which has been identified through the failure of Road Safety Plan 2014 – 2020 policy. Secondly, evidence gap which has been identified through the conceptualization of two moderators of soft and hard approaches. Thirdly, empirical gap which has been identified through the development of the conceptual framework that combined six independent variables: attitude, moral norm, PBC, sensation seeking, past behaviour and group norm, a mediator of risky driving behaviour, moderators of soft and hard approaches and dependent variable of accident involvement among young drivers and riders. Finally, theoretical gaps which have been identified through the underpinning theories of Attribution Theory, Fear Appeal Theory and Reinforcement Theory. The respondents of this study were young drivers and riders aged between 18 to 25 years old who had experienced a road accident for the past 12 months, possessed a valid driving license with at least six months of experience and remain active drivers or riders. This quantitative study was undertaken in Selangor, Johor and Kuala Lumpur (states with the highest accident number for 10 consecutive years). Results showed that all the independent variables significantly influence risky driving behaviour and accident among young drivers and riders except for the group norm. Whereas for the mediating analysis, both moral norm and group norm were reported to be insignificant, which means that although the variables could lead toward the occurrence of risky driving behaviour, such behaviour did not necessarily cause road accident among young drivers and riders. Finally, for the moderating analysis, only soft approach was reported to be significant to overcome the accident involvement issue among young drivers and riders. This result is also consistent with report released by Malaysian Institute of Road Safety and Research (MIROS) which reported that Malaysian citizens neglect traffic rules and regulations. These findings help to enrich the body of knowledge on accident involvement among young drivers and riders, especially in the context of Asian countries particularly Malaysia. The result also proved that the best way to overcome accident among young drivers and riders is to intervene through the soft approach.

ABSTRAK

Penglibatan kemalangan jalan raya di kalangan pemandu dan penunggang muda di Malaysia yang semakin meningkat sejak beberapa tahun lalu telah menyumbang kepada kehilangan nyawa dan harta benda. Untuk menangani isu ini, faktor-faktor yang menyumbang kepada kemalangan jalan raya di kalangan pemandu dan penunggang muda iaitu lima faktor individu (sikap pemandu, norma individu, kawalan tingkah laku, mencari keseronokan dan tingkah laku lalu) serta satu faktor sosial (norma kumpulan) telah dikaji. Kajian ini juga dijalankan untuk menjawab beberapa jurang kajian. Pertama, jurang pengetahuan-praktikal yang dikenal pasti melalui kegagalan pelaksanaan dasar Pelan Keselamatan Jalan Raya 2014-2020. Kedua, jurang bukti yang dikenal pasti melalui pengunaan konsep penyederhana pendekatan secara lembut dan pendekatan secara keras. Ketiga, jurang empirikal yang dikenal pasti melalui pembentukan kerangka konseptual kajian yang menggabungkan enam pemboleh ubah bebas: sikap, norma individu, kawalan tingkah laku, mencari keseronokan, tingkah laku lalu dan norma kumpulan, pengantara tingkah laku pemanduan secara berisiko, penyederhana pendekatan secara lembut dan pendekatan secara keras dan pemboleh ubah bersandar penglibatan pemandu dan penunggang muda dalam kemalangan jalan raya. Yang terakhir, jurang teori telah dikenal pasti menerusi penggunaan Teori Atribusi, Teori Pendekatan Rasa Takut dan Teori Penguatkuasaan. Responden kajian ini adalah pemandu dan penunggang muda yang berusia antara 18 hingga 25 tahun, yang telah terlibat dalam kemalangan jalan raya dalam tempoh 12 bulan yang lalu, mempunyai lesen memandu yang sah, dengan sekurang-kurangnya enam bulan pengalaman memandu serta masih memandu secara aktif. Kajian kuantitatif ini dijalankan di Selangor, Johor dan Kuala Lumpur (negeri dengan bilangan kemalangan tertinggi selama 10 tahun berturut-turut). Hasil kajian menunjukkan bahawa semua pemboleh ubah bebas mempengaruhi tingkah laku pemanduan secara berisiko dan penglibatan pemandu dan penunggang muda dalam kemalangan jalan raya kecuali pemboleh ubah bebas norma kumpulan. Manakala, untuk analisis pengantara, pemboleh ubah bebas norma individu dan norma kumpulan dilaporkan tidak signifikan, dengan erti kata lain, walaupun kedua-dua pemboleh ubah ini boleh menyebabkan pemanduan secara berisiko, tingkah laku tersebut tidak semestinya mengakibatkan pemandu dan penunggang muda terlibat dalam kemalangan jalan raya. Yang terakhir, untuk analisis penyederhana, hanya pendekatan secara lembut dilaporkan berjaya mengatasi masalah penglibatan kemalangan di kalangan pemandu dan penunggang muda. Keputusan ini juga selaras dengan laporan yang dikeluarkan oleh Institut Keselamatan dan Penyelidikan Jalan Raya Malaysia (MIROS) yang melaporkan bahawa rakyat Malaysia mengabaikan peraturan lalu lintas. Hasil kajian ini dapat membantu mempertingkatkan lagi pengetahuan mengenai kemalangan di kalangan pemandu dan penunggang muda terutamanya dalam konteks negara-negara Asia secara khususnya Malaysia. Hasil kajian juga membuktikan bahawa pendekatan secara lembut adalah campur tangan terbaik yang boleh digunakan untuk mengatasi masalah penglibatan kemalangan jalan raya di kalangan pemandu dan penunggang muda.

