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USE OF SECOND-GENERATION ROAD FUNDING MODELS FOR ROAD SAFETY MANAGEMENT IN MALAYSIA

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ABSTRACT

Concern regarding road safety has spread across the world, particularly in low- and middle-income countries (LMIC). This is because lax road safety has resulted in on average 1.3 million deaths and 78.2 million injuries annually at an estimated cost of US$ 518 billion. In fact, it has been forecast that the rates of death and disability due to road accidents may emerge as the third leading contributor to the worldwide burden in 2020. This miserable prediction could be mitigated through enhanced road safety. Unfortunately, several factors seem to impede effective road safety strategies, such as the road safety management (RSM) system itself and insufficient road funding.

This thesis is focused on Malaysia to represent the LMIC in order to assess the effectiveness and efficiency of RSM systems based on best practices, as suggested by the World Bank. As such, interviews were carried out to detect inefficiencies in the RSM system and the insufficient amount of funding granted to roads has been examined as a primary factor hindering improved road safety.

This thesis proposes a new model of RSM with the aim of enhancing the effectiveness and efficiency of the system in Malaysia. The thesis also suggests that the new system be independent and function based on the concept of commercialisation. Additionally, this thesis proposes the employment of the second-generation road fund concept as a sustainable and viable road fund solution.

The proposed funding mechanism and the RSM model were assessed alongside selected stakeholders at both the local (Malaysia) and international level. The stakeholders appeared to agree with the notion that road safety in Malaysia needs to be independent in terms of its arrangement and funding for improvement. The stakeholders also agreed that levying charges on road users would provide sustainable and sufficient funding. The study findings show that

road users preferred Model 1, which suggests a new RSM arrangement in Malaysia, as this would solve the redundant functions observed in the present arrangement, provide transparency, and reduce bureaucracy. It would also generate rapid progress and work synchronisation. They also supported adopting the commercialisation concept and a second-generation road fund for the new system. The privatisation policy implemented in Malaysia makes this proposed concept applicable and suited to its context.

This thesis concludes that second-generation road fund models may be embedded in RSM in an attempt to overcome the existing shortcomings in road safety.

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CHAPTER 1: INTRODUCTION

1.1 Background of study

Road safety is a major transport, health, and social issue across the globe. Ever since the first road fatality in 1896 – Bridget Driscoll in England – road fatalities and injuries have been an alarming issue with the number escalating into this new millennium (British Broadcasting Channel (BBC), 2010). It has been estimated that 1.3 million road users have been killed on average per year on the road since the invention of the motorcar while 78.2 million have suffered non-fatal injuries (World Health Organisation (WHO), 2015). Over the past two decades, road fatalities have rapidly increased by 46%, resulting in more than 79.6 million healthy years of lives lost annually (Bhalla *et al*., 2014) – more than Human Immunodeficiency Virus (HIV), tuberculosis or malaria. At the global level, road fatalities and injuries have become a considerable burden and caused substantial economic loss totalling approximately US$ 518 billion worldwide (WHO, 2009). Looking further into the future, more than 50 million deaths and 500 million serious injuries on roads worldwide are expected by 2050 unless viable and new initiatives are taken (Bliss & Breen, 2012). It is also projected that by 2030, road fatalities will be the fifth leading cause of death across all age groups (WHO, 2009).

The issue of poor road safety demands immediate institutional action (policies, strategies, plans), which will be the focus of this research. The failings of institutional road safety management (RSM) so far were pointed out in the World Report on Road Traffic Injury Prevention 2004 (Bliss & Breen, 2008). In an attempt to address this shortcoming, both the World Bank and the WHO have devised several measures, including allocating financial and human resources to allow for road safety initiatives to overcome this rising problem as without

adequate funding and skilled resources, institutional structures and processes become ineffective and national action plans remain merely paper plans.

1.2 Statement of problem

Effective intervention in road safety requires collective responsibility and involvement from government, civil society and the public and private sectors. It also demands a well-planned strategy and systematic effort to ensure that road safety is constantly enhanced (Elvik, 2008). Therefore, the primary goal of RSM is to reduce the number of road accidents and to alleviate the magnitude of accidents that still occur (European Transport Safety Council (ETSC), 2006).

Nonetheless, despite the impact of poor road safety on societies and economies worldwide, resulting in annual loss of Gross Domestic Product (GDP) of as much as 3% - 5%, only a limited number of countries seem to have a coordinated approach to RSM (WHO, 2015). Unfortunately, it is undeveloped nations that tend to suffer the most. For example, based on the Global Status Report on Road Safety 2015 by the WHO, Malaysia recorded 25 deaths per 100,000 of the population – one of the world's highest figures compared with the regional figure of 17.9 deaths per 100,000. This figure is alarmingly high and suggests a negative economic impact of some Malaysia Ringgit (MYR) 80 billion since 2004 (Road Safety Department (RSD), 2014). All countries suffer from road accidents but the size and severity of such accidents differs from one country to another depending on their development and road safety systems (Al-Haji, 2007).

Poor institutional RSM worldwide, primarily amongst low- and middle-income countries (LMIC)[1], has led to a failure to reduce road traffic accidents (Bliss & Breen, 2008). In

[1] For the current 2016 fiscal year, calculated using the World Bank Atlas method, lower middle-income countries are those with a GNI per capita between $1,026 and $4,035.

particular, some issues are associated with (a) identification of appropriate institutional management functions, as well as (b) intervention and achievement of results. At the same time, poor road safety records demand immediate action to be taken in the areas of management, institutional reform, and funding.

Numerous international organisations, such as the WHO (Peden *et al.,* 2004), the World Bank (Bliss, 2004), and the Organisation for Economic Cooperation and Development (OECD, 2008), have acknowledged that the key to achieving better performance in road safety is effective RSM. Nevertheless, the fragmentation of decision-making has been identified as an issue hindering the improvement of road safety worldwide (Bliss & Breen, 2008). This fragmentation takes place as RSM requires involvement from various multi-sectoral organisations.

At the same time, policy and target-setting are vital for RSM. Road safety policies, strategies, and targets are designed to select, guide, and describe actions to reduce injuries and primarily fatalities by focusing on road users, vehicles, roads, and socio-economic factors (Haddon Jr., 1980). The absence of effective policy, strategy, and targets could lead to poor road safety performance.

Numerous plans have been devised and identified in an effort to reduce road accident statistics (Downing, 2004). However, most of the plans cannot be implemented without sufficient and sustainable funding. The World Bank stressed that due to a shortage of funding, especially in developing economies, there is a need to fully utilise the funds available and to ensure the efficacy of every initiative carried out for road safety (World Bank, 2007). The positive impact of RSM and every consequent initiative taken can only be ensured if the budget available is not only adequate but also sustainable. The present mechanisms of road safety funding that

mostly depend on government budgets may no longer fund road safety initiatives effectively. Furthermore, Zietlow (2005) asserted that government administrative systems, which tend to adhere to a conservative set of rules and regulations, may not be conducive towards or capable of generating good management for road safety, although many capable and motivated employees exist within the system.

In several developing countries, a number of funding mechanisms have been used in recent years to finance the road sector, including road funds – accounts used to fund primarily road maintenance. Generally, there are two 'generations' of road funds. The first generation is associated with funds linked to the national budget while the second generation reflects bank accounts not subject to interference by central or local government.

To this end, it is felt that second-generation systems should be used to fund road safety and to ensure that road safety stakeholders use their resources efficiently, offer affordable road safety countermeasures, generate sufficient revenues to operate as well as maintain a safe road network on a sustainable and long-term basis and therefore improve road safety at the institutional level. With that, this study presents a systematic approach to this effect with Malaysia as the case study.

1.3 Research aim and objectives

1.3.1 Research aim

The primary aim of this research is to improve RSM and funding at the institutional level through the use of modern financing mechanisms developed to generate sufficient and sustainable funding for integrated road safety plans linked to the needs of road users. Malaysia has been selected as the focus country to demonstrate the feasibility of the proposed approach.

1.3.2 Research objectives

In order to achieve the research aim, the following research objectives had been outlined:

a) Investigation of the Effectiveness and Efficiency of RSM at Institutional Level

i. To develop a methodology to investigate the success of RSM at institutional level.

ii. To demonstrate the use of the developed methodology by examining a case study.

iii. To identify how objectives are defined, agreed, and met in the development of a road safety programme (effectiveness) and thereafter how resources are allocated to activities planned to affect the road safety programme (efficiency).

iv. To analyse and identify the major issues that facilitate or impede RSM plans at the institutional level.

b) Identification of Suitable Mechanisms for RSM and Funding

i. To identify a suitable funding mechanism (or tool) for RSM and funding.

ii. To explore the suitability of using second-generation road funds as a mechanism for RSM and funding.

iii. To investigate the acceptability of using second-generation road funds concept as a mechanism to enhance RSM and funding.

c) Assessment of the Proposed Institutional Models for RSM & Funding Tools

i. To develop and propose institutional models to enhance RSM as well as to create sufficient funding for road safety.

ii. To assess the models using feedback from key stakeholders and experts in RSM from various organisations.

1.4 Research innovation and novelty

The novelty of this research lies in the development of institutional models specific for the implementation of second-generation road funds as an RSM and funding tool. The following are the contribution and the applicability of this study:

i) The research adds to the existing knowledge besides providing insight into RSM and funding tools with regards to the possibility of using second-generation road funds and road user charges to fund road safety. These, together with several associated safety performance indicators, should be able to empower policy makers and road safety experts to identify the future directions of RSM and funding;

ii) The research proposes institutional models for RSM in order to enhance RSM as well as to create sufficient and sustainable funding based on the second-generation road funds concept. These new models reflect a new road-funding mechanism for road safety, new road safety measurement, and new responsibilities to the authorities concerned; and

iii) The research presents an exploratory methodology that points out the issues impeding RSM, especially in LMIC, in line with the recommendations given by the World Bank. This transferable methodology aids in assessing the effectiveness and efficiency of RSM at the institutional level apart from assisting organisations to determine their strengths and weaknesses.

Therefore, the outcomes of this research add to the knowledge on RSM and how to improve its effectiveness and efficiency at the institutional level.

1.5 Thesis structure

This thesis is comprised of ten chapters, as follows.

Chapter 1 introduces the research background and defines the problem at hand, the aim of the thesis and the research objectives. It also presents the innovative nature of the research and how it contributes to the body of knowledge.

Chapter 2 reviews the literature on international scenarios and experiences in RSM – particularly funding. It then discusses various mechanisms employed across the globe to provide funding for road safety, including their limitations, key challenges, and best practices. It then presents the gaps in the present knowledge as the basis to develop a conceptual framework for sufficient and sustainable road safety funding.

Chapter 3 elaborates the research methodology employed in this study. It defines the overall aim of the research and explains the stages involved in meeting the research objectives. The conceptual framework, the preliminary analysis, and the model development are also discussed in brief.

In Chapter 4, the present situation of Malaysian RSM is described and discussed, including the role of its government in terms of its RSM and policy set-up. The present practice of RSM in terms of institutional structures and funding mechanisms applied by the government is also discussed.

Chapter 5 presents a case study combining the literature review related to Malaysia's RSM policy as well as analysis of the data collected during interviews with key stakeholders in Malaysia. This chapter enhances understanding about RSM practices in Malaysia and if they are effective and efficient, especially in terms of funding.

Chapter 6 depicts the preliminary analysis of the present funding mechanism based on the investigation carried out in Malaysia. The present set-up and practices within the RSM, as well as the funding in Malaysia, are presented in this chapter to offer a glimpse of problems that may impede RSM at the institutional level.

Chapter 7 presents the three proposed models for road safety funding based on the second-generation road fund concept. All of the characteristics of the proposed models, together with their advantages and disadvantages, are discussed in this chapter.

Chapter 8 investigates into the acceptability of the second-generation road funds mechanisms and the commercialisation concept for road safety at the institutional level. At the same time, the three proposed models are evaluated using data retrieved from the interviews. The outcomes are presented in this chapter.

Chapter 9 presents the discussion of the findings depicted in the previous chapter.

Chapter 10 draws conclusions and lists recommendations for future work.

CHAPTER 2: INTERNATIONAL ROAD SAFETY MANAGEMENT AND FUNDING

2.1 Introduction

This chapter presents the literature review and explores various aspects of RSM and road safety funding. It starts by elaborating the key concepts in RSM and its economic impact. In order to explore possible mechanisms for road safety funding, road safety funding principles are explained to clarify the underlying concepts of road safety funding. A description is also given regarding the different mechanisms applied in international road safety funding, and comparisons are made in order to assess their success. Finally, the concept of second-generation road funds is explained to display its function as an RSM and funding tool at the institutional level.

2.2 Road safety management concepts

In an effort to achieve the fixed targets and gain good results in road safety, a wide range of activities from varied disciplines and jurisdictions have been carried out with the engagement of numerous organisations. Assum (1998) asserted that collective efforts from all stakeholders (i.e. public and private sectors, road users) are required to determine the efficiency of RSM. Adequate institutional management capacity to support the development and implementation of effective interventions is essential (Robinson, 2008). This requires the identification of a lead agency, as well as the clear definition of roles, responsibilities, and accountabilities pertaining to key road safety organisations and individuals. Approaches to safety research and

management that adopt a holistic approach are more likely to generate successful interventions to enhance road safety.

2.2.1 What is road safety management (RSM)?

RSM refers to the collective responsibility of the government, civil society and both the public and private sectors to enhance road safety (Evdorides, 2010). Road safety measures are devised in almost every nation across the globe and their successful implementation depends on exceptional RSM systems. The systems, nonetheless, may require institutional structures that are sometimes complex as they involve cooperating and interacting with multiple bodies that support the tasks and processes necessary for the prevention and reduction of road traffic accidents (Muhlrad *et al.,* 2014; Jahi *et al.,* 2012). These systems may commonly involve a policy-making cycle involving agenda setting, policy formulation, adoption, implementation, and evaluation (Muhlrad *et al.,* 2014). Such RSM systems are needed to ensure the continuous improvement of road safety in a cost-effective manner, and this notion has been acknowledged by a number of developed countries (Elvik, 2008).

2.2.2 The evolution of road safety management (RSM)

A comprehensive review of high income countries (HICs) was carried out by Bliss and Breen (2008) into the evolution of RSM systems. The findings proposed that the system goes through four significant phases of development (see Figure 2.1) with the aim of enhancing road safety (Breen *et al.,* 2008).

Figure 2.1 illustrates that the evolution of RSM derived from various factors and involving many scholars from vast fields, i.e. road safety engineering, medical sciences and management. The early versions of road safety approaches, which were designed during the early years of motorisation, were mainly based on a premise where individual road-users were solely

responsible when crashes occurred (Peden *et al.*, 2004). During this phase, legislative rules, penalties, and training were introduced to educate users in road behaviour (Bliss & Breen, 2008).

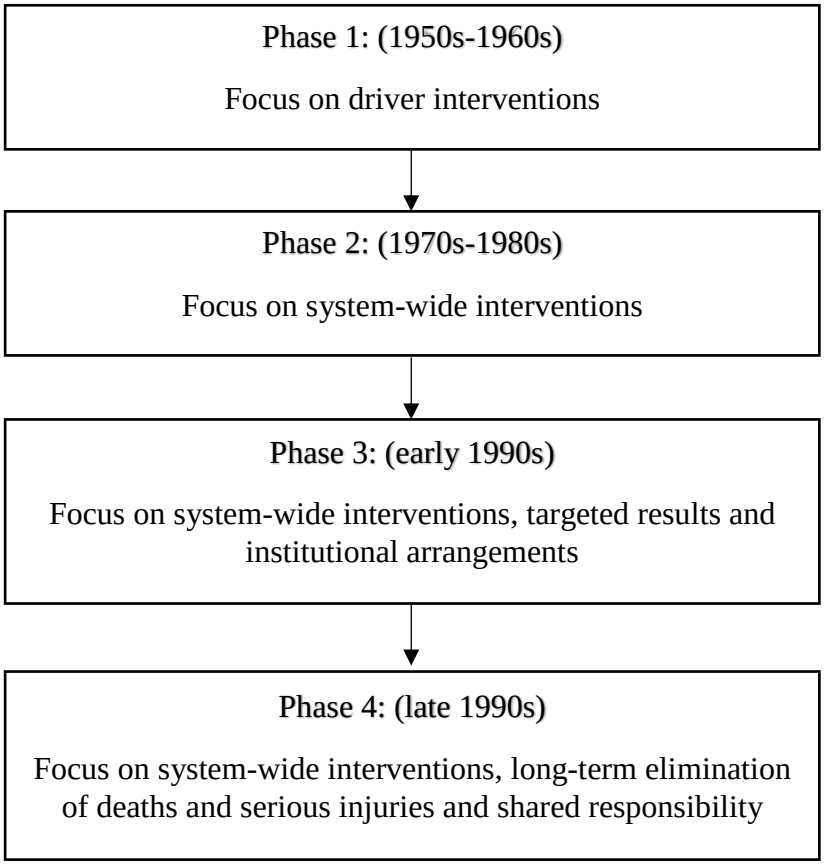


Figure 2.1: Evolution of road safety management (RSM) (Breen *et al.*, 2008)

In light of the limited success of Phase 1, there was a pressing need to devise strategic approaches to road safety. Most of the approaches and analyses associated with improving road safety are based on the Haddon Matrix (Chen & Meuleners, 2011; Bliss & Breen, 2008). The evolution of the RSM system also highly depends on the advancement of technology and motorisation. Scientific research began initiating concepts of modern RSM by integrating interactions between all the elements of institutional management functions (Breen *et al.*, 2008). Subsequently, several road safety approaches have been developed over time to explain why accidents occur and how to prevent them (Wegman, 2002).

Although information on the evolution and development of RSM is limited, HICs are by far more advanced in their implementation of such systems compared with LMIC. Challenges facing HICs seem to have sparked innovation on the basis of sound safety principles and beyond those presently reckoned as effective in order to attain higher levels of safety performance (Bliss & Breen, 2008). Meanwhile, in LMIC, based on their road safety records and due to their late growth in both motorisation and technology, much work is required to enhance road safety performance. This might be achieved by looking at HICs' experiences. However, Wegman (2016a) suggested that LMIC need to tailor the effective strategies of HICs to their own requirements and capacity.

2.2.3 'Safe System' approach

Traditional approaches to RSM have placed all of the blame on the driver and sought to improve road safety via legislation, enforcement and campaigns, the production of safer vehicles and through safer infrastructure. These have proven to be less effective and efficient than expected, particularly in nations with established road safety policies (United Nations (UN), 2011). In order to achieve more advances in road safety, Wegman (2016a) listed two reasons for a paradigm change moving from the conventional approach to the 'Safe System' approach, as depicted in the following:

- There will be no improvement in reducing the number of road accidents if the inherently unsafe conditions in road systems are left untouched; and
- The traditional approach is outdated and is coming towards the end of its life cycle.

The 'Safe System' approach promotes the development of a road transport system that tolerates human error and minimises casualties following road crashes (Chen & Meuleners, 2011). This notion is based on an argument that road users, as the weakest link in the transport chain, tend

to make mistakes that should not be considered as a punishment to them (Vliet & Schermers, 2000). Therefore, the 'Safe System' approach attempted to protect road users aside from accepting the possibility that road users can make mistakes and road accidents cannot be resolved by only improving their behaviour (Australasian College of Road Safety (ACRS), 2010). The original key elements of the 'Safe System' approach are 'Safe Vehicles', 'Safe Roads and Roadsides', and 'Safe Speeds'. In contrast to the conventional road safety approaches that primarily focus on road users and risky behaviours, the 'Safe System' approach is designed to protect road users by offering a systematic method to reduce the occurrence of crashes and subsequent injuries in the event of a crash.

The 'Safe System' approach has been implemented worldwide under various names in developed nations, such as Sweden (Vision Zero) and the Netherlands (Sustainable Safety) (Lenné *et al.*, 2013; Wegman & Aarts, 2005). Several car manufacturers have also adopted this approach, such as Volvo in their Vision 2020, which stated that 'No one is killed or injured in a new Volvo Car by 2020' (Wiesbaden, 2016). This approach is set on a vision to eliminate deaths and injuries and is shared by key stakeholders responsible for road safety (Tingvall, 1995; Wegman & Elsenaar, 1997). Wegman (2011) claimed that any vision that aims to give a long-term perspective and to attract interest from stakeholders would gather momentum and support to produce better road safety results. This may be seen in the case of the 'Sustainable Safety' vision introduced in the 1990s as a policy that attempted to bring road safety performance to its highest level and uphold the Netherlands as the champion of road safety. The aim was to considerably reduce the number of crashes and casualties (Wegman *et al.*, 2006).

HICs are expected to shift from the conventional approach, suggesting the end of its life cycle, and initiate a 'Safe System' approach to make further progress that focuses on reducing

fatalities and serious injuries (Wegman, 2016a). While RSM systems have evolved in some HICs over the last few decades, the challenge for LMIC is to benefit from the lessons learned and to minimise their injuries and fatalities. This demands that LMIC shift rapidly and directly to the 'Safe System' approach with a focus on eliminating road deaths and serious injuries instead of charting a fatalistic pathway that accepts these impacts as an inevitable price of economic progress.

2.2.4 The underlying problems of road safety management (RSM)

2.2.4.1 Road safety institutional arrangements

There is a correlation between investment in road safety and its positive impact (Bishai *et al.,* 2003). Many countries have failed to ensure successful implementation of road safety plans due to slashed budgets for road safety, primarily because of a lack of funding and weak commitment from stakeholders (Assum, 1998; Downing, 2004). These findings are supported by a study carried out by Batool *et al.,* (2012) who found that in LMIC, governments tend to place little value on road safety, and, as a consequence, the budget for road safety is compromised. Zietlow (2005; 2007) stated that insufficient and unsustainable funding conditions are the most crucial issues that must be addressed since any effort to improve road safety conditions, including institutional ones, will not succeed without them.

In order to ensure the effectiveness of RSM, a well-planned road safety strategy must be implemented efficiently by considering three important elements: (a) *institutional management functions*, together with (b) *interventions*, leading to (c) *results*. Bliss and Breen (2008) state that effective institutional management is of primary importance for successful result-focused interventions. Hence, the effectiveness of RSM at the institutional level should be considered along with the seven functions portrayed in Figure 2.2.

Figure 2.2: Institutional management functions (Bliss & Breen, 2008)

The above framework was introduced by the World Bank as a guideline to generate good practice in RSM, while several studies of HIC and LMIC have also employed this framework as their guidelines, such as Breen *et al.*, (2008) in Sweden, Howard *et al.*, (2010) in Western Australia, Luoma and Sivak (2012) in Brazil, Russia, India, and China (BRIC), and most recently Raymond *et al.* (2015) in Brazil.

Establishing and strengthening institutional RSM can lead governmental agencies to put more effort into enhancing national road safety, as recommended by the WHO (Peden *et al.*, 2004). This lead a number of nations worldwide, particularly LMIC, to establish their own lead agencies. In Malaysia, this happened in 2007 (MIROS, 2014).

Nevertheless, without proper institutional arrangements and sufficient funding, lead organisations cannot play their role efficiently or effectively, as expected. Observations further depict that road safety is underfunded worldwide as the impact of this element is underestimated (Zietlow, 2007; Bliss & Breen, 2008).

Both institutional arrangements and funding have been reckoned to be major issues that hinder the improvement of road safety performance at the institutional level. The main reason, as highlighted by Robinson (2008), is that the present institutional arrangement within the governmental environment is not conducive to providing effective and efficient RSM to road users. Therefore, in an effort to enhance road safety at the institutional level, this study presents a systematic approach using Malaysia as a case study.

2.2.4.2 Effectiveness and efficiency of road safety management (RSM)

Effectiveness concerns the manner in which strategic road safety targets are defined, agreed, and met, whereas efficiency is linked to the optimisation of the resources utilised to achieve these targets (Aeron-Thomas *et al.,* 2002). In road safety, effectiveness may be well-defined when funds to implement policies adopted are made available as a pre-condition for implementation to take place. This has been considered 'good practice' in road safety, whereby the schedule and period of execution for each measure or intervention in the programme define the allocation of funding. Moreover, to ascertain that none is being put to waste, the funds are proficiently allocated where they are needed (Muhlrad, 2005). Efficiency ensures that the maximum output is obtained from the resources devoted to an organisation (or programme) or, alternatively, that only the minimum level of resources is devoted to a given level of output (Glynn, 1985). The efficiency of a system refers to the ability of an organisation to execute activities using the available resources in an optimised manner. Therefore, all resources must be put together and ensured to work well towards attaining efficiency.

The problem of efficiency in public administration is thoroughly discussed by Thuesen and Fabrycky (2000), who argued that the public sector is solely driven by the aim to serve tax payers as part of general welfare initiatives. This contradicts the private sector that is motivated and driven solely by profit. Even though some improvements have been reported in recent years, the public sector administration appears to still be lagging behind the private sector in terms of effectiveness and efficiency. Flynn and Talbot (1996) asserted that competition is a strong pushing factor that enhances effectiveness and efficiency, which is needed to improve the delivery system in the government sector.

Two primary impediments have been identified for the enhancement of efficiency in public administration, (Thuesen & Fabrycky, 2000):

i. tax payers are not well-informed as to how their money is spent by the government and no method points out the evaluation of benefits that are reaped in return by them; and

ii. a lack of competitive forces within government organisations can affect the efficient use of resources.

This notion is in agreement with Zietlow (2007) who insisted that rules and regulations in public administration are the main reason for the failure to offer effective and efficient RSM for road users. Robinson (2008) suggested that the main objective of road institutional reform is to improve the effectiveness and efficiency of the road sector and that the best way of implementing it is by shifting from the unconducive government environment to the competitive private environment, driven by commercialisation. It may, thus, be agreed that by introducing the concept of commercialisation into RSM, existing institutional arrangements can be altered and both effectiveness and efficiency may be increased in due time since the concept of commercialisation shows road users what they pay for and the benefits that they will receive.

2.2.4.3 Insufficient and unsustainable road safety funding

The provision of an appropriate level of funding has been identified as a major constraint for the implementation of road safety measures at the global level. Financial support in the field of road safety remains a barrier to attaining the goal of the Decade of Action for Road Safety. Evidently, more funding is needed to support road safety activities, as suggested by the UN and civil society worldwide (Ki-Moon, 2013). This notion is in line with Heggie (1995), Heggie and Vicker (1998), and Zietlow (2007), who postulated that both insufficient institutional capacity and inadequate funding for road safety measures and management can delay enhancements to road safety.

As postulated by Zietlow (2005), stable and sufficient funding for the road sector through the annual budget allocated by the government is almost impossible to be realised since it depends on political debate. This statement is supported by Heggie (1999), who mentioned that fast-growing economic sectors with high cost, such as roads, will be insufficient by only relying on government budgets. He listed four factors that can reduce government budgets allocated to the road sector, as follows:

i. demands by other strategic sectors, such as defence, health, and education;

ii. tax payers not willing to pay higher tax rates;

iii. road maintenance always being viewed as a less important task that can be delayed with a minimal impact; and

iv. the budget for road construction and maintenance continuing to increase annually and requiring more funding than the government alone can provide.

2.3 Road safety funding issues

Assum (1998) identified four areas that can improve road safety: political concern, funding, implementation and monitoring, and evaluation and research. Funding has turned into a serious and fundamental issue that can hinder the enhancement of road safety performance across the globe. For example, many African nations view a lack of funding as the main challenge for road safety (Assum, 1998). However, previous studies have shown than it is the allocation or organisation of funding that is more influential in the success of RSM than the availability of the funding (Wetteland & Lundebye, 1997).

Conventionally, most countries fund their road safety programmes like any other activities from their general government revenue (Aeron-Thomas *et al.,* 2002). The present situation of intensified road safety initiatives and public awareness of road safety, including campaigns via mass media, suggest that road safety budgets may need to be increased in the years to come. This, in theory, can be easily achieved if the entire annual grant allocated to each sector is capitalised comprehensively. However, as other important sectors also need government funding, such as health, education, and defence, it can be difficult to channel extra resources to road safety. The major challenge for RSM among high-, middle-, and low-income nations is therefore ensuring the availability of sufficient and sustainable funding (Aeron-Thomas *et al.,* 2002).

In the wider road sector, it is impossible to execute strategies or implement the action plans devised by policy makers and institutions without sufficient and sustainable funding (Faiz & Gutman, 1988; Gyamfi *et al.*, 1992). According to Heggie and Vickers (1998), numerous projects, including those planned to reduce the rates of road accidents, fatalities, and injuries, have failed due to lack of funding. Lack of funding does not cease the execution part alone but also affects the success of other plans, including those framed to create awareness among road

users. Therefore, it is vital to identify funding sources that are sufficient and stable to design and execute road safety programmes effectively.

2.4 Road safety activities

The UN Road Safety Collaboration initiated a Global Plan for the Decade of Action that identifies key capacity building and injury prevention measures. The plan consists of five pillars: RSM, safer roads and mobility, safe road users, safer vehicles, and post-crash response, along with four key areas: engineering, enforcement, education, and emergency responses. As these activities reflect shared responsibility between many ministries and agencies, there is a need for coordinated efforts among them. However, this is an issue in many nations (Assum, 1998) that has to be overcome.

2.4.1 Engineering

The engineering aspects of road safety are usually considered the most essential in road safety as these are the root cause of several problems that need to be improved. This includes constructing and maintaining roads, such as providing road safety countermeasures (e.g. installing new barrier systems, street lighting, constructing pedestrian bridges, traffic calming, and pavement rehabilitation programmes) (Hashim *et al.*, 2010). These activities are normally placed under the responsibility of Ministry of Works (MOW) or in certain nations, such as the United Kingdom (UK) and Japan, under the Ministry of Transport (MOT) (Nakagawa & Matsunaka, 2006). The budget for road safety engineering activities is usually embedded under development or maintenance costs and funded via government budgets. However, Zietlow (2007) claimed that LMIC spent less than HICs, which is a problem for road safety engineers when applying for funding. For example, New Zealand allocated about 40% of its transport

budget to fund road improvements, which is a huge amount (New Zealand Transport Agency (NZTA), 2016). This is much higher than the 15% of national budget suggested for LMIC to spend on road improvements (Zietlow, 2007). Apart from safe road development, engineering in the automotive field also plays an important role in providing safer vehicles. Safer vehicles equipped with safety systems can minimise injuries for drivers and passengers.

2.4.2 Enforcement

Enforcement aspects of road safety are categorised as soft measures that involve activities, such as driver and vehicle licensing and traffic enforcement. In many countries, these activities are the responsibility of Traffic Police and Road Transport Department (RTD), which come the Ministry of Home Affairs (MOHA) and MOT. A number of studies have revealed that good enforcement by the police or other agencies generates awareness and enhances driver behaviour (Robinson & Thagesen, 2004). Therefore, enforcement plays a major role to ensure that road users comply with every road transport act and rules that are governed by the government in terms of speeding, drinking and driving, and wearing seatbelts. McIlvenny (2006) postulated that in LMIC, good and strict enforcement plays a vital role in reducing fatalities and injuries as the challenges in those countries are bigger to begin with such as their poor road conditions, often complicated political situation, lack of departmental coordination, and unclear responsibilities among enforcement agencies (Baluja, 2004). Not only do traffic police and enforcement in LMIC lack training and equipment but the budget allocated to such activities is also lower compared to HIC. For example, Pakistan spent only about 13% of its road safety budget on enforcement (Bishai *et al.*, 2003). Such a tight budget later caused many issues such as underpaid police officers, which in turn can lead to corruption (Zietlow, 2007; Oleinik, 2015).

2.4.3 Education

Education plays a vital role to ensure that road users are well-educated, especially regarding road safety and road regulations. Soft measures also aim to educate present road users as well as younger people. Many countries have taken the approach to introduce road safety education at primary school level to introduce young people to good road practices. Many programmes have been introduced for this purpose by the Ministry of Education (MOE), commonly together with support from the MOT. However, Robinson and Thagesen (2004) highlighted that road safety education also needs to be disseminated via informal community programmes, especially in LMIC due to often poor school attendance rates. In LMIC, 3% - 5% of the road safety budget should be allocated to road safety programmes, including education and campaigns (Zietlow, 2007).

2.4.4 Emergency response

Post-crash care is vital to prevent death and limit the extent of temporary and long-term disabilities due to injuries from road crashes. The faster the stabilisation and hospitalisation of an injured person, the greater their potential for survival and full recovery. This element involves providing post-accident medical services and treatments to accident victims. It is crucial to ensure that certain facilities, such as coordinated emergency call centres, ambulances, medical support, and care treatments, are available and sufficient to cater for road accident victims as soon as they are needed. This can be achieved by implementing 'The Platinum 10' and 'Golden Hour Principle' in emergency response. While the underlying basis of the 'Golden Hour Principle' is that an injured patient has 60 minutes from the time of injury to receive definitive care, 'The Platinum 10' denotes the first ten minutes following the arrival of key players in the rescue team (Watson, 2012). Through these principles, prompt medical treatment of traumatic injury within an hour can prevent death. In order to allow this, many aspects are

involved, including providing emergency lanes and emergency exits to the nearest hospitals. To some extent, improvements in emergency response and hospital services are identified as a major factor that reduces road fatalities (Noland, 2003; Litman, 2013). This element is normally placed under the custody of the Ministry of Health (MOH) and it is difficult to identify the actual costs involved in treating road crash victims directly. It is evident that more than half of public expenditure on road safety in the UK – around GBP 474 to GBP 530 million – was allocated to ambulance and medical services, making it the largest funded activity in the UK (Aeron-Thomas *et al.*, 2002, Hill & Starrs, 2011). This is highly dissimilar to LMIC where the budgets for such activities become smaller every year due to constraints. For example, budget recalibration in 2016 saw the healthcare budget in Malaysia, including the budget for ambulance and medical services, reduced by about MYR 300 million (MOH, 2016). According to the WHO (2015), the proportion of patients that die before reaching hospital in LMIC is more than twice that in HICs, suggesting that strengthening pre-hospital systems may have a huge global impact.

2.5 Mechanisms for road safety funding

Beyond doubt, the major source of road safety funding worldwide is government general revenues. Other sources include earmarked taxes, levies added to vehicle insurance premiums, sponsorship or partnership with private entities, loans from multilateral development banks (MDB) and road funds (see Table 2.1).

2.5.1 Government general revenues

Traditionally, most nations across the world regard road safety as the government's responsibility to manage through government bodies, such as the MOT, MOW, and MOH. A national road safety plan is normally used as a mechanism to identify the need for road safety expenditures (Aeron-Thomas *et al.*, 2002). Each ministry is given a certain budget and funding for road safety programmes is duly allotted. Although the responsibilities are given to these ministries, there is no clear indication of the amount of money spent to improve road safety as it is embedded within the larger engineering, enforcement, health, and education programmes of each ministry without any specific budget for road safety (Potter, 1997; DaCoTa, 2012). It is difficult to provide sufficient and sustainable funding for road safety through this mechanism, especially in LMIC, as it requires commitment from governments – and governments never have sufficient budgets for road safety (Chowdhury, 2014). Evdorides (2010) claimed that it is difficult to enhance road safety performance if it continues to receive funding from government revenues because this source of funding is highly dependent on political debate in parliament and, more importantly, funding availability.

2.5.2 Earmarked taxes

Earmarked taxes or off-budget financing is a mechanism that takes a certain percentage of government revenues to fund road safety without going through the treasury (Aeron-Thomas *et al.*, 2002). Even though it can provide a significant increase in funding, there is no clear evidence that this mechanism could provide sustainable funding for road safety (Creightney, 1993). This method is opposed by economists from monetary authorities, such as the International Monetary Fund (IMF), based on the argument that it may reduce government revenues that will affect other sectors and the national budget balance (Brathen & Odeck, 2009). In several countries, such as Australia, Sweden, and Serbia, a certain percentage of

traffic fines is channelled into road safety enforcement activities, while in many other countries, this idea is rejected based on the above argument (Aeron-Thomas *et al.*, 2002). It is also evident in the UK that a certain percentage of fines revenue from speed cameras is earmarked and channelled into intervention (DaCoTa, 2012).

2.5.3 Insurance levies

For over five decades, a small percentage levy on compulsory third-party insurance premiums has been used as a mechanism to fund road safety in a few countries, including Finland (DaCoTa, 2012). This mechanism involves applying a levy or surcharge that requires insurance premiums to assist in funding road safety events. Insurance premiums are linked to road crash expenses; thus insurance companies have an incentive to reduce crash costs to help lessen the premiums charged. This mechanism has been successfully used to fund almost 60% of Fiji's National Road Safety Council by only applying a levy of 10% of third-party insurance premiums (Zietlow, 2007). The only concern with this source of funding is that LMIC have many unlicensed and uninsured vehicles, often accounting for more than 50% of the vehicle fleet, thus causing two main problems. First, the returns from the levy are less than they could be, and second, which is a bigger concern, the levy increases the costs of insurance, which in turn leads to a larger number of uninsured vehicles (Zietlow, 2007).

2.5.4 Sponsorship

Many private industries sponsor road safety-related activities to generate a positive image for good product marketability, create new lines-of-business through demonstrations of developments, and to provide a perception that their products are safe. Fewer road crashes and safer driving practices may also benefit them from the lower costs associated with it. The World Bank's Global Road Safety Partnership (GRSP), established in 1999, is an instance of strategic

partnership that is aimed at improving road safety within government, private sector, and public (Robinson & Thagesen, 2004). The sponsorship can be either provided directly, in kind, or both. Such corporate sponsors focus on delivering four major agendas: road safety education and knowledge transfer, road safety awareness campaigns, enforcement campaigns, as well as driver training and awareness (Aeron-Thomas *et al.*, 2002). However, the main concern about this mechanism is that most private industries do not see any direct benefit from their contribution to road safety, such as tax exemptions or special rewards for their contribution. Hence, contributions via this mechanism, especially in LMIC, are very low and insufficient to fund road safety.

