

**PROVISION OF AN ENHANCED ROAD SAFETY FINANCING MECHANISM
THROUGH THE APPLICATION OF SOCIAL IMPACT BONDS**

by

ARUMDYAH WIDIATI

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Department of Civil Engineering
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ABSTRACT

Attempts have been made in low and middle-income countries (LMICs) to reduce the number of road fatalities and injuries through the implementation of road safety programmes. However, the results were not as expected and still tended to increase. It has been identified that weak road safety management causes low road safety performance in LMICs and high-income countries (HICs).

This study investigates the potential implementation of social impact bonds to improve road safety performance in low and middle-income countries, using Indonesia as a study case. A social impact bond (SIB) is an outcomes-based payment tool with a multi-sector partnership among government, private, community, and non-profit organisations.

The study consists of two main parts. Part one assesses the road safety management system, including road safety financing, in terms of the robustness of the road safety target, the efficiency and effectiveness of the institutional arrangement, the effectiveness of road safety intervention delivery, and the financial availability and capacity. Part two investigates the implementation of SIBs for road safety to improve the road safety management system, which consists of assessing the suitability of SIBs to improve road safety management and develop SIB delivery and payment structures.

The findings show that road safety management performance at the national and local levels is still below the margin. Therefore, implementing SIBs is expected to improve road safety management performance by utilising outcome-based payment and multi-sectoral partnerships. Furthermore, the investigation of the potential implementation of SIBs for road safety shows that SIBs may be implemented in Indonesia, with some conditions and structures to address the current road safety management. Three SIB delivery structures are proposed, which can be implemented in Indonesia with specific requirements that must be met before implementation. Two models of investment cases were demonstrated: economic and financial cases. The financial case generates a low rate of return, which may make SIB investment unattractive to potential investors. The economic case generates a higher return payment. However, the benefits of this model are spread to many stakeholders.

Keywords: *road safety management, road safety assessment, road safety financing, road safety funding, Social Impact Bonds, road safety investment.*

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To
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CHAPTER 1. INTRODUCTION

1.1. Introduction

It has been found that road crashes involving motor vehicles are the eighth largest cause of fatality worldwide. Furthermore, the biggest cause of death for children and young adults aged 5 to 29 is motor vehicle collisions (World Bank, 2022). Road fatalities and injuries are responsible for US\$100 billion in losses in low and middle-income countries (LMICs) every year, in which more than 90% of road traffic fatalities occur, 80% occur in middle-income countries, and 13% in LMICs (Hyder et al., 2012; Hyder et al., 2013; World Health Organization, 2015;). The losses represent up to 6.5% of their Gross Domestic Product (GDP). Meanwhile, the impact of road fatalities and injuries globally is 3% (International Transport Forum, 2022; World Health Organization, 2015).

Abagale et al. (2013) further confirmed that poorer societies suffer a more detrimental impact from road crashes. The study found that poor households in the Kassena Nankana districts in northern Ghana suffer more losses caused by road crashes, as much as 183% of their annual income, compared to a wealthy household, which only 5% of its annual income.

Furthermore, Davies and Newman (2016) identified a broader impact of road crashes on a household. This impact is rarely captured in the valuation of road traffic injuries in LMICs, such as family's quality of life, financial resilience, school drop-out, and long-term social outcomes. Belinsky et al. (2014) argued the impact is caused by immediate medical costs that the crash victims or families should pay. For example, 70% of total health expenditure in

Southeast Asia countries is an out-of-pocket payment, representing more than 10% of total consumption spent on health.

Apart from road crashes, fatalities, and injuries impacting socio-economic conditions, i.e., economic losses, socio-economic conditions also affect the risk of road crashes, fatalities, and injuries. The socio-economic conditions include income, population, and motorisation growth. The relationship between income level, shown by the GDP, and the road fatality rate can be seen in the study by Kopits and Cropper (2005). Kopits and Cropper (2005) identified that the fatality rate worsens as income and the number of motor vehicles grow. These results align with the study by Yannis et al. (2014) on 27 European countries, which showed that an increase in the annual GDP per capita may lead to an increase in the annual fatality rate and vice versa. Furthermore, it has been shown that the risk of road traffic fatality in LMICs, which have lower income levels showed by a lower GDP, may reach more than three times higher than in high-income countries (HICs). The average fatality rate of LMICs and HICs is 27.5 and 8.3 fatalities per 100,000 population, respectively (WHO, 2018). Furthermore, Li et al. (2018) found that population and private car ownership growth leads to increased road crashes. In contrast, the road network expansion leads to decreased road crash frequency in Hong Kong.

Moreover, in 2003, Kopits and Cropper predicted that by 2020, the fatality rate in high-income countries will be less than 8 per 100,000 population, while in low-income countries, about 20 per 100,000 population. In 2020, three of the 36 OECD members had a fatality rate of less than eight (8) (Commonwealth of Australia, 2022). Therefore, it can be said that the prediction by Kopits and Cropper (2003) on the HICs fatality rate is aligned with the Commonwealth of Australia (2022). Meanwhile, Kopits and Cropper's (2003) prediction of HIC and LMIC's fatality rate is slightly lower than WHO (2018). As mentioned previously, according to WHO

(2018), the road fatality rate in HICs was 8.3 fatalities per 100,000 population, while in LMICs, it was 27.5 fatalities per 100,000 population.