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LIST OF ABBREVIATIONS

PBC	-	Perceived Behavioural Control
MIROS		Malaysian Institute of Road Safety Research
SOCSO	-	Social Security Organization
ASEAN	-	The Association of Southeast Asian Nations
TPB	-	Theory of Planned Behaviour
PWM	-	Prototype Willingness Model
RSM	-	Road Safety Management
OECD	-	Organisation for Economic Co-operation and Development
JPJ	-	Road Transport Department
KPI	-	Key Performance Indicator
CRS	-	Child Restraint System
AADK	-	National anti-Drug Agency
Awas	-	Automated Awareness Safety System
AES	-	Automated Enforcement System
Kejara	-	Demerit Pints System
NCD	-	No Claim Discount
PLS-SEM	-	Partial Least Squares Structural Equation Modelling
CB-SEM	-	Covariance – based Structural Equation Modelling
CFA	-	Confirmatory Factor Analysis
EFA	-	Exploratory Factor Analysis
AVE	-	Average Variance Extracted
CR	-	Composite Reliability
VIF	-	Variance Inflation Factor
SPSS	-	Statistical Package for Social Sciences
CMV	-	Common Variance Method
LTCCS	-	Large Truck Crash Causation Study
DUI	-	Driving Under Influence
WHO	-	World Health Organisation

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter provides a comprehensive research overview with the information on the problem of road accidents in Malaysia. The scope and research problem, research objectives and questions are clearly discussed. Apart from that, this chapter also discussed the significance of the research as well as the conceptual and operational definition. Finally, this section ends with the comprehensive chapter summary.

1.2 Background of the Study

Road accident is one of the major problems in Malaysia (Thiagarajan, 2017). The number of road accidents and fatalities keeps increasing over the years, despite numerous efforts made by the government (Hamid, 2017). It is been reported that on average about 20 people died every day due to road accident in Malaysia (Thiagarajan, 2017). According to the Director of Road Safety Department, Chan Pei Hong, motorcycle riders and pillions leading the fatality statistics in the country (Hamid, 2017). This is due to the fact that they are consider as the “vulnerable” road users which exposed to the greater risk of accident involvement (World Health Organization, 2018). Notwithstanding, accident among other vehicles especially car also reported a high accident rate in Malaysia (Jamaluddin, Ho, Shabadin, Megat Johari, & Ameer Batcha, 2015; Oxley, Ravi, Yuen, Hoareau, & Hashim, 2013).

Traffic crash and fatalities have not only caused loss to family members and employers, but also to the government. For every death in road accident cases, the government spent at least RM 1.2 million on the medical costs, road damages and human productivity losses ("RM79bil in losses from road fatalities, says ministry,"

2014). Over the period of nine years (2004 – 2013), the government suffered a total loss of RM 79 billion due to the high number of road accident cases in Malaysia ("RM79bil in losses from road fatalities, says ministry," 2014). This issue became more serious when most of the accident victims in Malaysia are among the younger drivers and riders aged between 16 to 25 years old (Jamaluddin et al., 2015; Oxley, Ravi, et al., 2013).

There are three main factors contributing to road accidents, which are technical factors, environmental factors and human factors (Haghi, Ketabi, Ghanbari, & Rajabi, 2014; Uchida, Kawakoshi, Tagawa, & Mochida, 2010) . Among these, human factors is seen to contribute the most with 80% road accident causation in Malaysia (Lee, 2015). The human factors includes human attributes, individual limitations and psychological states (Malle, 2011). Conceptualization process over the concerned issue of accident involvement among young drivers and riders summarized that there are two human factors that commonly discussed by scholars, namely individual factors and social factors (Eyssartier, Meineri, & Gueguen, 2017; Wishart, Somoray, & Rowland, 2017). There are numerous individual factors that cause road accidents, such as attitude, norm, past behaviour, drivers' personality as well as human errors of tiredness and sleepiness (Cristea & Gheorghiu, 2016; Eyssartier et al., 2017; Prat, Gras, Planes, Gonzalez-Iglesias, & Sunman, 2015). Among these, several significant individual factors relating to accident involvement among drivers and riders that are selected by the researcher as the indicators in this study are drivers' attitude, moral norm, perceived behavioural control (PBC), sensation seeking or feeling of excitement and drivers' past behaviour (Cristea, Paran, & Delhomme, 2013; Eyssartier et al., 2017; Gauld, Lewis, & White, 2014; Wishart et al., 2017).

Moreover, a social factor of the group norm also has been selected as the indicator because this indicator proved to cause accident involvement among young drivers and riders, specifically through the influence of peer pressure toward drivers and riders driving behaviour (Bingham et al., 2016; La, Duong, Lee, & Meuleners, 2017). Both factors (individual and social) are considered vital in influencing the accident involvement among young drivers and riders as well as their risky driving behaviour of speeding, dangerous overtake, tail tailing, run over red light fail to turn

the turning indicator and use of mobile phone while driving (Eyssartier et al., 2017; Gauld et al., 2014; Moan, 2013; Wishart et al., 2017).

Further conceptualization over literatures reveals that risky driving behaviour is defined as the young drivers' and riders' intentional violation behaviour over traffic rules and regulation. Examples of the risky driving behaviour are driving over speed limit, illegal use of mobile phone while driving, close following or tail gaiting and dangerous overtakes. These risky driving behaviour is not only an outcome of the young drivers and riders bad driving attitude, poor moral norm, low PBC, high sensation seeking, bad past behaviour and the influence of group norm, but, it can also act as the antecedence of accident involvement among young drivers and riders (Cestac, Paran, & Delhomme, 2011; Chen & Chen, 2011; Coogan, Campbell, Adler, & Forward, 2014; Eyssartier et al., 2017; Wishart et al., 2017). Furthermore, it has been observed that the authorities and other related bodies have implemented the soft approach (road safety campaign, training and education) as well as hard approach (traffic fines, penalty and surveillance camera) to curb the problems of accident involvement among young drivers and riders from worsen (Auzoult, Lheureux, Hardy-Massard, Minary, & Charlois, 2015; Olumide & Owoaje, 2016). However, the effectiveness of the enforcements is rather inconclusive which urged for further confirmation.