2.5.5 Multilateral Development Banks (MDBs)

Many MDBs such as the World Bank and the Asian Development Bank (ADB) offer loans and grants for road safety projects, especially in LMIC. For example, the World Bank funded a road safety project in Vietnam that cost nearly US$ 32 million to improve traffic safety among two-wheeler motorists. Meanwhile, the ADB funded some regional road safety projects by providing grants, technical assistance, and expertise in devising road safety plans (ADB, 2005). At the same time, the Commission for Global Road Safety (CGRS) took the initiative to launch a ‘Make Roads Safe’ that urged any new road development project to delegate at least 10% of the total development cost for road safety improvement (McMahon & Ward, 2007). However, Zietlow (2007) claimed that such mechanisms are insufficient and unsustainable for long-term funding of road safety as they only reflect preliminary initiatives and a supplementary role.

2.5.6 Road funds

Road funds is a separate institutional device outside the government used to manage and create funding for road development and maintenance (Heggie, 1995; 1999; 2000a). Although several kinds of road funds have been applied since the 1950s, only two primary types of road funds are discussed here: first- and second-generation funds.

Table 2.1: Source of funding for road safety (continued)

Sources	Description	Mechanism	Country	References
Government General Revenues	Income of govt. from taxes etc. Embedded within larger engineering, enforcement, health, and education programmes	Budget for road safety widely provided as an element of other activities, such as road maintenance, education or traffic policing	Developed countries (Sweden, UK, Netherlands and many OECD countries)	i) Aeron-Thomas *et al.*, 2002 ii) DaCoTa, 2012
		No specific budget for road safety		
		Road Safety Plan normally used as a mechanism to identify the need for road safety expenditures		
Earmarked Income	Potential government revenues assigned directly to road safety (e.g. traffic fines) without going through treasury	100% of fines to road safety	Serbia, Vietnam	i) Aeron-Thomas *et al.*, 2002 ii) DaCoTa, 2012
		100% of speed and red-light cameras fines	UK	
		35% of speed and red-light cameras fines	Western Australia	
		35% of parking fines	Sweden	
Insurance Levies	Some percentages of levy on compulsory third-party insurance premiums (TPIP) and revenue allocated to fund road safety	1% of TPIP	Finland	i) Zietlow, 2007 ii) DaCoTa, 2012
		10% of TPIP	Australia (State of Victoria)	
		10% of TPIP	Fiji	
		1% of insurance revenue	Poland	
		US$2 surcharge on motor vehicles insurances	Hawaii	

Table 2.1: Source of funding for road safety

Source	Description	Mechanism	Country	References
Multilateral Development Banks (MDB)	MDBs and Bilateral Donors (loans and grants from development banks and aid agencies) e.g. The World Bank, Asian Development Bank (ADB) etc.	Many countries around the world using such funds, e.g. Vietnam implemented a US$ 32 million world bank funded road safety project ADB funding regional project in 10 countries	Developing countries, LMIC, Asian & African countries	i) ADB, 2005 ii) Zietlow, 2006 iii) CGRS, 2008
Sponsorship	Private sectors (petroleum companies, car manufacturers, insurance companies) providing funding for specific activities of interest to them	Sponsored road safety education & knowledge transfer	UK, Germany, India, Bahrain, Malaysia etc.	i) Aeron-Thomas *et al.*, 2002 ii) Robinson and Thagesen, 2004 iii) Zietlow, 2007
		Sponsored publicity & awareness campaigns	UK, Canada etc.	
		Sponsored enforcement	UK, New Zealand, Ethiopia, India, Malaysia	
		Sponsored driver training	India, Central & Eastern Europe, Malaysia.	
Road Funds	Road user charges from: i. Fuel levies; ii. Weight-distance charges; iii. Vehicle insurance premium; iv. Vehicle license fees; v. Road tolls.	15% of road fund	New Zealand	i) Aeron-Thomas *et al.*, 2002 ii) GRSP, 2005 iii) Zietlow, 2007 iv) DaCoTa, 2012
		5% of road fund	Zambia	
		3% of road fund	Ethiopia	
		2.5% of fuel levy incomes of road fund	South Africa	

2.6 The concept of Commercialisation of Road Safety Management (RSM)

In emphasising the importance of implementing the concept of commercialisation in road safety, Evdorides (2010) indicated that road safety performance is not enhanced if government revenues are used to fund road safety. Therefore, in a manner similar to that for the road sector, it is envisaged that RSM could be enhanced if a similar concept of commercialisation is adopted as a mechanism to enhance the efficiency and effectiveness of its management.

The concept of commercialisation has emerged to be a popular alternative mechanism for road administrators since the early 1990s to implement road sector reforms (Madelin, 1994; Dunlop, 1999; Haynes & Roden, 1999; Robinson & Stanciu, 2004). It appears that commercialisation is arguably the best mechanism to reduce road maintenance problems (Schliessler & Bull, 1993; Heggie, 1998; Zietlow, 2005). The fundamental point of this concept is treating roads like any other goods by putting them into the marketplace on a fee-for-service basis and managing them like a business entity. This concept, when compared to other types of mechanisms, can enhance the efficiency and effectiveness of the road sector as it generates competition among service providers.

This concept is comprised of four inter-related building blocks, as listed in the following (Heggie, 1995; Heggie & Vickers, 1998; EBRD, 2007):

i. Creating ownership - Road tariffs that are evidently not part of the government's general taxes are paid by road users for the purpose of road use. This is usually done in the form of a two- or three-part tariffs, inclusive of charges for admission to the road network (sometimes supplemented by a heavy-vehicle license fee) through annual vehicle license

fees, a road maintenance levy added on top of the price of fuel that charges for use of the road network and, where feasible, a congestion charge to manage congestion.

ii. Providing sufficient and sustainable funding - Revenues from the government's consolidated fund must not be subtracted when the above road tariff is introduced. Extra payments by road users provide additional revenues, thus the Ministry of Finance (MOF) is solely invited to convert the existing allocations for road maintenance into an equivalent fuel levy. This offers a clear objective whereby road users have transparency in terms of what they are paying for and are then encouraged to demand value for money.

iii. Responsibility - A board that is comprised of public and private sector representatives from various backgrounds, such as road users and the business community, manages the revenues obtained from the road tariffs that are deposited into a road fund. At least half of the board members should come from outside the government and may be nominated by the organisations represented by them. A chairman can be elected from the board members and must be independent from any interference or influence. This clearly shows that the board members represent those who are paying for the roads and that they are concerned that users are not overcharged and that funding is well-spent.

iv. Strengthening management through commercialisation - A small secretariat must exist in the board to manage funds. Well-updated legal regulations should be published and govern the methods used in managing the funds. Independent technical and financial auditing must be carried out by the Auditor General's office or private sector auditors appointed by the Auditor General.

All four of the building blocks listed above should be implemented simultaneously to ensure the success of the concept of commercialisation in the area of road safety. The road safety funding problem will not be resolved without strong support from road users, which must be won by ensuring them that their money is used efficiently for road safety initiatives. Simultaneously, the accountability of fund managers is increased and their responsibilities must be clarified.

Therefore, guided by the underlying commercialisation building blocks, second-generation road funds, which have been widely used to create sufficient and sustainable funding for the road sector, may be used as a funding mechanism for road safety, as well as a tool to enhance the role of RSM.

2.7 First-Generation Road Funds

First-generation road funds, also known as earmarked road funds (Heggie & Vickers, 1998), were introduced in the 1950s, and this mechanism has been widely used in Africa, Asia, and Latin America and later in Eastern Europe in the 1970s to help fund road development and maintenance (Potter, 1997; Kumar, 2002). Revenue is generated by earmarking certain road-related taxes, such as road tax, fuel tax, and vehicle registration fees. The main idea is to channel more funding from government revenue into the road development and maintenance sector. The allocated budget for all sectors is reduced to contribute to earmarking road funds. Most finance ministries, the World Bank and IMF do not completely support the concept of earmarking (Potter, 1997; Heggie, 2000a) and will only agree if the additional funding required comes from the road users based on road user charges (Heggie & Vickers, 1998). This is because road funds have many drawbacks, such as being misused for other purposes (Heggie, 1995), which may eventually decrease the leverage and flexibility of the government (Deran, 1965) and be less effective in its management (Heggie,

2000a). Heggie (2000a) identified and summarised the weaknesses of first-generation road funds as follows:

- No oversight board to monitor the management of the fund;
- Source of funding comes from earmarked revenues that may affect the government's general revenues;
- Managed by national road agency within government bureaucracy;
- Established without sound legal framework;
- No published financial rules and regulations; and
- No proper independent financial and technical audit.

This shows the negative elements of first-generation road funds from a macroeconomic viewpoint as they are ineffective and inefficient in terms of overcoming funding shortages in the road sector. As a consequence, first-generation road funds are not recommended by the World Bank and IMF based on these arguments (World Bank, 1986; McCleary, 1991).

2.8 Second-Generation Road Funds

2.8.1 The principles of second-generation road funds

The concept of the second-generation road fund began to take shape in the early 1990s (Potter, 1997). They were initiated to ensure sustainable and effective funding for road maintenance amongst developing nations with the assistance of the World Bank. The primary aim was to recover the cost of road maintenance by bringing it to the marketplace on a fee-for-service basis (Harral & Faiz, 1988). This concept is based on a more business-like approach to road maintenance

with strong financial management. The fund is justified on the grounds that it allows long-term planning due to stable revenues, ensures value for money, increases efficiency, and creates an incentive structure for the behaviour of road users and suppliers. Second-generation or commercially managed road funds have attracted interest from many countries worldwide, especially LMIC, which have either established such road funds or are in the final stages of doing so (Heggie, 2000b).

These specific road funds collect fees from users that are used to improve road infrastructure and safety aspects (Bliss & Breen, 2008). Funds are usually managed by a board comprised of representatives of road users and business owners. The road fund revenues are collected by levying fuel prices and charging fees related to vehicle registration, vehicle licenses, and direct road user charges (e.g. tolls and weight-distance fees), whereby the levy category is varied based on nations. Jacobs and Thomas (2000) suggested that the possibility of using road user charges should be explored for the purposes of road safety funding. However, to date, there is no evidence about any study that has looked into the possibility of using the second-generation road fund mechanisms for these purposes.

When compared to the earmarking scheme of first-generation road funds, which refers to collecting funds from certain government revenues, the concept of second-generation road funds is much better with additional sound legal frameworks. The improvements include more efficient management of the collected funds and proper accountability for both the government and the general public. Heggie and Vickers (1998) and Heggie (2000b) developed frameworks for second-generation funds with the following features:

i. Sound legal framework that covers clear regulations and rules, with a separate administrator for road fund;

ii. Strong oversight by a public-private board representing key stakeholders with vested interests in roads;

iii. An agency that specifically purchases services related to road maintenance and does not provide services related to road maintenance;

iv. Day-to-day management performed by a small secretariat to manage the road fund along commercial lines;

v. An administrative structure that is viable financially, and both efficient and lean;

vi. Regular technical and financial audits of all works financed through the road fund; the results should be tabled before parliament and published in the press; and

vii. Generate more revenue from charges related to road use and store the fund in a dedicated bank account.

It is interesting to highlight that a study of eight African countries conducted by Gwilliam and Kumar (2003), which implemented second-generation road funds to support road maintenance, showed that the consequent implementation of road works seemed to be more efficient and led to more sustainable funding arrangements, as well as increased participation of private contractors or service providers. The study further postulated that second-generation road funds could enhance the efficiency of road management since they generate an explicit link between payments received from road users and the quality of roads provided for them. The advantages of second-generation road funds over first-generation, as summarised by Boamah (2010), are as follows:

i. Financing arrangements are designed to ensure that money is not diverted from other sectors. This is essential to ensure that budget constraints are hard and that expenditure decisions are responsive to users with strong legal backing;

ii. Charges can be adjusted regularly to meet agreed expenditure targets;

iii. Regular technical and financial audits to ensure efficiency; and

iv. Funds are administered separately from other government tax systems on the basis of the following principles:

- Provision of incentives to reduce evasion of charges by road users by keeping the rate as low as possible to avoid corruption and under-declaration.
- Broadening the tax base by limiting exemptions.
- Avoiding large differences in tax rates of similar items.
- Simplifying the tax collection structure to reduce administrative costs and effective enforcement.

Gwilliam and Shalizi (1999) and Gwilliam and Kumar (2003) suggested that the implementation of second-generation road funds should be viewed as a preliminary phase either to introduce complete commercialisation of roads or to enhance good governance in public administration since the funds are designed to cultivate a commercial environment to generate sufficient and sustainable funding. Therefore, the second-generation road funds are envisaged to serve as a tool to introduce commercialisation into road safety and ultimately enhance the effectiveness and efficiency of RSM.

2.8.2 Road safety management (RSM) tools

As detailed above, second-generation road funds are managed commercially on the grounds of private administration, financial autonomy, and regular auditing. These management processes are important to provide increased transparency, accountability, and reporting for the fund so that safer roads may be successfully achieved. Besides, the rules and regulations within the second-generation road funds ensure proper usage of the funds to enhance road safety via various options.

Another direct benefit offered by second-generation road funds is improving the road safety infrastructure by separating the channels of service provider and purchaser. The purchaser is the road safety fund board while the service provider is the road safety stakeholders, such as MOT and MOW. This segregation ensures smooth, high-quality service delivery owing to decreased conflicts of interest. Benmaamar (2006) argued that this separation ascertains specificity as road fund boards will be more focused as a purchaser and will not have conflicts with many other responsibilities that might weaken their financial discipline and compromise efforts to control costs and maintain service quality. Therefore, it is envisaged that by implementing this concept, competition among service providers will increase, which aside from providing the purchaser with more choices and bargaining power in obtaining the best service, is also considered to improve value for money.

2.8.3 Sufficient and sustainable funding mechanism

In second-generation road funds, revenues are generated mostly from road user charges and levies, while the management of the fund is the responsibility of the board that upholds the interest of the public. This fee-for-use basis by charging a certain level of tariff to road users allows sufficient and sustainable funding for road safety. Nonetheless, the application of second-generation road

funds can be diverse due to increased accountability and improved management prospects in comparison to first-generation roads funds (World Bank, 2007). In fact, several mechanisms may be introduced together with the concept of second-generation road funds. First is to establish a dedicated road safety fund that will be overseen by a road safety fund board. This fund will receive its revenues through road user charges for road safety aspects through various stakeholders. Generally, road safety allocation and spending are decided by the road safety board. Wherever the board is applicable, road safety stakeholders need to prepare supporting documents with well-prepared road safety programmes.

Second, certain road funds in certain countries directly allocate a specific budget to provide road safety support. For example, the Ethiopian Road Fund Board reported that up to 3% of the road fund was allowed to be used to enhance road safety (Aeron-Thomas *et al.*, 2002). Meanwhile, Ghana has already established a road fund to initiate a monetary source for road maintenance, which has a direct impact on road safety. From the perspective of Fan and Chan-Kang (2005), without proper maintenance poor roads are prone to creating more road accidents compared to roads in good condition. This reveals the point that more road accidents can be observed in LMIC due to the higher chances of having more roads in poor condition, which is also in agreement with Dahdah (2008), who stated that road accidents are low in developed countries due to their better road infrastructure and conditions.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction: Overall aim and how it is achieved

This chapter concentrates on the research methodology aimed at identifying the efficiency of RSM systems and the innovative funding mechanisms that can be applied to improve the implementation of road safety strategies and plans. Generally, this study incorporated two main phases, as illustrated in Figure 3.1.

The first phase focused on the weaknesses of the present RSM system. An analysis to determine the effectiveness and efficiency of present RSM practices was performed. At the same time, a preliminary analysis was carried out. Since this research work focused on funding issues in road safety, the preliminary analysis was conducted to investigate major RSM issues from a funding stance.

The second phase integrated the concept of effectiveness with efficiency by means of a proof-of-concept institutional model to enhance road safety. In this phase, candidate models were proposed and their applicability to enhance RSM institutional system, as well as to solve road safety funding in LMIC, were studied. This research selected Malaysia as a representative LMIC to serve as a case study.

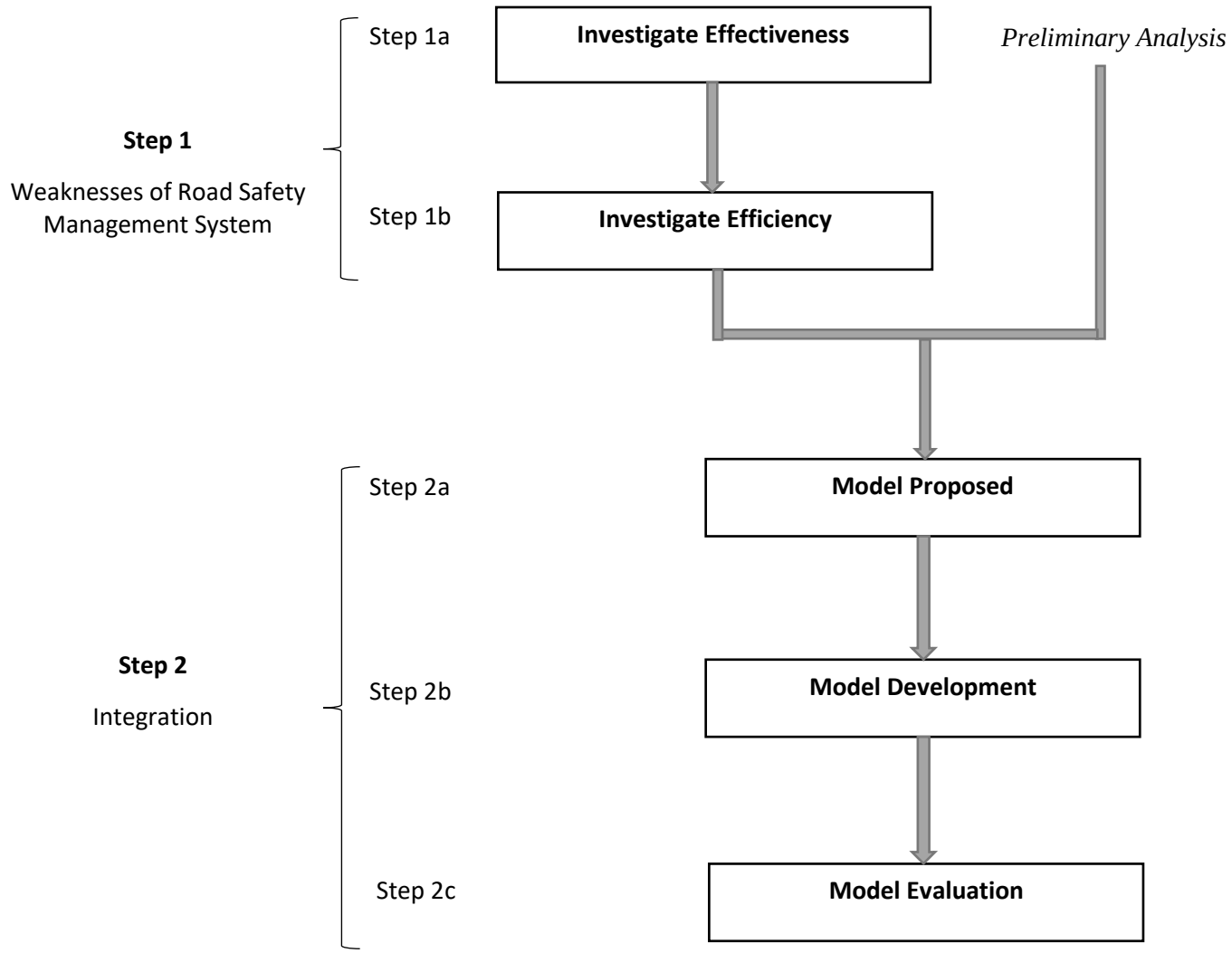


Figure 3.1: Flow of Research Methodology

3.2 Road safety institutional enhancement

Road safety is a complex issue with different obstacles to enhancing its management in every country. One of them, especially in LMIC, is poor institutional arrangements (Bliss, 2004).

The multi-disciplinary nature of road safety has led to the realisation (Wegman, 2001; Koornstra *et al.,* 2002; Bliss, 2004) that the success of road safety depends in large part on the institutional arrangements and the inter-relationship between institutional management functions, interventions, and outputs. Based on this concept, safety is produced like other goods and services while the production process is viewed as a management system with three pillars: institutional management functions that lead to interventions, which in turn, produce results (Bliss & Breen, 2008).

Wesemann (2000) asserted that the role of government in enhancing road safety is vital and that it cannot be led by another party outside the government body. Thus, the WHO strongly suggested that each government needs to identify a lead organisation to guide the national road safety effort and monitor policy implementation (Peden *et al.,* 2004). Without such a dedicated lead organisation on the government side, the national institutional arrangement may be fragmented and consequently any significance enhancement may be difficult (Trinca *et al.,* 1988). Bliss and Breen (2008) suggested that the highest attention must be given to institutional management functions (i.e. coordination, legislation, funding and resource allocation, promotion, monitoring and evaluation, Research & Development, and knowledge transfer) as they are linked to RSM systems, which in turn, generate the interventions to achieve the desired outcomes.

In this study, the present RSM system was evaluated in terms of its effectiveness and efficiency. The effectiveness of the RSM system was investigated based on the conceptual framework

introduced by the World Bank. Subsequently, a preliminary analysis was carried out to explore new funding mechanisms along with their potential arrangements. The investigation of their effectiveness and efficiency was based on both quantitative and qualitative data gathered via interviews.

The data were gathered during a preliminary phase, together with supporting information collected from the literature to identify the issues that impeded RSM, with an emphasis on funding. Based on the analysis, new models were designed for road safety funding as a mechanism that facilitates not only better financing of road safety but also implementation of the associated road policy plans. The model proposed in this study was based on a case study in Malaysia that served as a representative of LMIC. The developed proposed model was evaluated using a second questionnaire delivered to a number of international experts in the area of road safety.

3.3 Effectiveness

Effectiveness of RSM is related to how RSM can help to reduce road traffic accidents by carrying out activities within timeframes and sufficient budgets (Aeron-Thomas *et al.*, 2002). This involves identifying how objectives are defined, agreed, and met for the management of the organisations concerned and the development of road safety programmes. An effective RSM must be built on interrelated elements of institutional management functions, interventions, and results (Bliss & Breen, 2008). This convention was the basis for the work reported herein. Bliss and Breen (2008) suggested that it is crucial to comprehend that effective institutional management is of primary importance for successful result-focused interventions. Therefore, the effectiveness of RSM at the institutional level should be based on the following seven functions:

i. Results focus;

ii. Coordination;

iii. Legislation;

iv. Funding and resource allocation;

v. Promotion;

vi. Monitoring and evaluation; and

vii. R&D and knowledge transfer.

The following sub-sections (3.3.1 to 3.3.7) describe the functions of effective RSM, as suggested by the World Bank. A methodology that comprised semi-structured interview questions and a questionnaire survey was developed based on the criteria of these functions to identify the major issues that facilitated or impeded RSM plans, particularly in funding.

3.3.1 Results focus

In order to achieve an efficient and effective RSM system, a focus on results is the first element in institutional management of road safety. Bliss and Breen (2008) stressed that this can be addressed across five activities: appraising the present road safety performance through high-level strategic review, adopting a far-reaching road safety vision for the longer term, analysing what could be achieved in the medium term, setting appropriate quantitative targets by mutual consent across road safety partnership, and establishing mechanisms to ensure stakeholder accountability for results.

A clear and achievable target should be set first before the entire element in institutional management functions can support the success of a road safety plan. As suggested by Allsop *et al.,* (2011), countries with a road safety target will achieve at least a 10% reduction in road fatality.

It should be emphasised that focusing on results is a requirement that provides a strategic orientation and sets out a performance-management framework for the delivery of interventions, as well as their intermediate and final outcomes. It defines the level of safety a nation desires to achieve in terms of vision, goals, objectives, and related targets (Luoma & Sivak, 2012). Without a clear and accountable road safety aim, the effectiveness of any initiatives implemented can be undermined and fail (Bliss & Breen, 2008).

3.3.2 Coordination

According to Bliss and Breen (2008), coordination cuts across four activities: horizontal coordination between central government agencies; vertical coordination between central, regional, and local levels of government; specific delivery partnerships between government, non-government, and businesses at the central, regional, and local levels; as well as parliamentary relations at central, regional, and local levels.

It concerns the management and the arrangement of interventions, as well as other related actions delivered by government and non-government organisations, including associated business partnerships with the aim to achieve the desired results. Such arrangements should be led and coordinated by a dedicated lead organisation to ensure the integration of the decisions made and consequent maximisation of benefits from road safety programmes (Trinca *et al.,* 1988).

Therefore, this research analysed and identified the problems with present arrangements of RSM, particularly in terms of coordination among the organisations concerned, with the view to suggest a mechanism that facilitates better coordination of road safety.

3.3.3 Legislation

The term 'legislation' refers to a legal instrument that is necessary for governance purposes that specifies the legitimate bounds of institutions in terms of their responsibilities, accountabilities, interventions, and institutional management functions to meet targeted goals (Bliss & Breen, 2008). In order to ensure the effectiveness of the roles and responsibilities of road safety agencies, Bliss and Breen (2008) posited four dimensions that need to be in place: reviewing the legislative framework scope; developing and updating legislation required for road safety strategy; consolidating legislation; and securing legislative resources for road safety.

It is necessary that appropriate legal mechanisms for governance purposes are in place to specify the responsibilities, accountabilities, roles, and other related functions of the institutions involved in the overall structure of the road safety sub-sector. Without strong legislation, road safety implementation may be ineffective.

Hence, this research adhered to a methodology that determined if the existing legislation for road safety is indeed adequate to ensure the effectiveness of RSM.

3.3.4 Funding and resource allocation

Sufficient and sustainable funding can only be achieved from secured and appropriate annual allocation (Zietlow, 2007). This weakness occurs in most LMIC, which has led to failure to reduce road accidents, as noted in the World Report on Road Traffic Injury Prevention 2004 (Bliss &

Breen, 2008). The World Bank, hence, has recommended that sustainable funding resources and viable procedures to guide allocation of resources across safety programmes can overcome this weakness.

In order to improve road safety, it is essential to provide sufficient financing for interventions on a sustainable basis via rational evaluation and a programming framework that can facilitate the allocation of resources to meet the desired results. It is evidenced that policy will only effectively work provided that there is adequate funding (Robinson, 2008). Efforts to improve road safety in any nation will not succeed without sufficient and sustainable funding. As highlighted by Downing (2004), many countries have failed to ensure that their road safety plans are delivered accordingly since they have been forced to slash their road safety budgets due to lack of funding. This argument is supported in a study conducted in thirteen countries by Aeron-Thomas *et al.,* (2002), which concluded that resources, such as expertise and funding, should be made available and sustainable to create a successful road safety plan.

Most nations draw on their general government budget to fund road safety. Based on the experiences from most developing nations, sufficient and sustainable road funding through general government budgets is impossible to secure, particularly if the process is influenced by annual political budget debates in parliament (Zietlow, 2005). Funding for road safety investment can therefore be slashed due to politically competing sectors, such as defence, education, and healthcare. However, the issue of road financing sustainability can be tackled through commercialisation of roads based on fee-for-services basis and managing them like a business (Heggie, 2000a).

Therefore, this research identified the major factors that affected road safety funding with the view of exploring appropriate funding mechanisms to generate sufficient and sustainable funding for RSM.

3.3.5 Promotion

Promotions are generally carried out with the objective of creating awareness and raising publicity about road safety issues, which are carried out towards either a specific focus group or to the general public to stimulate behavioural changes. It concerns the sustained communication of road safety as a core requirement for government and society that emphasises the shared societal responsibility to support the implementation of the interventions required to achieve the desired results. Bliss and Breen (2008) listed a few dimensions to be noted in addressing the promotion function: promoting a far-reaching road safety vision or goal; championing and promoting at a high level; generating multi-sectorial promotion of effective intervention and shared responsibility; leading by example with in-house road safety policies; developing and supporting safety rating programmes and publishing their results; carrying out national advertising; and encouraging promotion at the local level.

This research, hence, developed a methodology that evaluated the mechanisms sculpted and implemented to convey the road safety message to road users, in particular to assess the correlation between road safety needs and user perception.

3.3.6 Monitoring and evaluation

Monitoring and evaluation concern the systematic and continuous measurement of road safety outputs and outcomes (both intermediate and final) as well as the evaluation of interventions linked

to an integrated RSM system. As discussed by Bliss and Breen (2008), three dimensions must be addressed in terms of monitoring and evaluation: establishing supporting data systems to set and monitor final and intermediate outcomes and output targets; ensuring transparent review of the national road safety strategy in terms of results, interventions, and institutional management functions; and making necessary adjustments to interventions and institutional outputs in order to achieve desired outcomes.

Monitoring and evaluation require the establishment of appropriate databases. For example, road accident databases produced by the traffic police can be used to monitor and evaluate road safety interventions in terms of the number or the severity of accidents. The economic costs and benefits of road safety programmes and the performance of organisations responsible for these may be monitored through regular financial and technical audits. Audits are required for every funded programme and the results should be published publicly for awareness (Heggie, 2000a). This mechanism ensures the transparency and accountability of funding besides enhancing the effectiveness and efficiency of RSM. Therefore, this research developed an enhanced model that embedded the above requirements.

3.3.7 Research & Development and knowledge transfer

This function concerns the systematic and continuous development and application of new knowledge that contributes to the efficacy of the road safety system. Through this function, many strategies have been put into place at the national level to sustain the decline in road fatalities and injuries, which in turn, achieves the sought-after focus on results. Bliss and Breen (2008) suggested six dimensions for this function, which are: developing capacity for multi-disciplinary research and knowledge transfer; creating a national road safety research strategy and annual programme;

securing sources of sustainable funding for road safety research; training and professional exchange; establishing good practice guidelines; and setting up demonstration projects.

It is evident that countries, such as Sweden, UK, and the Netherlands (the SUN nations), have invested in research and development (R&D) projects to generate innovative approaches to RSM. However, this requires an appropriate platform to develop high expertise and adequate funding from stakeholders.

Hence, this research demonstrated the manner in which R&D, as well as knowledge transfer, can be better funded and steered.

3.4 Efficiency

The weakness of institutional RSM in LMIC, as well as its consequent failure to reduce road traffic accidents, has been identified by the World Report on Road Traffic Injury Prevention 2004 (Bliss & Breen, 2008). In an attempt to overcome this weakness, the World Bank has recommended several measures, including allocating financial and human resources to implement specific road safety initiatives. Without adequate funding and skilled resources, institutional structures and processes would become ineffective and national action plans will remain paper plans. As declared by the Secretary General of the UN in the 68th session of the General Assembly, in order to enhance the global road safety scenario, multi-sectoral collaboration, funding, and partnerships among relevant parties are greatly needed (UN, 2011).

Sufficient and sustainable funding for road safety, together with a rational resource allocation system, may enhance RSM. However, it is imperative that the utilisation of funding is optimised

to achieve the road safety objectives set, as well as to gain strong support from road users. Hence, a mechanism has to be introduced to acknowledge this requirement.

In order to identify the most suitable model for road safety funding, several funding mechanisms have been considered, such as government budget funding, earmarked taxes, insurance levies, multi-lateral development banks, private partnerships, and road funds. These have pros and cons, while their success depends on some conditions, such as strong political support, revenue adequacy, good planning, and legal backing (Aeron-Thomas *et al.,* 2002).

Since 1990, a general platform for road funds has been developed to generate long-term plans that can successfully improve road safety measures (Potter, 1997). The improvements consist of efficient management of the collected funds and proper accountability for both the government and general public. Benmaamar (2006) described the second-generation road funds as:

'Thus governed by specific legislation which sets out the roles and responsibilities of a representative management board to oversee operations and a secretariat to manage the business of the road fund on a day-to-day basis.'

These road funds have been used with success in a number of nations, particularly in the area of road maintenance. Therefore, it is necessary to investigate their feasibility in the area of road safety as a means to integrate setting and financing policies and plans.

Hence, this study developed several suitable funding models for LMIC to evaluate their success.

3.5 Integration

Zietlow (2005) stated that the main issues found in road safety are similar to those of road maintenance. Both lack appropriate institutional capacity and inadequate funding for measures and management, which can hinder substantial improvement. Insufficient and unsustainable funding conditions are crucial issues that must be addressed as any effort to improve road safety conditions, including institutional efforts, are stunted without sufficient and sustainable funding (Zietlow, 2007).

Therefore, it is necessary to address the two main underlying causes of road safety problems: financing mechanisms and institutional arrangements. In addition, both effectiveness and efficiency must be acknowledged and integrated appropriately.

Heggie and Vickers (1998) suggested that both effectiveness and efficiency may be enhanced by:

i. Creating ownership among stakeholders;

ii. Establishing responsibility through regulatory and institutional development;

iii. Strengthening management through commercialisation; and

iv. Providing sufficient and sustainable funding through tariff reform.

Based on these building blocks, new funding sources and mechanisms need to be established not only to ensure sufficient and sustainable road safety funding but also to enhance the RSM system. Nevertheless, road issues cannot be solved without the strong support from road users and one cannot win the road users' support without convincing them that the resources are indeed used efficiently (Boamah, 2010).

Therefore, there is a pressing need to explore such mechanisms by initiating innovative concepts that place road users at the centre of the decision-making process and make them the direct recipients of the benefits accrued from their contribution to road safety funding. This thesis, therefore, presents the research carried out to establish such mechanisms in the area of road safety.

3.6 Case study

In an attempt to test the concepts developed conceptually, a case study was considered. Case study research may be defined as comprehensive research of an event or series of related events that the investigator believes exhibits the operation of some identified general theoretical principles (Mitchell, 1983). It is also described as an approach in which the investigator explores a bounded system (a case) or multiple bounded systems (cases) over time through detailed and in-depth data collection involving multiple sources of information and, from this, reports a case description and case-based themes (Creswell, 2013). The data collection in a case study research is typically extensive. A case study strategy allows deeper understanding of the relationship that exists between the government agencies and other key stakeholders in RSM. This enabled the assessment of the correlation between the existing set-up, the decision-making hierarchy, and the processes involved in RSM at the institutional level.

In this research, the case study used was Malaysia as a representative of LMIC with a road safety record that demanded further improvement. This research investigated the efficiency and effectiveness of the present institutional RSM system in Malaysia and whether it met the criteria set by the framework. Consequently, a detailed analysis of the present road safety funding

mechanism was carried out, together with an investigation for the suitability and readiness of introducing new financial concepts as an overall road safety implementation tool.

CHAPTER 4: EVOLUTION OF ROAD SAFETY IN MALAYSIA

4.1 Introduction

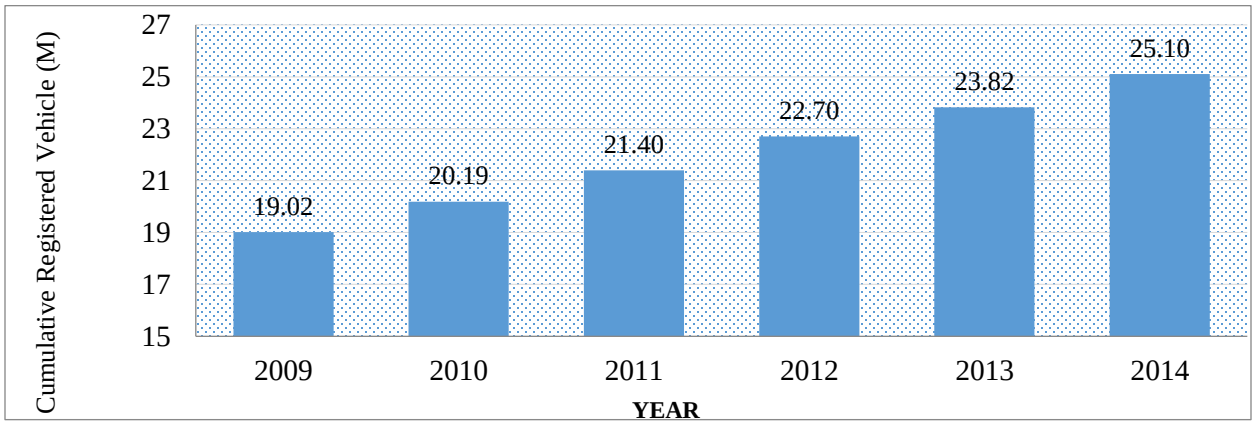
This chapter explores the setting up of institutional arrangements by the Malaysian Government to deal with RSM. The chapter also explains the present issues related to RSM in Malaysia and its funding. In order to comprehend the management and financing of road safety at the institutional level, it is imperative to determine the role of the government in managing road safety in Malaysia.

4.2 Road safety in Malaysia

Malaysia is widely viewed as an established, dynamic, and progressive LMIC. Since its independence in 1957 and the establishment of a federation of 14 states in 1963, Malaysia has experienced rapid growth in its economy, motorisation, and industrialisation towards the upper-middle-income position (World Bank, 2013).

Like many other developing countries, Malaysia has also experienced economic growth that has helped to spur economic activities, inclusive of construction and transportation industries. At the same time, the rapid urbanisation in Malaysia over the past 25 years since 1990 has led to urban mobility challenges. Yet insufficient and unsatisfactory availability of public transport as well as the rapid expansion of the urban fabric of cities have increased the total number of vehicles registered in Malaysia. More than 50% of people in metropolitan cities, such as Hong Kong, Singapore, and London, use public transportation, while Malaysians still depend on private

transport (Performance Management & Delivery Unit (PEMANDU), 2012). This situation has increased the number of vehicles on the road and consequently increased risk of accidents (Chuah & Chen, 2008). Figure 4.1(a) illustrates that cumulative registered vehicles in Malaysia increased by 40% from 19.0 million in 2009 to 25.1 million in 2014.



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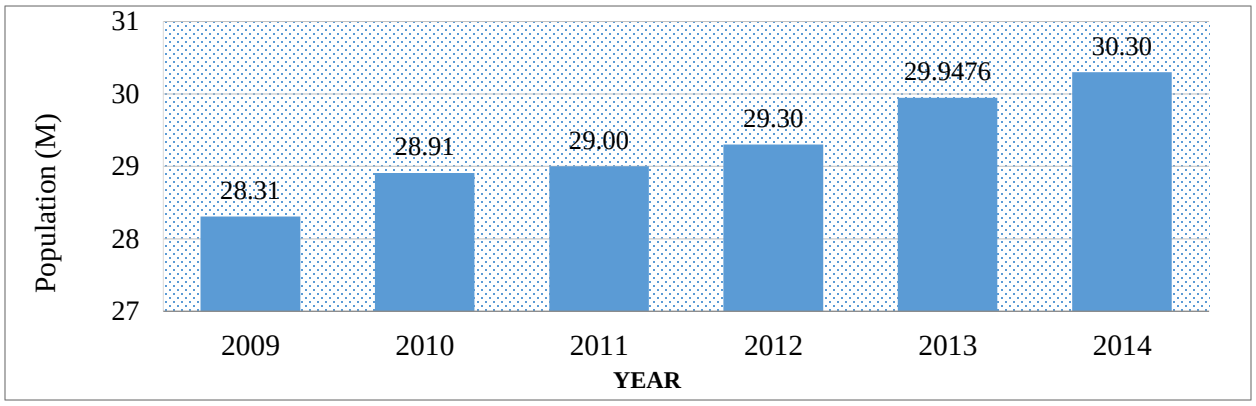


(b)

Figure 4.1: (a) Cumulative Registered Vehicle for year 2009 until 2014, and (b) Population for year 2009 until 2014

Figure 4.1(b) portrays population growth from 2009 until 2014. Malaysia has experienced population growth from 28.3 million in 2009 to 30.3 million in 2014. Increases in the population have therefore led to an increase in the number of vehicles. Apart from the population, economic activities have also contributed to the increasing number of vehicles with GDP growth of between 4.7% and 7.0% since 2009 (World Bank, 2015).

In order to overcome congestion caused by the higher number of vehicles on the roads, the government has implemented initiatives to upgrade the country's infrastructure, including constructing new roads and highways. As of 2017, more than 200,000 km of roads, inclusive of highways, as well as federal, state, and private roads, have been constructed in Malaysia (see Table 4.1).

Law and Radin (2005) and Radin (2006) demonstrated that several variables, such as population, registered vehicles, and economic growth, have been identified as the key factors influencing the uptrend in the number of fatalities in Malaysia. Therefore, concerted and coordinated efforts need to be taken by all stakeholders, including road users, to implement effective road safety initiatives.

Table 4.1: Malaysia Road Networks

Road Classification	**Federal Road**	**Private Road**	**Highway**	**State Road**
Road Length (Km)	49, 935	6,074	1,988	165,078
Authority	Ministry of Works (MOW)			MOW/ MOUWH&LG
Maintenance	Public Work Department (PWD)		MHA	PWD/ Local Authority

Source: Ministry of Works (MOW) & Malaysian Highway Authority (MHA) (2016)

**MOUWH&LG- Ministry of Urban Wellbeing, Housing & Local Government*

In Malaysia, every road accident must be reported to the Royal Malaysian Police (RMP) – a federal agency responsible for collecting and coordinating all accident data in Malaysia. Based on the data and figures collected, the number of road accidents in Malaysia is still far above global standards despite the various measures taken by the government, including strengthening its road safety management (Rohayu *et al.,* 2009). These efforts seem inadequate to minimise the possibility of accidents from occurring, as seen in the significant increase in the number of total road accidents from 397,330 in 2009 to 476,196 in 2014, illustrated in Figure 4.2.

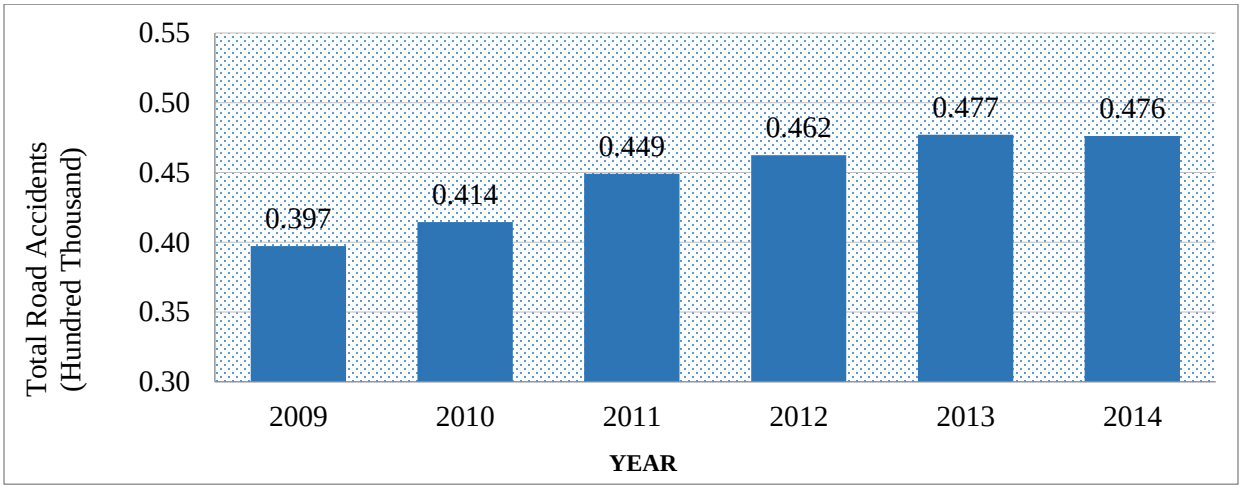
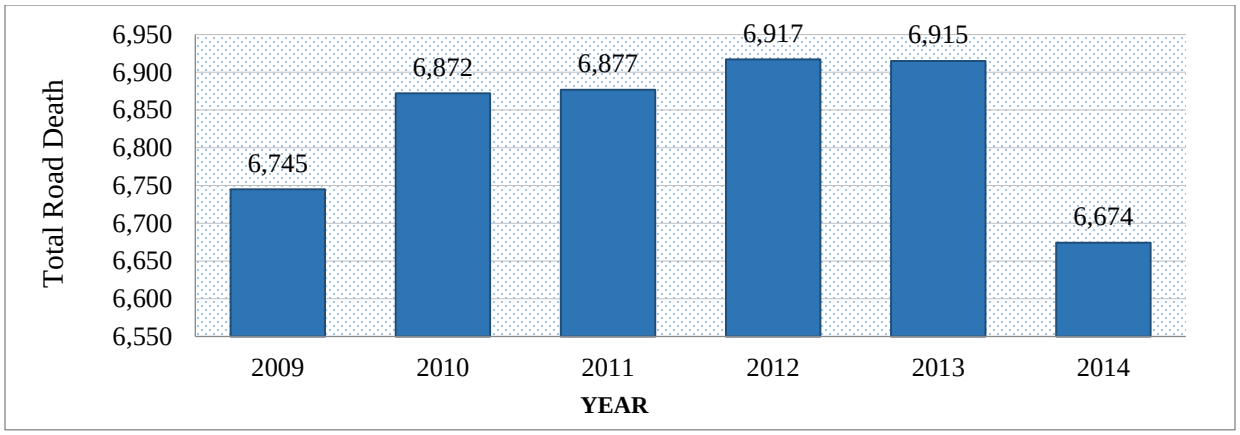


Figure 4.2: Total Road Accidents in Malaysia from year 2009 until 2014

Total road deaths, as well as serious and slight injuries, due to road accidents between 2009 and 2014 are portrayed in Figure 4.3(a), (b), and (c). In 2015, the MOH (2015) reported that road death was ranked seventh as the main cause of death in Malaysia. Although Figure 4.3(a) shows a slightly decreasing rate of total road death in 2014, according to Perangkaan (2016), the rank actually increased to fifth place after Ischaemic heart disease, pneumonia, cerebrovascular disease, and septicaemia. Ismail *et al.* (2009) reported that road deaths in Malaysia occurred due to human error and drivers' behaviour. At the same time, it was estimated that around 65% of road deaths in 2014 involved drivers of powered two-wheel vehicles, followed by car occupants at 17%, and pedestrians at 8% (Sivasankar *et al.,* 2014). This is because two-wheelers are still the main choice of private transportation in Malaysia – similar to most LMIC worldwide (Hussain *et al.,* 2005).



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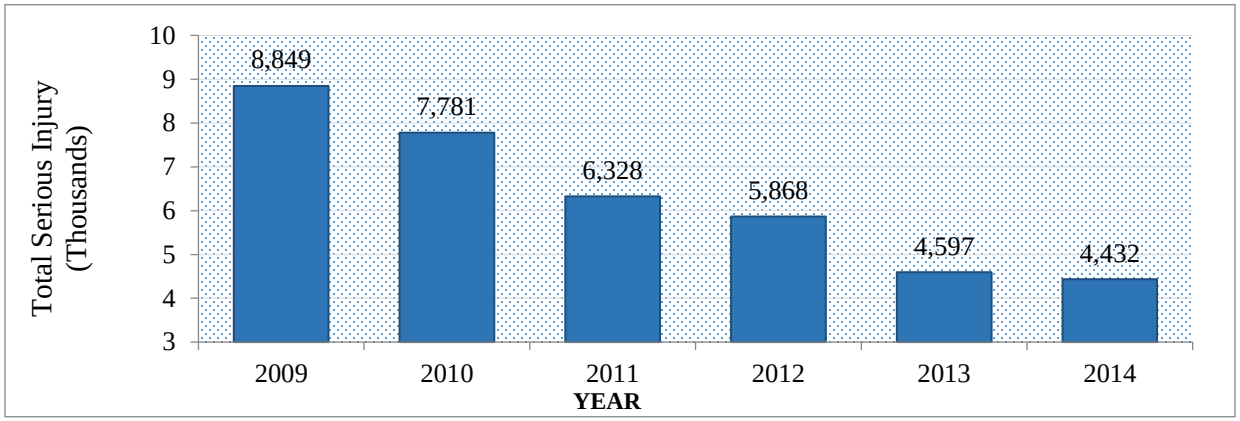

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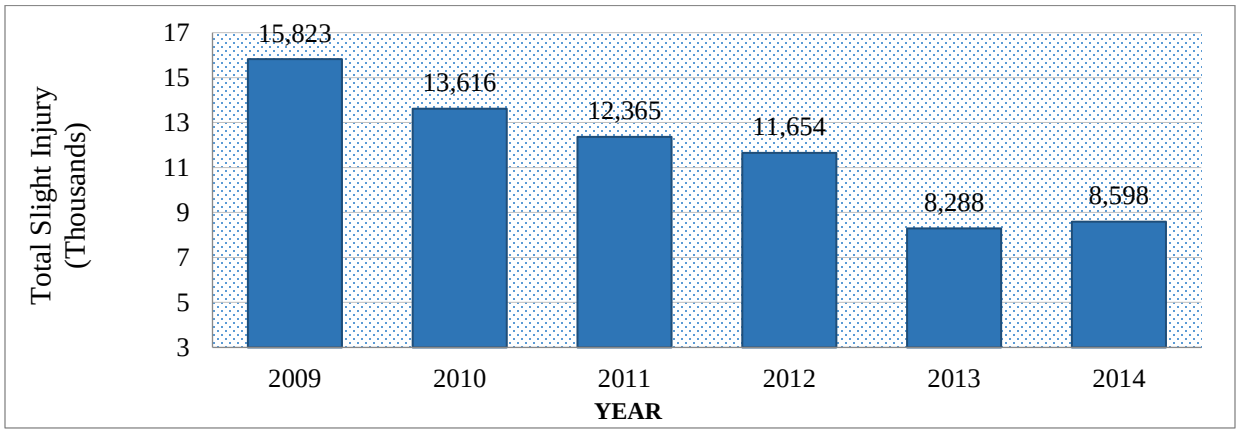
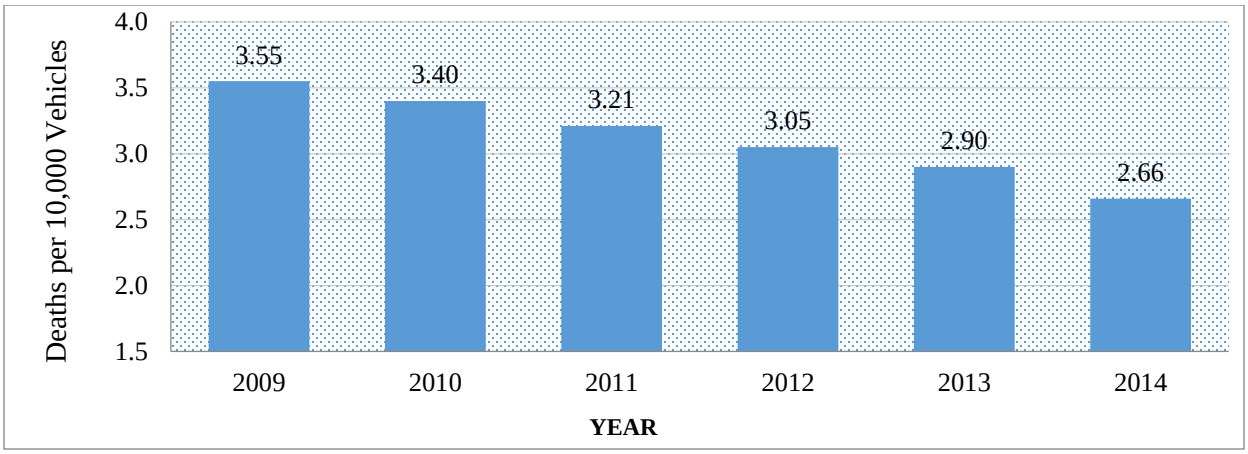


(c)

Figure 4.3: Injury statistics in Malaysia for year 2009 until 2014; (a) Total road deaths, (b) Total serious injuries, (c) Total slight injuries

The three main indicators used in Malaysia to measure road safety performance are: the index of deaths per 10,000 registered vehicles; deaths per 100,000 population; and deaths per billion vehicle-kilometre travel (VKT). Figure 4.4(a), (b), and (c) show the performance of all three indices from 2009 until 2014 in Malaysia. The latest death rate of 24.0 per 100,000 population in 2014 was considered alarming and one of the highest in the region (WHO, 2015). This is supported by Figure 4.5(a), where Malaysia is categorised among the worst countries in terms of the death index per 100,000 population in South East Asia. Figure 4.5(b) indicates a huge gap in the index of death per 100,000 population between Malaysia and HIC. The high index of death shown in Figures 4.4 and 4.5 shows the crucial need for road safety improvements Malaysia. In terms of economic loss, almost MYR 80 billion was recorded between year 2004 and 2013 based on the statistical value of life of MYR 1.3 million (MIROS, 2014). This amount is very high and incurred a significant loss to the country. It was also estimated that road accidents contribute to a loss of around 1.6% of GDP to the country per annum (IRTAD, 2015).



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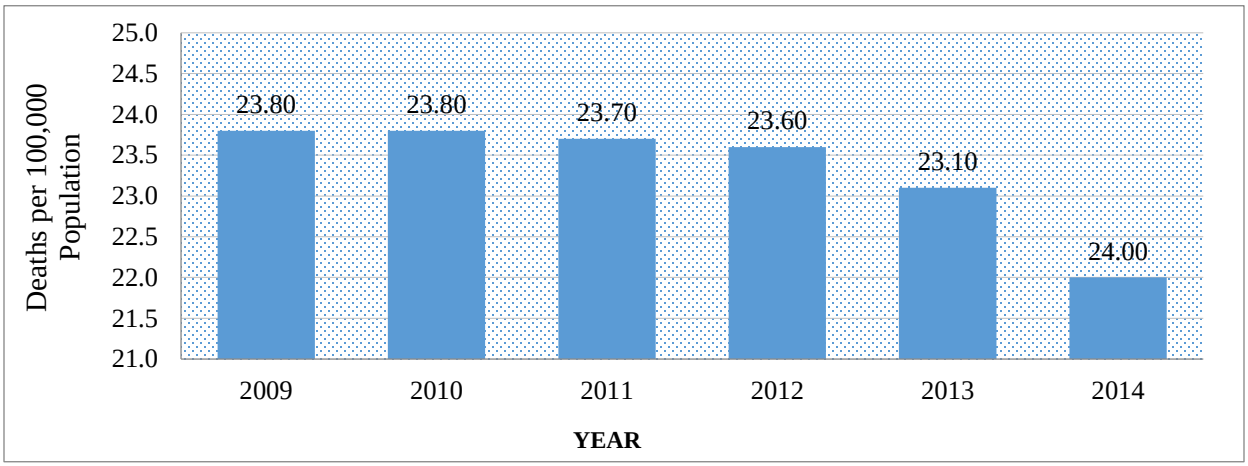

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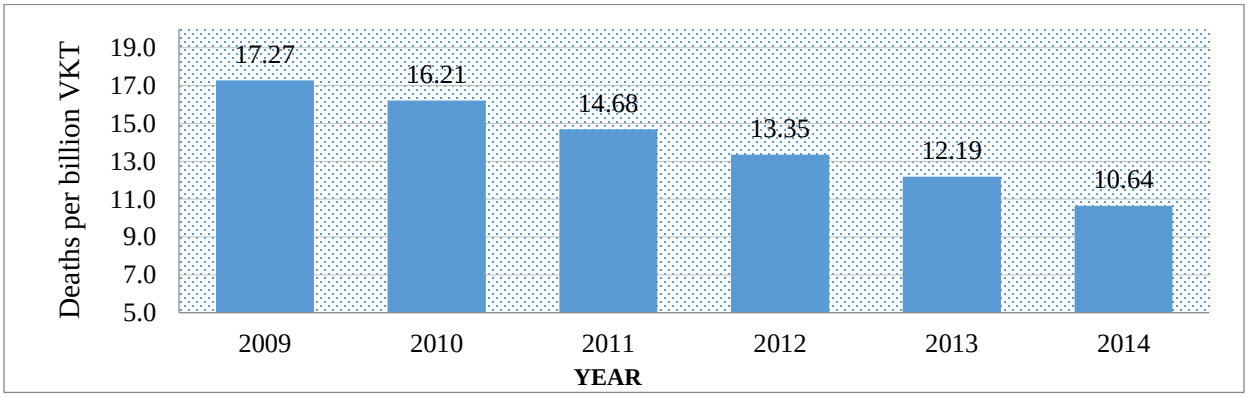

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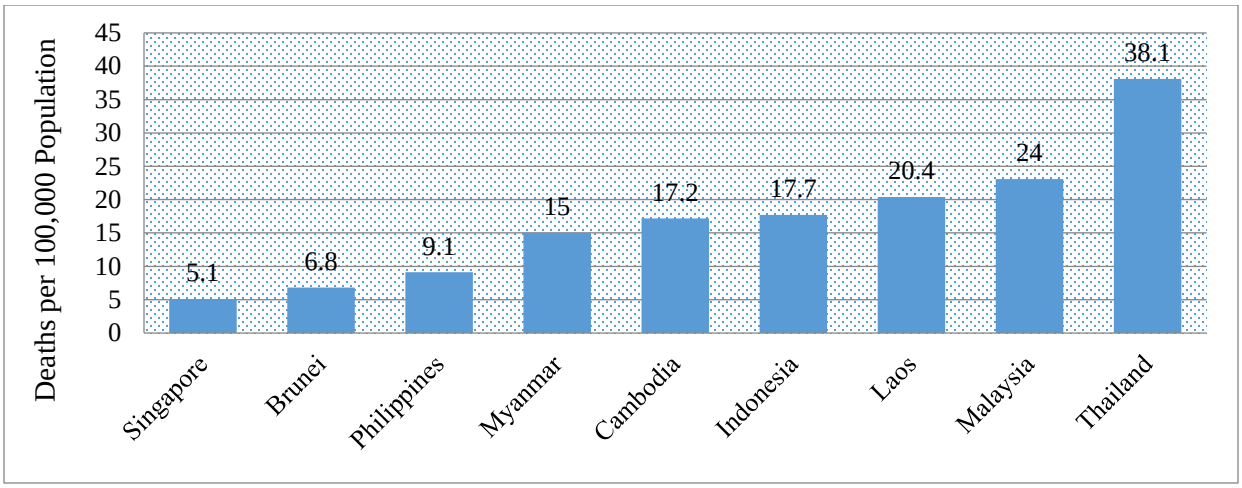
Figure 4.4: Deaths (a) per 10,000 vehicles, (b) per 100,000 population, and (c) per billion VKT



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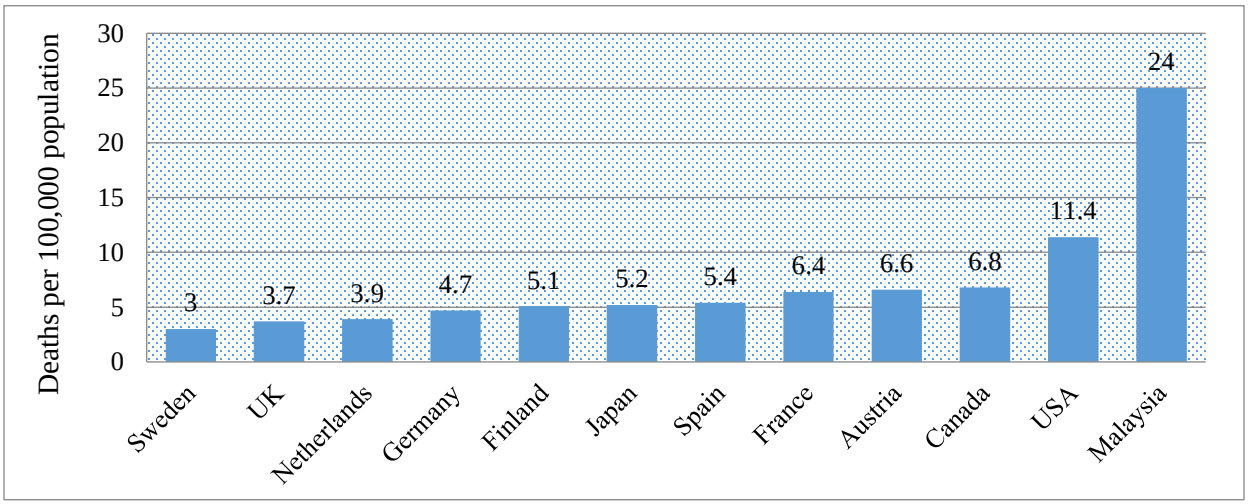

(b)

Figure 4.5: Deaths per 100,000 population; (a) Malaysia and South East Asia, and (b) Malaysia and HIC

Based on a prediction by MIROS, by 2020, if no proactive action is taken by the government to enhance road safety, the number of deaths due to road accidents in Malaysia per year would exceed 10,000. The burden caused by road accidents, which lead to death and disability, brings negative

societal and economic impacts to the majority of the world's population (Ameratunga *et al.*, 2006). The considerable gap in deaths between Malaysia and HIC indicates that Malaysia is in critical need of road safety improvements.

4.3 Road Safety Management in Malaysia

As stated in the Federal Constitution, RSM, as part of transportation elements, is a jurisdiction of the federal government. This means that the federal government is the responsible party that ensures the management and performance of road safety in Malaysia. In terms of management, road safety is managed in three tiers of management: federal, state, and local council (see Figure 4.6).

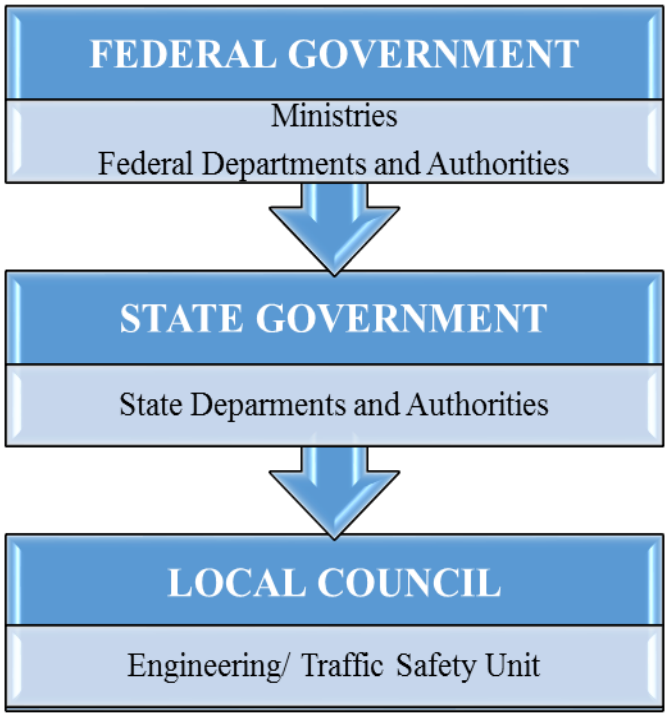

Figure 4.6: Governmental institutional arrangement for road safety in Malaysia

At the federal level, the MOT is the responsible ministry, together with several other ministries, that oversees the management of road safety. Under these ministries, departments and organisations are established to assist the ministry, such as RSD, RTD, and Public Work Department (PWD). At the same time, the government has established two special committees for road safety at the highest level (i.e. Cabinet Committee and Steering Committee) to give the highest attention to this particular matter.

At the state level, each federal department has a branch office to help the state governments to manage road safety. For example, RSD is established in all 14 states in Malaysia to assist the state government. At the same time, every state government has its own Road Safety Council (RSC) that is responsible for supporting the implementation of road safety advocacy and campaigns. Meanwhile, at the lowest level, road safety is the responsibility of local councils, which normally have their own engineering or traffic safety departments.

Since 2004, RSD has been the lead organisation coordinating and monitoring road safety in Malaysia and is assisted by the Malaysian Institute of Road Safety Research (MIROS), which offers support by carrying out road safety research to reduce the number of road traffic deaths. MIROS stated that if no measures are taken, the number of deaths in Malaysia due to road crashes will exceed 10,000 by 2020 – an alarming rate that demands effective and strategic efforts from the government.

4.3.1 Overview of key stakeholders in road safety

In order to generate good road safety, the government has set up two committees at the highest levels alongside the existing arrangements, as illustrated in Figure 4.7.

Figure 4.7: RSM hierarchy in Malaysia

4.3.1.1 Cabinet Committee

In 1990, the Prime Minister at that time chaired a newly established Cabinet Committee on Road Safety, which was an improved, better-coordinated, and high-level decision-making body to overcome the alarming number of road accidents at that time. Its objective was to strengthen road safety initiatives at the national level. In 1991, the first action taken by the Cabinet Committee on Road Safety was to set a target of reducing the death rate to 4.0 fatalities per 10,000 registered vehicles by 2010 (Law *et al.*, 2005). The Cabinet Committee was supervised by the National Steering Committee on Road Safety – the highest decision-making authority regarding road safety administration in Malaysia.

The government is serious about promoting road safety and reducing traffic accidents in Malaysia, evidenced by the involvement of the Prime Minister himself. Reducing road accidents has always been a fundamental policy of the Cabinet Committee. The core functions of the Cabinet Committee regarding RSM (RSD, 2006) are:

i. To approve and endorse national policies and strategies for the promotion and development of road safety in Malaysia;
ii. To promote and facilitate road safety best practices;
iii. To allocate funds and resources for the implementation and development of road safety policies and programmes;
iv. To monitor road safety performance of stakeholders based on Key Performance Indicators (KPIs);
v. To approve changes to organisational structures of stakeholders involved in road safety;
vi. To set national targets for injury and fatality reduction arising from accidents;
vii. To take such actions or do such things as it deems fit or necessary to enable it to carry out its function and powers effectively; and
viii. To ensure all stakeholders in government remain committed to achieving national road safety targets and plans.

4.3.1.2 National Steering Committee

The Steering Committee on Road Safety is the second highest decision-making body that overlooks and coordinates the implementation of decisions made by the Cabinet Committee. Unlike the Cabinet Committee, the Steering Committee is chaired by the Minister of Transport and has 25 members, including the Secretary General of Ministries, the Director General of

Departments representing the public sectors, chief executives of various private companies, and leaders of non-governmental organisations (NGOs).

The main function of the Steering Committee is to safeguard effective implementation of all road safety matters and to report its progress to the Cabinet Committee in a timely manner. An outline of the functions of the Steering Committee is listed below (RSD, 2006):

i. To examine, evaluate, and approve policy and national targets on road safety of all stakeholders;
ii. To monitor the progress of the implementation of policies and programmes as agreed by the Cabinet and the Cabinet Committee on Road Safety;
iii. To consider any new initiative on road safety; and
iv. To monitor the development of educational, engineering, and enforcement programmes as agreed under the KPIs of Road Safety.

4.3.1.3 Ministry of Transport (MOT)

The MOT is associated with both the Cabinet Committee and the National Steering Committee. Generally, it supervises the development of air, land, and sea transport. The Land Division of the ministry acts as the secretariat for both the Cabinet Committee and the National Steering Committee. Under this ministry, three agencies are responsibility for road safety: the Road Transport Department (RTD), Road Safety Department (RSD), and Malaysian Institute of Road Safety (MIROS). The ministry has liability for all laws and regulations governing transportation matters. With the support of the RSC, the government organises safety programmes and campaigns in order to create awareness among road users.

Road Safety Department (RSD)

It was estimated that the total social costs incurred due to road accidents in 2004 was almost MYR 9 billion with 6,223 road deaths in the year (RSD, 2006). In an attempt to address this issue, the Malaysian government via the Cabinet Committee on Road Safety established the Road Safety Department (RSD) to lead, monitor, and implement road safety programmes, including education, legislation, engineering, and the safety of road environments. The RSD has since played a vital role as the lead agency for road safety by helping the MOT to formulate road safety plans and programmes.

Road Transport Department (RTD)

The RTD oversees registration of vehicles, licenses and test drivers, as well as enforcement of traffic rules and monitoring of privatised inspection activities. The RTD is also responsible for ensuring that drivers in Malaysia are given suitable and sufficient training and testing programmes in order to develop the right attitude and skills. The RTD works with the RMP to enforce traffic rules and regulations under the Road Transport Act 1987, the Commercial Vehicles Licensing Board Act 1987, the Tourist Vehicle Licensing Act 1999, and the Motor Vehicles Rules. At the same time, the RTD is also involved in advocacy and campaigns in collaboration with other organisations.

Malaysian Institute of Road Safety Research (MIROS)

MIROS was established in 2007 to assist the government in terms of researching new programmes and assessing the effectiveness of established programmes. Since its establishment, MIROS has played a vital role as a research centre that produces and broadcasts information on road safety through the media and their annual training programme (MIROS, 2014). MIROS is responsible

for evaluating present road safety procedures by obtaining valuable information about enhancing road safety programmes.

4.3.1.4 Ministry of Finance (MOF)

The MOF plays an important role in Malaysia's economic growth. One of its functions is to formulate and implement fiscal and monetary policies in order to provide effective and efficient distribution and management of financial resources. All road safety budgets are channelled from the Federal Consolidated Fund to the respective ministry and organisation through the MOF upon approval by parliament (Ferry *et al.,* 2014). Therefore, the MOF has a vital role in providing a sufficient and sustainable budget for road safety in Malaysia.

4.3.1.5 Ministry of Works (MOW)

The MOW focuses on the construction and maintenance of roads across Malaysia. Under this ministry, three organisations are directly responsible for the roads and their safety, which are: Highway Planning Unit, MHA, and PWD. Each organisation is responsible for road safety activities within their territories; for example, the PWD is responsible for all federal and state roads while highway safety is the responsibility of the MHA.

Public Work Department (PWD)

The PWD is a body governed under the MOW that is directly involved in road safety through the construction and maintenance of all federal and state roads throughout Malaysia (Hashim *et al.,* 2010). Through its Road Safety Unit, the PWD carries out and coordinates Road Safety Audits for all road projects. At the same time, the PWD also carries out black spot treatment and introduces

a road safety programme that involves auditing works on unsafe roads and later helps to improve road safety.

Malaysian Highway Authority (MHA)

As a statutory body that was established on 24 October 1980, in accordance with the Highway Authority of Malaysia (Incorporation) Act 1980 (Act 231), the MHA supervises and executes designs, regulations, operations, and maintenance of inter-urban highways. MHA is also the sole regulating authority responsible for monitoring the implementation and development of works, including road safety activities on the highways, by concessionaires. The MHA is responsible for monitoring 31 toll highways; six further highways are still under construction and planning (MHA, 2016).

4.3.1.6 Ministry of Health (MOH)

The MOH is responsible for providing post-accident and trauma management as their main involvement in RSM. Apart from that, MOH is also the provider of accident and injury data, which are crucial for generating statistics and information pertaining to road safety. The Violation and Injury Prevention Unit disseminates leaflets about road safety, while the Non-communicable Diseases Unit of the Division of Disease Control is involved in matters concerning surveillance, training, research, and promotion of injury prevention (ADB, 2005).

4.3.1.7 Ministry of Home Affairs (MOHA)

The MOHA is the ministry that ensures orderly registration of organisations and societies in accordance with prevailing laws. Regarding road safety, the MOHA, through the RMP, is

responsible for carrying out enforcement activities related to road safety and ascertaining smooth road traffic operation, particularly concerning road traffic laws and regulations.

Royal Malaysian Police (RMP)

The RMP refers to the uniformed federal police force in Malaysia that maintains and preserves peace and security in the country. Under Section 21 of the Police Act, it is the duty of RMP to regulate, control, and divert traffic. The role of RMP in enforcement is vital as many studies have shown that compliance with the law among drivers in Malaysia remains low (WHO, 2015). Apart from that, the implementation of road safety discipline among road users is enforced by the RMP through coordinated and systematic operations, especially during the festive seasons, such as *'Op Sikap' and 'Op Selamat'.* The RMP, under its Reporting System Unit, is also responsible for collecting and coordinating all crash data in Malaysia (ADB, 2005). The method that they use to collect this data adheres to a standard form called POL 27. The form covers data regarding transport, atmosphere, injury, location and background of the crash, as well the victim(s) involved. The data cover mostly all variants of crashes (fatal, serious, slight or damage only) as all road crashes that occur in Malaysia must be reported to the police (IRTAD, 2015).

4.3.1.8 Ministry of Education (MOE)

The MOE formed a smart partnership with the MOT to develop the Research Safety Education Programme. This partnership identifies best practices in Road Safety Education from literature reviews as well as reviews of programmes and initiatives. The Cabinet Committee approved the implementation of Road Safety Education Programme (RSEP) in primary school in 2008, which involves the teaching of Road Safety Education on a weekly basis (in the native language) (Bakar

et al., 2011). Almost 29,195 teachers throughout Malaysia have attended a special course on RSEP organised by RSD to familiarise them with the subject matter (RSD, 2014).

4.3.1.9 Ministry of Urban Wellbeing, Housing & Local Government (MOUWHLG)

The MOUWHLG is responsible for the Department of Fire and Rescue, which plays a vital role in road safety by providing rapid response and support to accident victims. The ministry is also responsible for planning, designing, and maintaining a safer road environment in municipal areas as all local authorities fall under the ministry's jurisdiction (ADB, 2005).

4.3.1.10 Ministry of Communications & Multimedia (MCMM)

In this era of technology where information is available at one's fingertips, this ministry plays an important role in ensuring that sufficient and impactful promotion, publicity and campaigns on road safety awareness are broadcast via electronic media through partnership with MOT.

4.3.1.11 Road Safety Council (RSC)

The RSC was established in 1955 and is the oldest organisation established to manage road safety in Malaysia. The RSC is patronised by the Prime Minister and chaired by the Minister of Transport. It was originally based within the Land Division of the MOT, which then had all of its responsibilities taken over by the RSD after it was established in 2004. The RSC plays an important role in promoting road safety throughout the country via road safety campaigns and advocacy, together with the RSD and other organisations, either at federal or state level.

4.3.1.12 Automobile Association of Malaysia (AAM)

The AAM is a well-known trade association in Malaysia related to the automotive industry and its involvement in promoting road safety in Malaysia. Throughout Malaysia, numerous promotions and campaigns have been organised by AAM to stress road safety awareness, issues, and updates either on their own or together with other governmental organisations. Aside from that, AAM offers technical advice and independent vehicle inspection at its headquarters.