Based on the overall discussion and given the importance of this scenario in Malaysia. This study was constructed to examine the contributing factors toward road accident involvement among young drivers and riders which consists of five individual factors of attitude, moral norm, PBC, sensation seeking and past behaviour as well as one social factor of group norm. Moreover, this study also seeks to examine the impact of risky driving behaviour toward accident involvement among young drivers and riders. Finally, the researcher also seeks to investigate on the effectiveness of road safety management interventions in term of soft approach (road safety campaign, training and education) and hard approach (traffic fines, penalty and surveillance camera) in overcoming the concerned issue. Continuality from this subtopic, the research problems and gaps are further discussed.

1.3 Research Problem and Research Gap

Figure 1.1 shows the Conceptual Model of Research Gap. From the figure, it can be summarized that process to identify research problem can be gathered from the research gaps. Meanwhile, process of identifying the research gap can be undertaken through several methods like citation analysis, content analysis reports, meta-analysis, systematic reviews and finally future research and limitation (Jacobs, 2013). Therefore, to address the concerned issue or research problem in this study, the researcher seeks to identify and answer several research gaps that been identified through the process of systematic literature review over four academic databases of Web of Science, Emerald, Scopus and Wiley Online Library.

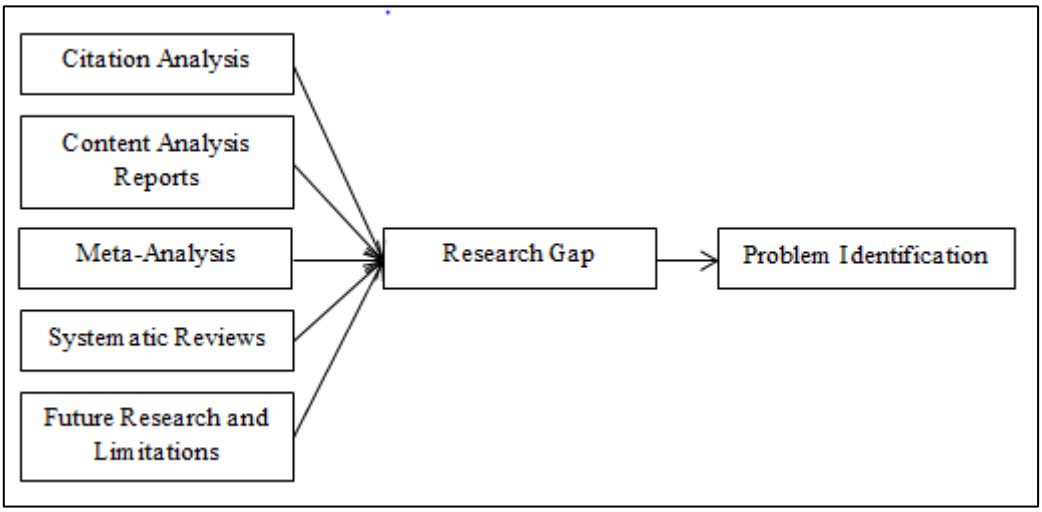

Figure 1.1 Conceptual Model of Research Gap. (R. Farooq, 2017)

Jacobs (2013) defined research problem as an inquiry or statement over the area of concern which needs to be explored and addressed in order to further improve the existing issue or condition. Moreover, research problem also been defined as any disturbing or troubling question that exist within the literatures or theories which seek for deliberate investigation (Jacobs, 2013). On the other hand, research gap is defined as the missing pieces of knowledge or any insufficient information which caused difficulty for researcher to draw any conclusion (Farooq, 2017; Miles, 2017). Study by Miles (2017) divided research gaps into seven types gaps which are evidence gap,

knowledge gap, practical-knowledge gap, methodological gap, empirical gap, theoretical gap and population gap.

Firstly, practical-knowledge gap which also known as the action-knowledge gap (Miles, 2017). The gap exists when the actual purpose of practices or any policies seem to deviate from the outcome or finding gathered (Miles, 2017). In another word, the practical-knowledge gap happens when the initial purpose of the practices or policies failed to serve it purpose. Secondly, knowledge gap which also known as knowledge void which exist when there is no knowledge in the area of study or the result of the study contradict to the expectation (Miles, 2017). Thirdly, evidence gap which occurs when the new research finding reported to be contradicted from the prior research that already been widely accepted by scholars (Miles, 2017). Next, empirical gap seeks to deal with the gaps that exist in the prior research (Miles, 2017). This gap also seeks to empirically verified and addressed on issue that up to date believed to be understudied or not been attempted to be undertaken (Miles, 2017).

Subsequently, theoretical gap exist when there is gaps in theory reported in previous research (Miles, 2017). This gap also exist when scholars tend to used various theories to explain the similar situation which further lead toward theoretical conflict, therefore, further study is required to confirm which theory is more superior (Miles, 2017). Moreover, population gap exist when there is inadequate or limited number of research undertaken toward certain population either in term of gender, age, etic/culture and ethnicity (Miles, 2017). This situation cause the population to be underrepresented or underserved in the previous studies (Miles, 2017). Finally, methodological gap exist when there is conflict over the research result due to the influenced of methodology (Miles, 2017). This gap offers variations of research methods to enriched the literature and avoid the distortion over research finding and knowledge (Miles, 2017).

In this study, discussion over research problem is been discussed through the several types of research gaps. Out of seven types of research gaps as proposed by Miles (2017), this study prompted to answer four types of research gaps which are practical-knowledge gap, evidence gap, empirical gap and theoretical gap. Based on

the researcher's perception, these four gaps indeed exist in this study, although it might not be the same as the other researchers' perception and opinion. Miles (2017) further highlighted that, "Research gaps seem to be in the eye of the beholder." (p.2). Arguments over whether there is a gap or not should not be questioned as this is just the matter of different scholars' perception and opinion (Miles, 2017). Further discussion on the research gaps is in the following subtopic.