4.4 Road safety policy and strategy

The Malaysian government has taken many initiatives to reduce road accidents and fatalities in Malaysia, evidenced by its earliest efforts of introducing varied measures and targets, i.e. reducing road fatalities by 30% before 2000 (Rohayu *et al.*, 2009). The implementation of these road safety measures is monitored by the Cabinet Committee of Road Safety, which is chaired by the Prime Minister. The efforts undertaken have produced good results whereby the number of fatalities has decreased (Law *et al.*, 2005). An earlier road safety target was introduced to reduce the fatality rate to 4.0 fatalities per 10,000 registered vehicles by 2010. This target ascertained that Malaysian road safety was on par with the best performing countries. However, the target was not completely achieved although some improvements were noted.

Since then, the government has introduced two major road safety plans to further reduce the number of road accidents and fatalities in the country. Details of both plans are discussed in the next sub-sections.

4.4.1 Road Safety Plan Malaysia (RSPM) 2006-2010

Upon the establishment of RSD in 2004, the government implemented the first Road Safety Plan of Malaysia (RSPM) 2006-2010 in 2006. The plan set out a number of targets to reduce the fatality rate to 2.0 fatalities per 10,000 registered vehicles by the end of the plan. The plan embedded the approach taken by the government in implementing road safety initiatives, which include the 4Es (engineering, education, enforcement, and environment), as well as co-ordinating, funding, and developing mechanisms based on the priority areas (RSD, 2006). Through this plan, the government set out its targets to reduce road accidents in Malaysia by 2010, as listed below (RSD, 2006).

i. Reduce the number of road deaths per 10,000 registered vehicles by 52.4% from 4.2 in 2005 to 2.0 in 2010;
ii. 10 deaths per 100,000 population as compared to the 23 deaths per 100,000 population; and
iii. 10 deaths per 1.0 billion VKT compared to the 18 deaths per 1.0 billion VKT.

After the plan ended in 2010, its results were analysed, as shown in Table 4.2. Although the specific targets in RSPM 2006-2010 were not completely achieved, some improvements were noted in road safety over the period. Based on a report by RSD, one reason that the targets were not entirely achieved was due to the delay in implementing some initiatives.

Table 4.2: The RSPM 2006-2010 - Targets and Outcomes

Road Fatalities Indicator	Road Fatalities 2006 (Actual)	Road Fatalities 2010 (Target)	Road Fatalities 2010 (Achieved)
Per 10,000 Registered Vehicles	4.0	2.0	3.4
Per 100,000 Population	23.6	10.0	23.8
Per Billion Vehicle Kilometre Travelled	18.9	10.0	17.3

Source: RSD, 2014

4.4.2 Road Safety Plan Malaysia (RSPM) 2014-2020

The MOT launched the Road Safety Plan 2014-2020 (RSPM 2014-2020) in November 2014 in an effort to further improve road safety in Malaysia to be on par with developed nations (RSD, 2014). The plan was a continuation of RSPM 2006-2010 and is aligned with global efforts through the Global Plan for the Decade of Action for Road Safety 2011-2020. The main aim of the plan is to stabilise and reduce the forecast level of road accident fatalities by 50% by 2020 worldwide through the implementation of various activities and initiatives regarding road safety. This plan was strategized based on the five pillars of the Global Plan for the Decade of Action for Road Safety, as illustrated in Figure 4.8.

Figure 4.8: Strategic Pillars of RSPM 2014-2020 (RSD, 2014)

Under RSPM 2014-2020, the MOT has set a target to reduce the fatalities index to 2.0 by 2020; the ministry is optimistic that it can achieve this goal with the cooperation of various government and private organisations. A report published by MIROS stated that the number of fatalities may increase in the absence of a comprehensive road safety programme, as presented in Table 4.3 (Sarani *et al.*, 2013a).

Table 4.3: Fatalities target under RSPM 2014-2020 (RSD, 2014)

Year	**2015**	**2020**
Predicted number of fatalities (Business as usual)	8760	10716
Fatalities targets with the implementation of the plan	6570	5358

4.5 Road safety funding in Malaysia

4.5.1 Source of road safety funding

Maintaining road safety is not an easy task as it demands support from every level, including funding. The government has to allocate sufficient and sustainable budget for road safety in order to ensure that the programme planned can be implemented accordingly.

In Malaysia, the situation is similar to other nations. Road safety is funded mainly from the government budget through an annual budget granted to each ministry and department that is responsible for road safety. This annual budget is subject to parliamentary debate and government policy. This makes the budget even harder to be obtained by each ministry and government agency as they have to compete with other strategic sectors, such as health, education, and defence. Apart from the government budget, there is also a small contribution from private sectors via donations and sponsorships, but these are meagre and insufficient. Figure 4.9 illustrates the comparison of

the approved budget received from the government by three key departments of road safety under the MOT.

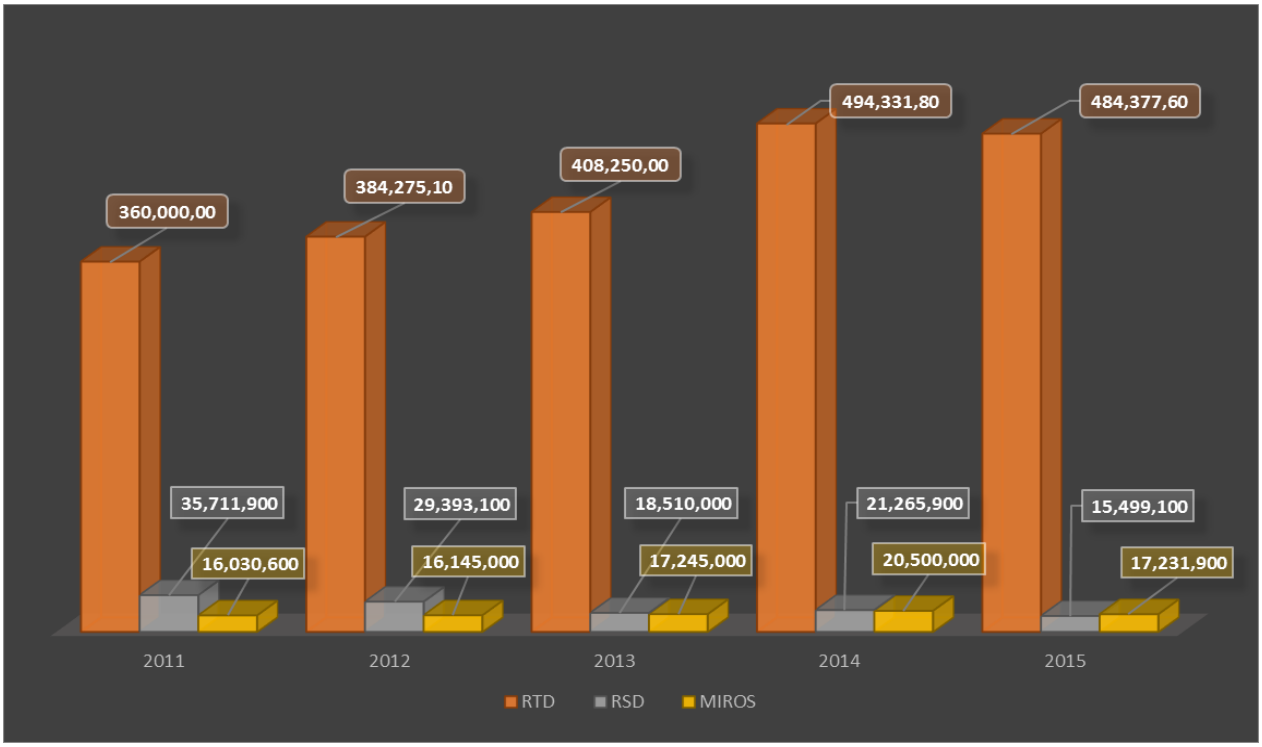

Figure 4.9: Approved management budget 2011-2015 (MOT, 2015)

The figure above clearly shows that the budget approved to the respective departments was reduced, especially between 2014 and 2015. The budget is expected to decrease further in 2016 and 2017 as the government recalibrates its budgets due to the recent reduction in annual revenue. This puts more pressure to stakeholders to obtain funds for road safety activities.

4.5.2 Mechanism for road safety funding

The road safety budget is funded by the government via annual budget formulations. The process starts with the circulation of guidelines regarding federal budget expenditure by the MOF. Each

ministry and agency prepare and forward their budget for the coming year to the MOF for review and approval.

In March, the MOF study the individual budgets before calling for preliminary hearings between April and June. By July, the MOF begins consolidating all federal budget expenditures from the ministries and agencies before seeking approval from the Minister of Finance and other cabinet members. The budget is then debated in parliament before it can be approved by December. After the final approval by the parliament at year-end, the MOF would begin issuing a general warrant to justify the spending to every ministry and agency so that they can execute the budget (Ferry *et al.*, 2014). Figure 6.1 in Chapter 6 illustrates the whole annual budgeting process in Malaysia.

CHAPTER 5: THE EFFECTIVENESS AND EFFICIENCY OF ROAD SAFETY MANAGEMENT IN MALAYSIA

5.1 Introduction

This chapter presents a systematic analysis for the assessment of RSM in Malaysia as a representative transition economy based on the concepts discussed in Chapter 3. The analysis was based on qualitative data gathered during a series of interview sessions. It examined the present institutional arrangements for the management of road safety in Malaysia focusing on road safety funding and seeking to provide an insight into how funding factors may affect both the effectiveness and efficiency of RSM. The results are discussed at the end of this chapter, along with the suggestion of a suitable mechanism to enhance RSM and funding to be implemented for road safety.

5.2 Methodology

5.2.1 Objectives

As discussed in Chapter 1, the objectives of this chapter are as follows:

i.) To demonstrate the use of the developed methodology by examining a case study.

ii.) To identify how objectives are defined, agreed, and met in the development of a road safety programme (effectiveness) and thereafter, how resources are allocated for activities planned to affect a road safety programme (efficiency).

iii.) To analyse and identify the major issues that facilitate or impede RSM plans at institutional level.

5.2.2 Procedure

This research adopted the case study approach because it suits the nature of the research as it is described as ‘an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident’ (Yin, 1994). Both interviews and document analysis were used in this research to gather information for analysis. The acceptability and reliability of the data gathered were crucial aspects. Thus, as suggested by Yin (1994), the data collection process included as many sources as possible. For this study, interviews were undertaken between November 2014 and December 2014. At least a month prior to the interviews, each interviewee was given a list of 28 semi-structured interview questions via email (see Appendix A). This protocol ensured that the interviewees were given ample time to read over the questions and prepare their best answers based on their knowledge and experience, hence making the interviews more effective. In line with ethical approval, the interviewees were briefed about the interview processes, including audio recording, which was carried out with their written permission and consent. They were also advised about their right to withdraw from the study at any time. Audio recording ensured that every significant point and information from the interviews was recorded for analysis; it also allowed the interviewer to be more attentive to the interviewees during the interview sessions. Concurrently, the essence of the answers provided by the interviewees was written down as backup for the audio recording, besides assisting the interviewer during the transcribing and analysing stages. Since the interview sessions

were conducted face-to-face, the researcher had the opportunity to gain further clarifications or explanations of certain questions and answers from the interviewees (Clifton & Handy, 2001).

In order to ensure maximum input from the interviewees, the interviews were comfortably held face-to-face at the interviewees' offices and lasted approximately between 60 and 120 minutes. The quiet and calming set-up ensured that the whole interview process was not disrupted, thus allowing the researcher to pay more attention to the interviewees and gain more comprehensive input from them. One essential element that must be highlighted is that despite their tight schedules due to the nature of their positions, all of the interviewees were very supportive and displayed high commitment to participate in this research to contribute to enhancing RSM in Malaysia.

5.2.3 Interviewees

All of the interviewees were selected based on the following criteria:

i. The senior officers selected were representatives of ministries, government agencies, the private sector, and academia, who were identified as key stakeholders responsible and involved in decision-making processes and formulating policy for road safety. This purposive sampling was essential as these are all key stakeholders who were involved in RSM at the institutional level in Malaysia; and

ii. The senior officers were decision makers and experts at their organisations with vast experience in RSM in Malaysia, in line with their positions at the respective organisations. Their participation was based on expert sampling, which was the best way to generate their expert views pertaining to RSM in Malaysia, which added exceptional input to this research.

Based on those considerations, both purposive and expert sampling techniques were employed in this research. The selection of the interviewees who participated in the research had been based on their involvement in RSM in Malaysia. The interview sessions were conducted using proper procedures and the respondents were divided into three categories: government sector, private sector, and academia. Senior officials from key government organisations who formulated policies and were involved in RSM in Malaysia, including MOF, MOT, MOW, MOH, RMP, RSD, MIROS, RTD, and MHA, were interviewed in this research. Additionally, Projek Lintasan Kota Sdn. Bhd. (PROLINTAS) – the toll highway concessionaire – and the AAM were interviewed representing the private sector and road users. An academic from a leading research centre in road safety from University Putra Malaysia (UPM) was also interviewed to look into his experiences and opinions. Table 5.1 lists the details of the 14 interviewees selected for this research.

Table 5.1: List of interviewees

CODE	[redacted]	MINISTRY/ DEPARTMENT	EXPERIENCE
R1	[redacted]	Ministry of Health	33 Years
R2	[redacted]	Malaysian Institute of Road Safety Research	22 Years
R3	[redacted]	Malaysian Highway Authority	32 Years
R4	[redacted]	Royal Malaysian Police	30 Years
R5	[redacted]	Policy, Road Safety Department	15 Years
R6	[redacted]	Enforcement, Road Transport Department	31 Years
R7	[redacted]	Highway Planning Unit, Ministry of Works	29 Years
R8	[redacted]	Policy, Ministry of Transport	32 Years
R9	[redacted]	Finance, Ministry of Transport	15 Years
R10	[redacted]	Budget Office, Ministry of Finance	15 Years
R11	[redacted]	Land Division, Ministry of Transport	15 Years
R12	[redacted]	Road Safety Research Centre, UPM	28 Years
R13	[redacted]	PROLINTAS, Highway Concessionaire	26 Years
R14	[redacted]	Automobile Association of Malaysia	35 Years

5.3 Analysis

The core of a research project is the analysis and the interpretation of data (Blaxter *et al.,* 2010). A similar view is shared by Denscombe (2003) who asserted that research plays a substantial role in the construction and analysis of qualitative data.

The interviews held were audio-recorded and transcribed verbatim precisely for analysis purposes. As postulated by Patton (1990), transcribing offers a point of conversion between data from the interview and analysis as part of data management and preparation. All gathered data from the interview sessions conducted were analysed via thematic analysis, which is also known as the template analysis technique. This analysis, which refers to a specific methodology used to thematically study qualitative data, has been extensively used in qualitative research (King, 2004; Cassell *et al.,* 2005).

The analysis began with the researcher producing a list of codes that signified themes that emerged from the textual data. Each code, to the researcher, is a marker related to a segment of text to index it and relays to a specific theme in the data identified as crucial information by the researcher. According to Brooks *et al.,* (2015), the template analysis technique permits one to use some *a priori* themes at the beginning of the analysis. These themes are normally identified prior to the analysis via the literature review, common sense constructs, as well as the researcher's values, theoretical orientations, and personal experiences (Maxwell, 2008). These themes are always tentative and may be redefined or discarded if they do not prove useful for the analysis at hand. Some common codes categorised as *a priori* themes are revised or added as the analysis deepens. By adopting this technique, the researcher gains the flexibility of tailoring the technique to his own requirements (King, 2004).

As for the analysis in this study, all of the gathered data were organised and consolidated in line with the seven criteria identified for the RSM system, as suggested by the World Bank as *a priori* themes. Next, all of the interview inputs were transcribed and the initial coding list was developed through in-depth study of all the related data within the scope. The coding list helped to formulate a conditional template that was then applied to mark up the remaining transcripts. The coding stage was achieved by identifying and emphasising significant passages within the text that had been transcribed earlier; these were then labelled. The related codes were then grouped together to reinforce a similar group or category and were organised hierarchically into three different levels. In accordance with King (2004), hierarchical coding permits analysis of transcribed texts at different levels of specificity, which appears to be the main criteria of template analysis whereby groups of related codes are grouped together to generate more general higher-order codes.

After the final analysis, the codes were considered at three different levels: Level 1, which is the highest or macro level, is comprised of a set of seven functions as *a priori* themes, as shown in Figure 5.1. Level 2 consists of the key components of the above criteria, while Level 3 offers more details about the components contained in Level 2. The related codes were then grouped together in order to reinforce similar groups or categories and are organised hierarchically into each level. After that, the analysis was based on a final template that displays the list of codes, their level, and the manner in which the codes are linked, as shown in Figure 5.1.

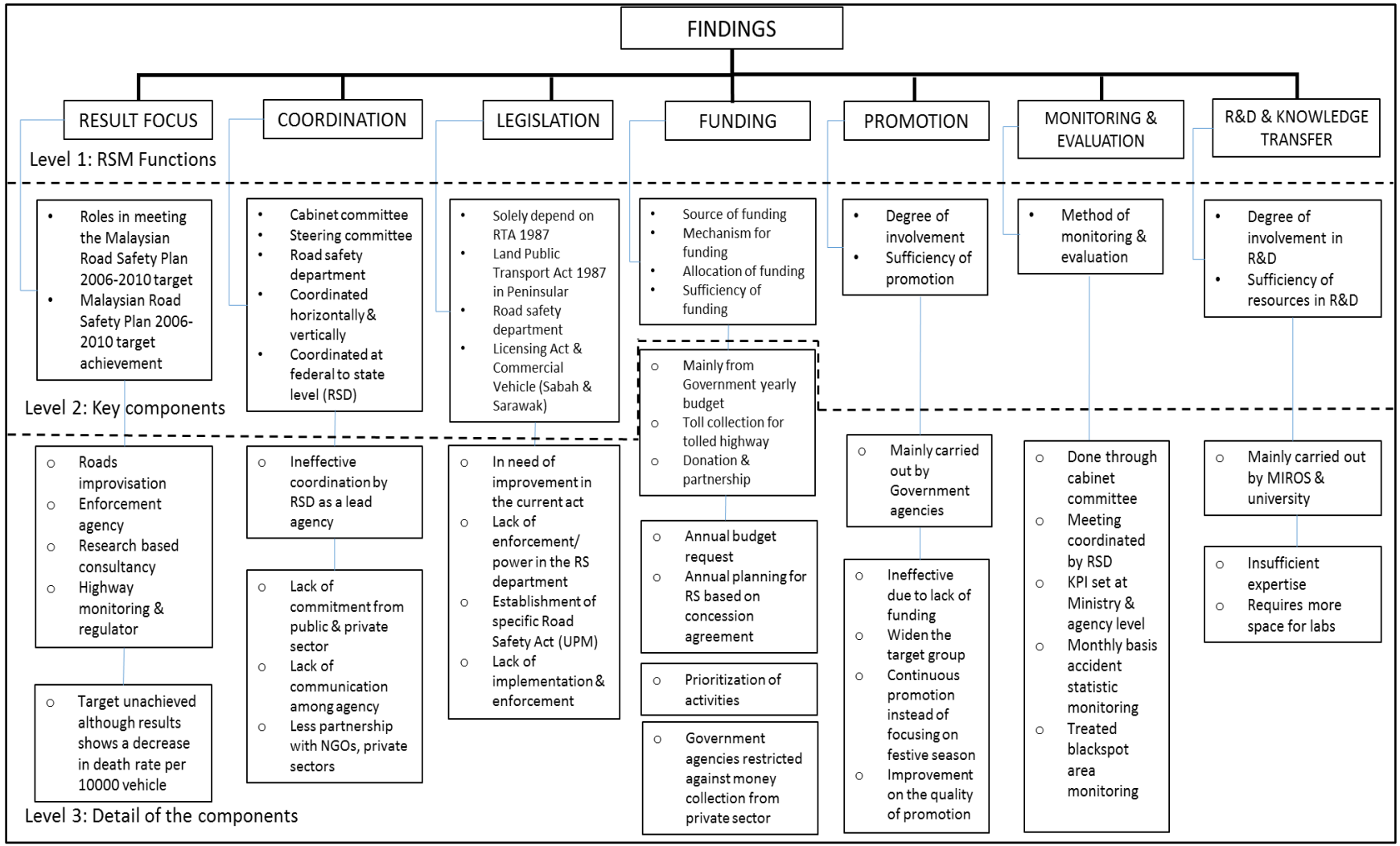

Figure 5.1: Themes identified during analysis

5.4 Findings

This section presents the analysed findings retrieved from the interviews and are discussed based on seven functions as *a priori* themes.

5.4.1 Results focus

The interviews confirmed that several practices in Malaysia do focus on enhancing road safety. Since the early 1990s, Malaysia has taken pro-active measures to generate better road safety conditions and results. A Cabinet Committee on Road Safety, chaired by the Prime Minister, has been formulated as the highest level of strategic review to monitor and ensure that road traffic injuries and fatalities in Malaysia are reduced. For the first time, a target to reduce road fatalities by 30% by 2000 was set up by the committee. At the same time, the National Road Safety Plan was established in 1991 with the goal of improving the road safety approach in Malaysia, particularly on RSM, road safety research, road and vehicle engineering, as well as emergency response (Radin, 1998).

This utmost priority led to the first comprehensive five-year RSPM 2006-2010, which outlined 9 strategies and 52 programmes to achieve its fixed target. With regard to the evaluation of the present implementations, the research showed that all of the interviewees agreed that RSPM 2006-2010 did not completely achieve its road safety target but exhibited some improvements, as discussed in Chapter 4.

Since 2009, Malaysia has adopted the Zero Fatality Vision, which is based on Sweden's Vision Zero approach. Through this far-reaching road safety vision, all aspects of road safety, such as driver, vehicle, road, and environment, are assessed to ensure that the goal of zero fatalities and

injuries can be achieved. From the interview, it is confirmed that the policy for road safety in Malaysia was developed by the MOT through its agencies, such as RSD and MIROS. The RSD, since being set up in 2004, has played a vital role as the lead agency in road safety, including devising road safety plans.

During this interview session, the MOT had just launched its long overdue RSPM 2011-2020 on 2 of December 2014, which has been designed to:

- increase efforts to reduce the number of deaths due to road accidents in Malaysia;
- support the recommendations of the UN in the success of the Action For a Decade of Road Safety; and
- gain political support and adequate resources for road safety initiatives.

Based on the RSPM 2014-2020, five main strategic pillars have been erected to achieve the targets set through the implementation of comprehensive strategies (see Figure 5.2). These five strategic pillars are then translated into six Final Results and ten Interim Results. Measures taken to draft and implement this plan have been based on the Decade of Action recommended by the UN that emphasises the need for a road safety program-oriented result.

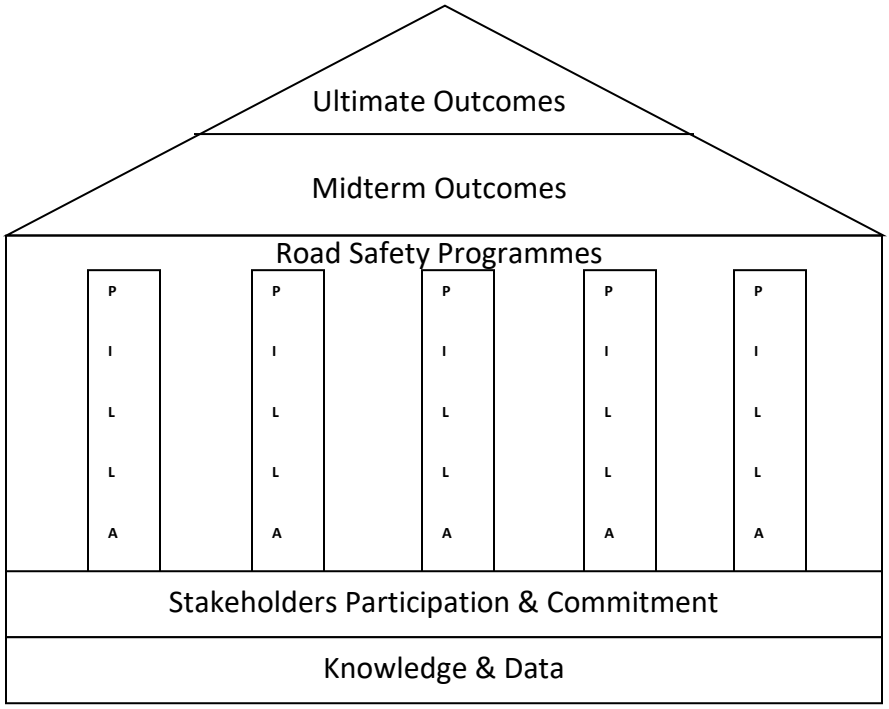

Figure 5.2: Framework for RSPM 2014-2020 (RSD, 2014)

In 2011, a fatalities prediction model based on an autoregressive integrated moving average (ARIMA) model was developed by MIROS to estimate the number of fatalities in Malaysia for 2020 (Sarani *et al.*, 2013a). This RSPM 2014-2020 set a quantitative target based on that research by assuming a business as a common situation without any intervention or additional programme. Underlying strategies embedded within the RSPM 2014-2020 are targeted to reduce road accident fatalities by 50% by 2020, as presented earlier in Table 4.3 of Chapter 4.

Based on the interviews carried out, significant partnerships required within the internal and external government with the purpose of a broader and longer-term road safety vision were identified. Key learnings and results based on the previous Road Safety Plan 2006-2010 were also taken into consideration to identify the key components of achievable medium-term targets. The RSD personnel confirmed that they were in the process of establishing a steering committee for

each strategy set within the RSPM 2014-2020. The key stakeholders have agreed to support the plans and strategies underlined in the plan and draft related to road safety programmes with each having its own allocation for the implementation. Although RSD serves as the main coordinator for the RSPM 2014-2020, each stakeholder is responsible for their own road safety programmes and ongoing meetings are held to discuss the effectiveness of each programme.

The Prime Minister, Dato' Sri Najib Tun Razak, through his slogan '1Malaysia, People First, Performance Now', introduced the National Key Results Area (NKRA). Each ministry is required to produce a set of KPIs to support their achievement of NKRA. These KPIs are assessed a few stages each year by a higher-level agency called the Performance Management & Delivery Unit (PEMANDU), which is established within the Prime Minister's Department and reports directly to them, as shown in Figure 5.3 (Sabel & Jordan, 2015). The interviews revealed that road safety has been fixed as a priority element of the NKRA under the MOT. This means that the Minister of Transport is assessed twice a year by the Prime Minister based on the KPIs that have been agreed pertaining to road safety.

Frequency	Action	Format
Annually	Annual report	Report published; televised address by PM
Once- to twice per year	"Putrajaya Inquisition"	Meeting chaired by PM to clear any issues not solved in lower meetings
Semi-annually	PM's performance review	Closed-door meeting: only PM, Minister, and PEMANDU CEO
Monthly to quarterly	Steering committee meeting	(Co-)Chaired by Ministers, with senior officials from all agencies: principal decision making forum
Weekly to fortnightly	Meeting of technical working group	Problem solving with relevant managers: principal working session
Weekly	Progress report	Emailed, uploaded, and available on iPads

Figure 5.3: Monitoring processes of KPIs by PEMANDU

5.4.2 Coordination

As for the implementation approaches with regard to coordination, the interviews conducted revealed that road safety in Malaysia is generally coordinated by three main media: (a) Cabinet Committee, (b) Steering Committee, and (c) RSD, as discussed in Chapter 4.

At the highest level of decision-making, the Cabinet Committee on Road Safety, which was initiated in 1990, consists of ministers from 13 ministries associated with road safety. Its main establishment is for any road safety-related decisions or policy-making and this function still remains in practice with RSD serving as the secretariat of the meeting between the cabinet committees held twice a year. One level lower, the National Steering Committee overlooks and coordinates the execution of decisions made by the Cabinet Committee.

At both the federal and state levels, the RSC, which was initiated in 1950 with the Prime Minister as patron, functions to promote road safety on the ground among the public, along with Members of Parliament and State Legislative Members. From the interviews, it was learned that until the present time, the legislative members have been actively involved in promoting road safety through RSC. Furthermore, the RSC Constitution (Item 5C) stated that the chairman of each state's RSC must be appointed from any state legislative members or any respective persons nominated by the state government. However, since the RSC was an NGO that looked into the best practice of RSM, the government decided to establish RSD as a department under the MOT. Its main function is as the lead agency that promotes road safety and increases public awareness of the significance of road safety to reduce deaths and road accident injuries. Before its establishment, its role was played by the MOT, but with less effectiveness as the MOT has to oversee other modes of transportation also, such as maritime, railway, and air (see Figure 5.4).

Figure 5.4: Organisational structure of the MOT (Ministry of Transport, Malaysia)

Since Malaysia is a federal country, the RSD has a branch in each state. The establishment and functions of RSD are coordinated horizontally, as well as vertically, between all the stakeholders at both federal and state levels. This can be clearly seen from the formation of 14 departments in each state under the RSD. The RSD branch acts as a focal point on road safety in Malaysia within the ministry or with other related organisations, such as those conducting programmes related to road safety education. This shows that well-structured coordination is in place to implement road safety policies and programmes.

Nevertheless, with regard to the evaluation of the coordination practice, it was found that there may be a lack of commitment by organisations, although there is coordination arrangement of road safety by the RSD. These issues may arise due to several factors, especially as it involves other organisations with varied levels of commitment. This finding seems to be in agreement with that asserted by Johnston (2010) that road safety itself is institutionally complex as it is comprised of engagements from various organisations, which in turn, influence its development. Hull (2005) also stressed that any policy in road and transport management cannot succeed without effective coordination among the stakeholders that derive from various organisations. Therefore, it seems that in Malaysia, although coordination of road safety by the RSD exists, the desired outcomes could not be achieved without adequate commitment from all the stakeholders.

During the interviews, the officials revealed that lack of coordination by RSD as the lead agency is mainly due to overlapping functions with other related agencies that may appear to share similar functions. To some extent, one of the officials suggested that better coordination can be attained by having RSD and MIROS as a division under the MOT instead of separate departments. This finding contradicts the best practices and the purpose of establishing the RSD as the lead agency to champion road safety in Malaysia. For example, although the task of gathering accidents data

is mainly the responsibility of the RMP, under-reporting is still an issue in Malaysia. This issue has been acknowledged as a global issue and may be one of the many reasons why road safety is still a major and complex problem across the globe (Derriks & Mak, 2007). This finding is further supported by the WHO (2015), which stated that one of the main factors that cause road safety problems in LMIC is a lack of coordination among the organisations concerned.

The interview also revealed that less partnership with NGOs and private sectors may lead to a lack of resources that can be used to fund road safety programmes. At the moment, only a few private sectors have formed partnerships with the RSD in promoting road safety in Malaysia, such as AAM, Petronas, Shell, Plus, Proton, Allianz Insurance, and Toyota.

One of the reasons identified as to why the RSPM 2006-2010 had failed, as mentioned during the interview carried out, was a lack of communication among the related agencies. This opinion was shared based on the findings obtained from The Independent Advisory Panel to The Minister of Transport Malaysia Report on Genting Highlands Bus Crash (MOT, 2014), which spelled out that lack of communication among various government agencies was a problem revealed as part of the cause for the occurrence of the accident. The report continues to suggest that every responsible stakeholder facilitated clear communication with each other to ensure such an incident would not recur. Thus, with better and improved coordination between RSD and other key stakeholders, it is envisaged that results that are sought may eventually be obtained efficiently.

5.4.3 Legislation

Based on analysis of the interviews, it was found that in Malaysia, only four agencies exist with enforcement powers – RMP, RTD, the Land Public Transport Commission (LPTC), and the Commercial Vehicle Licensing Board (CVLB). The main legislation that has been in use since

1987 is the Road and Transport Act 1987 (Act 333). This Act governs every activity related to the roads in Malaysia, alongside the Commercial Vehicles Licensing Board Act 1987 (Act 334) (for East Malaysia), and the Land Public Transport Act 2010 (Act 714) (for West Malaysia), which are legislations meant for commercial vehicles and public transport, respectively. Most of the road safety regulations are embedded under these three major Acts. Act 333 has 44 rules related to vehicle construction and use, traffic regulations and offences, as well as the wearing of helmets and seatbelts (ADB, 2005). The interview findings suggested that the legislative framework seemed sufficient to enact road safety but stressed the need to review the Act from time to time to suit its current situation and needs or, where deemed necessary, to reflect the demands and needs of other stakeholders.

The finding also revealed that the present road safety legislations are reviewed and updated from time to time. The interviewee revealed that during RSPM 2006-2010, all of the legislation stipulated under Act 333 was reviewed and amended to strengthen the Act, as well as to accommodate present needs and road safety strategies – for instance the amendment of four (4) sections of the act (Section 41, 42, 45, and 46). Although the road safety legislations are sufficient, there is a problem with ineffective implementation of enforcement. There is evidence to suggest that enforcement will only be effective when there is a strategy for its implementation. In agreement with past studies, (see Chaudhury *et al.*, 2004; Jamilah *et al.*, 2012; Yusof, 2013; Sarani *et al.*, 2013b; Rabihah *et al.*, 2013), most of the officials interviewed strongly criticised that enforcement of road safety must be enhanced and strictly implemented without favours to anyone to mitigate the situation since it has been proven that only strict enforcement can increase compliance and promote safer behaviours (Stanojević *et al.*, 2013). It was also revealed that the enforcement departments, such as the RMP and RTD, sometimes face difficulties performing their

jobs that do not only interrupt but at times demoralise them. This finding is in agreement with the Global Status Report on Road Safety 2013 (WHO, 2013), which assessed the Malaysian enforcement levels for speeding, drink-driving, helmets, seat-belts, and child restraints as moderate. Thus, there is a need to apply more stringent enforcement on road safety. Based on prior established studies, it has been proven that effective enforcement can enhance the performance of road safety. For example, Delaney et al. (2006) proved that enforcement on drink-driving can reduce road accidents due to impaired driving, whereas Tay (2009; 2010) found a positive impact on road safety performance when speed enforcement was implemented.

The interviews highlighted that the issue of corruption among enforcement officers is also a concern, as emphasised by the CGRS, as a fundamental issue that hinders the improvement of road safety in LMIC (McMahon & Ward, 2007). This finding implies a pressing need to apply more stringent and adequate enforcement on the ground to ensure that road safety regulations are adhered to by road users to successfully generate road safety interventions (Ross *et al.*, 1991).

The interviews also exposed that although the RSD is the leading agency overlooking road safety-related issues in Malaysia, they do not have any authority when it comes to enforcement. This lack of power seems to be a drawback of RSD and it is mentioned that it would be a good measure to grant them the authority to take out traffic offenders, alongside the RTD and the RMP. As such, the road safety enforcement system in Malaysia will appear stronger. Hence, this should be considered from the higher level. This research suggests that one of the methods to achieve this is to include the enforcement power by RSD in the Road Safety Act.

In addition, the ADB-ASEAN Regional Road Safety Programme Report (ADB, 2005) stated that the Malaysian juridical system was ineffective in prosecuting offenders due to excessive pending cases of traffic offenses. The report recommended that the government should consider introducing

traffic courts or tribunals to speed up clearing traffic cases and the entire backlog. Accordingly, the interviews found that in 2005, an all-encompassing Road Safety Act was proposed to the Cabinet Committee. Another option suggested was to set up a court specifically for road safety offences and cases. Unfortunately, those suggestions have yet to be materialised, but seem to be highly recommended as they could in turn give beneficial outcomes for the entire road safety system in Malaysia.

5.4.4 Funding and resource allocation

The interviews carried out revealed that the road safety programmes or activities in Malaysia are mainly funded from the federal government budget on an annual basis. All revenues and proceeds from the federal government are channelled to the federal fund called *'Kumpulan Wang Disatukan Persekutuan*' (Federal Consolidated Fund), according to Article 97(1) of the Constitution of Malaysia:

> *'All revenues and moneys howsoever raised or received by the Federation shall, subject to the provisions of this Constitution and of federal law, be paid into and form one fund, to be known as the 'Kumpulan Wang Disatukan Persekutuan (Federal Consolidated Fund)'.*

Even though funding may be available, there is a strict mechanism and procedure to adhere to before it is allocated to each organisation concerned. Generally, the mechanism of obtaining funding starts with organisations submitting their annual budget proposals to their respective ministries, which will then be brought to the cabinet for approval. This annual budget proposal will then be tabled at parliament for further consideration and discussion. Upon obtaining approval from parliament, it will be channelled to each ministry, which will later disseminate the budget to the organisations, such as RSD, MIROS, RTD, and RMP, as requested and approved earlier. This

implies that Malaysian road safety activities are entirely dependent on the government budget. The interviews, however, revealed that the budget may be insufficient and unsustainable since the government budget for fast-growing economic sectors with high cost consumes, such as roads, shrinks yearly due to competition with other strategic sectors in the government (Heggie, 1999; Elvik, 2008).

An interesting finding acknowledged from the interviews was that only one official had a view that the funding allocated by the federal government for road safety is sufficient, while the rest unanimously agreed otherwise. In addition, most of the interviewees stated that there may be many programmes, plans, and activities drafted for road safety but only a handful materialise due to budget constraints. Some organisations face difficulties allocating the approved fund as they not only cater for the safety of road transport but also of maritime and air transport. This leads to a smaller share for road safety. This issue has previously been raised at the annual general meeting of the RSC, which was attended by representatives from the MOF. It is important for the government to provide sufficient and sustainable funding for road safety programmes and activities to ensure that they get the best outcomes from them. This is in line with the study carried out by Elvik (2008), who asserted that effective RSM can only be realised if it is supported by sufficient and sustainable funding.