1.3.1 Practical-knowledge Gap

The practical-knowledge gap in this study can be identified through the failure over the Road Safety Plan 2014 – 2020 policy implemented by the Malaysia government. This policy is been established with an aim to reduce the number of road fatalities up to only 5358 cases during 2020 ("General Road Accident Data in Malaysia (1997-2016)," 2017). However, so far, during the first year of the implementation of the Road Safety Plan, no reduction was shown in the number of road accidents and fatalities. There was a total of 489,606 road accident cases recorded in 2015 with an increment of 2.7% compared to 476,196 cases in 2014. Meanwhile, the number of road fatalities in 2014 is 6,674 cases with an alarming jump of 0.05% compared to 6,706 cases in 2015 ("General Road Accident Data in Malaysia (1997-2016)," 2017). The similar result also been reported during the second year of the implementation of the policy. The number of accidents recorded in 2016 is 521,466 cases with an increment of 6.1% from the previous year (2015). Similarly, the number of road fatalities in 2016 is 7,152 cases with an increment of 6.2% cases compared to year 2015 ("General Road Accident Data in Malaysia (1997-2016)," 2017).

Nevertheless, a contradict result has been reported during the third year of the policy implementation. The number of road accident in 2017 is 533,466 cases with an increment of 2.3% compared to the year 2016, whereas, fatalities cases reported a reduction over 412 cases in 2017 as compared to the previous year ("General Road Accident Data in Malaysia (1997-2016)," 2017). From the statistics presented, it has been reported that motorcyclists and pillions lead the fatality statistics in the country due to the fact that they are more vulnerable to the accident risk as compared to the

other road users (Hamid, 2017). Apart from that, another dreadful fact reveals that young drivers and riders aged between 16 to 25 years old are those who are highly involved in road accidents in Malaysia, statistically around 46% (Jamaluddin et al., 2015; Oxley, Ravi, et al., 2013).Moreover, in comparison to other ASEAN countries, Malaysia reported the highest number of road fatalities compared to its total population (Sultan, Ngadiman, & Kadir, 2016). In overall, it can be summarized that so far, the Road Safety Plan 2014 – 2020 seems fail to serve it purpose (based on the latest accident statistics by Ministry of Transport Malaysia). This clear evidence proved the existence of practical-knowledge gap in this study.

1.3.2 Evidence gap

Evidence gap can be identified through the conceptualization of soft approach (road safety campaign, training and education) and hard approach (traffic fines, penalty and surveillance camera) which seem to act as the moderators in this study. According to MacKinnon (2011), a variable is considered as a moderator when it can actually influence the strength or final outcome of the relationship between one variable (i.e. independent variable or mediator) with another variable (i.e. dependent variable). In another word, the strength or the final outcome of the accident involvement among young drivers and riders might be differs in accordance to the implementation of soft and hard approaches. Review over literature reveals mixed findings over the effects of soft approach (road safety campaign, training and education) and hard approach (traffic fines, penalty and surveillance camera) in overcoming the accident involvement issue. Some scholars reported that both of the approaches are able to cater the accident involvement issue, whereas, some scholars reported a contradict result (Auzoult et al., 2015; Luca, 2015; Solmazer, Üzümcüoğlu, & Özkan, 2016).

Firstly, from the perspective of soft approach, there were mixed findings of previous studies on the impact of soft approach on road accident. For example, two meta-analysis studies proved the success of soft approach through road safety campaign, education and training to reduce the number of accidents (Elvik, 2016;

Phillips, Ulleberg, & Vaa, 2011). Study by Auzoult et al. (2015) further reported that soft intervention plan of social communication and campaign implemented by the France authorities has successfully reduced the speeding related accidents in the country. In addition, Castillo-Manzano, Castro-Nuño, and Pedregal (2012) in their evaluation toward the road safety advertisement and campaign also reported a positive impact as there was a significant reduction in the number of traffic crashes in Spain. On the contrary, in an experimental study conducted by van Schagen, Commandeur, Goldenbeld, and Stipdonk (2016) showed that the road safety campaign through poster did not help in overcoming driver's speeding behaviour. A similar finding was reported on the impact of the social safety campaign on drunk-drive behaviour (Auzoult et al., 2015; Bhalla et al., 2013). Furthermore, a review paper conducted by Yadav and Kobayashi (2015) recorded that 7 out of 19 included studies showed no evidence of successfulness of media campaigns in reducing the risk of injuries and fatalities due to drunk-drive. In overall, it can be identified that the implementation of soft approach indeed provides a different finding on the strength or final outcome of accident involvement which either it can help to reduce the accident involvement or otherwise. Thus, it can be summarized that soft approach is best suit to become the moderator in this study. More thorough discussion on the implementation of soft approach is discussed in Chapter 2.

Likewise, the implementation of had approach to overcome road accident also has been questioned by several researchers due to inconsistent findings. Legal enforcement or the hard approach through the penalties, traffic fines and surveillance camera has become an important aspect in reducing the road accident and fatalities. Numerous studies conducted in Western countries proved that the use of surveillance camera intervention helped to reduce the road accident statistics (Auzoult et al., 2015; Skubic, Johnson, Salvino, Vanhoy, & Hu, 2013). Similarly, the use of the penalty enforcement approach as an intervention had proved its effectiveness in reducing the traffic crash in Spain (Alonso, Esteban, Calatayud, & Sanmart¨ªn, 2013). More stringent law enforcement through higher fines and longer jail terms have been seen to help reduce the road fatalities in Botswana, however, the number of reductions was still very low (Mphela, 2011). This suggests that the method has helped the country to

deter the traffic crash issue, but there is still a need for a more stringent enforcement to educate the people for a much greater result.

Nevertheless, despite various studies proving the effectiveness of the hard approach, study by Li et al. (2011) found that the law enforcement in Maryland, US was not able to cater the road crash risk issue. Apart from that, it is also been reported that the speed limit law implemented by the US government is among the most ineffective traffic law to cater the road accident issue in the country (Ying, Wu, & Chang, 2013). The similar finding also been reported toward the implementation of Driving Under Influence (DUI) fine law. The effectiveness of this law is rather questionable, as in certain area in the US this law unable to overcome the road accident and fatalities related to drink drive (Ying et al., 2013). Meanwhile, the Malaysian government and authorities have also faced the same problem. Malaysian Institute of Road Safety and Research (MIROS) chairman, Tan Sri Lee Lam Thye highlighted that higher fines imposed by the authorities does not provide the key solution to reduce the number of road accidents (Singh, 2016). He further emphasised that Malaysians are unfazed and often taking the traffic compounds and summonses issued by the authorities for granted (Singh, 2016). It overall, it can be summarized that there is contradict findings over the implementation of hard approach toward the strength or final outcome of accident involvement which either it can help to reduce the accident involvement or otherwise. As a result, hard approach is best suit to act as the moderator in this study and more thorough discussion over the implementation of hard approach is discussed in Chapter 2.

1.3.3 Empirical gap

Empirical gap in this study can be identified through the development of the conceptual framework as shows in Figure 2.3 in Chapter 2. Up to date, through the researcher's search over the systematic literature review, no scholars have proposed the similar research framework as outlined by researcher. Most scholars have been reported to study on the direct relationship between each indicator separately. For example, study by Eyssartier et al. (2017) only investigate on the direct relationship

between attitude, PBC, sensation seeking and group norm toward speeding behavioural intention among motorcyclists of (i.e. attitude → speeding behaviour; PBC → speeding behaviour; sensation seeking → speeding behaviour and group norm → speeding behaviour).

Meanwhile, Gauld et al. (2014) investigate on the direct relationship between attitude, PBC and moral norm toward driving behaviour of concealed texting while driving (i.e. attitude → driving behaviour; PBC → driving behaviour; and moral norm → driving behaviour). Moreover, study by Kosuge, Okamura, Kihira, Nakano, and Fujita (2017) and Ross, Jongen, Brijs, Brijs, and Wets (2016) only studied on the direct relationship between past behaviour and group norm toward accident involvement (i.e. past behaviour → accident involvement and group norm → accident involvement).

Similarly, past researchers also been reported to study on the relationship of soft and hard approach toward accident involvement separately without combining all these indicators in one model. For example, Elvik (2016) and Markl (2016) only studied on the direct effect of soft approach (road safety campaign, training and education) toward road accident (i.e. soft approach → accident involvement). Meanwhile, Luca (2015) and Solmazer et al. (2016) only studied on the direct effect of hard approach (traffic fines, penalty and surveillance camera) toward road accident (i.e. hard approach → accident involvement). So far, up to the researcher review over literature, only one study by Mohamed and Bromfield (2017) proposed a model that combined on the relationship between attitude, driving behaviour and accident involvement (i.e. attitude → driving behaviour → accident involvement). Mohamed and Bromfield (2017) introduced apparent driving behaviour as their mediator in the study, however, the definition of apparent driving behaviour only limited to aggressive and speedy driving. Therefore, to further conceptualized the function of risky driving behaviour as a mediator in this study, the researcher had broaden the definition of risky driving behaviour to six common traffic violation behaviour committed by the Malaysian drivers and riders which are speeding, dangerous overtake, run over red light, use of mobile phone while driving, close following and fail to turn turning indicator (Abdul Manan, 2014; Abdul Manan & Várhelyi, 2015; Cheng, Ting, Liu, & Ba, 2016; Cristea & Gheorghiu, 2016; Fruhen & Flin, 2015; Wishart et al., 2017). All

these risky driving behaviour have been proved to significantly lead toward the occurrence of road accident (Cheng, Liu, & Tulliani, 2015; Havârneanu, Jilavu, & Havârneanu, 2014). Apart from that, literatures further reported that risky driving behaviour is the outcome of drivers and riders bad driving attitude, poor moral norm, low PBC, high sensation seeking, bad past behaviour and the influence of group norm (Eyssartier et al., 2017; Gauld et al., 2014; Moan, 2013; Wishart et al., 2017). Further discussion on the development of risky driving behaviour as the mediator in this study is discussed in Chapter 2.

As a result, researcher's proposal over the development of conceptual framework that combine all the indictors in one model has the novelty value. The overall conceptual framework consists of six independent variables of five individual factors of attitude, moral norm, PBC, sensation seeking and past behaviour as well as a social factor of group norm, a mediator of risky driving behaviour, two moderators of soft and hard approaches and finally a dependent variable of accident involvement. More thorough discussion on the conceptualization of all selected indicators and development of conceptual framework are discussed in Chapter 2.

1.3.4 Theoretical gap

In this study, the theoretical gap can be identified through the application of three theories such as Attribution Theory, Fear Appeal Theory and Reinforcement Theory which been used to underpin the development of conceptual framework. The first theoretical gap can be identified through the use of Attribution Theory to underpin of the development of relationship between all the independent variable of five individual factors of attitude, moral norm, PBC, sensation seeking and past behaviour as well as a social factor of group norm toward the mediator of risky driving behaviour. This theory is commonly been used to explain the reason behind the occurrences of human behaviour (Malle, 2011). Based on this theory, human behaviour is the results of internal attribution (individual factors) and the external attribution (other external factors) (Malle, 2011). This theory is highly related with all the independent variables proposed in this study. In contrast, most scholars usually used the Theory of Planned

Behaviour (TPB) to explain on the occurrences of human behaviour especially in the context of road safety (Castanier, Deroche, & Woodman, 2013; Cestac et al., 2011; Chen & Chen, 2011). For example, study by Cristea et al. (2013) and Elliott, Armitage, and Baughan (2007) used TPB to explain on the development of drivers' speeding behaviour through the original variables under the TPB such as attitude, subjective norm and PBC and other additional variables such as past behaviour and descriptive norm. For the purpose of this study, TPB does not fit (lacking of social factor) to underpin this study conceptual framework. This is because the independent variables proposed to be tested in the study consist of both individual and social factors, whereas, TPB only outlined on the individual variables. As a result, the application of Attribution Theory to underpin the relationship between all the independent variables and mediator is seem to be relevant.