Advocacy and promotion are the backbone of road safety-related activities; organising efficient campaigns is therefore crucial in determining their success. Nonetheless, this also means that more budgets have to be set aside to achieve this objective as advocacy is costly. One of the best ways to penetrate all generations and audiences is through the mainstream media, particularly at prime time, which happens to be the most expensive. This is why most agencies with advocacy as their KPI express concerns about the funding allocated for road safety, which has seen substantial cuts

in recent years while costs have increased. Besides, a correlation between the amount of investment in road safety and its positive impact has been proven (Bishai *et al.,* 2003) and it was evidenced that many nations have failed to ensure that road safety plans are delivered accordingly due to budget cuts stemming from funding shortages (Downing, 2004). Similarly, it is normal in LMIC for governments to ascribe less value to road safety than HIC (Batool *et al.,* 2011). It was also found that the funding allocated to road safety is disproportionate to the increasing number of registered vehicles and drivers in Malaysia over the past decade.

The interviews also disclosed that it is a unique case for MHA and all the concession companies under its monitoring, which highlighted that funding for activities related to road safety at all tolled highways come from the income generated from toll revenues. This obligation is stated clearly in their concession agreement (CA) with the government as part of their responsibility as a concession company that manages the highways. The funding sourced from concessionaires is obtained from annual planning for road safety based on the CA.

Despite the fact that MIROS, which is categorised as a statutory government body, is allowed to generate income from commercial and business sources, such as research and consultation work, the interviews revealed that to date, MIROS still completely depends on its annual grant and budget from the government. At the same time, private participations and contributions are also considered at a low level in road safety in Malaysia in comparison to certain developed nations, such as in the UK and the Netherlands. From this finding, it is evidenced that Malaysian road safety activities are entirely dependent on the government budget. This is insufficient and unsustainable as government budget for fast-growing economic sectors with high cost consumes, such as roads, appears to decrease yearly due to competition with other strategic sectors in the government (Heggie, 1999).

The interviews confirmed that funding and resource allocation are the main challenges faced by most departments and agencies related to road safety. It has been highlighted that the present budget approved for the RSD as the lead agency fails to meet the department's funding requirements. This may affect the level of effectiveness and efficiency of its road safety campaigns and activities. Evidently, government agencies are not allowed to collect any form of monetary payments or contributions from the private sector and so are dependent on government funding. This research highlights the fact that Malaysian road safety faces a similar issue to other countries, particularly LMIC, in terms of providing sufficient and sustainable funding and resource allocation. It is envisaged that the effectiveness and efficiency of the RSM system in Malaysia may be sustainably improved if other sources of income can replenish the present dependency on government funding.

5.4.5 Promotion

Based on analysis from the interviews, road safety promotion in Malaysia is mainly effected at both the federal and state levels through media campaigns, advertisements, and education syllabi in schools, based on the strategies formulated in the RSPM and Zero Fatality vision. The interviews found that promotion is supported at the highest level by the Cabinet Committee on Road Safety. They also claimed that most organisations responsible for road safety are involved in its promotion, with RSD being the lead advocate. The degree of involvement of each organisation, however, differs with some conducting it on their own or in collaboration with RSD.

At the federal level, all government agencies, such as RSD, RMP, and RTD, organise, from time to time, road safety campaigns. However, there are mainly two promotions carried out in Malaysia, both during the biggest festive seasons in the country: the '*Aidilfitri'* and Chinese New Year

celebrations. At this time, all road safety-related agencies are involved in a centrally-coordinated operation called *'Op Selamat'*. This operation, led by the RMP as the main enforcement agency in Malaysia, takes place for two weeks to ensure that road users adhere to the rules accordingly. Road safety campaigns are linked to enforcement with good effects depending on the level of enforcement associated with the target behaviour (Delaney *et al.,* 2004). Therefore, according to the IRTAD 2015 report, the RMP announced that these integrated campaigns and enforcement approaches have successfully achieved their primary objective and target of reducing fatalities despite the increased traffic volume on the roads during those particular periods (IRTAD, 2015).

The RSD conducts road safety campaigns on a continuous basis. These campaigns focus on speeding as well as the wearing of seatbelts and helmets, as these are the main causes of road fatalities in Malaysia (Radin, 2006). The RSD also encourages public participation in road safety via *'Community Based Program (CBP)'*, which involves community and religious leaders, educationists, professional bodies, and politicians (RSD, 2006). A previous study conducted in Putrajaya by Yusof *et al.* (2013) showed that the CBP could potentially serve as a 'vaccine', especially among the most affected group – for instance, young Malaysians – in preventing road accidents. As partnerships between the government and the private sector also help in increasing the outcomes of road safety promotion, the RSD has begun forming partnerships with several private companies. In fact, RSD has signed a renewal of its Memorandum of Understanding (MoU) with Allianz Insurance to promote road safety among motorists. In addition, road safety promotions have to be carried out continuously to enable sustained communication and effectiveness towards the target audience. Also, there is a need to avoid advocacy on an ad hoc basis as well as short-term promotions.

One important step in developing a campaign is to identify the target group and gather key information about them to ensure more specific and appropriate targeting (Delaney *et al.,* 2004). All of the interviewees agreed that road safety promotions need to be done continuously to. There is a need to avoid ad hoc advocacy and promotions being performed at specific times. At the same time, the interviewees stressed that the quality of the advocacy produced should also improve to be catchy and fresh. It is also evident from the interviews that there are still a lot of improvements that can be done in order to garner public attention. One of the best ways to tackle this is by switching to advertisements and campaigns via social media, such as Facebook and Instagram, which may be able to reach more young people, as evident in many developed countries. Unfortunately, due to funding and resource constraints, many campaigns cannot be carried out more widely and therefore appear to be inefficient. The interviews revealed that due to restrictions on overall government spending, the annual campaign budget allocated to RSD was drastically cut in 2015 to only MYR 2 million from MYR 8 million in 2014.

It is also evident from the analysis that road safety promotions in Malaysia not only need to target motorists but also students from primary school age. This is because that RSD believes that road safety education can lead to desired changes in behaviour, new skills, and different attitudes among drivers. Road users that are accident-prone, such as motorcyclists and pedestrians, should be given adequate road safety education through educational programmes designed specifically for them starting from school age. Hence, the Road Safety Education Programme (RSEP) was approved at a meeting of the Cabinet Committee on Road Safety Bill 1/ 2006 chaired by the Prime Minister on 15 May 2006 (RSD, 2014). This refers to a collaborative programme between MOT and MOE, in which the subject is taught in the native Malay language class in schools. This aims to foster understanding among children and their parents about the dangers while on the road, as well as

good practices for pedestrian and road users. RSEP has been introduced to 7,655 schools throughout Malaysia (RSD, 2014).

At the same time, RMP and RTD have their own road safety programmes that involve engagement with school students. Although, RTD needs to look into its enforcement strategy and enhance its public acceptance. Since 2014, RTD has recruited over 50,000 youngsters to become part of '1RTD Young Squad'. These youngsters are trained to become ambassadors to promote road safety to others their age. This strategy is also aligned with RSPM 2014-2020, which encourages government agencies to engage and get more participation from the public at large in order to create awareness (RSD, 2006).

5.4.6 Monitoring and evaluation

The analysis showed that accident statistics are monitored on a monthly basis by the RSD. In addition, the RSD coordinates the monitoring and evaluation of other road safety information by other organisations. The information gathered facilitates computation of KPIs. KPI setting is decided by the Cabinet Committee and it is aimed to provide consistent safety performance data at both the international and national levels. In order to strengthen the monitoring and evaluation processes at the national level based on RSPM 2014-2020, all stakeholders are responsible for the implementation of their own plans and strategies, although the RSD remains the main coordinator for implementation of RSPM 2014-2020 (RSD, 2014). All stakeholders agree to support plans and strategies outlined and to develop and implement road safety programmes. These programmes are designed in accordance with schedules and at an appropriate level. This means that each stakeholder is held responsible for the success of the road safety agenda under their respective fields.

Continuous discussion between stakeholders is hoped to ensure effective implementation of the RSPM 2014-2020. RSD, as the lead and main coordinating agency, coordinates the overall implementation of the plan. Some programmes are monitored in detail based on KPIs through periodic assessment, research, and follow-up actions. The effective implementation of this plan demands support and commitment from all stakeholders. The achievement of RSPM 2014-2020 has been monitored by the Cabinet Committee, which also convenes periodically.

McLoughlin and Evdorides (2014) asserted that weakness in policy implementation always results from a lack of awareness of systems monitoring and evaluation. Therefore, monitoring and evaluation of road safety are vital to ensure that policies are implemented successfully and achieve their targeted results. The processes of setting and monitoring road safety targets, especially at the national level, require systematic gathering of traffic and accident data in order to analyse current performance (Wegman, 2016a). Without good data, analysis could not be performed and therefore efforts to convince policy makers and politicians would be difficult (Wegman, 2016b).

It is evidenced from the interviews that previously there was a mechanism to monitor road safety performance based on the 'Safe System' approach developed by MIROS. Based on Table 5.2, 15 identified road safety KPI areas were monitored and evaluated annually by MIROS and the results of this monitoring were presented to the Cabinet Committee, which would discuss and decide on further directions (Sadullah, 2009). The KPI is calculated based on the percentage of the target achieved or completed of the total target during planning. Effective monitoring and evaluation carried out by the RSD increased the KPI percentage from an average of 37.4% (2004) to 57.2% (2007). Indeed, the main objective from the KPI evaluation was to reduce the rates of road accidents and deaths.

Table 5.2: Road safety KPIs

SECTORS OF ROAD SAFETY KPIs (%)		Year			
		2004	**2005**	**2006**	**2007**
1	Coordination and Management of Road Safety	31.6	55.0	60.6	47.9
2	Road Accident Data System	61.7	53.0	65.0	60.7
3	Road Safety Funding	30.6	49.0	39.5	27.6
4	Safe Planning and Design of Roads	28.6	41.0	46.1	59.1
5	Improvement of Hazardous Locations	42.6	24.0	30.6	38.3
6	Road Safety Education	3.5	39.0	60.1	63.3
7	Driver Training and Testing	39.7	38.0	49.4	39.8
8	Road Safety Campaign	46.1	53.0	82.9	97.6
9	Vehicle Safety Standards	49.5	53.0	50.5	56.1
10	Traffic Legislation	39.4	41.0	58.6	59.2
11	Traffic Police and Law Enforcement	50.0	36.0	44.3	41.3
12	Emergency Assistance to Road Accidents Victims	46.6	44.0	62.2	62.9
13	Road Safety Research	56.5	65.0	80.2	84.6
14	Road Accident Costing	10.0	19.0	33.0	42.1
15	Partnership	25.3	48.0	44.9	59.3
	Average	**37.4**	**43.9**	**53.9**	**57.2**

Source: MIROS, 2014

In addition, the interviews revealed that this mechanism has been replaced by monitoring the final outcome of three road safety indices, as stated in RSPM 2006-2010 and continued in RSPM 2014-2020, in which RSPM 2006-2010 was a failure.

Table 5.3 displays road death data from 2004 until 2007. It shows that increments in KPI percentages, as indicated in Table 5.2, correspond with decreases in the road death indices, as shown in Table 5.3. This underlines the importance of monitoring and evaluating targeted road safety plans to ensure that the main objectives are being achieved.

Table 5.3: Road Deaths 2004 - 2007

Road Deaths	2004	2005	2006	2007
Per 10,000 Registered Vehicles	4.52	4.18	3.98	3.74
Per 100,000 Population	24.30	23.70	23.60	23.10
Per Billion VKT	21.10	19.58	18.69	17.60

5.4.7 Research & Development and knowledge transfer

The interviews depicted that the R&D activities carried out by MIROS are based on the present direction and policies of the MOT to develop viable strategies and programmes. The establishment of MIROS by the government enables scientific research on road safety to be carried out to support decision-making processes and policies within the MOT and the government (Tran *et al.*, 2009). MIROS has the expertise and capacity to conduct multi-disciplinary research and knowledge transfer. To date, MIROS has produced hundreds of research publications and guidelines within the context of Malaysia. Other parties that perform similar research work are the Road Safety Road Centre (RSRC) in University Putra Malaysia, which was considered to be a leading road safety research centre in Malaysia prior to the establishment of MIROS. The results from these research-driven initiatives are useful for implementation of effective road safety programmes either at the federal, state or local authority levels (Radin, 2006).

Moreover, it was agreed at the Association of South East Asian Nation (ASEAN) Road Safety meeting in August 2014 to appoint MIROS as the ASEAN Regional Road Safety Research Centre. This accountability gives MIROS its position as a multi-disciplinary research and knowledge transfer institute not only in Malaysia but also within the ASEAN region (Jawi *et al.*, 2013). On a wider scale, the appointment of MIROS, which owns the one and only vehicle crash laboratory (PC3- Provisional CRASE Crash Centre) test in the ASEAN region, has led to the setting up of the New Car Assessment Programme for Southeast Asia (ASEAN NCAP), hence creating a new paradigm shift in the ASEAN automotive industry, in line with the UNs' Decade of Action for Road Safety 2011-2020, provided that it develops a sustainable operational plan (Zulhaidi *et al.*, 2013).

Based on the interviews, a link emerged between road safety policy-making and research, which proves that knowledge transfer is taking place as analysis and results of research conducted are used to determine national strategies. This is crucial to ensure that an effective plan of achievable levels of safety and interventions are first well-understood and studied by professionals – in this case the researchers – before they are implemented on the ground.

This analysis discovered a view that MIROS, as the main research institute, should be given more funding annually to generate more research work of an even better quality. Nonetheless, it appears that income generated by MIROS is irregular and insufficient and hence may jeopardise its success. The extent of the issue can be understood when looking at an earlier study, which found that the availability of funding from the government had been identified as a factor that could enable this process to occur (Tran *et al.*, 2009). Even though MIROS has been given the authority to undertake a commercialised approach to generate its own revenue from their research or consultation works, this has yet to be achieved due to some internal issues. This issue should be

addressed quickly since MIROS only receives a limited amount of annual grants from the government. Furthermore, the interviews discovered a rising need for more road safety expertise in Malaysia. One of the suggestions is to acquire more expertise from international partnership arrangements. In this regard, MIROS has signed several partnership agreements with well-established research institutes and organisations, such as the International Road Assessment Programme (iRAP), Global New Car Assessment Programme (Global NCAP), and the Institute of Road Safety Research, Netherlands (SWOV).

It has also been suggested that human resource management is vital for implementation of road safety policies at the institutional level, as well as for their continuity and sustainability, so that researchers and decision makers can be motivated and play prominent roles in the development of new knowledge and decision-making processes, respectively (Frenk, 1992).

5.5 Discussion and Recommendations

Generally, this research has carried out an in-depth qualitative study that explored the effectiveness and efficiency of RSM that necessitate further investigation. Overall, the research discovered that in recent years, the institutional arrangements of RSM in Malaysia seem to have been in line with the best practices suggested by the World Bank. The RSM at the institutional level in Malaysia is not significantly dissimilar to other road safety organisations in comparable countries, such as BRIC. Like Malaysia, the degree of effectiveness of each road safety organisation is unclear (Luoma & Sivak, 2012). However, unlike these countries other, Malaysia has established a lead agency for road safety, as discussed above. With regard to road safety plans, it appears that all countries require further improvements although Malaysia seems to have a more advanced

approach based on the 'Safe System' approach, which is similar to that in Sweden and Netherlands. This may improve the selection of appropriate interventions and lead to more effective reduction of road crashes, unlike the BRIC countries. Nevertheless, the problem of fragmentation of RSM at the institutional level appears to exist in Malaysia, similar to the four BRIC countries.

It is evident from the research that the key issue impeding the effectiveness and efficiency of RSM in Malaysia is insufficient and unsustainable funding. Road safety initiatives in Malaysia are found to be too dependent on government funding – reflecting the conventional mechanism for road-related activities that has been practised since colonial times. The gaps uncovered in the institutional arrangements, especially road safety funding in Malaysia, show that any subsequent form of effort underlined by the World Bank to create effective and efficient RSM is likely to be fragmented. Several initiatives, such as coordination, promotion, and R&D, are the most affected by this lack of funding. There is also evidence of limited partnership between NGOs and the private sector, which in turn may lead to limited funding being available for road safety.

At the same time, several departments and organisations are responsible for road safety with RSD the lead agency. Nonetheless, due to a lack of coordination and communication between them, overlapping and replication of functions seems to occur. It appears that the RSD should be given more legislative power to ensure that better coordination and communication are achieved between the organisations concerned. This is particularly significant as more concentrated efforts and commitments from every stakeholder are required, especially to ensure the success of the newly launched strategic plan. Enforcement organisations should also be empowered via legislation.

Another key finding revealed that the road safety legislative system in Malaysia only depends on the Road Transport Act 1987 as its main legislation, while the rest are scattered in various acts, such as the Commercial Vehicles Licensing Board Act 1987 (Act 334) (for East Malaysia) and the

Land Public Transport Act 2010 (Act 714) (for West Malaysia). Although several amendments have been made to these acts recently, the legislation framework still has loopholes that require improvement. An inadequate legislative framework not only causes difficulties for enforcement agencies but also departments like RSD in carrying out their responsibilities as the lead agency effectively and efficiently. This research also explored another barrier that influenced road safety issues among Malaysians, which is individuals' behaviour or attitude. This includes problems, such as aggressiveness while driving, lack of patience, and self-assessment among drivers. There is a plan in place for relevant promotions, advocacy, and campaigns to promote behavioural awareness for drivers. However, this is far from achievable due to the lack of funding and improper coordination. At the same time, the limited level of enforcement for road safety offenders in Malaysia has also contributed to the ongoing road safety problems in the country.

Malaysian road safety issues are similar to other LMIC. Government funding allocations through the annual budget are the main mechanism used to fund road safety in Malaysia, with minimal funding from donations and partnerships. In line with the previous literature, this research discovered the same three major issues that always seem to impede long-term sustainability of RSM in LMIC (Zietlow, 2007): (i) lack of awareness of road safety problems among the public, professionals, and policy makers; (ii) lack of institutional capacity and adequately trained and motivated staff; as well as (iii) insufficient funding for road safety measures.

It is evident that without sufficient and sustainable funding, efforts to improve road safety at the institutional level cannot succeed or be carried out effectively and efficiently. A new and innovative mechanism hence has to be implemented to help sustain funding for road safety in Malaysia. This suggestion is related to the idea of creating a road safety fund based on second-

generation road funds as one of the best mechanisms that should seriously be considered by the government to improve the effectiveness and efficiency of RSM in Malaysia.

This research discovered that the institutional arrangements of RSM in Malaysia in place are in line with the best practices outlined by the World Bank. Nonetheless, the efficiency and effectiveness of the RSM system in Malaysia may be sustainably enhanced by addressing the present dependence of funding on government sources, the fragmentation of the decision-making process of this *de facto* multi-disciplinary area, the road safety legislative framework, the public awareness, the local needs, and institutional capacity.

All in all, funding and resource allocation appear to be the main challenges for road safety in Malaysia, similar to other LMICs. Hence, it is envisaged that the effectiveness and efficiency of the RSM system in Malaysia may be sustainably improved if other sources of income can replenish the present dependency on government funding. New and innovative funding mechanisms, thus, are needed to facilitate the application of road safety policies in Malaysia or other similar countries. For example, the establishment of a dedicated road safety fund based on viable adapted concepts of cost recovery and commercialisation to country-specific conditions is recommended and should be seriously considered by governments to ensure the effectiveness and efficiency of the RSM in Malaysia and elsewhere.

CHAPTER 6: EXPLORING THE POTENTIAL OF ROAD SAFETY FUNDS IN MALAYSIA

6.1 Introduction

This chapter presents the preliminary investigation carried out to determine the major problem of RSM in Malaysia – funding. The investigation covered an evaluation of the present funding mechanism and its arrangement for road safety purposes. Second, the preliminary analysis identified the possibility of alternative appropriate funding mechanisms, particularly those of a road safety fund to assist in creating sufficient and sustainable funding for road safety purposes. Third, the preliminary analysis was conducted to identify viable prospects for a new funding arrangement to enhance road safety.

This preliminary analysis was completed based on the data collected during the interview sessions with fourteen representatives of key stakeholders in Malaysia. The interviewees included policy makers, private sector companies, and academics. The semi-structured interview questions (see Appendix A) were distributed one month beforehand via email. This protocol was to ensure the effectiveness of the interview sessions. Furthermore, this gave the interviewees ample time to read the questions and to prepare their best feedback based on their knowledge and experiences.

6.2 Funding mechanism

6.2.1 Present government funding mechanism

From the interviews, like many other countries, the researcher learned that the Malaysian fiscal budget is divided into two main groups: revenue and expenditure (Asmat *et al.*, 2011). The expenditure budget is further divided into two groups: operating and development expenditure. The revenue received for this budget derives from multiple sources that are collected and consolidated into an account called '*Kumpulan Wang Disatukan Persekutuan'* (Federal Consolidated Fund). According to Article 97(1) of the Constitution of Malaysia:

> *'All revenues and moneys howsoever raised or received by the Federation shall, subject to the provisions of this Constitution and of federal law, be paid into and from one fund, to be known as the 'Kumpulan Wang Disatukan (Federal Consolidated Fund)'*

In this fund, all government revenues are comprised: tax and non-tax revenues, as well as local and foreign loans, and revenues related to road and transportation, such as traffic fines and road tax, which are deposited before being used for the government fiscal budget, as approved by the parliament. For fiscal year 2015, the Malaysian government allocated a total of MYR 273.9 billion, MYR 223.4 billion of which was used for operating expenditure, while only MYR 50.5 billion was used for development expenditure (MOF, 2014). Since the estimated revenue for Malaysian government in fiscal year 2015 was approximately MYR 235.2 billion, the federal account for that particular year was in deficit by approximately MYR 38.7 billion. Such a budget deficit has been recorded as many as 43 times in the Malaysian economy since 1970 until 2014 and it increased substantially since 2005 (Amin, 2014). As suggested by Adolph Wagner, through his famous **'**Wagner's Law', also known as the 'law of increasing state spending', government expenditure

rises faster than income as demand increases, since he believes that the government is responsible for initiating a number of development initiatives, such as roads and schools (Kolluri *et al.*, 2000).

The present arrangement for road safety funding in Malaysia involves several sources to cover matters related to road safety (the four Es: engineering, enforcement, education, and emergency response). From the research, it is known that except for engineering, the other elements of road safety come under operating costs. Meanwhile, the decreasing trends of development expenditure are a worrying state since the engineering element of road safety, such as road development, road maintenance, and improvement projects, are funded through this. This concern has been highlighted by Hashim *et al.,* (2010) which emphasised that the Malaysian PWD is facing a real challenge in undertaking road maintenance since its allocation has decreased despite the length of road to be maintained increasing. Meanwhile, the other elements of road safety (education, enforcement, and emergency response) are funded via operating expenditure, which is channelled to the respective ministries and departments as approved by parliament. This situation can affect the budget allocation for road safety as the government slashes its expenditure to reduce the deficit and produce a healthy budget performance. In the latest development, due to lower government revenue, it was reported that the annual budget for the MOH, which had direct involvement with post-accident treatments, was slashed by between MYR 250 million and MYR 300 million in 2016 (MOH, 2016). This cost cutting was announced by the Prime Minister in the 2016 budget presentation and is surely to affect healthcare services, including post-accident treatments.

The main funding mechanism for road safety in Malaysia comes directly from the federal government fiscal budget. Every fiscal year (by end-March), it is compulsory for each ministry and department to submit their budget proposals based on their policy and needs for cabinet consideration. The established process flow, in order to receive this allocation, is practiced

amongst the ministries and departments, whereby budget proposals are submitted before they are approved at the cabinet level to be tabled in the parliament for approval (see Figure 6.1).

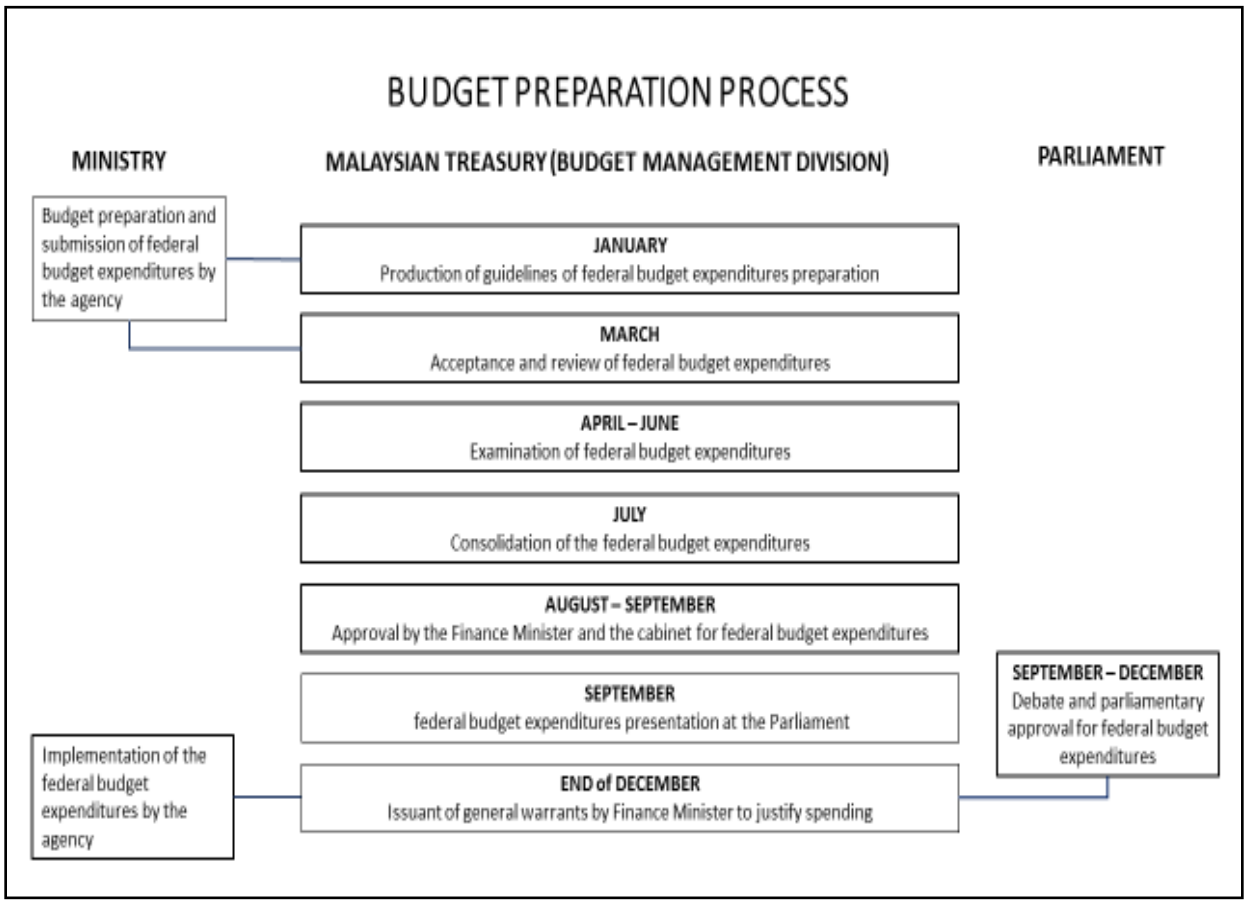

Figure 6.1: Budget preparation process (Source: MOF, 2014)

Through this mechanism, it is crucial to prioritise each proposal based on its importance and benefits, thus impeding several projects due to lack of funding. In Malaysia, as found in most LMIC (Aeron-Thomas *et al.*, 2002), no specific funding is allotted for road safety, except for the operating expenditure channelled to RSD and MIROS, which only covers campaigns, advocacy, and research.

This situation is due to an absence of a suitable mechanism, such as a specific road safety fund, to fund all road safety related activities in Malaysia. The interviews revealed that for 2015, the RSD

(through MOT) requested a budget of MYR 10 million for campaigns and advocacy, but was only granted MYR 2 million from the MOF. This was lower than the allocation for 2014 (MYR 8 million). Out of fourteen interview sessions conducted, only one official from the MOF stated a different view from the rest. Most of the officials revealed that many road safety activities cannot be implemented effectively due to this issue while some of them have to be cancelled or deferred. These findings prove that Malaysia – like other nations that depend on government funding mechanisms – has a problem funding road safety activities. This notion is supported by Heggie (1999; 2003), who concluded that fast-growing economic sectors with high cost consumption, such as roads and road safety, are deemed to be insufficient if they depend solely on government budgets. The interviews also outlined a drastic cut of 75% from the advocacy and campaign budget for RSD between 2014 and 2015. Insufficient funding that affects the effectiveness of RSM justifies why Malaysia desperately needs to implement an alternative funding mechanism.

6.2.2 The role of the private sector

This preliminary analysis also investigated the involvement of the private sector in road safety, particularly in terms of funding. The private sector's participation and role in enhancing road safety conditions have been acknowledged worldwide (Elsig, 2004). Aeron-Thomas *et al.* (2002) claimed that the private sector has contributed widely either through sponsorship or partnership, especially in a few major areas identified as road safety education and knowledge transfer, publicity and awareness campaigns, enforcement, and driver training. In certain parts of the world, this contribution includes new areas, such as road signs and pavement markings, to enhance road safety conditions.

Analysis from the interviews indicated that aside from government funding, the Malaysian road safety sector also received contributions from partnerships and donations from NGOs and the private sector. Nevertheless, the findings revealed that this mechanism is minimal in Malaysia due to several factors. First, fewer contributions are attained due to the limited participation and involvement of the private sector in activities and programmes related to road safety. This was a point mentioned in RSPM 2006-2010, which stressed the need to promote fund-sharing between the government and private sector (RSD, 2006). Second, each and every government department involved is restricted and bound by rules and regulations set by the government. Like many other nations, the public sector in Malaysia is not allowed to accept direct donations from the private sector as it may reflect bribery.

This research also revealed that the only way the private sector participates in road safety is through partnerships, whereby it is common for oil and gas companies, car manufacturers or highway concessionaires to jointly organise road safety campaigns or events, such as road safety awareness talks, along with government departments. Such efforts, even though good, are inadequate to create awareness among road users or to enhance the effectiveness of RSM in Malaysia. The private sector must also play their role in getting involved with road safety programmes. More advocacy could be carried out and more programmes on educating and creating awareness of safety behaviours could be held nationwide if and when adequate funding is generated. Such purposeful and effective implementation could greatly improve road safety in Malaysia. There were also suggestions of R&D collaboration between government departments, such as MIROS, and private companies, for example, car manufacturers, to utilising MIROS specialist research or as a consultant to generate income.

One interviewee suggested a method that may attract more participation from the private sector, which is by setting less stringent rules on contributions and to have a win-win situation where each contribution from the private sector leads to tax redemptions. This idea appears to be attractive in getting more private companies involved in road safety activities and to contribute in terms of funding. One official revealed that the government established a Road Safety Trust Account a few years back for this purpose, which was managed by the RSC as it is an NGO not bound to government rules and can therefore accept monetary contributions from the private sector. Unfortunately, the trust account was inactive due to the poor response and it received only a MYR 500 contribution from the private sector as no incentives were offered to encourage them to donate. Several officials, during the interviews, mentioned that the fund was terminated by the government as it was obsolete.

6.2.3 Introduction to Road Safety Fund

Road safety, which is part of the road sector, is a huge sector that cannot rely solely on the government budget, and a new mechanism is needed to support it (Heggie, 2003). It is evidenced, based on the interviews, that establishing a specific road safety fund is an agreeable suggestion to address the funding issues in Malaysia. By having its own fund, the government need not be the only major source of funding with regard to issues or activities related to road safety. Establishing a road safety fund would not only increase the allocation for road safety activities but also create better governance for the allocation of public revenue (Gwilliam & Kumar, 2003). Decision-making could also be achieved more quickly through an independent body with its own board of directors and top-level management. Nonetheless, some officials highlighted that several criteria or principles are required to establish such an independent body. First, this body must be

financially self-sustained by income generated through various methods: for example, direct user charges, collaboration, donations or research publications. Second, it must be independent and not attached to any government department and be transparent in all of its activities, campaigns, and programmes. A road safety board can be effective and efficient in managing road safety if there is a sound legal basis and financial management, strong oversight by a public-private board, revenue generated from direct user charges and regular technical and financial audits (Zietlow, 2007).

This fund may come from various sources, such as contributions, donations or even charges on road users, for example insurance, which can be channelled into one single fund. One official also suggested that such a fund could be obtained directly from road users through road tax, licence renewing fees, tolls, and fuel levies, whereby a fraction from these could be set aside for road safety. This generally creates transparency as to how the money paid by road users is utilised to benefit road users themselves. Nevertheless, it is crucial to ensure that this practice does not burden road users. Further studies into the consequences of implementing such a fund should be thoroughly investigated before rolling a similar model out to the public. For example, if a portion of income is to be set aside for road safety funding in the future, there must not be a drastic increase in licence renewal fees or road tax.

Based on the interviews, it can be summarised that in order to set up a specific fund dedicated to road safety, strong support and political will from the government is required. The majority of interviewees agreed that agencies and departments related to decision-making for road safety are heavily influenced politically in Malaysia. Therefore, without strong political backing, a dedicated road safety fund in Malaysia would be impossible.

The road user charges mechanism is not a new concept in Malaysia. Since 1988, the Malaysian government has successfully developed 31 toll highways through privatising its major road

networks. The concession companies were given rights to build and operate the highways with all the operation and maintenance costs, including aspects related to road safety during the concession period, funded through the tolls collected from highway users. It is proven that the commercialisation concept in managing roads on a 'fee-for-use' basis (Gwilliam & Shalizi, 1999) has been practised in Malaysia since then. The government seems to recognise this as one of the best mechanisms to support insufficient and unsustainable funding for road development in the country. Therefore, interviews with officials from MHA and a highway concession company revealed that sufficient and sustainable funding does exist for road safety activities. This proves two important aspects for the idea of road safety fund: first, there will be sufficient and sustainable funding for road safety through toll revenue. Second, since toll collection is not a new concept to road users in Malaysia and has been widely accepted, this 'fee-for-use' basis for RSM should be easily implemented with support from the public. However, it is vital to highlight that besides toll collection, other sources from direct road users, such as levies, fuel tax, license fees, and insurance premiums, have never been used directly for road safety as they are bound to the Federal Consolidated Fund.

6.3 Funding arrangement

6.3.1 Role of Road Safety Board

Based on the preliminary analysis, road safety in Malaysia could be improved through efficient and sustainable funding. Hence, it is vital to understand the way forward for funding arrangements and to acknowledge the views of key stakeholders in this matter. It is important to highlight that all of the officials interviewed agreed with the idea of having a separate independent road safety

board to manage road safety in the country and envisaged that this step will enhance the effectiveness and efficiency of road safety in Malaysia. In their opinion, the present arrangement for road safety in Malaysia features overlaps between departments. One official also revealed the difficulty they face accessing data to conduct research because all data are controlled by one party and it is not easy to attain. This reflects the argument regarding the fatalities targeted by 2020, as announced by MIROS, which was disagreed by the RMP, as it was claimed to be misleading and confusing to the public. From the interviews, it is believed that this situation can be overcome through the establishment of a road safety board that is responsible for managing all road safety related issues including collecting and disseminating all key information and data to the public at large.

The majority of the interviewees agreed on having a separate independent road safety board with its own management and funding to manage road safety-related activities. This approach is seen as one of the best ways to improve the present effectiveness and efficiency of the Malaysian RSM system. As briefly described by one of the officials, by having an independent body, all processes can move at a faster pace compared to being solely dependent on the government, which is bound by its own policies and procedures. Decision-making can also be achieved at a quicker rate as an independent body has its own board of directors and top-level management. However, the officials highlighted that several criteria or principles are required when establishing such an independent body. First, the body must be financially self-sustained by an income generated through various methods, for instance, direct user charges, collaboration, donations or research publication. Second, it must be independent and not attached to any government department, and be transparent in all of its activities, campaigns, and programmes. The road safety board can be effective and efficient in managing road safety if there is a sound legal basis and financial management, strong

oversight by a public-private board, revenue generated from direct user charges, as well as regular technical and financial audits (Zietlow, 2007).

It is interesting to highlight a few years ago there was a suggestion to set up a fund similar to a road safety fund in Malaysia. This fund was suggested to generate revenue via donations and contributions from third parties, including insurance companies. However, the idea did not materialise due to the unavailability of a proper body or a mechanism to manage the fund independently and transparently. This issue proves that a properly set up board with independent and transparent management is crucial for a separate road safety fund (Heggie, 1999). This not only creates confidence among road users but also increases the effectiveness and efficiency of the fund management.

6.3.2 Transformation of Road Safety Council (RSC)

Some officials suggested that it would be easier to change the present status of RSC into an independent body that can act as a road safety board. RSC is an NGO that involves representatives from many sectors, such as politicians, government, private, NGOs, and the public. Therefore, if its status were to change, RSC would be structurally suitable to become the new road safety board due to its existing functions and responsibilities. One official also suggested merging RSD and MIROS into one body to oversee issues related to road safety in Malaysia. Such a merger could result in the formation of a body that is specialised in road safety issues, including policy-making and research. This idea needs to be studied from other angles, such as jurisdiction and constitution, to ensure if it is viable.