The second theoretical gap can be identified through the use of Fear Appeal Theory (Drive Model) to underpin on the development of soft approach to moderate on the relationship between risky driving behaviour and accident involvement. This theory used the element of fear, through the persuasive communication in order to avoid the recipient from committing any unwanted behaviour (Shen & Dillard, 2014). The theory is worthy to underpin the model because the moderator soft approach indeed used the similar concept of fear element through the road safety campaign, education classes and the road safety training (Auzoult et al., 2015; Elvik, 2016; Phillips et al., 2011; van Schagen et al., 2016). The element of fear is been delivered by creating an emotional and sad feeling due to the property damages and loss of loved one as the result of accident involvement (Markl, 2016; van Schagen et al., 2016). However, so far, based on the researcher review over literature, the Fear Appeal Theory (Drive Model) is not widely used in the context of road safety. In facts, this theory is commonly been used in the context of public health studies such as the smoking prevention campaign and hypertension prevention campaign (Simson, 2017; Tannenbaum et al., 2015). Therefore, the use of Fear Appeal Theory (Drive Model) to underpin on the development of moderator soft approach to moderate on the relationship between risky driving behaviour and accident involvement is seem relevant to further enrich the literature.

The last theoretical gap can be identified through the use of Reinforcement Theory to underpin on the development of moderator hard approach to moderate on the relationship between risky driving behaviour and accident involvement. This theory use the concept of punishment in order to avoid the undesired behaviour (Wei & Yazdanifard, 2014). Similarly, the moderator of hard approach also used the concept of punishment through the penalty, surveillance camera, and traffic fines in order to avoid accident involvement (Auzoult et al., 2015; Izquierdo, Ramírez, McWilliams, & Ayuso, 2011). Up to date, through the researcher's pertinent review over literature, there is no trace of study using Reinforcement Theory within the context of road safety. This theory is widely been used in the psychology and management study (Omomia & Omomia, 2014; Wei & Yazdanifard, 2014). For example, study by Isai Amutan (2014) highlighted on the use of punishment such as dock on wages when the workers violate the workplace ethics like disturbing other workers during work time. This punishment acts as the removal of undesired behaviour and promotes the desired behaviour (Omomia & Omomia, 2014; Wei & Yazdanifard, 2014). Likewise, all the punishment under the hard approach also been used to distort the undesired behaviour of violation over traffic rules and regulation which consequently lead toward accident involvement. In short, the use of Reinforcement Theory to underpin on the development of moderator hard approach to moderate on the relationship between risky driving behaviour and accident involvement is seem relevant to further enrich the literature.

1.4 Research Questions

This research aims to address the following research questions:

1. What is the relationship between individual factors (i.e. attitude, moral norm, PBC, sensation seeking and past behaviour) and accident involvement among young drivers and riders?

2. What is the relationship between social factor of group norm and accident involvement among young drivers and riders?

3. What is the relationship between individual factors (i.e. attitude, moral norm, PBC, sensation seeking and past behaviour) and the young drivers' and riders' risky driving behaviour?

4. What is the relationship between social factor of group norm and the young drivers' and riders' risky driving behaviour?

5. What is the relationship between young drivers' and riders' risky driving behaviour and accident involvement?

6. Does risky driving behaviour mediate the relationship between individual and social factors and accident involvement among young drivers and riders?

7. Does soft approach moderate the relationship between risky driving behaviour and accident involvement among young drivers and riders?

8. Does hard approach moderate the relationship between risky driving behaviour and accident involvement among young drivers and riders?

1.5 Research Objectives

The objectives of this research are as below:

1. To investigate the relationship between individual factors (i.e. attitude, moral norm, PBC, sensation seeking and past behaviour) and accident involvement among young drivers and riders.

2. To examine the relationship between social factor of group norm and accident involvement among young drivers and riders.

3. To examine the relationship between individual factors (i.e. attitude, moral norm, PBC, sensation seeking and past behaviour) and the young drivers' and riders' risky driving behaviour.

4. To identify the relationship between social factor of group norm and young drivers' and riders' risky driving behaviour.

5. To study the relationship between young drivers' and riders' risky driving behaviour and accident involvement.

6. To investigate whether risky driving behaviour can mediate the relationship between individual and social factors and accident involvement among young drivers and riders.

7. To identify whether soft approach can moderate the relationship between risky driving behaviour and accident involvement among young drivers and riders.

8. To identify whether hard approach can moderate the relationship between risky driving behaviour and accident involvement among young drivers and riders.

1.6 Purpose of the Study

The purpose of this research is to study the impact of individual factors such as attitude, moral norm, PBC, sensation seeking and past behaviour as well as the impact of social factor of group norm toward the accident involvement among the young drivers and riders. This study also investigates on the mediating role of risky driving behaviour and moderating role of soft approach (i.e. road safety campaign, education and training) as well as the hard approach (i.e. penalty, surveillance and traffic fines).

1.7 Scope of the Study

There are six independent variables that tested in this study. Five of them are the individual factors such as drivers' and riders' attitude, moral norm, PBC, sensation seeking and past behaviour, whereas one of the variables is the social factor which is group norm. The dependent variable is accident involvement among the young drivers and riders, meanwhile, the mediator is risky driving behaviour. Finally, two moderators of soft approach and hard approach are also discussed. To undertake this study, the researcher applied the purposive sampling by setting several inclusion criteria such as the research respondent are those who consider young drivers aged

between 18 to 25 years old, who have the valid driving license, with at least six months of driving experience as well as actively driving (drive at least 3-4 times a week) for the past six months. The respondents also must involve in any road accident for the past 12 months in either Selangor, Johor or Kuala Lumpur at the time of the accident occurrence. Only these three states are chosen for this study because the Malaysian Ministry of Home Affair reported that Selangor, Johor and Kuala Lumpur are among the states with the highest number of road accident cases for the past 10 consecutive years (Ministry of Transport Malaysia, 2017). Details on the data collection process are discussed in Chapter 3.

1.8 Significance of the Study

The research findings contribute various impacts to various parties. The significances of study are further discussed based on the practical, empirical and theoretical contribution.

1.8.1 Practical contribution

The research findings will provide an insight over the issue of accident involvement among drivers and riders. The effectiveness of Road Safety Plan 2014 – 2020 policy implemented by the Malaysian government can also been studies through the intervention of soft approach (road safety campaign, training and education) and hard approach (traffic fines, penalty and surveillance camera). Apart from that, the findings of this study also can benefit all the related bodies such as the Ministry of Transportation, MIROS, Social Security Organization (SOCSO) and police. Finally, based on the research findings, the authorities can outline the best preventive measure that suit with this type of respondents which proved to lead the number of accidents in Malaysia.

1.8.2 Empirical contribution

This research finding helps to fill the gap of knowledge on the aspect of road accident involvement among young drivers and riders especially within the context of Malaysia. Through the finding, the researcher able to identified the most significant factors leading to young drivers' and riders' risky driving behaviour as well as their involvement in road accident. Furthermore, the development of conceptual framework that combined all the indicators of six independent variables of individual factors of attitude, moral norm, PBC, sensation seeking and past behaviour as well as a social factor of group norm, a mediator of risky driving behaviour, two moderators of soft and hard approaches and finally a dependent variable of accident involvement, provide a thorough insight over this issue. Findings gathered from the overall analysis help to enrich the existing literature. Based on the researcher's systematic literature review over four academic databases of Web of Science, Emerald, Scopus and Wiley Online Library, there is limited number of studies being conducted in Malaysia. Therefore, this study will help to add a new piece of knowledge.

1.8.3 Theoretical contribution

The research findings will provide an insight over the application of Attribution Theory, Fear Appeal Theory and Reinforcement Theory which been used to underpin the development of conceptual framework. The ability of these theories to underpin and support the development of conceptual framework can be further confirmed through the research findings. Most of the time, all the theories are used to support the management and social health study. Thus, there is lacks of research that use the Attribution Theory, Fear Appeal Theory and Reinforcement Theory to underpin and support research on the road safety area. As a result, the findings gathered from this research helps to enrich the body of knowledge which been identified as understudied.

1.9 Operational Definition

1.9.1 Accident Involvement

Mohamed and Bromfield (2017) define accident involvement as the number of collisions involving at least one vehicle which occurred whether or not it is the driver's fault. Meanwhile, in this study, the operational definition of accident involvement is defined as the number of accident or collision that occurred between one or more vehicle in an open road or highway that mainly occurred either or not at the fault of the driver or rider within the past 12 months.

1.9.2 Attitude

Paris and Broucke (2008) define attitude as an evaluation of behaviour through negative or positive outcome. The outcome can be in term of instrumental outcome, such as the need of less time to arrive to the destination and in term of effective outcome like the excitement of speeding (Paris & Broucke, 2008). Moan (2013), as well as Moan and Rise (2011) define the term attitude as an individual's attitude towards certain behaviours either the positive or negative evaluation of attitude. Similarly, attitude also has been associated as the positive or negative evaluation toward particular behaviour (Eyssartier et al., 2017). Whereas, Nemme and White (2010) highlighted attitude reflects an individual's favourable or unfavourable assessment of one's behaviour. In this study, the operational definition of attitude is defined as the driver's or rider's positive or negative evaluation of certain driving behaviour. Such evaluation will help the drivers to determine whether that particular behaviour is right or wrong or whether it will harm the drivers themselves and other road user or otherwise.

1.9.3 Moral Norm

Nemme and White (2010), Moan (2013) and Moan and Rise (2011) define moral norm as a personal perception on the correctness or incorrectness, right or wrong to perform such behaviour based from the social perception. The similar definition of moral norm was also discussed by Gauld et al. (2014) which focussed more on the individual moral obligation of deciding what is right or wrong. Finally, Åberg and Wallén (2008) in their research defined moral norm as the importance of complying the rule and regulation that are necessary and required to be complied. In this study, the operational definition of moral norm is defined as the drivers or riders moral sense of obligation in fulfilling and complying with what's supposed to be complied (i.e. traffic rules and regulation: not over speed, not to drive while intoxicated & etc.) which will eventually assist the drivers and riders to perform the right behaviour and avoid the wrong behaviour.

1.9.4 Perceived Behavioural Control (PBC)

PBC is defined as the degree to which the person to be able to control his behaviour (Paris & Broucke, 2008). The term also has been defined as to the extent of such behaviour which is easy or difficult to be committed (Moan, 2013; Moan & Rise, 2011; Nemme & White, 2010). Eyssartier et al. (2017) define PBC as a person internal factor of own abilities and effort as well as the external factors of barriers and opportunities in controlling certain behaviour. Apart from that, Elliott (2010) emphasized PBC as the internal and external locus of control in handling own behaviour. In this study, the operational definition of PBC is defined as to what extent the drivers or riders believe that their driving behaviour is under their control. Specifically, to what extent the drivers and riders are able to handle their driving style and behaviour of overspeeding, misjudgment of gap when overtaking, violating the red light and others.