6.3.3 Formation of a National Transport Safety Board

Based on the interviews, one official mentioned that the idea of having a separate independent body specifically for road safety has already been brought up by an independent advisory panel, Genting Bus Crash Investigation Committee. This was done after the tragic road crash that occurred in Genting Highlands, Malaysia. This panel suggested establishing a National Transport Safety Board (NTSB) to manage matters related to road safety. It was also revealed that RSD is in the middle of setting up the abovementioned board and basing it on the Australian Transport Safety Board (ATSB). Later, after the interview (on 19 January 2015), a local newspaper reported:

> "*The Ministry of Transport will set up a National Transportation Safety Board to monitor aspects related to roads, rail, aviation and maritime safety. It is understood that the board will assume the role of an adviser and will investigate, analyse and report directly to the government any suggestions and improvements on issue related to transport safety, in addition to increase public awareness on similar matters"* (The Malay Mail, 2015).

It is evidenced from the report that NTSB is not a board that will act purely as a road safety board. Its function is very wide and it will cover roads, rail, aviation, and maritime safety, and only act as an advisor or independent investigator when accidents occur. This does not create a focused function, which would be expected of a Road Safety Board.

6.4 Discussion

It is evident from the analysis that although RSD exists as a lead agency, its role and responsibilities are limited to conducting advocacy programmes and road safety education among

the public at large. Therefore, the responsibility to coordinate and manage overall RSM in Malaysia is still carried out by individual departments separately under the monitoring of their respective ministry. Apart from having Cabinet Committee and Steering Committee meetings as and when required, the RSM in Malaysia is still at a stage where it can be improved to enhance its effectiveness and efficiency. The research demonstrates that the present practice, whereby an approved amount of funding is disseminated among the ministries and departments where each department still functions in silos with regard to road safety, should be reviewed. This problem creates a gap in terms of communication and coordination among the ministries and departments, which may affect the effectiveness of managing road safety in Malaysia. On top of that, the funding received by the ministries and departments was described as insufficient and unsustainable to fund road safety in Malaysia by most of the officials interviewed.

The interviews also revealed that the funding for road safety activities in Malaysia is insufficient and unsustainable. Most of the road safety activities, such as campaigns, advocacy, education, and engineering, require more funding from the government to be effective. The idea of having dedicated road safety funding and an independent road safety board to manage RSM in Malaysia was welcomed by all of the officials interviewed. This suggestion is in line with that asserted by Sufiyan and Zulakma (2009) that in order for the government to achieve its target of reducing road accidents fatalities, it is essential to set up a sufficient and sustainable fund to fund future road safety programmes.

A specific board to manage issues related to road safety can lead to more systematic and efficient implementation of programmes and activities. To encourage transparency and road user engagement, the road safety board proposed must consist of independent persons from various backgrounds. This board should also be able to make its own decisions with regards to the funding

received and be financially sustainable and not dependent on annual government allocations. Past experiences, especially in LMIC, revealed that road funds with sufficient and sustainable funding, together with effective and efficient management by road boards, have proven to be the best options to improve RSM (Zietlow, 2007).

Therefore, it is envisaged that the best mechanism to be introduced in order to overcome these critical problems is to establish a road fund managed by a road board. However, the question is whether there is enough enthusiasm and support from the government to do so.

CHAPTER 7: PROPOSED INSTITUTIONAL MODEL FOR ROAD SAFETY FUNDING

7.1 Introduction

This chapter proposes three new institutional models for RSM based on the concept of commercialisation and other key principles of second-generation road funds by considering how the aspects of road safety can be provided on a 'fee-for-use' basis with the ultimate aim of improving the management of road safety (Richecour & Heggie, 1995; Heggie, 2000c; Gwilliam & Kumar, 2003; Gwilliam, 2011). This chapter focuses on Malaysia as the focus country from where specific information and feedback were retrieved. A wider study covering more nations, however, is beyond the resources currently available. Nevertheless, the methodology and models depicted in this study may have broader applications notwithstanding the local conditions that necessitate adaptation prior to implementation.

7.2 Road safety management reforms

It is important to ensure that reforms of road organisations translate into effective management structures with clear objectives to ensure that they are commercially effective (Heggie, 1995). This could change the modus operandi of the road sector from public to private, which in return would enhance the effectiveness and efficiency of its management. The study conducted and presented in Chapter 5 shows that the road safety professionals interviewed felt that having a separate and independent road safety board with its own management and funding is one of the best ways to enhance RSM in Malaysia.

Moeller (1993) suggested that the most important factor that motivates managers to cut waste, improve operational performance, and allocate resources efficiently is competition among service providers. Therefore, it is believed that road safety organisations would be in the same position if some form of competition was created between them. This could only be achieved if road safety is managed within the concept of commercialisation.

The present institutional arrangements for RSM and funding in Malaysia are illustrated in Figure 7.1.

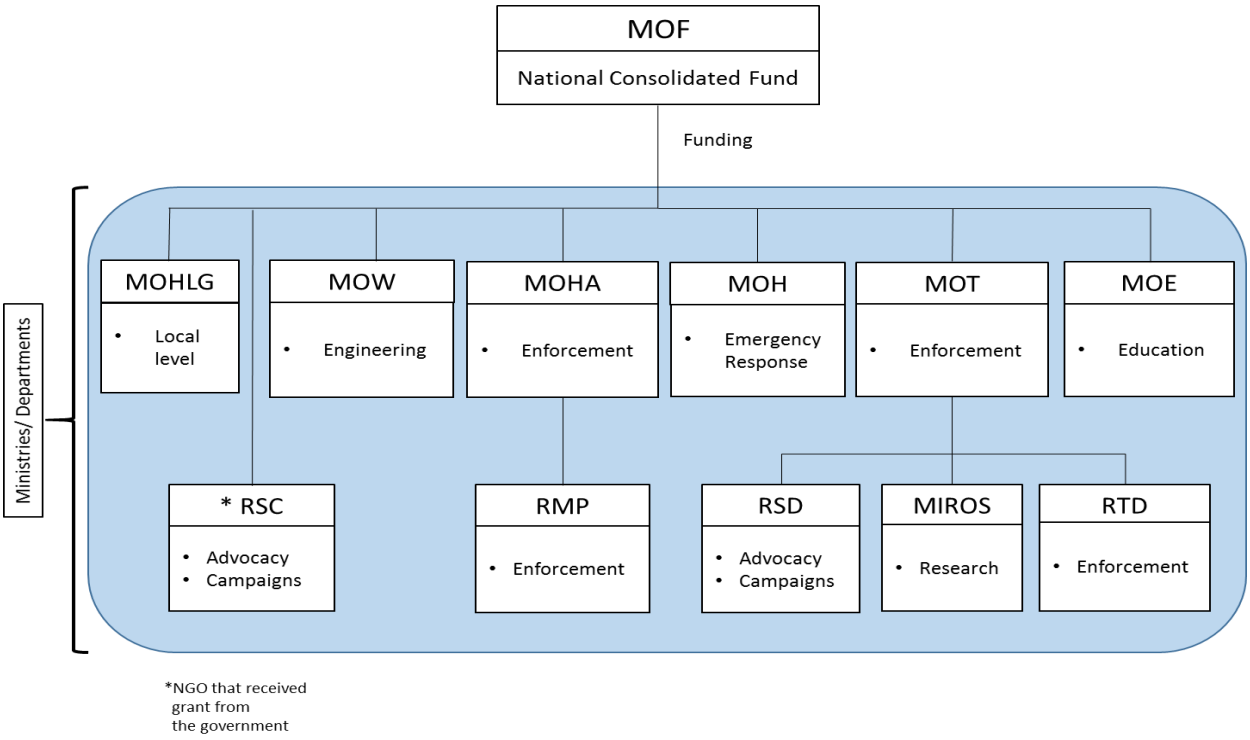

Figure 7.1: Ministries and departments engaged in road safety

The scenario in Malaysia appears to be similar to other LMIC, where road safety budgets are derived from government funding and granted through annual budgets (Asmat *et al.*, 2011). Looking at the present situation of intensified road safety initiatives and public awareness towards road safety, including campaigns via mass media, there is a pressing need to increase funding in

the years to come. Through the present model, the budget is channelled into each ministry via the MOF, which is responsible for disbursing the budget as approved by the parliament. This arrangement is considered monolithic. It may be argued that the present model does not effectively or efficiently address issues related to road safety as it does not offer holistic and integrated management. Based on the preliminary analysis, the number of ministries involved is excessively high and there is no suitable mechanism to integrate the activities undertaken by each ministry or prioritise them in terms of costs and benefits. This fragmented structure would be improved if any of the proposed models were implemented. Another missing element that could be enhanced in the present institutional model is the direct involvement of road users in RSM.

7.3 Proposed models

Based on the findings depicted in Chapters 5 and 6, three institutional models for RSM are proposed. The main objective of these arrangements is to maximise the specificity and engage more road users in the management of road safety organisations (Robinson, 2008).

7.3.1 Proposed Model 1

Model 1 proposed involves the introduction of a road safety fund managed by an independent agency from the MOF administrative body (see Figure 7.2). The financial resources for road safety may be obtained directly from road user charges, such as vehicle or driving license fees, third-party insurance premiums, traffic fines, international transit fees, and fuel levies.

Through this arrangement, the MOF will have legal responsibility for the road safety fund, which they can access for monitoring purposes (Allen *et al.*, 2013). However, the main responsibilities

of the fund will be managed by the Road Safety Fund Administration, which will also be responsible for manage the collection and the distribution of funds. The administration may include a non-executive board that consists of members appointed by the Minister of Finance and a chairman. In order to gain support from the road users, the board may represent both public and private sectors, including road users' associations, transporters, and business chambers. Day-to-day management of this board may be carried out by a secretariat headed by a Chief Executive Officer (CEO) responsible for assisting the board, especially on operational issues. The fund should be established on a sound legal basis with strong oversight by the board, sound financial management, as well as regular technical and financial audits that ensure the success of the arrangement (Heggie, 1999; Zietlow, 2007; Gwilliam, 2011).

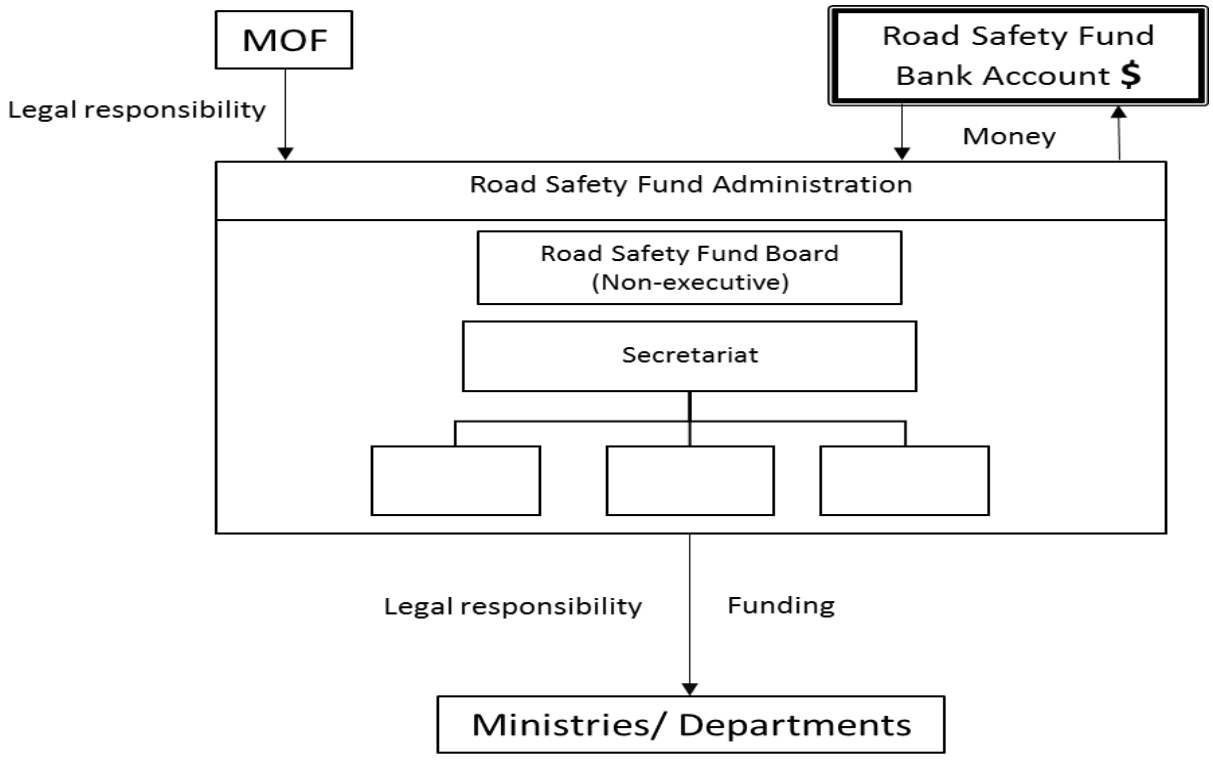

Figure 7.2: Proposed Model 1

This model retains the existing structure of the ministries responsible for road safety. Nonetheless, the road safety fund board has overall responsibility to ensure that every activity implemented by each ministry goes through technical and financial audits on an annual basis. Competition between ministries may also be promoted through a cost-benefit analysis of the programmes followed by each ministry or through achieving pre-set targets. Each ministry and department will have to bid for funds by preparing and submitting their action plans to the road safety fund administration. The plan could be then evaluated by the road safety fund board with the funds allocated then directly managed by the related ministry or department. The main advantage of this model is that the funding resources for road safety will be sufficient and sustainable, and this in turn will increase the transparency and accountability of RSM.

7.3.2 Proposed Model 2

A more complex structure is presented in Model 2, where a new board called 'Road Safety Administration' is established with its main responsibility being to administer and manage road safety (see Figure 7.3). Unlike Model 1, the Road Safety Administration is segregated from the Road Safety Fund Administration, which will focus exclusively on managing the fund. The legal responsibility of the MOF is still retained in this arrangement.

The Road Safety Board will establish procedures for allocating and disbursing funds for the implementation of road safety programmes by the respective ministries and departments. This may improve the coordination of RSM since the board will also be held responsible for preparing, integrating, and monitoring the implementation of the annual road safety programmes by involving each ministry and department. This will also increase transparency and accountability as it will prepare and publish both financial and technical audit reports.

Competition between ministries would be encouraged and this could lead to cost-savings. Such a Road Safety Administration agency may be chaired by a senior politician, such as the Prime Minister, or a key figure in national road safety, so that implementation decisions can be made quickly without unnecessary political interference.

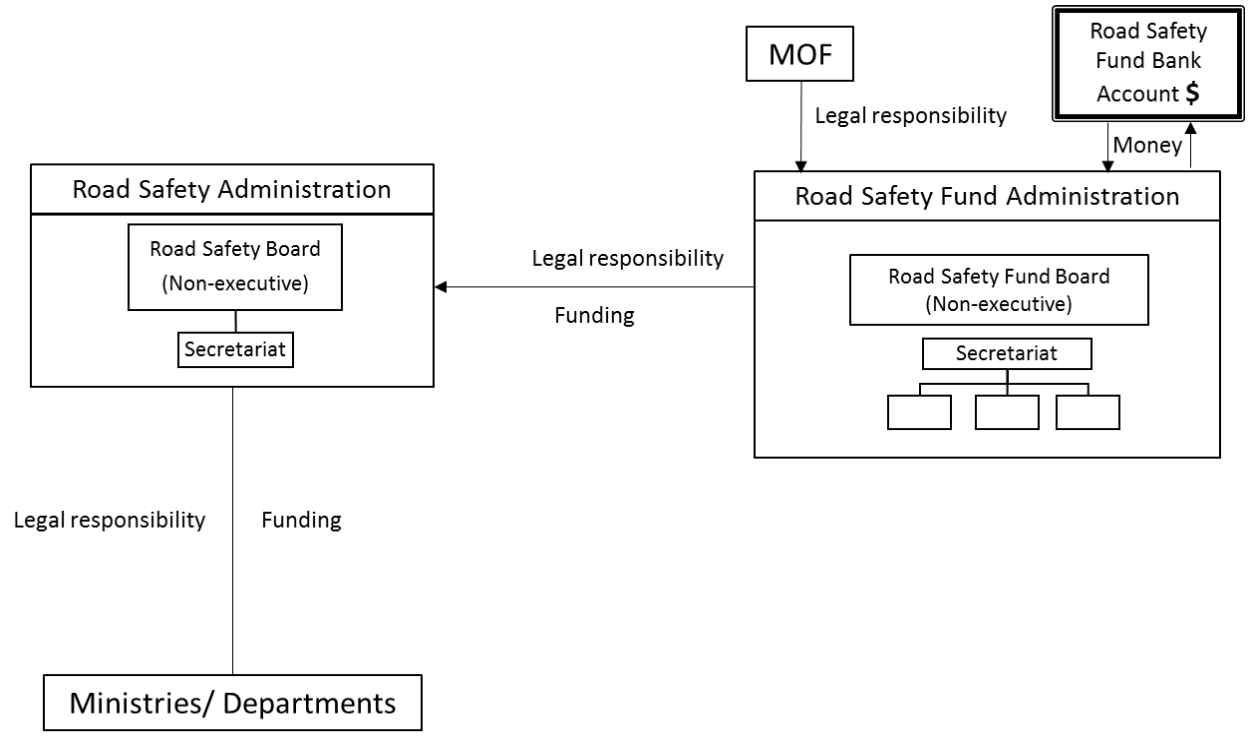

Figure 7.3: Proposed Model 2

7.3.3 Proposed Model 3

Model 3 presents the most complex structure among all the models proposed and seeks to link both a Road Safety Board and a Road Board with a single source of funding (see Figure 7.4). The set-up for the Road Fund Administration and the Road Safety Administration is similar to the previous models. The Road Fund Administration will focus on the entire road sector. This model would outline more specifically the areas for each board to focus on, especially in countries that

already have road funds in place. By doing so, funding for road safety will be directly channelled to the Road Safety Board instead of only given a certain fraction from the Road Board allocations.

The Road Fund Administration will still have the responsibility of managing the fund account and allocating funding based on the needs and requests from both administrations. This model has shown success in some nations, such as in Ethiopia and Zambia, where road safety initiatives are funded through road funds (Zietlow, 2007). Therefore, establishing a separate Road Safety Board may increase the success of road funds and enhance the effectiveness and efficiency of management.

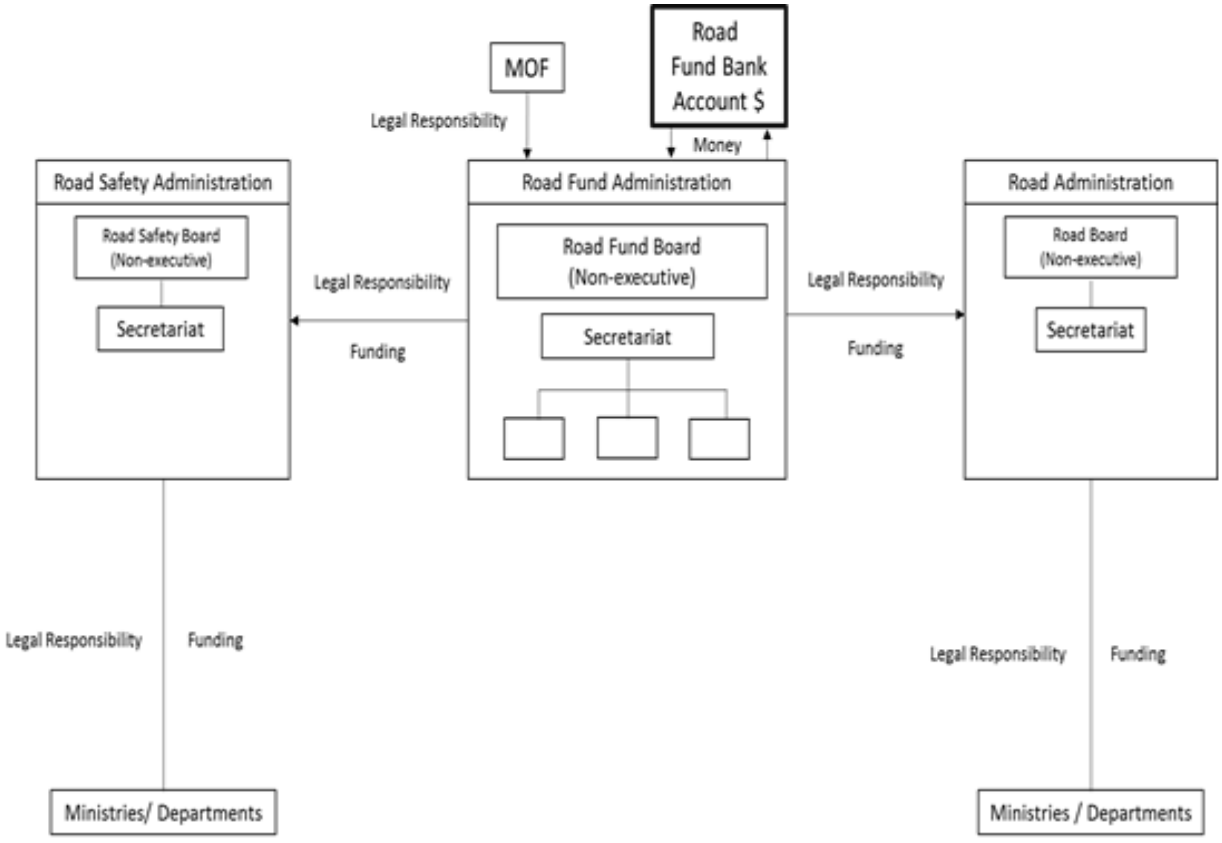

Figure 7.4: Proposed Model 3

7.4 Implementation in Malaysia

As suggested by Heggie (1998; 1999), these boards must be established on a strong legal foundation to ensure their success. Such legislation should be clearly spelled out and cover the key areas, such as:

i) management of the fund to include setting up of road fund boards and the secretariat for day-to-day management;

ii) scope of the boards and the secretariat in terms of the responsibilities of setting out national road safety policies, strategies, standards, KPIs, and road safety data management;

iii) sources of the funds and procedures for the disbursement or allocation of the funds; and

iv) financial and technical audits of the road safety fund boards and road safety boards.

As evidenced through the analysis presented in Chapter 6, the implementation of these models in Malaysia could be carried out as a few existing organisations could be transformed to fit into these models, such as the RSD and the RSC. At the same time, the resources and expertise from the existing departments could also be utilised to manage the proposed administrations. These conditions make the processes of transforming to the new structure faster and also inexpensive, mainly because this can be done at the ministry level. The details of their implementation in Malaysia are given in the next sub-sections.

7.4.1 Road Safety Fund Boards

Road Safety Fund Boards will be established and managed by a non-executive board, whereby their main responsibilities are to manage, collect, and allocate funding for road safety to the respective ministries and departments. The board may have to report to the MOF as they have a legal responsibility to monitor the fund management. As postulated by Richecour and Heggie (1995), the appointment of board members is ideally made by the organisations they represent and the chairman could be elected from the most senior and prominent figures among the board members. This is important to ensure that the board is seen as an independent body that may influence and gain strong support from the road users. The board will be assisted by a permanent secretariat headed by a CEO who will help in day-to-day management. Based on the best practices and the suggestions offered by the World Bank, the roles and responsibilities of the board may be as follows (Robinson, 2008):

i. To administer and manage the Road Safety Fund assisted by a permanent secretariat led by an appointed CEO for day-to-day management;

ii. To set the appropriate levels of road user charges, fines, premiums, levies, etc., to be collected;

iii. To collect and allocate the fund revenues to the Road Safety Boards or respective ministries and departments based on the approved and certified road safety plans or policies;

iv. To establish procedures for allocating the funds to the Road Safety Administration or the respective ministries and departments; and

v. To prepare and publish the financial audit report on the funds account.

It is therefore suggested that the board may consist of seven to nine members nominated by their organisations as follows:

i. An independent chairman elected by the board members to chair the board meeting and officially represent the board;

ii. A representative of the government (MOF, MOT, MOW, etc.) to represent the public sector;

iii. A representative of the road users (i.e. AAM) to protect the interest of road users;

iv. A representative of the economics association/chambers to represent the private sector;

v. A representative of the health sector industry to represent the private sector;

vi. A representative of the insurance industry to represent the private sector; and

vii. A CEO to head the secretariat to manage day-to-day operation of the board.

7.4.2 Road Safety Boards

The establishment of a Road Safety Board could enhance the effectiveness and the efficiency of road safety as the present arrangement for road safety seems to have many overlaps amongst the departments concerned. Access to safety data could also be enhanced, which in turn, could lead to improved and undisputable performance indicators available to stakeholders concerned, including road users (Guillossou & Stankevich, 2008; Wegman, 2016b).

The roles and responsibilities of the board may be as follows:

i. To administer and manage the Road Safety Board assisted by a permanent secretariat led by an appointed CEO for day-to-day management;

ii. To establish procedures for allocating and disbursing funds for the implementation of a road safety programme by the respective ministries and departments;

iii. To advise the MOT on the national RSM plan and policy;

iv. To prepare, coordinate, and monitor the implementation of the Annual Road Safety Programme by the respective ministries and departments, including the strategies, standards, and KPIs;

v. To coordinate the management of road safety data by the respective ministries and departments and publish them to the public; and

vi. To prepare and publish the technical audit report of the road safety programme.

It may therefore be suggested that the board may consist of five to eight members nominated by their organisations, as listed in the following:

i. An independent chairman elected by the board members to chair the board meeting and officially represent the board;

ii. A representative of the government (MOT, MOW, etc.) to represent the public sector;

iii. A representative of the road users (i.e. AAM) to protect the interest of road users;

iv. A representative of the automotive manufacturer to represent the private sector;

v. A representative of the health sector to represent the private sector;

vi. A representative from the engineering profession to represent the professional sector, especially those related to road safety engineering and management; and

vii. A CEO to head the secretariat to manage the day-to-day operations of the board.

7.4.3 Funding sources

The proceeds for road funds are usually derived from several sources, such as motor vehicle registration fees, driving license fees, a levy added to the price of fuel, international transit fees, traffic fines, and direct road user charges (e.g. tolls and weight-distance fees). Payment is due by road users for using the road system and the income collected from them is utilised to finance road improvements and safety features. From the interviews conducted during the preliminary study, it was suggested that it would be crucial to ensure that the road safety fund should not burden road users, and further pilot studies should be conducted to look into the consequences of its implementation.

Nonetheless, in Malaysia, there is some experience from funding arrangements based on the concept of commercialisation, where roads are managed on a 'fee-for-use' basis. For toll roads, there is evidence of sufficient and sustainable funding for road safety activities. Although this experience may prove helpful in setting up a road safety fund, except for toll collection, other direct road user charges, such as levies, fuel tax, license fee, and insurance premiums, have never been used directly for road safety. Therefore, the mechanisms for collecting the revenue and allocating the funds to road safety projects should be examined carefully. Findings from the interviewees also revealed that RTD, which refers to a department responsible for road transport, has collected some revenues directly from road users that have been used as a source of income to the Road Safety Funds (see Figure 7.5). In 2013, the RTD managed to collect approximately MYR 3.6 billion of revenue, of which almost 67% came from motor vehicle licenses (MOT, 2015). The second-highest source was driving license revenue (11%), followed by registration numbers and others (6%), down payments (4%), fines (3%), change of ownership fees (2%), and lastly, ownership claims (1%).

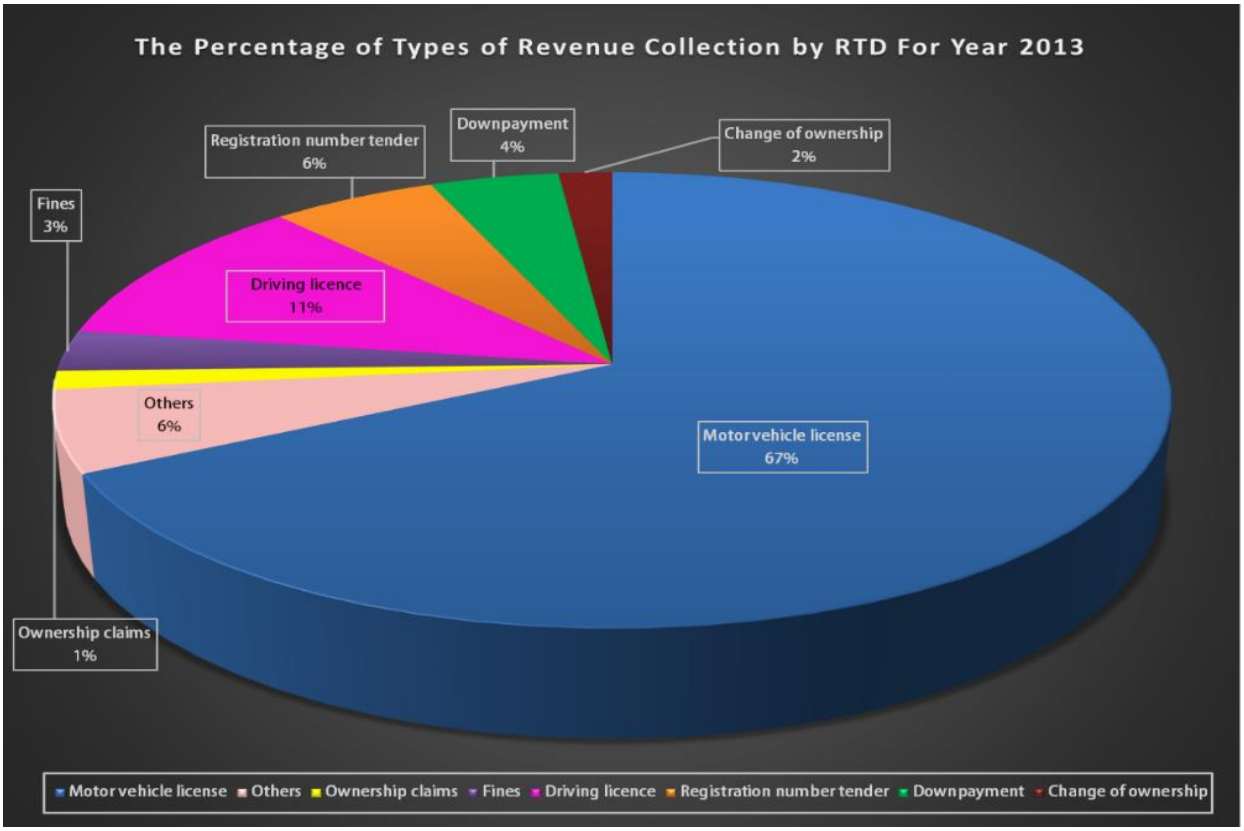

Figure 7.5: Main sources of income for RTD

7.4.3.1 Motor vehicles license fees

Motor vehicle license fees may be used as one of the main sources of income for Road Safety Funds. As illustrated in Figure 8.5, the income generated from this source is equivalent to MYR 2.4 billion per annum. In fact, there are two ways of collecting income from this particular source. First, some portion of 1% - 3% of the income collected may be channelled into the funds that will generate income between MYR 24 million and MYR 72 million annually. Second, a levy of MYR2 to MYR 5 may be collected from each registered motor vehicle in Malaysia. For the year 2014,

around 25 million motor vehicles were registered, which would generate approximately MYR 50 million to MYR 125 million of funding for the Road Safety Funds.

7.4.3.2 Driving license fees

Similar to motor vehicle fees, a levy of MYR 2 to MYR 5 may be collected from road users on top of their driving license fees. In 2014, based on the statistics published by the RTD, the total number of drivers in Malaysia was nearly 15 million, which would have easily generated another MYR 30 million to MYR 75 million to the funds.

7.4.3.3 Third-party insurance premiums

This includes a levy on top of required insurance premiums to assist in funding road safety events. Insurance premiums are linked to road crash expenses; thus insurance companies have an incentive to reduce crash costs to help lessen the premiums charged. Both the public and the insurance companies must accept any additional surcharge on insurance premiums. In fact, many countries have introduced some percentage of levies on third-party insurance premiums, as shown in Table 2.1 (see Chapter 2). In 2014, motor vehicle insurance premiums in Malaysia totalled MYR 282.9 million (PIAM, 2015). Therefore, by introducing a levy of 5% - 10% of the insurance premiums, a total of MYR 14 million to MYR 28 million could be easily generated for the funds annually.

7.4.3.4 Traffic fines

In Western Australia, a third of red light and speed control camera fines are paid into the Road Trauma Trust Fund (Downing, 2004). Some states in the USA also utilise traffic fines to part-fund law enforcement training. Surcharges are levied on harmful moving violations in Mississippi,

where the funds are used to provide emergency medical facilities (Aeron-Thomas *et al.*, 2002). The money is contributed to a Traffic Safety Education and Enforcement Fund in New Mexico. As a whole, improved implementation of road enforcement will, in turn, lead to lower traffic fines in the future. Based on Figure 8.5, the total amount of traffic fines collected by the RTD in 2013 was almost MYR104 million. This is a considerable amount that excludes other traffic fines collected by the RMP, which is believed to be bigger than this figure. With 2% - 5% of this amount channelled directly into the fund, it would be about MYR 2 million to MYR 5 million of funding contributed into the Road Safety Funds.

7.4.3.5 International transit fees

International transit fees refer to a charge that has to be paid by a foreign vehicle every time it crosses any border of the country that imposes it. There is evidence of this in Malaysia where the government has a plan to collect a 'Vehicle Entry Permit' of MYR 20 from each foreign-registered vehicle that enters Malaysia from Singapore and other 12 road entry points in Malaysia in stages (CNA, 2016). Such implementation may generate approximately MYR 350 million and a fraction of this amount (say 2% - 5% or MYR 7 million to MYR 18 million) may be channelled into the Road Safety Funds.

7.4.3.6 Fuel levies

Fuel levies refers to a charge collected together with the sale of motor fuels. Levies are derived from the fuel price build up and should be separated from other fuel taxes (Gwilliam, 2011). Njenga and Davis (2003) claimed that fuel levies contributed the largest amount for road maintenance funds as they apply to all road users. Nevertheless, in order to ensure the sustainability

and sufficiency of funding for road safety, the right level of fuel levy has to be determined and set by the Road Safety Fund Administration. Total petrol and diesel sales collected in Malaysia in 2013 amounted to MYR 50.1 billion (MOF, 2014). Charging 0.5% - 1.0% of these levies would generate about MYR 250 million to MYR 500 million for the fund.

In total, if the mechanisms of Road Safety Funds are used to collect the funding for road safety, it suggests an estimated MYR 350 million to MYR 750 million of funding for RSM in Malaysia from the various sources depicted above. The figure displayed is ample to cover the present funding needs for road safety in Malaysia, which is estimated at MYR 517 million in 2015, including the operational and management expenditures of the related departments, such as RTD, RSD, and MIROS (MOT, 2015).

Nonetheless, in order to ensure that the fund will not collect an excessive amount of funding, the Road Safety Fund Board would need to fix an initial level of levies and charges, and later monitor it annually with regard to the present requirements. By doing so, an adequate, but not excessive, level of funding for road safety can be maintained and guaranteed.

7.4.4 Allocation of funding

Allocation of funding by any road organisation normally involves three main steps: (a) project identification, (b) project evaluation, and (c) project funding. This 'bottom-up' approach cannot be relied on to enhance the efficiency of the budget allocation process (Bliss *et al.*, 1999). Hence, several options for road safety funding allocation are presented. New Zealand has established two models that may be used as a basis for allocating funding for road safety, as given in the following (Bliss *et al.*, 1999):

- Generalised Model

Can be applied for all elements of road safety; engineering, enforcement, education, and emergency response; and

- Enforcement Model

  Can be applied specifically for road safety enforcement that involves road-policing resources.

At the same time, the International Road Assessment Programme (iRAP) can also be applied as a model to determine the allocation for safer roads investment programmes that specifically focus on hard engineering interventions.

Based on international practice, the major critique of these methods of road fund allocation is the missing inputs from road users (Gwilliam & Kumar, 2003). This is considered a major disincentive to user contributions towards road funds as a lack of road user involvement in decisions could demotivate users from contributing, thus demonstrating failure of the commercialisation concept. Hence, a pressing need exists to ensure that whichever method is used involves road users.

7.4.5 Advantages and disadvantages of proposed models

As discussed earlier, since all the proposed models are based on the concept of second-generation road funds, a number of advantages and disadvantages have been identified, as follows:

7.4.5.1 The advantages

The advantages that have been identified are:

i. Changing from government management to commercial will reduce bureaucracy and increase efficiency of RSM since there will be competition among service providers;

ii. The fragmentation issue and the lack of coordination among stakeholders may be enhanced since it will be coordinated through the Road Safety Administration as the central organisation;

iii. Funding for road safety will be sufficient and sustainable since road users will pay for road safety based on a 'fee-for-use' basis; and

iv. Increased transparency and accountability of RSM since models require road users to be informed of road safety performances through annual technical and financial audit reports.

7.4.5.2 The disadvantages

Based on the past experiences of implementation of second-generation road funds for road maintenance, several disadvantages can be highlighted:

i. The government may not be willing to pay for the remainder if there is a shortfall in road safety funds revenue since they have already released that responsibility to the Road Safety Funds and Road Safety Administration. Therefore, the responsibility of funding from the MOF is still required, hence MOF should have legal responsibility for the Road Safety Fund Administration; and

ii. Allocations from the fund may be used by the government through other agencies if a surplus is generated through the fund. However, strong legislation may be established to avoid such worst-case scenarios from occurring.