1.9.5 Sensation Seeking

Sensation seeking is one of the personality traits that show an individual need for novel, complex sensation, new experience and the willingness to take either social or physical risk in order to achieve the new experience (Cestac et al., 2011; Eyssartier et al., 2017; Wishart et al., 2017). Sensation seeking also defined as the desire to seek more complex thing, varied, novel, changed of sensation and seeking for new experience (Chen & Chen, 2011). Meanwhile, Coogan et al. (2014) in their research, discuss the excitement seeking as the catalyst that reflect one' competence and confidence behaviour. In this study, the operational definition of sensation seeking is defined as the drivers' or riders' propensity toward seeking on excitement and new experience, novelty and risk. Drivers and riders with sensation seeking trait like to drive faster and commit other traffic violations in order to fulfil their excitement stimuli.

1.9.6 Past Behaviour

The term past behaviour is defined as the interrelation between the previous behaviour and an involuntary process of underlying the habit (Cristea et al., 2013). In a more specific definition by Nemme and White (2010), past behaviour is explained as the frequent and repetitive behaviour in the past that eventually become a habit and such behaviour is highly possible to be repeated again in the future. The similar definition also being highlighted by Elliott and Thomson (2010) which emphasized on the probability of repeated performance of behaviour what have been done repeatedly and continually in the past which lead to a formation of habit. In this study, the operational definition of past behaviour is defined as the formation of the habit among the drivers' or riders' past and repetitive behaviour which lead to the high possibility of repetition in the near future. In other words, drivers and riders that involved in one or more road accident in the past, are highly possible to be involved in another road accident in the future mainly because of their risky and aberrant driving behaviour has become a bad habit.

1.9.7 Group Norm

Eyssartier et al. (2017) defined group norm as the norm or custom that are interconnected with a specific group which to influence one's behaviour. Individual behaviour and decision making can be influenced by the presence of others. There are both positive and negative implications of group influence on individual behaviour. Group influence can be useful, however, the influence of groups on the individual can also generate negative behaviours. (Elliott, 2010). Nemme and White (2010) in their research also provide the similar definition regarding the changes of one's attitude and behaviour based on the reference of the specific group of people. In this study, the operational definition of group norm is defined as the alteration and changes of drivers' or riders' behaviour in accordance with the specific behaviour of the group whenever they are with them. The existence of peer passengers can highly influence and alter the drivers' or riders' behaviour in accordance with the peer passengers' unique driving behaviour. Peer passengers with a risky and aberrant driving behaviour are likely to influence the drivers to drive similarly. As a result, the drivers will start to over speed and violate other traffic rules and regulations, although they have never committed such driving behaviour in the past.

1.9.8 Risky Driving Behaviour

Cristea and Gheorghiu (2016) defined risky driving behaviour as the drivers' behaviour of not using seat belts and committing general driving violations such as speeding, drunk-drive, texting while driving and crossing the yellow lights. Similarly, Wishart et al. (2017) and Fruhen and Flin (2015) highlight risky driving behaviour as the violation behaviour of drunk driving, speeding and non-seatbelt use. Whereas, Cheng et al. (2016) further explained that risky driving behaviour as the involvement of driving violation behaviour which consequently could lead to road accidents. In this study, the operational definition of risky driving behaviour is defined as the drivers' or riders' behaviour of violating the traffic rules and regulations such as speeding, dangerous overtake, run over red light, use of mobile phone while driving, close following and fail to turn turning indicator. These are among the common traffic

violation behaviour committed by Malaysian based on a study conducted by Abdul Manan (2014) and Abdul Manan and Várhelyi (2015) and Harith and Mahmud (2018).

1.9.9 Soft Approach

Soft approach is being associated with the process of communicating and educating the drivers through the persuasive and emotional message with an objective to educate the drivers to drive safely (Olumide & Owoaje, 2016). Various researchers explain about the use of communication and public campaign which emphasized on the road safety knowledge as an intervention to educate the drivers (Auzoult et al., 2015; Elvik, 2016; Phillips et al., 2011; van Schagen et al., 2016). On the other hand, Glendon, McNally, Jarvis, Chalmers, and Salisbury (2014) highlight the role of road safety training which followed by several follow-up programs to ensure on the effectiveness of the road safety training as an education intervention. In this study, the operational definition soft approach is defined as the application of persuasive communication and education prospect towards road safety knowledge and information through the execution of road safety campaign, training and education classes.

1.9.10 Hard Approach

The term hard approach has usually been linked with the legal and law intervention as a measure to educate the drivers to obey the traffic rules and regulations (Fell et al., 2014). Meanwhile Mphela (2011) defined hard enforcement as stricter penalties of higher fines and longer jail term. Izquierdo et al. (2011) and Auzoult et al. (2015) highlight the use of surveillance camera to monitor the drivers' speeding and other traffic violation behaviour also has been considered as the hard enforcement approach, whereas Luca (2015) and Alonso et al. (2013) include the use of traffic fines and road penalty as the hard enforcement intervention. In this research, the operational definition of hard approach is being defined as the legal intervention by the authorities

and police through the use of road penalties, fines and surveillance camera in order to overcome the risky driving behaviour and road accident causation.

1.10 Summary of the Chapter

This chapter explains the background of the accident involvement among young drivers' and riders' issue in Malaysia. To further understand and investigate this issue, the researcher outlined the research problems which been derived from the discussion over four types of research gaps namely evidence gap, practical-knowledge gap, empirical gap and theoretical gap. Subsequently, the research outlined the research questions, research objectives and followed by research purposes. Moreover, the scope of the study is also being explained together with the clarification on the choice of respondents and research setting. The significance of this research also was addressed by the researcher which highlighted the contribution of the findings by the authorities, police and to the body of knowledge. The researcher ends this chapter with the operational definition of each variable. Next, the extensive and comprehensive reviews on literature are further explained in the next chapter.

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