CHAPTER 8: ANALYSIS AND MODEL EVALUATION

8.1 Introduction

There is a need at this point to acquire insight into the understanding and acceptance of key stakeholders and world experts regarding the concept of user charges and the commercialisation of road safety. To this end, this chapter analyses the results from a survey conducted using a focus group to investigate the suitability of second-generation road funds as both RSM and financing tools to address the shortcomings of the present arrangements in Malaysia. At the same time, the models proposed in Chapter 7 are assessed in this chapter as well.

8.2 Methodology

8.2.1 Objectives

This second survey was carried out with the following particular objectives:

i. To identify the most suitable funding mechanism for RSM and funding tools.
ii. To investigate the acceptability of using the second-generation road funds concept as a mechanism to enhance RSM and funding.
iii. To assess the models by obtaining feedback from key stakeholders and international RSM experts from various organisations, such as the World Bank.

8.2.2 Procedure

In order to meet the above objectives, a questionnaire was developed comprising three sections, as follows:

i. Section I: Personal profile of the interviewees
ii. Section II: Investigation of the suitability of second-generation road funds
iii. Section III: Investigation of the applicability of the proposed models

Section I of the questionnaire was designed with six questions that sought information regarding the administrative responsibilities of the officials contacted to ensure that all stakeholders related to road safety in Malaysia were represented, including international experts. They were asked about their age, gender, education, years of experience, and their role in their organisations.

Section II was divided into seven sections, namely: (i) Road safety financing, (ii) Effective financing objectives, (iii) Stakeholder and road user engagement, (iv) Road safety: Public or Private Good, (v) Cost recovery, (vi) Charging revenues, and (vii) Financial accountability. This section is comprised of 34 questions that focused on the respondents' comprehension of the above theoretical concepts as a pre-requisite for the potential application of the second-generation road funds for RSM and funding. The questions were based on the concept of commercialised road management as defined in Robinson (2008), Heggie (2003), and Roth (2006). Their views represented the overall stance of their institutions although it should be appreciated that their answers may not be unbiased. Nevertheless, for the purpose of this feasibility study, the views of the respondents have been considered to be adequate.

Section III of the questionnaire sought to acquire the opinions from the respondents on the proposed institutional models based on the concept of second-generation road funds. The three

models proposed in the previous chapter were considered by a number of stakeholders and the respondents were asked to choose the model they thought best for implementation.

The questions were designed in such a way that the answer could be either 'Yes' or 'No', along with an option to provide further comments. Finally, all the answers were entered into a database and analysed. The complete questionnaire is displayed in Appendix B.

8.2.3 Participants

In total, 20 respondents were involved in this study and further divided into two groups:

i. Fourteen respondents were key stakeholders responsible for, and involved in, decision-making processes and policy formulation for road safety in Malaysia. They were from the government sector, the private sector, and academia, hence covering the following stakeholders: Ministry of Finance (MOF); Ministry of Transport (MOT); Ministry of Works (MOW); Road Safety Department (RSD); Malaysian Institute of Road Safety Research (MIROS); Malaysian Highway Authority (MHA); Road Safety Research Centre, UPM (RSRC); Road Safety Council (RSC); Automobile Association of Malaysia (AAM); and Allianz Insurance. The interviewees were selected was based on their involvement in RSM at the institutional level in Malaysia and their availability. Prior to the interviews, each respondent was given a list of questions and guidelines via email. All the interviews were held face-to-face in Malaysia between February and August 2017.

ii. Six respondents were world experts in RSM and road funds, who were attached to or used to be attached to various reputable organisations, such as the World Bank, the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), the

International Road Federation in Geneva (IRF), and the Tanzania Road Fund Board. Each respondent was given the questionnaires and the guidelines via email, while their feedback was collected using a similar method.

A detailed list of the selected respondents is given in Appendix C.

8.3 Section I: Demographic Data of the Participants

The proposed models of institutional arrangements and road fund mechanisms were evaluated through a survey questionnaire (see Appendix B). A total of 20 respondents participated and their demographic data are tabulated in Table 8.1.

Table 8.1 shows that 50% of the respondents exceeded 50 years of age. It also shows that the respondents were experts within RSM, whereby five (25%) respondents claimed to have about 21-30 years of experience, while another seven (35%) respondents had more than 30 years' experience. Eight respondents (40%) were from the government sector, six respondents (30%) were from the private sector, one respondent (5%) was an academic and five were (25%) from NGOs such as the World Bank, the UNESCAP, and the IRF. Based on the demographic data presented in Table 8.1, the survey involved many RSM experts, which represented government and private sectors, academia, and NGO. Their opinions and feedback were very valuable in evaluating the proposed models and mechanisms elaborated in Chapter 7.

Table 8.1 Demographic Data of Respondents

Variables	Description	N (%)
Responses		20
Age (years old)	< 25	0 (0%)
	25-34	7 (35%)
	35-44	4 (20%)
	45-54	1 (5%)
	< 55	8 (40%)
Academic Qualification	Diploma	0 (0%)
	Bachelor	9 (45%)
	Master	7(35%)
	Doctorate	4 (20%)
	Others	0 (0%)
Years of Experience	< 5	0 (0%)
	5-10	5(25%)
	11-20	3 (15%)
	21-30	5 (25%)
	> 30	7 (35%)
Nature of Organisation	Government	8 (40%)
	Private	6 (30%)
	Academia	1 (5%)
	NGO	5 (25%)

8.4 Section II: Analysis of the Suitability of Second-Generation Road Funds

The results retrieved from the survey questionnaires were statistically analysed based on the z-test and chi-square to determine the variance between the two proportions, with the confidence interval set at 95%. The results of the survey were divided into three sub-sections, which were responses to road safety financing, effective financing objectives, as well as stakeholders and road user engagement or support financing. The key stakeholders and experts were asked to share their feedback and explore their comprehension of the theoretical concepts as a pre-requisite for the potential application of the second-generation road funds as a mechanism for RSM and funding.

8.4.1 Road safety financing

In this section, the respondents were asked nine questions related to road safety financing and using universally accepted terms (Heggie *et al.*, 1998). They were aimed to assess whether road safety is an area where fundamental concepts of commercialised road financing can be applied. Table 8.2 tabulates the statistical outcomes.

Table 8.2: Statistical results for Road Safety Financing

	YES (N (%))	**NO (N (%))**	**TOTAL**
A.01 Is road safety seen as a public good and funded like a social service?	13 (65)	7 (35)	20
A.02 Are road taxes and charges treated as a general revenue to the government?	18 (90)	2 (10)	20
A.03 Is there any form of relationship between funding and revenues in road safety?	1 (5)	19 (95)	20
A.04 Is there any form of relationship between funding and road safety network needs?	11 (55)	9 (45)	20
A.05 Is there any form of relationship between funding and expenditure in road safety?	13 (65)	7 (35)	20
A.06 Do road users perceive any price for the road safety use?	6 (30)	14 (70)	20
A.07 Is there any consideration of choice on whether and how to travel with regard to safety?	6 (30)	14 (70)	20
A.08 Is there any significant pressure from the road users felt by the administrations?	17 (85)	3 (15)	20
A.09 Is there any significant pressure due to a hard budget constraint by the administration?	20 (100)	0 (0)	20

Table 8.2 presents the statistical results of the first question (A.01). The result indicated that 13 (65%) respondents agreed (YES) while the other 7 (35%) respondents disagreed (NO) that road safety can be treated as a public good and funded like a social service. The low awareness of the benefits of being funded, such as social service, specifically the second-generation road fund in LMIC, including Malaysia, led to insignificant results in the statistical test because 14 (70%) respondents came from multiple sectors in Malaysia. The respondents stressed that generally,

except in the UK and Europe, many countries still have low awareness of the benefits of funding road safety, especially in LMIC. Nonetheless, it was highlighted that the New Zealand road fund has a specific surcharge added to cover road safety, including the enforcement of rules and legislation by the traffic police. Therefore, based on a similar concept adopted in New Zealand, it is a good approach to educate road users so that they will understand and accept this concept.

The results from question A.02 showed that 18 (90%) respondents confirmed that road taxes and charges related to road and road safety were treated as general revenue to the government. The result in Table 8.2 is in line with present practice, where the budget for road safety is allocated annually based on the requests from the relevant ministries and then subject to political debate within the government. This also highlighted that this approach needs to be changed and that road users need to be educated about road safety funding and consider it as a charge similar to that for other utilities.

The respondents were also asked about the correlations between funding and revenue (A.03), road safety network needs (A.04), and expenditure on road safety (A.05). Table 8.2 shows that 19 (95%) respondents claimed that there was no strong relationship between funding and revenue, while 11 (55%) and 13 (65%) respondents thought that there were correlations between funding and road safety network needs, as well as expenditure on road safety, respectively.

The results demonstrated that both Malaysian and international respondents agreed that there was no relationship between funding and revenues in road safety for the present implementation, as posed in A.02. They argued that this is due to the fact that funding for road safety is controlled by the MOF, which is also responsible for allocating funds to other sectors, such as education and health. For instance, the UK government raises approximately £55 billion to £60 billion from road users every year but spends less than £10 billion on road infrastructure and road safety.

Table 8.2 shows that about 11 (55%) respondents agreed that there was a relationship between funding and road safety network needs, while the other 9 (45%) disagreed. They stated that the present practices in most nations across the world are based on budget requests and justifications by the related ministries and departments. They stressed that funding or availability of funds does not usually consider the needs of improving the safety of road networks. The pressures on funds are mainly to keep the network serviceable, such as road safety improvement schemes, black spot management, as well as to create new capital projects to address expansion needs.

Meanwhile, 13 (65%) respondents agreed that there was indeed a correlation between funding and expenditure on road safety, as shown in Table 8.2. They emphasised that the optimum approach is to spend where the most benefits are achieved. Spending more on safety aspects, particularly on infrastructure, would gain some, but they portray diminishing returns. They added that each ministry would spend all of its allocated funding every year to ensure that their budget performance was exceptional. Nonetheless, the efficiency of the budget spent and the effectiveness of the efforts can be questioned.

This survey investigated if road users perceive any price for road safety (A.06). Table 8.2 shows that 14 (70%) respondents disagreed. They asserted that if safer roads were placed into operation and road user charges were increased, either through direct tolling or higher levies, the price for the road safety use can then be perceived.

A total of 14 (70%) respondents disagreed to consider safety in travel, as posed in A.07. They beheld this situation with the level of awareness among road users on the benefits that they would gain by having a safe trip without thinking about the costs that might incur. In fact, it is agreed that the level of awareness among road users has increased, especially when faced with obvious dangers, such as avoiding dangerous routes.

As for items A.08 and A.09, Table 8.2 shows that 17 (85%) respondents agreed that administrative and stakeholders of road safety are pressured by road users due to road safety issues. They mentioned that present road users have become more demanding and aware of their rights. Hence, more complaints regarding road safety have been voiced through various media, such as email, newspapers and social networking platforms (e.g. Facebook and Twitter). At the same time, it seems that the government appears to be more open to addressing public complaints and working harder on improving road safety. It is also interesting to highlight that this scenario is only prominent in nations with advisory RSCs that exhibit more engagement with road users.

Table 8.2 tabulates that all the respondents – 20 of them (100%) – agreed that there was significant pressure due to hard budget constraints. This result demonstrates that the budget provided by the government for road safety activities is insufficient and that there are times when the approved budget is slashed in budget adjustments for economic reasons. The respondents also highlighted that without sufficient budget from the government, road safety administrations would have a hard time generating appropriate road safety interventions. In addition, spending on road safety seems to be given less priority and may even be postponed compared to other activities.

8.4.2 Effective financing objectives

Six questions were posed pertaining to effective financing objectives and the results are displayed in Table 8.3. The questions began by investigating secure and reliable sources of funding for RSM in the present implementation, as stipulated in B.01. Table 8.3 shows that about 14 (70%) of the respondents verified the absence of secure and reliable sources of funding for RSM. This is consistent with the pressure felt among the RSM authorities due to budget constraints in the government.

Table 8.3: Statistical results for Effective Financing Objectives

	YES (N (%))	NO (N (%))	TOTAL
B.01 Is there any secure and reliable source of funding for RSM?	6 (30)	14(70)	20
B.02 Should the source of funding for road safety be independent from political interference?	17 (85)	3 (15)	20
B.03 Should spending decisions on road safety be based on needs and requirements of transport policy?	20(100)	0(0)	20
B.04 Is there any established link between revenue and spending for road safety?	4(20)	16 (80)	20
B.05 Should prices paid by road users reflect the level of road safety?	17 (85)	3 (15)	20
B.06 Is there any effective revenue collection for road safety countermeasures?	6 (30)	14 (70)	20

The statistical results from the survey also indicated that the majority of the respondents (17, 85%) believed that the sources of funding for road safety should be independent from political interference (B.02). They felt that political independence is a desirable objective to enhance the process of securing budgets for road safety. Without political interference, the process of securing funding for road safety may be faster, more transparent, and specific. The respondents also highlighted the need to clarify how the proposed mechanisms can be implemented. Additionally, it was stressed that road safety is an area of political interest and sensitivity.

Table 8.3 shows that all of the respondents (100%) agreed that spending decisions on road safety must be based on needs and policy requirements (B.03). They stressed the need for road safety policy and standards for infrastructure. They also emphasised that since resources are always likely to be constrained, spending choices should be guided by strategic priorities, such as economic, social, and environmental factors, with the aim being to maximise human welfare as well as to balance costs and benefits.

Table 8.3 also displays that a strong majority of the respondents (16, 80%) believed that there is no direct link between revenue and spending on road safety (B.04). The respondents suggested that a viable link has to be established by analysing the required road safety countermeasure costs and their impact. It is essential to ensure that the allocated funding for road safety reflects the government revenues related to road safety so that road safety activities can be funded effectively and efficiently.

In order to explore the possibility of introducing a new mechanism for road safety funding, the respondents were asked if the price paid by the road users reflects the level of road safety. The outcomes tabulated in Table 8.3 show that a strong majority of 17 (85%) respondents agreed that safety is indeed an utmost priority and an important element in providing road infrastructure, and that road users should pay to access this (B.05). By linking the level of safety with the price that should be paid by the road users, any road user charge should be identified as a payment for safe roads that generates better road safety conditions. However, some respondents disagreed with this concept as they asserted that in any condition, all roads should be inherently safe and road safety must be provided at the best level.

Table 8.3 also shows that 14 (70%) respondents agreed that there is no efficient revenue collection for road safety countermeasures (B.06). They claimed that alternative revenues should be explored and utilised widely in order to increase road safety efficiency. One suggestion is to have a new-style road safety fund managed by representatives of the public and private sectors, as well as the road users.

8.4.3 Stakeholder & Road User Engagement / Support Financing

Three questions were posed in this section to investigate the present engagement of stakeholders and road users in RSM. Table 8.4 shows that 14 (70%) respondents were stakeholders and were actively involved in road safety through varied roles, such as policy makers at the ministerial level, the chairmen of state RSCs, world experts at road safety organisations worldwide, and researchers (C.01). They stressed that such involvement allowed them to not only participate in road safety activities, such as advocacy and awareness, but also in the development of policy and action plans, and in budget formulation. The respondents stated that in order to enhance awareness of road safety, the ministries and departments responsible for road safety must have good engagement with road users. Nonetheless, as evidenced from the study, some ministries and departments in LMIC showed unwillingness to lead the initiatives.

Table 8.4: Statistical results for Engagement of Stakeholders and Road Users

	YES (N (%))	**NO (N (%))**	**TOTAL**
C.01 Are you as stakeholders or road users actively involved in RSM?	14 (70)	6 (30)	20
C.02 Should road users pay for road safety?	14 (70)	6 (30)	20
C.03 Is there any engagement between the stakeholders and road users in supporting road safety financing?	6 (20)	14 (70)	16

Table 8.4 presents that 14 (70%) respondents agreed that road users should pay for road safety (C.02). They highlighted that even in present practice, road users seem to be paying for road safety indirectly via road taxes, vehicle and license fees, as well as insurance. Whenever road user charges are being set, the board of the new-style road fund must consider affordability to ensure that every road safety activity can be implemented based on priority. They agreed that the benefit of having road user charges should be conveyed to the public to at least cover some portion of road safety

activities. Road users have also been identified as a cause as well as the beneficiaries of the safe roads. Hence, this concept reflects a collective responsibility among all parties involved to create sufficient and sustainable funding, apart from enhancing road safety conditions.

In terms of engagement between stakeholders and road users in generating funding for road safety, 14 (70%) respondents agreed that there has been no engagement between these two parties (C.03). Even though it is known that many fees or charges related to road safety have been collected from road users, the revenues are not directly allocated for road safety purposes but treated as collective income to the government. Hence, more engagement may be promoted if a new-style road safety fund board and road safety board are established. They added that both boards would encourage more engagement and participation from road users, even in terms of its management.

8.4.4 Road Safety: Public or Private Good

This section discusses if road safety should be treated as a public or private good and if there is a difference between economic and social roads in terms of road safety. For this purpose, four questions were posed; the statistical results are presented in Table 8.5.

Table 8.5: Statistical results for Road Safety: Public or Private Good

	YES (N (%))	**NO (N (%))**	**TOTAL**
D.01 Should cost-benefit analysis be used to justify the provision and management of the safety of economic roads?	20 (100)	0 (0)	20
D.02 Is there any difference between the economic roads and social roads in term of road safety?	9 (45)	11 (55)	20
D.03 Economically, is there any strong justification for social roads in term of road safety?	13 (65)	7 (35)	20
D.04 Is the provision and management of social road justified by road safety benefits?	13 (65)	7 (35)	20

All of the respondents (20, 100%) agreed that in order to justify the provision and management of the safety of economic roads, cost-benefit analysis should be applied as an economic tool to perform an accurate and reliable evaluation of the actual needs for road safety (D.01). The respondents believed that if it is performed in a scientific manner and wider costs associated with road accidents are taken into account, such as the costs to families left behind, health service costs, and productivity losses, it would be most helpful, especially in creating efficiency in terms of funding allocation. This scenario is similar to a business whereby it is crucial to make the right investment to reap the maximum profit. The respondents also stressed that it is important to carry out analysis, especially for decision makers and key stakeholders, so that they will comprehend the economic costs of road safety. This helps to produce a better policy for road safety, along with sufficient funding.

Table 8.5 shows that 11 (55%) respondents disagreed that there is a variance between economic and social roads in terms of road safety (D.02). Generally, they stressed that all types of roads have to be inherently safe, although the standards and specifications of those roads may differ in reality. The respondents claimed that economic roads are usually safer as they tend to receive higher levels of safety funds. Additionally, subsidies should be considered for social roads.

Table 8.5 displays that 13 (65%) respondents agreed that from the stance of economics, strong justification was observed for investment in social roads in terms of road safety (D.03). Their agreement was based on the argument that each life lost in a road accident has a similar value whether it is a social or economic road. Any loss of life represents economic loss to the country.

Furthermore, 13 (65%) respondents agreed that both the provision and management of social roads were justified by road safety benefits (D.04) as the cost of accidents is similar on social or economic roads. Therefore, effective and efficient RSM is required to reduce the burdens

mentioned above. The only concern was how the costs for the provision and management of social road would be paid for.

8.4.5 Cost Recovery

The concept of cost recovery for road safety is assessed in this section. Five questions were posed; the statistical results are shown in Table 8.6.

Table 8.6: Statistical test for Cost Recovery

	YES (N (%))	**NO (N (%))**	**TOTAL**
E.01 Should the concept of cost recovery be considered as appropriate for road safety financing?	17 (85)	3 (15)	20
E.02 Should financing instruments that provide the correct market signals be used for road safety?	17 (85)	3 (15)	20
E.03 Do you use any financing instrument to ensure efficient usage of resources for road safety by road administrations?	5 (25)	15 (75)	20
E.04 Do you use any financing instrument to constrain the size and the quality of the road safety network to that which is affordable?	5 (25)	15 (75)	20
E.05 Do you use any financing instrument to generate sufficient revenue and therefore to operate and maintain the safety of the road network on a sustainable long-term basis?	4 (20)	16 (80)	20

A total of 17 (85%) respondents agreed that the concept of cost recovery should be weighed in as appropriate for road safety financing (E.01). They agreed that this concept, if implemented well, can be a good move for road safety funding as it generates better transparency and efficiency. For instance, in the road sector, the road tax prices that need to be paid by heavy vehicles are higher when compared to smaller vehicles after considering that their weight that can deteriorate roads more. Simultaneously, they believed that this concept could persuade governments to pay more

attention to road safety as the benefits of having safer roads are clearly demonstrated in the cost-benefit analysis.

Table 8.6 shows that 17 (85%) respondents agreed that appropriate financing instruments that offer accurate market signals should be employed in RSM (E.02). Appropriate financing instruments generate better transparency and efficiency as funding allocation for road safety would be based on actual safety needs. If all of these conditions are met, the road safety authorities will be placed in a better position to gain trust from the road users.

Based on Table 8.6, 15 (75%) respondents revealed that no specific financing instruments were available to ensure efficient usage of resources, as well as to constrain the size and quality of the road safety network to that which is affordable (E.03 and E.04). The respondents highlighted that it is good if any mechanism can channel a portion of the funding for road safety purposes, such as the system implemented in New Zealand. The respondents also asserted that both the size and quality of a safe road network at the moment highly depend on needs and budget availability.

The results in Table 8.6 confirmed that 16 (80%) respondents did not use any financing instruments to generate sufficient revenues for road safety (E.05). Nonetheless, they believed that it is a very good initiative to start using a proper financing instrument for that purpose so that sufficient and sustainable funding for road safety could be provided in order to operate and maintain a higher level of safety for road networks on a long-term basis.

8.4.6 Charging and Revenues

The concept of charging and revenues for road safety is assessed in this section. Three questions were posed and the statistical results are as displayed in Table 8.9.

Table 8.7: Statistical results for Charging and Revenues

	YES (N (%))	NO (N (%))	TOTAL
F.01 Should road charging method be considered for road safety?	19 (95)	1 (15)	20
F.02 Should road safety funding be treated as similar to that of other utilities?	14 (70)	6 (30)	20
F.03 Should road users be charged for the cost of road safety?	15 (75)	5 (25)	20

Table 8.7 shows that 19 (95%) respondents agreed that the road charging method should be considered as a mechanism to initiate sufficient and sustainable funding for road safety (F.01). The findings displayed that about 14 (70%) respondents agreed that road safety funding should be treated similar to other utilities (F.02). About 15 (75%) respondents also agreed that road users should be charged for the cost of road safety (F.03).

The outcomes indicate that the respondents agreed that charging users a certain fee for road safety would provide sufficient and sustainable funding for road safety. The respondents believed that through this mechanism, many road activities could be carried out, particularly maintaining road conditions. This concept may also educate road users to be more responsible regarding road safety as they need to pay for what they use. The respondents also suggested that the 'polluter-pays principle' should be applied in road safety in order to ensure that irresponsible road users pay for any damage that they inflict. The findings in this section portray that the respondents agreed that road safety funding should be treated similar to other utilities, such as telecommunications, electricity, and water. The respondents believed that this mechanism may create more transparency as road users would only pay for what they use. However, challenges may arise in its implementation as road users might not agree and would therefore find it difficult to accept this concept. The respondents also suggested that road safety could be charged to road users through

some other mechanisms, such as road taxes and fuel surcharges. However, it is important to note that road taxes and fuel surcharges, at present, are collected as government revenue and not specifically for road safety purposes.

8.4.7 Financial Accountability

In this section, respondents were asked about the concept of financial accountability for road safety. Four questions were posed and the statistical results are shown in Table 8.8.

Table 8.8: Statistical Results for Financial Accountability

	YES (N (%))	**NO (N (%))**	**TOTAL**
G.01 Is there any relationship established between the road users and the government in the present RSM system?	4 (20)	16 (80)	20
G.02 Does the government provide answers and justifications for its action and regularly inform the road users on how it spends the public funds for road safety?	6 (30)	14 (70)	20
G.03 Does the present system provide information on the effectiveness of the government's road safety programmes in terms of specific targets?	12 (60)	8 (40)	20
G.04 Is there any accountability in the present RSM system?	2 (10)	18 (20)	20

Table 8.8 shows that 16 (80%) respondents revealed that there is no official relationship between road users and the government in the present RSM system in Malaysia (G.01). The escalating number of road crashes at the global level is putting pressure on the government to act immediately to halve the current number of road fatalities by 2020 (WHO, 2015). Therefore, the involvement of road users is essential to ensure the inclusion of every stakeholder in road safety towards achieving this fixed target. The respondents highlighted that in some developed nations, road user involvement is significant, but this is usually unofficial and through an NGO or similar body. The involvement of road users in RSM can only be achieved when new-style road funds are established for RSM. In Tanzania, a lead agency for road safety is being established where road users will be

included in the management of the agency and consulted during planning, advocacy, and other activities.

Table 8.8 also shows that 14 (70%) respondents verified that the government neither provided any answer nor justification for its actions or regularly informed the road users about how it spends public funds for road safety (G.02). They highlighted that this issue is becoming more serious in LMIC compared to HIC where such information is usually shared in annual budget reports, parliamentary statements, White Papers, and other public publications. The respondents also agreed that it is common for information to not be shared directly with road users, which could lead to miscommunication or misunderstanding.

Twelve (60%) respondents agreed that the present system provides information on the effectiveness of the road safety programmes organised by the government in terms of specific targets (G.03). Most of the respondents highlighted that there is still room for improvement as the present system is not particularly effective and could not be accessed by every road user. For example, some information disseminated to road users is only available online, such as the 'Think! Campaign' in the UK, which did not reach all road users.

Table 8.8 shows that 8 (40%) respondents disagreed on the present system's ability to provide information regarding road safety programmes. This notion is supported by 18 (90%) respondents who verified the lack of accountability in the present RSM system in Malaysia (G.04). The respondents stressed that road safety agencies should prioritise transparency process, which would increase road users' confidence and support.

8.5 Section III: Model Assessment

This section looks into the three proposed institutional models for RSM developed on the basis of the second-generation road fund mechanism. The questions were aimed at identifying issues associated with the implementation of such funds and collecting recommendations to enhance this process. Each model has different characteristics and benefits, as discussed in Chapter 7.

The proposed RSM and funding models were presented to 20 participants, who comprised stakeholders from Malaysia and the wider world. The statistical results displayed in Table 8.9 show that 14 (70%) respondents preferred Model 1 to Models 2 (4, 20%) and 3 (2, 10%).

Table 8.9: Statistical results for the proposed models

Model 1 (N (%))	Model 2 (N (%))	Model 3 (N (%))	TOTAL
14 (70)	4 (20)	2 (10)	20

The majority of the respondents viewed the proposed Model 1 as the simplest model and an easy institutional structure that could be set up successfully with the view to introduce a second-generation road fund mechanism for RSM and funding. This is because the set up would only involve the establishment of a road safety fund that would be attached to the present institutional structure of RSM. They commented that road safety funds would represent a new entity in ensuring the sustainability and sufficiency of road safety funding. Therefore, it would not radically change the present management of road safety and would give ample time to the system to adopt this new element. Simultaneously, it would make this model focus on collecting and allocating funds for road safety. It has been suggested that funding roles should be isolated from execution. Hence, there is a need for another board that is separate from the function of the road safety fund board explicitly for funding. This particular model is considered a short-term model that can refer to a step to introduce a second-generation road funds mechanism for institutional road safety

arrangements before the other proposed models can be implemented in stages. The respondents believed that this would require minimal changes to their present institutional arrangements.

The proposed Model 2 is more concerned about the clear functions that are segregated between the funding and administration of road safety, which assumes the separation of roles between two boards. The respondents highlighted that by having two separate entities, such as a road safety fund board and a road safety board, the focus on both funding and management would become more vivid. This model creates a clear line of responsibilities between the two different boards. The respondents thought that this model would be more comprehensive in terms of structure and easy to establish as well. Nevertheless, some respondents thought that this model is intricate and that it seems to create another agency, suggesting redundancy. Unlike the first model that does not have a complex structure, Model 2 has been claimed to have the potential to interrupt present arrangements. The most important aspect, however, is to strengthen the roles of road safety agencies in order to improve road safety. It was suggested that ideally both funding and RSM could be managed by a single board – at least in the initial stages of implementation.

The proposed Model 3 was viewed as the most comprehensive model that combined both road safety and road management under the same fund administration and funding source. The respondents stressed that road safety is broader than road management, so a focused and dedicated structure may be the best way to ensure the efficiency and effectiveness of RSM. Hence, they agreed that implementing such an arrangement would definitely create a good link between road boards and road safety boards. At the same time, issues related to fragmentation among boards can be minimised as their funding is allocated under the same roof. However, this model appeared as an unreasonably complicated model and difficult to implement. They felt that such a set up would lead to many layers and the organisations involved in the road and RSM would appear redundant.

Nonetheless, it is possible to be implemented, but in stages. As such, this model serves as a long-term model after the implementation of the first and second models, particularly to ensure a smooth transition from the present institutional arrangements.

8.6 Discussion

The analysis of the data gathered from the key stakeholders and experts suggests that road safety is a significant aspect that needs to be given special attention as its impact on both road users and the nation is very strong. The study revealed that both economic and social roads should be treated equally for road safety as the value of life and the cost of accidents in either situation is similar. The data verified the suggestion made in this study that there is a pressing need to devise a new mechanism for RSM and funding to create a good link between revenue and spending to enhance effectiveness and efficiency of its management. The evidence shows that there is definitely a possibility of using the concepts of cost recovery or user charges in road safety – similar to other utilities – as they may the improve efficiency, transparency, and accountability of RSM. The evidence also shows that direct involvement of road users in RSM is essential for its success. The analysed data suggest that second-generation road funds can be used as a mechanism for RSM and funding to implement the above concepts by designing a simple institutional structure that can evolve as necessary.

CHAPTER 9: DISCUSSION

9.1 Introduction

The primary objective of this research is to improve RSM and funding at the institutional level through the use of modern financing mechanisms aimed at establishing sufficient and sustainable funding for integrated road safety plans linked to the needs of road users. Upon acknowledging the multidimensional issues of RSM, this research has brought in a new dimension to the issue by introducing the concept of commercialisation for RSM as a holistic management and funding tool. The possibility of introducing the concept of commercialisation for road safety by using second-generation road funds was explored and investigated using Malaysia as the focus country. To date, the literature offers very little information regarding the applicability of second-generation road fund models for RSM and funding due to their innovative and pioneering approach. The outcomes from the previous chapter are promising in terms of the acceptability of the concept amongst key stakeholders of road safety. These findings may be used as a stepping stone to move forward and as an introduction to the concept initiated in this study for better comprehension not only among stakeholders such as policy makers but also amongst road users.

The following sections discuss the findings and emergent ideas of the research based on the results presented in the previous chapters.

9.2 Road Safety Management through Second-Generation Road Funds

This section discusses a number of fundamental aspects associated with the above developments.

9.2.1 Managing multi-disciplinary sectoral aspects

The findings presented in Chapter 5 serve as evidence that road safety is a complex issue and involves many different ministries and departments, thus leading to red tape and redundancy issues. As such, road safety has to be well-coordinated to ensure that all stakeholders are working in the same direction to achieve the fixed targets within the area of road safety. Based on the analyses, the main issue that seems to hinder the improvements of road safety is how to manage the various stakeholders in RSM. Although some nations have lead agencies to coordinate their road safety systems, such as the RSD in Malaysia, the function of these lead agencies may be very limited as it is not based on a solid legal basis to enable the agency to call and coordinate all stakeholders within the road safety arena.

This situation, however, can be improved if the proposed models are implemented. For instance, the findings of the research suggest that the previous gap between road management and road safety authorities could be reduced by implementing the proposed Model 3 as it generates a good link between road and road safety boards through the Road Fund Boards. Lack of coordination and communication between ministries and departments, as displayed in the findings presented in Chapter 5, could also be enhanced as both road management and road safety would have to report to the same Road Fund Boards for funding. Therefore, the efficiency of their activities could be monitored and audited by the same boards.

9.2.2 De-fragmentation of decision-making and clearer results focus

The outcomes of the research, as presented in Chapter 5, show that fragmentation of the decision-making process appears to be a main issue that impedes RSM. The involvement of various organisations from the public and private sectors has added to its intricacy. There is evidence to suggest that this could be resolved if all of the organisations involved are managed under one single arrangement, such as the Road Safety Board, which would coordinate the implementation of road safety strategies and plans. This research demonstrates how the second-generation road funds could be used to overcome the issue of fragmentation of decision-making among stakeholders in road safety. The institutional models that have been proposed in this research may create de-fragmentation of decision-making and enhance the effectiveness and efficiency of RSM. Although Zietlow (2007) asserted that effectiveness could be achieved through various institutional structure arrangements as long as funding and resources are available, setting up a good structure arrangement would definitely help to improve focus and make road safety management more effective. Hence, the proposed models would help to further enhance the effectiveness of RSM by creating a clear delineation of responsibilities between each organisation, apart from addressing the issues of fragmentation and lack of communication between them, as evidenced from the findings of the research.

The direct involvement of road users through these proposed models to monitor and audit the management of the boards would ensure two levels of monitoring in RSM. The first would monitor the collection and allocation of funding processes by the Road Safety Fund Boards while the second wold monitor the implementation processes of road safety activities using the allocated funding to ensure that it is used efficiently and in accordance with the approved plans.

9.2.3 Policy issues

Policy implementation for road safety is an integral aspect that has to be coordinated well in order to ensure that every stakeholder works towards a common aim (Robinson, 2008). As depicted in the findings of this research, the national road safety policy in Malaysia is formulated by the government through the MOT. This policy serves as guidance for the implementation of road safety activities and also for budget allocation purposes by the MOF since the policy provides a set of requirements and guidelines that can be adhered to by road safety stakeholders. There is also evidence that the present institutional arrangements in Malaysia are not well-coordinated regardless of the presence of a lead agency for road safety, the RSD. This was agreed by the RSD in the previous RSPM 2006-2010, whereby every ministry and department worked based on their own strategies and did not officially report to the RSD. Therefore, this research suggests that the implementation of the proposed models based on the second-generation road funds mechanism has the potential to overcome this issue as the Road Safety Boards would set up a national road safety policy and simultaneously help each ministry and department to set up their own plans and strategies to support the national policy. By doing so, all policies, plans, and strategies would be aligned, enhancing the effectiveness and efficiency of RSM as the end results.

It is critical to ensure that the establishment of Road Safety Boards is supported by a strong policy and legal basis, especially in terms of funding revenues and allocations, in order to ensure sufficient and sustainable funding for both the road and road safety boards. Furthermore, it is essential to ascertain that these road policies associated with the establishment of a second-generation road fund are in line with other transport and government policies. There could be another long-term issue pertaining to sustaining the road fund with its associated policies. In Malaysia, there is relative political stability and so this may not be a critical issue. Nevertheless,

in nations with unstable political situations, the sustainability of a road fund would be the ultimate challenge in implementing second-generation road funds as it would require continuous support or tolerance from governments regardless of their overall political views.

9.2.4 Implementation issues

This research shows the possibility of implementing the concept of commercialisation for road safety through second-generation road funds. As shown in the emerging good practice of the New Zealand road fund, the majority of the key stakeholders and world experts believed that this mechanism, along with road user charges, should be treated and explored similarly to utilities (i.e. electricity, water, and telecommunication) as it would enhance the effectiveness, efficiency and transparency of RSM (Jacobs & Thomas, 2000; Zietlow, 2007). This is in line with the concept of financial accountability in public financial management linked to the government's responsibility to secure and use its available resources effectively, efficiently, and transparently (Rabrenović, 2007; Allen *et al.,* 2013; Cangiano *et al.,* 2013). However, the challenges behind the implementation of a new policy for road user charges has to be addressed carefully, especially when it involves policy makers and road users as key stakeholders (Allen & Tommasi, 2001). The findings also show that these challenges could be overcome by designing road user charges carefully, similar to the 'polluter-pays principles' and the 'benefit principle', which emphasise that those responsible for creating costs and who also receive benefits from a service should pay the costs (Ecola & Light, 2009; Lindsey, 2010). It is identified that road users are the group that receives most of the benefits of road safety initiatives and at the same time are the major contributors and victims of road accidents, contributing almost 65% - 95% of damages (Sabey & Taylor, 1980; Papantoniou *et al.*, 2016). Furthermore, other factors that may determine the success

of the new policy for road safety charges are clear legal authority, competitive neutrality, effective collection, regular audits, and performance evaluation (Allen & Tommasi, 2001; Allen *et al.*, 2013).

9.2.5 Political interference or influence

It is almost impossible to see whether the present management of road safety is independent from political interference. This situation seems to be unavoidable since the funding for RSM comes from the government budget that has to be debated in the parliament by politicians before it is approved. As discussed in Chapter 6, this can lead to insufficient budgeting for road safety as it can be less attractive to politicians compared to other developments, such as new roads or schools.

As revealed in this research, the source of funding for road safety has to be independent from any political interference in order to ensure that the process of obtaining funding is fast and transparent. Therefore, the implementation of the proposed models could overcome this situation. Money collected from road user charges would be professionally managed and distributed to the respective ministries and departments based on the approved plans. This arrangement could reduce political interference as the road safety budget would not have to be approved in parliament. In addition, these new arrangements would not jeopardise the transparency and accountability of the processes as they would be monitored closely by the Road Safety Fund Boards, together with an annual independent audit that would be tabled to the government and the public. The presence of the MOF in the model structures for monitoring purposes would ensure the adherence of the Road Safety Fund Boards to standard procedures.

The respondents agreed that a certain degree of political influence in RSM is needed to ensure that the impact of road safety would be heard and understood by the government. In order to achieve

this without compromising the independence of the fund, it would be possible to offer a communication line with politicians through an appropriate public forum, for instance. By doing so, politicians could voice their concerns but primarily champion the issues related to road safety within a wider context, which in return could bring further positive impacts to road safety.

9.2.6 Commercialisation challenges

The concept of commercialisation needs strong support not only from policy makers but most importantly from road users. The findings from the research suggest that with proper policy and execution plans, it would be beneficial to educate road users about this concept and gain their trust so that they know what they will be paying for, which should encourage them to demand adequate and cost-effective road safety interventions (Heggie, 1999; Gwilliam & Shalizi, 1999; Heggie, 2000b; Heggie, 2000c; Gwilliam & Kumar, 2003; Jaensirisak *et al.*, 2005; Lindey, 2010). This is crucial as one of the prerequisites for successful implementation of the second-generation road funds is creating ownership by involving road users in management to secure their full support for the fund.

The findings of this research suggest that the proposed models resolve two main impediments that currently hinder RSM improvements, as discussed earlier. First, the payments received from the road users will be channelled directly into the Road Safety Funds and monitored by the fund boards represented by the road users. Second, the commercialisation environment that is created within the mechanism will encourage competition among the ministries and departments, which later will ensure the efficient use of the allocated funding and resources for RSM.

The findings of the research also demonstrate that the proposed Model 1 could be used as a preliminary model to introduce the concept of commercialisation by using second-generation road

funds for RSM. Thus, it would not radically change the present institutional structure of RSM and would provide ample time for the system to adapt to the new entity. Simultaneously, the structure of the model would allow the funds to reduce rent-seeking and increase the efficiency of allocation by linking revenues to expenditure and the quality of road safety services provided to road users. These arrangements also would allow the fund boards to operate in a more efficient manner within the commercial environment since the board would have full authority and a strong incentive to operate professionally (Heggie, 1999; Gwilliam & Kumar, 2003). Furthermore, by implementing these proposed models based on the commercialisation concept of second-generation road funds, it is envisaged that the efficiency of RSM would increase progressively as it would be motivated and driven by competition between road safety organisations (Thuesen & Fabrycky, 2000).

9.2.7 Composition of board and management of funding

The composition of the boards proposed is aligned with the best practices worldwide. Mixed representatives between the public and private sectors are essential to ensure that a business-like environment could be created and the concept of commercialisation could be introduced. Representatives from professional groups and business chambers would also help to rejuvenate the existing environment into one that is fresh and competitive, which can enhance the effectiveness and efficiency of management. These board members would be nominated by their organisations, while the chairman of the board would be elected by the board members. This mechanism would ensure that the transparency and independence of the board members would be kept at the highest level. However, such an arrangement could be resisted by politicians.

The findings from the research suggest that the present RSM lacks involvement from road users and that there is no engagement between the stakeholders and the road users to support road safety

financing. Therefore, the presence of road users on the boards would not only bring that group to the centre of road safety but would also help to increase the levels of transparency and accountability in road administrations and, in turn, increase their efficiency by maximising expenditure and improving road safety performance (Heggie, 2000c; Gwilliam & Kumar, 2003; Robinson, 2008).

In terms of funding levels, experiences from many road funds worldwide show that the establishment of funds based on the second-generation road funds mechanism has increased funding levels significantly and made them more sustainable (Heggie & Vickers, 1998; Heggie, 1999; Kumar, 2000; Gwilliam & Kumar, 2003; Robinson, 2008). Therefore, this mechanism would essentially help in raising sufficient funding for road safety activities. The newly proposed sources of funding collected from the road users via levies and charges would be used entirely for road safety. As clearly demonstrated in Chapter 7, the considerable amount of funding that could be generated from those levies and charges would be more than sufficient to cover annual road safety activities.

The findings in Chapter 8 demonstrate that by both boards – the Road Safety Fund Board and the Road Safety Board – having the same structure, the focus on both funding and management for road safety would be better and clearer as issues related to effectiveness could be eliminated gradually. The distribution of funding would be carried out by the Road Safety Fund Board based on the approved plans. The Road Safety Fund Board would focus on distributing the funding to the Road Safety Boards, which would later allocate the funding to each ministry and department in accordance with the approved plans. This new mechanism would enhance the monitoring and auditing processes by establishing independent auditing and regular monitoring by the Road Safety Fund Boards or any independent auditor appointed by the government. This newly independent

monitoring and auditing processes would ensure the effectiveness of the road safety activities and the efficiency of the allocated funding since the funding would be channelled correctly to the targeted activities (Gwilliam & Kumar, 2003).

The proposed models would need to be implemented carefully to avoid duplication and overlapping of their functions. Thus, clear roles and responsibilities need to be established and supported by a sound legal basis for all parties, including the Road Safety Fund Board, Road Safety Board, ministries, and departments, which would be executed at the ground level (Heggie, 2000b; Robinson, 2008).

9.2.8 Managing data

As postulated by Wegman (2016b), without a good set of data, it is impossible to improve road safety performance in any country. From the research, data management has been identified as an issue in present RSM in Malaysia. Even though collecting primary traffic accident data is the responsibility of the RMP, it is evident that the official data are not disseminated or made available to all stakeholders. This is because all of the stakeholders involved come from various ministries and departments, hence making communication between them difficult and unorganised. Researchers from various research institutes have raised concerns regarding this issue, which hinder them from conducting and publishing good research that may improve road safety in Malaysia. Therefore, the implementation of the proposed models could overcome this issue as all of the data would be gathered and managed by the Road Safety Boards. The board will be responsible for analysing and publishing the data not only to stakeholders but also to the public. In addition, the availability of a good dataset will allow the Road Safety Boards to design an effective national policy and strategy that can serve as guidance for the respective organisations.

9.3 Feedback from stakeholders in Malaysia

The feedback from stakeholders was based on the following objectives:

i) To discuss the findings from this study (on the effectiveness and efficiency of RSM in Malaysia) with the highest authority of road safety in order to retrieve their views and suggestions on the findings;

ii) To acquire early views and suggestions from policy makers on how the second-generation road fund mechanism could be used as a tool for RSM and funding.

All feedback and suggestions are deemed to strengthen the results of this research and help in developing viable recommendations for Malaysia and potentially other similar LMIC.

9.3.1 Discussion with the Hon. Minister of Transport, Malaysia

In order to increase exposure to the highest policy-maker in the road safety space in Malaysia, the findings of this research were briefly presented to the Hon. Minister of Transport, Malaysia during his working visit to London, UK in November 2015 (The Star, 2015). The results of this research were shared with the Hon. Minister and it was important to get his direct feedback and views pertaining to the research findings.

The following findings and recommendations are presented for further consideration:

Institutional arrangements

i. Generally, it appears that the institutional arrangements of RSM in Malaysia are in place and in line with best practices, as suggested by the World Bank.

ii. There is a lack of coordination and communication among key stakeholders, which seems to lead to overlapping and replication of functions, as well as creating fragmentation of the decision-making process, which can reduce the effectiveness and efficiency of RSM at the institutional level.

iii. More road safety initiatives need to be considered in order to provide safer roads to road users, such as the policy of 'Safe System'.

Funding

i. It has been identified that the key issue that may impede road safety is insufficient and unsustainable funding for road safety.

ii. Road safety initiatives appear to be unreasonably dependent on government funding. In addition, coordination, promotion, advocacy, and R&D seem to be fragmented.

iii. There is also evidence of limited partnership between NGOs and the private sector, which in turn may limit the funding needed for road safety.

At the end of the briefing, the Hon. Minister was in agreement with the findings, as follows:

i. There is fragmentation in RSM in Malaysia due to the replication and overlapping of responsibilities among the related ministries and departments;

ii. There is difficulty getting funding for road safety due to government budget constraints;

iii. The concept of commercialisation is interesting and should be explored further in order to enhance the effectiveness and efficiency of RSM, which may be implemented in Malaysia; and

iv. The possibilities and practicalities of the concept and the proposed models in this study could indeed be implemented in Malaysia.

In line with this research, in February 2016, the Hon. Minister announced a significant commitment to upgrade at least 75% of the road networks in Malaysia to a minimum of a three-star rating by year 2020 (iRAP, 2016). Furthermore, this initiative generated a three-year partnership between MIROS and SHELL, which covers the assessment and also research related to iRAP in Malaysia. As for upgrading road infrastructure, the MOT will work closely with MOW, PWD, and MHA as the responsible parties for road infrastructure development in Malaysia. All stakeholders in road safety will also be combining their efforts to educate road users and improve driving behaviours.

9.3.2 Discussion with policy makers

RSM and funding are the major issues that seem to impede road safety, especially in LMIC. Therefore, the findings of this study and the concept of the second-generation road fund mechanisms were shared with several policy makers from Asian countries during the International Road Traffic Management Forum 2016, held in Singapore (Eusofe & Evdorides, 2016). Among the participants were the Traffic Chief of Police, Brunei, as well as officials from MOTs from Singapore, Taiwan, Hong Kong, India, Timor Leste, Malaysia, Thailand, and Indonesia. This forum was highly important in order to understand stakeholders' views on the proposed concept.

The following key feedback and suggestions were concluded at the end of the forum:

i) There is a lack of funding for road safety in many countries, especially LMIC that depend on government funding. Some countries did not even have a specific RSM budget;

ii) RSM refers to concerted efforts by many parties and needs to be coordinated by a strong authority to reduce fragmentation amongst the organisations involved;

iii) Commercialisation for road safety using second-generation road funds is a new concept that might be used for road safety, especially considering present budget constraints. However, the concept needs to demonstrate its benefits before it can be accepted, especially by road users;

iv) Information needs to be disseminated to road users through engagement before the establishment of road safety funds in order to educate them about the whole concept and the benefits of having road safety funds; and

v) The study needs to identify the source of income for the proposed road safety funds and must ensure that it will not burden road users more than the benefits that they will reap.

CHAPTER 10: CONCLUSIONS AND RECOMMENDATIONS

10.1 Accomplished work

The research reported in this thesis is concerned about the effectiveness and efficiency of RSM and funding that impede the success of road safety at an institutional level, using Malaysia as the focus country. In order to enhance the effectiveness and efficiency of RSM, as well as creating sufficient and sustainable funding, the possibility of implementing second-generation road funds was investigated and analysed. The conclusions and recommendations drawn from this research are listed below with regard to the objectives outlined.

10.2 Key conclusions

a) Investigation of the Effectiveness and Efficiency of RSM at the Institutional Level

i) A conceptual framework was developed to integrate the effectiveness and efficiency of RSM using second-generation road funds as an appropriate mechanism to achieve these together with a set of guidelines for transferable implementation of RSM in nations with similar road sector features to those found in Malaysia.

ii) The methodology was systematic and based on the de facto international standards developed by the World Bank.

iii) Fourteen key policy makers and stakeholders of RSM in Malaysia were interviewed to identify how their organisations defined, agreed, and met their objectives.

iv) It was found that aspects of the institutional arrangements of RSM in Malaysia seem to be in line with the best practices suggested by the World Bank.

v) The key issue that seems to impede road safety is insufficient and unsustainable funding.

vi) Road safety initiatives appear to be solely dependent on government funding.

vii) Coordination, promotion, advocacy, and R&D appear to be fragmented. There is evidence of limited partnership between NGOs and the private sector.

viii) The gathering and indeed the management of accident data in Malaysia are unclear.

ix) New and innovative funding mechanisms are required to facilitate the application of road safety policies.

x) The establishment of a dedicated road safety fund based on the adapted concepts of cost recovery and commercialisation to country-specific conditions should be considered by governments to ensure the effectiveness and efficiency of the RSM in Malaysia and elsewhere.

b) Identification of Suitable Mechanisms for RSM and Funding

Twenty respondents from both key stakeholders in road safety in Malaysia and world experts were interviewed to seek their opinions on the suitability of using second-generation road funds as a mechanism for RSM.

i) It was found that overall, the implementation of second-generation road funds needs to be carefully and strategically executed to ensure that every stakeholder and in particular road users will understand the concept and consequently offer full support towards its implementation.

ii) The concept of cost recovery should be considered as appropriate for road safety financing in order to provide a clear link between funding and road safety network needs.

iii) Direct road user charging should be considered for road safety funding as road safety should be treated like other utilities (i.e. telecommunications, electricity, and water).

iv) Although the concept of commercialisation appears to be fully supported by stakeholders in Malaysia, there should be no distinction as far as fund allocation is concerned between economic and social roads.

v) It was demonstrated that by implementing second-generation road funds for road safety in Malaysia, an estimated fund of between MYR 350 million and MYR 750 million per year could be generated.

vi) This amount appears to be sufficient to fund the present activities of road safety in Malaysia.

vii) It appears that a small percentage of between 0.5% and 3.0% of fuel levies, traffic fines, motor vehicle licences, insurance premiums, and international transit fees may be sufficient to cover funding needs.

c) Assessment of the Proposed Institutional Models for RSM & Funding Tools

Three institutional models based on the second-generation road funds mechanism were developed, proposed, and assessed.

i) Any candidate model for implementation should consider the government procedures that lead to the approval of the overall institutional structure and the importance of political support or resistance to change.

ii) A simple model involving the establishment of a Road Safety Fund Board as the responsible body to oversee road safety implementation plans and manage their funding appears to be the optimal institutional structure.

iii) This simple model could be implemented as a stepping stone towards implementing commercialisation for the road sector in Malaysia.

10.3 Suggestions for future research

The following suggestions are given for further research in the future:

i) To widen the scope of the study at the road user level to evaluate their stances and acceptance of second-generation road funds;

ii) To examine the details of the implementation of second-generation road funds, including the setting up of funds, the revenues and allocations mechanisms, as well as their associated issues; and

iii) To compare the findings of this study that represent LMIC with other countries, especially HIC, in order to identify the strengths and weaknesses of each country group with varied levels of GDP.

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APPENDICES

APPENDIX A

UNIVERSITY OF BIRMINGHAM

Participation Information Sheet

Project Title: Road Safety Financial Management at Institutional Level

Researcher: Zarulazam Eusofe

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Supervisor: Dr. Harry Evdorides

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Summary of research

In today's world, road safety is a major transport, health and social issue worldwide as an estimated 1.3 million road users are killed on the roads every year. In terms of cost, it is estimated that USD 518 billion of losses yearly has been recorded according to the World Health Organisation (WHO). The World Bank stressed that due to shortage of funding especially in developing economies, there is a need to fully utilise the available funds and ensure the effectiveness of every initiative that will be carried out for road safety.

Current mechanism of road safety funding which mostly depend on a budget from government and also earmarking on certain services can no longer fund the road safety initiatives effectively. Effectiveness and efficiency of road safety management and every initiative taken towards it can only be ensured if the budget available is not only sufficient but also sustainable.

Therefore, this research aims to study and analyse the problem of current road safety institutional arrangement in terms of funding in order to develop a framework for road safety management that can be used worldwide as a guideline to create sufficient and sustainable funding for road safety.

The objectives of the questionnaire are to:

i. investigate the efficiency and effectiveness of current institutional arrangements in the area of road safety management;

ii. identify how objectives are defined, agreed and met in the development of a road safety programme (effectiveness) and thereafter how resources are allocated to activities planned to effect a road safety programme (efficiency); and

iii. identify the major issues that facilitate or impede road safety management plans in road institutions in the countries concerned from a funding viewpoint.

Further Information

This study has been reviewed by the Research Ethics Team of the University of Birmingham. If you have any concerns regarding the way this research has been conducted, please contact the ethics team by email at ethics@contacts.bham.ac.uk.

Further information regarding this research can be obtained from Dr. Harry Evdorides and Zarulazam Eusofe (see contact details above).

INTERVIEW PROTOCOL & QUESTIONS

Introduction key components	I would like to express my gratitude to you for taking the time to meet with me today and agreeing to participate in this research. My name is Zarulazam Eusofe, a postgraduate researcher at the School of Civil Engineering, University of Birmingham, United Kingdom. I would like to talk to you about your experiences and opinions as a one of policy maker/ key stakeholder who is involved directly in the Road Safety Management process in Malaysia. Specifically, as one of the components of my overall research, I'm investigating the efficiency and effectiveness of the current institutional arrangements by looking at Malaysia as a case study in order to capture lessons and experiences that can be used to further investigate the major issues that facilitate or impede road safety management plans at institutional level concerned from a funding viewpoint. Thank you for agreeing to take part in my research. The interview should take about an hour. Before we begin the discussion I would like to emphasise that: • Your participation is entirely voluntary; • You are free to refuse to answer any question; • You are free to withdraw from the discussion at any time; and, • You may withdraw your data from this research within 2 weeks. With your consent, this discussion will be recorded. This is purely to enable me to concentrate on listening to your responses and to ensure accuracy when transcribing what you say. All responses will

	be kept confidential. This means that your interview responses will only be shared with research team members. When the notes are created from the recording, all names and information that may identify you or other persons may be removed if necessary. Parts of the discussion may be used in my thesis and in publications arising from it. Signature : Interviewee : Designation : Organisation: Date :
Interview questions to investigate the effectiveness and efficiency of the current institutional arrangement in Malaysia.	1) Can you please elaborate on the relation AND/OR responsibility of your organisation with road safety. 2) Below are the targets set in the Malaysia Road Safety Plan 2006-2010: i. Ten (10) deaths per 100,000 inhabitants ii. Two (2) deaths per 10,000 units of registered vehicles; iii.Ten (10) deaths per billion kilometre covered journey Can you please list the roles played by your respective organisation in meeting the targets mentioned above. 3) How successful has the Malaysian Road Safety Plan 2006-2010 been in meeting the targets? 4) How does your organization play any role in coordinating road safety related issues with government central agencies namely

	Ministry of Transport, Ministry of Education, Ministry of Health, Ministry of Home Affairs, Ministry of Works, Ministry of Housing & Local Governments and also other federal agencies such as Road Transport Department, Traffic Police, etc.? i. What is this role? ii. Is it effective in term of i.e. setting up target, coordination, implementation etc.? 5) In relation to road safety matters, does your respective organization establish any affiliation or partnership at the Federal level and/ or State level? 6) Can you elaborate on your opinion whether the current judicial structure for road safety in Malaysia is effective and what are the improvements that can be taken if it is not? 7) What is the involvement of your organization in promoting road safety at both federal and state level? 8) Do you think that there is enough promotion and publicity on road safety being conveyed to the people at large? 9) Could you explain the source of funding in your organisation to execute road safety related activity? 10) What is the mechanism used by your organization in order to obtain the funding to finance the road safety related activity? 11) Is this funding sufficient? If NO, then why?

	12) How does your organisation allocate its funding for effective implementation of road safety management policies? 13) Is there any special mechanism used for the allocation of the funding? 14) What are the financial challenges your organization encounters in implementing the road safety management policies? 15) Have partnerships or agreement been established at the national level with the private sector? If ANY, could you briefly explain in what terms (expertise, research, funding etc.)? 16) How does your organisation monitor and evaluate the targets set for road safety nationally? 17) How does your organisation monitor and evaluate the targets set for your KPI? 18) Has there been any involvement in any research carried out by a governmental body or independent research institution on road safety by your organization? If YES, elaborate on your organization's role in it. 19) In your opinion, do we have enough resources (expertise, research) in road safety? 20) In your opinion, what are the greatest challenge to road safety in Malaysia and how can we overcome this barrier?

Interview questions to investigate the current arrangement for road safety funding in Malaysia.	1) How much is the yearly budget for road safety related activity that your organisation received in the last 3 years? 2) What was spent yearly on road safety activity in the last 3 years? 3) In order to provide sustainable funding for road safety, do you think that the government need to introduce a new innovative mechanism for road safety funding? 4) What are the funding mechanisms besides government budget, in your opinion, that could be used to help increase the source of funds for implementing the road safety related activity in Malaysia? 5) Based on your answer above, what could be the impact of the implementation of the new proposed mechanism in increasing the source of funds? 6) Is there any income from vehicle license fees, fuel levy, insurance levy, traffic fines etc. being used/ channelled to funding road safety in Malaysia? If YES, how does it work? 7) Do you agree on the idea of using income from vehicle license fees, fuel levy, insurance levy, traffic fines etc. for funding road safety in Malaysia? 8) What is your opinion on having a separate independent road safety board with their own funding to manage road safety related activity at the federal and state level?

Closing Key Components:	Is there any concluding remark that you would like to add? I'll be analysing the information you gave me and submitting a draft report to the research supervision team in one month. I'll be happy to send you a copy to review at that time, if you are interested. Thank you very much for your time and cooperation.

THANK YOU FOR PARTICIPATING IN THIS RESEARCH &

FOR YOUR VALUABLE TIME!

APPENDIX B

UNIVERSITY OF BIRMINGHAM

RESEARCH INFORMATION STATEMENT FOR THE PHD PROJECT

Project Title: Road Safety Financial Management at Institutional Level

Researcher: Zarulazam Eusofe

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Supervisor: Dr. Harry Evdorides

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Email: h.evdorides@bham.ac.uk

Dear Sir/Madam,

My name is Zarulazam Eusofe and currently undertaking PhD program at School of Civil Engineering, University of Birmingham, UK under the supervision of Dr. Harry Evdorides. As part of the research, you are kindly invited to participate in my research. The aims are to further investigate the suitability of Second Generation Road Funds as both road safety management and financing tools and to validate the model that may be used to improve the implementation of road safety schemes and the efficiency of road safety management system. I appreciate your kind cooperation in providing your time, experience and thoughts by answering the questionnaire form provided. Your cooperation is most essential as the deliverables of the case study could be beneficial to both industry and academia.

Privacy Protection

All responses to this questionnaire would be kept strictly confidential and will only be used for academic purposes. Once an appropriate data collection is conducted, the questionnaire will be shredded away for disposal.

Data Protection

Unless requested, by default, once you have decided to participate, the anonymous data collected from your verbal and written contributions may appear in the PhD dissertation and other related publications such as local and international journal. However, no personal details or details about the organisation will be disclosed.

Ethics

This study has been reviewed by the Research Ethics Team of the University of Birmingham. If you have any concerns regarding the way this research has been conducted, please contact ethics team by email at ethics@contacts.bham.ac.uk.

Further information regarding this research can be obtained from the researcher, Zarulazam Eusofe (see contact details above).

SECTION A: PERSONAL PROFILE *(PLEASE TICK WHERE APPROPRIATE)*

1. Age:

	<25 years		25 – 34 years		35 – 44 years		45 – 54 years		>55 years

2. Gender:

	Male		Female

3. Educational qualification:

	Diploma		Bachelor		Master		Doctorate		Others

4. Years of experience:

	<5 years		5 – 10 years		11 – 20 years		21 – 30 years		>30 years

5. Role:

	Stakeholder		Road user

6. Nature of organisation:

	Government		Private		Academia		Non-Governmental Organisation

SECTION B: INVESTIGATE THE SUITABILITY OF SECOND GENERATION ROAD FUNDS

Please answer by ticking one of the box (YES/NO) for each question based on your view and/or experience.

	QUESTION	YES	NO
ROAD SAFETY FINANCING	A.01: Is road safety seen as a public good and funded like a social service?		
	If YES, why?		
	A.02: Are road taxes and charges treated as a general revenue to the government?		
	If YES, how?		
	A.03: Is there any form of relationship between funding and revenues in road safety?		
	If YES, how?		
	A.04: Is there any form of relationship between funding and road safety network needs?		
	If YES, how?		

	A.05: Is there any form of relationship between funding and expenditure in road safety?		
	If YES, how?		
	A.06: Do road users perceive any price for the road safety use?		
	If YES, how?		
	A.07: Is there any consideration of choice on whether and how to travel with regard to safety?		
	If YES, how?		
	A.08: Is there any significant pressure from the road users felt by the administrations?		
	If YES, how?		
	A.09: Is there any significant pressure due to a hard budget constraint felt by the administrations?		
	If YES, how?		

Please answer by ticking one of the box (YES/NO) for each question based on your view and/or experience.

	QUESTION	**YES**	**NO**
EFFECTIVE FINANCING OBJECTIVES	B.01: Is there any secure and reliable source of funding for road safety management?		
	B.02: Should the source of funding for road safety be independent from political interference?		
	If YES, why?		
	B.03: Should spending decisions on road safety be based on needs (e.g. economic, social, environmental) and requirements of transport policy?		
	If YES, why?		

	B.04: Is there any established direct link between revenue and spending for road safety?		
	If YES, how?		
	B.05: Should prices paid by road users reflect the level of road safety?		
	If YES, why?		
	B.06: Is there an efficient revenue collection for road safety countermeasures?		
	Why?		
STAKEHOLDER & ROAD USER ENGAGEMENT	C.01: Are you as stakeholders or road users actively involved in road safety management?		
	If YES, why?		
	C.02: Should road users pay for road safety?		
	If YES, why?		
	C.03: Is there any engagement between the stakeholders and road users in supporting road safety financing		
	If YES, how?		

Please answer by ticking one of the box (YES/NO) for each question based on your view and/or experience.

	QUESTION	**YES**	**NO**
ROAD SAFETY:	D.01: Should cost-benefit analysis be used to justify the provision and management of the safety of economic roads?		
	If YES, why?		

	D.02: Is there any difference between the economic roads and social roads in terms of road safety?		
	If YES, how?		
	D.03: Economically, is there any strong justification for social roads in terms of road safety?		
	If YES, how?		
	D.04: Is the provision and management of social road justified by road safety benefits?		
	If YES, how?		
COST RECOVERY	E.01: Should the concept of cost recovery be considered as appropriate for road safety financing?		
	If YES, why?		
	E.02: Should financing instruments that provide the correct market signals be used for road safety?		
	If YES, why?		
	E.03: Do you use any financing instrument to ensure efficient usage of resources for road safety by road administrations?		
	If YES, what is it?		
	E.04: Do you use any financing instrument to constrain the size and quality of the road safety network to that which is affordable?		
	If YES, what is it?		
	E.05: Do you use any financing instrument to generate sufficient revenues and therefore to operate and maintain the safety of the road network on a sustainable long-term basis?		
	If YES, what is it?		

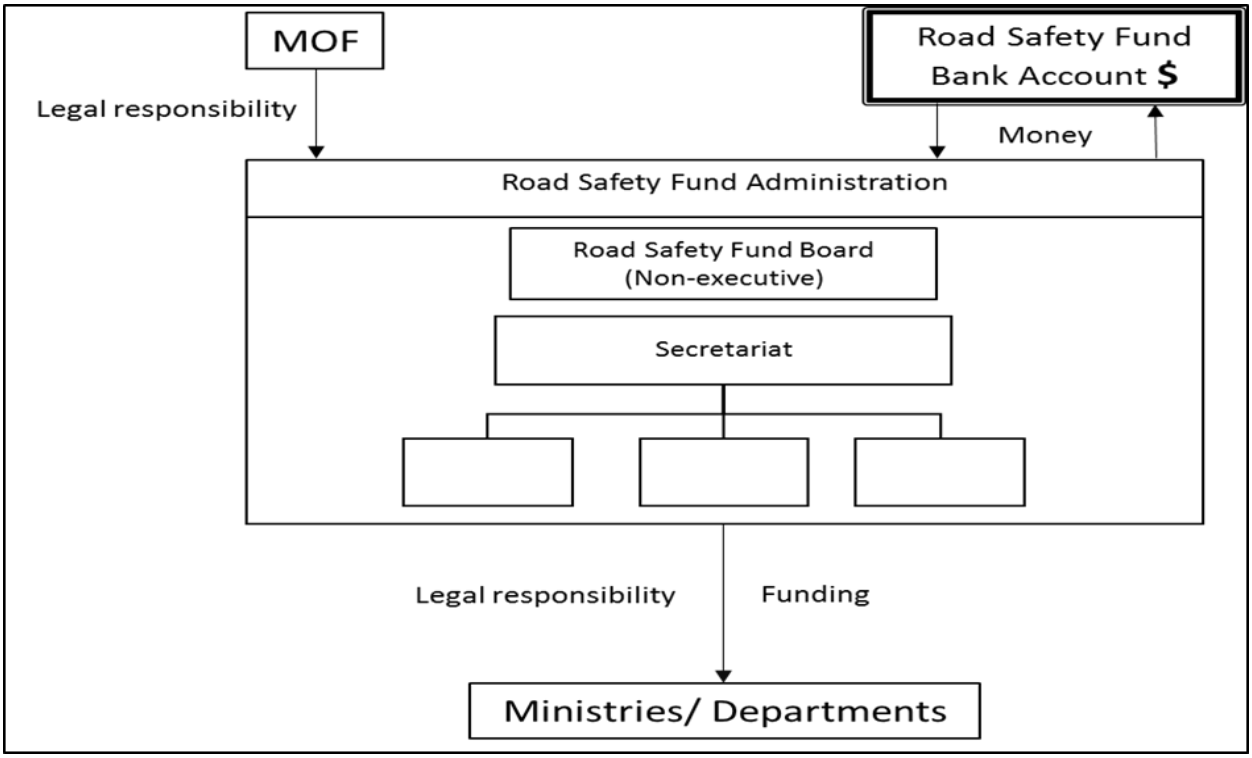
Please answer by ticking one of the box (YES/NO) for each question based on your view and/or experience.

	QUESTION	YES	NO
CHARGING AND REVENUES	F.01: Should road charging method be considered for road safety?		
	If YES, why?		
	F.02: Should road safety funding be treated as similar to that of other utilities (i.e. telecommunication, electricity, water, etc.)?		
	If YES, why?		
	F.03: Should road users be charged for the cost of road safety?		
	If YES, why and how?		
FINANCIAL ACCOUNTABILITY	G.01: Is there any relationship established between the road users and the government in the current road safety management system?		
	If YES, how?		
	G.02: Does the government provide answers and justifications for its action and regularly inform the road users on how it spends the public funds for road safety?		
	If YES, how?		
	G.03: Does the current system provide information on the effectiveness of the government's road safety programmes in terms of specific targets?		
	If YES, how is this effected?		
	G.04: Is there any accountability in the current road safety management system?		
	If YES, how is it achieved?		

SECTION C: INVESTIGATE THE APPLICABILITY OF THE PROPOSED MODELS

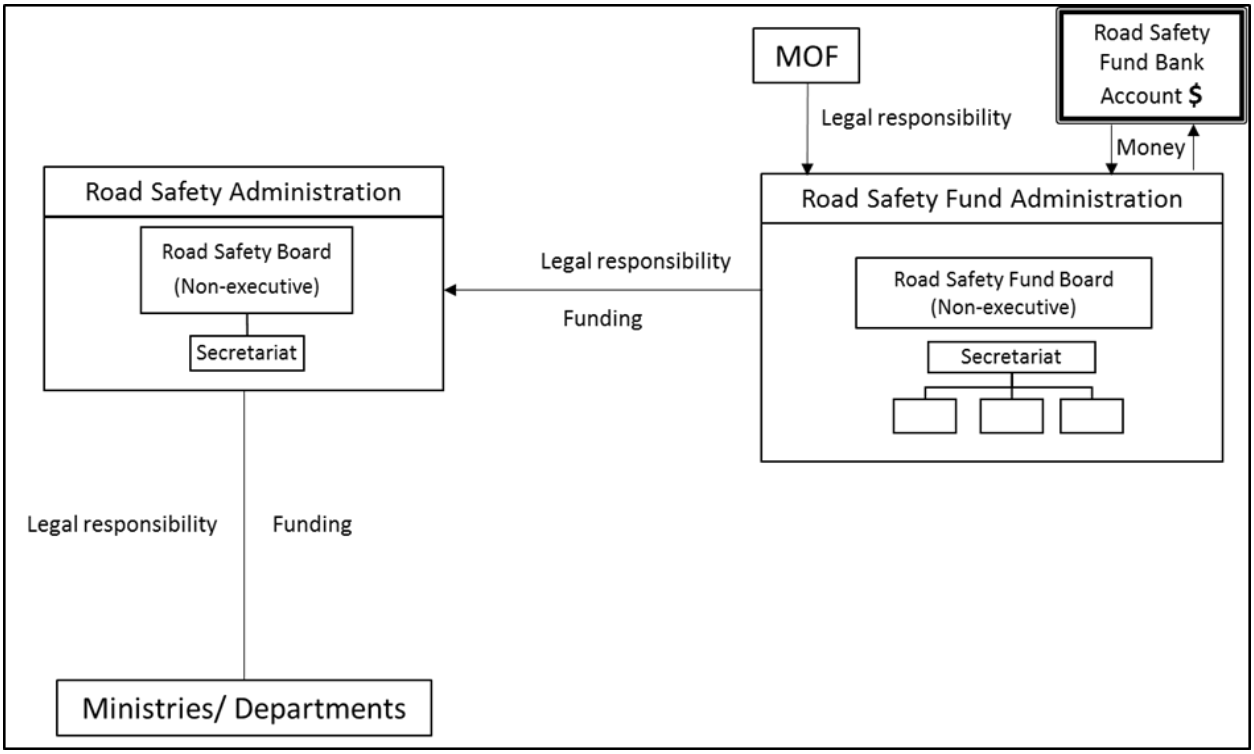
Please choose the best in your view model from those proposed and give the reasons/comments for your choice.

i) Proposed Model 1



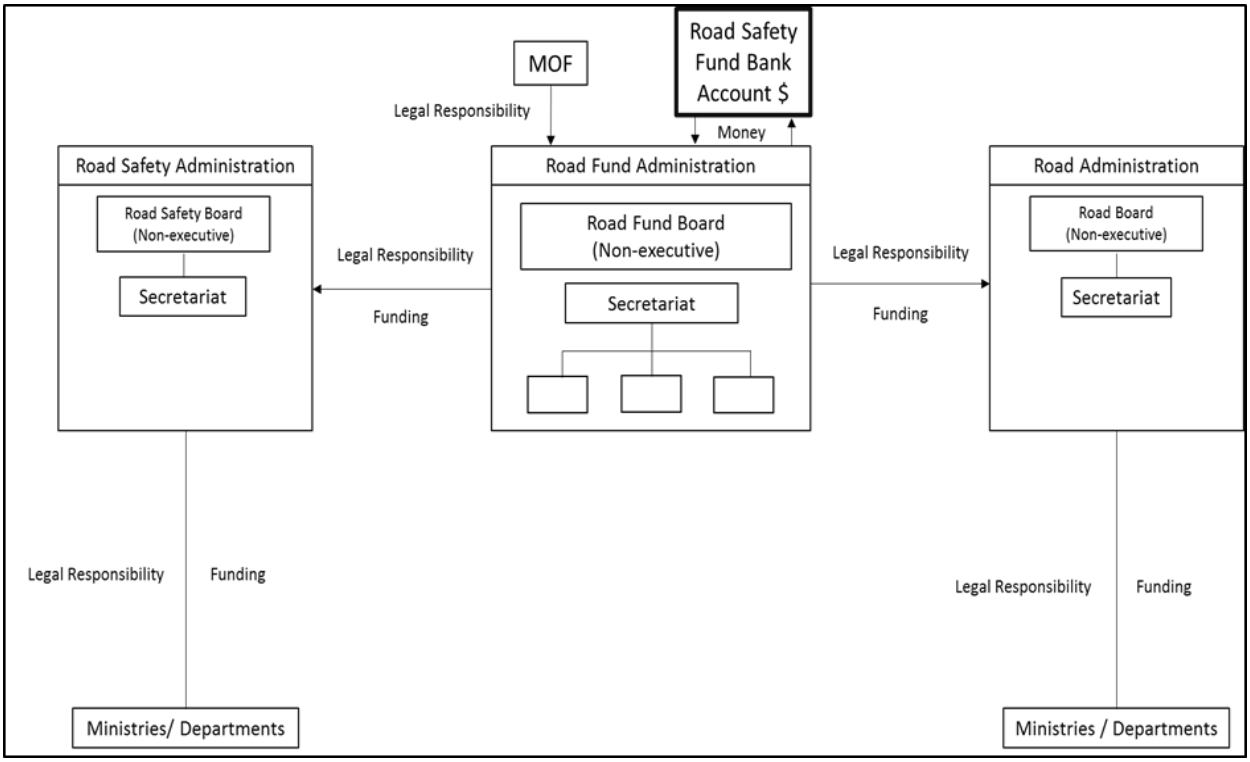
Reasons/comments:

ii) Proposed Model 2



Reasons/comments:

iii) Proposed Model 3



Reasons/comments:

…END OF QUESTION…

THANK YOU FOR YOUR VALUABLE TIME

APPENDIX C

THE DETAILS LIST OF RESPONDENTS

No	Participant	Designation	Organisation	Group
1	[redacted]	[redacted]	The World Bank	World Experts
2	[redacted]	[redacted]	The World Bank	
3	[redacted]	[redacted]	IRF	
4	[redacted]	[redacted]	UNESCAP	
5	[redacted]	[redacted]	UNESCAP	
6	[redacted]	[redacted]	Road Fund Board, Tanzania	

No	Participant	Designation	Organisation	Group
7	[redacted]	[redacted]	MOT	Malaysian Key Stakeholders
8	[redacted]	[redacted]	MIROS	
9	[redacted]	[redacted]	MHA	
10	[redacted]	[redacted]	RSC	
11	[redacted]	[redacted]	RSC	
12	[redacted]	[redacted]	RSD	
13	[redacted]	[redacted]	RSD	
14	[redacted]	[redacted]	RSRC	
15	[redacted]	[redacted]	MOF	
16	[redacted]	[redacted]	MOF	
17	[redacted]	[redacted]	MOT	
18	[redacted]	[redacted]	AAM	
19	[redacted]	[redacted]	Allianz Insurance	
20	[redacted]	[redacted]	Allianz Insurance	