Kopits and Cropper (2005) also identified that road traffic fatality risk declines when per capita income equals or exceeds \$8,600 (1985 international dollar). This figure was reached by countries such as Austria, Finland, Norway, and the United Kingdom in the 1970s. These countries are categorised as HICs. This finding may also explain the significant decline of the European Region, with a 51% reduction since 2000, to 7.4 fatalities per 100,000 population in 2019 (WHO, 2022). The rate is the lowest among all WHO regions. Other regions have a slower decline.

It can be concluded that the road safety performance in LMICs is lower compared to HICs. In addition, Kopits and Cropper (2005) argued that LMICs would take many years to achieve road fatality risk as HICs if they follow the historical trends with the present road safety policies. A leap should be made by adopting road safety policies at the same rate as HICs.

Attempts have been made in LMICs to reduce the number of road fatalities and injuries through the implementation of road safety programmes. However, the results were not as expected and still tended to increase. Bliss and Breen (2009) identified that weak road safety management may cause low road safety performance in LMICs and HICs. As has been identified by Muhrad et al. (2016), implementation, funding, monitoring, and evaluation are the lowest levels of availability and the most problematic components of the road safety management system in European countries.

Funding is a fundamental issue in road safety management (Assum, 1998; Bliss and Breen, 2009; WHO, 2015; Muhlrad et al., 2016). The funding issues include funding sources and funding management.

Limited and ineffective budgets for road safety programmes generate a need to use the accessible funds completely and ensure the usefulness and sustainability of every programme conducted for road safety ((World Bank, 2022)). Budget limitations for road safety might occur because it is rarely considered a priority programme since it is difficult to get support from decision-makers. This situation often occurs in LMICs, where road safety is not a priority yet because of the inadequacy of their transportation modes and infrastructure, a lack of road safety awareness, and less road safety data recorded. Moreover, ineffective budgets happen because most public sector projects are funded based on the delivery of the activities. For example, the financing for a helmet-wearing campaign will be determined by the frequency of the events, not the increase in helmet-wearing following the campaign. They do not consider the outcomes and impacts of the projects.

Concerning ineffective funding, the government, which manages the money from the taxpayers, should ensure that this money is used effectively for the projects (cost-effective). The money will be paid if the desired results are achieved. For example, in the case of road safety, the desired result is a reduced number of road crashes, fatalities, and injuries.

Limited funding may be addressed by finding additional or supplementary funding, as Bliss and Breen (2009) suggested in one of the six World Report recommendations for improving road safety performances, i.e., finding new funding resources is necessary for weak road safety management capacity.

Currently, in most countries, the funding for road safety comes from the government's budget. If road safety programmes, funded by a government budget or the taxpayers, failed, then it would negatively impact the government's budget allocation and even other posts of the government budget. Furthermore, Assum (1998) identified that the problem is organising a sustainable system for collecting revenue and ensuring it is spent on road safety rather than resources.

As Minford argued in the work of Walters (1982), public sector projects funded by governments have poor returns. There are two reasons why this situation occurs: firstly, projects are usually carried out with social or political considerations and are not concerned about solving the real problems. Additionally, some projects are less popular politically, such as constructing a new road, which is more favourable than road maintenance projects (Roth, 2006). Secondly, the corruption of funds given to particular projects leads to unexpected results.

Furthermore, road safety is a multidisciplinary field which includes health, engineering, psychology, and social science (Hagenzieker et al., 2014). In the latest paradigm of road safety, road safety is seen as a system. Therefore, road safety should be approached systematically and holistically, which considers inter-sectoral works.

Indonesia has a road safety master plan comprising all road safety pillars. However, those plans do not seem to be adequately delivered. There is less attention to implementing and delivering road safety programmes/measures, including at the regional and local levels. This can be seen from the high number and rate of crashes in each province. In addition, road safety programmes were planned without transparent and sustainable funding, financing sources and implementation, giving the plans the appearance of theoretical texts rather than operational

recommendations (Aeron-Thomas et al., 2002); Bliss and Breen, 2009). The government budget has funded the current road safety programmes.

Furthermore, road safety may not be prioritised in LMICs compared to other transport activities, such as infrastructure provision, because road density is still low. This condition may lead to no specific road safety plan funding. In this situation, the World Bank suggested that it is necessary to make full use of the funds available (efficiency) and ensure the effectiveness of every road safety initiative (World Bank, 2007).

The safe system approach, which nowadays is one of the best approaches for road safety, also suggests a shared responsibility among road safety stakeholders. In Indonesia, the shared responsibility for road safety can be seen from the division of tasks among several ministries and high-state agencies to address road safety. However, stakeholders of road safety are not just the government. Other sectors, such as community, business, and private sectors, must also improve road safety. This aligns with The International Transport Forum Report 2016, which presented the Safe System approach as a new governance model for road safety. It recognised that effective road injury prevention involves different government departments and agencies interacting with civil society and the private sector. And while this is organisationally challenging, it can help to overcome policy-making “silos” and promote multi-sectoral collaboration and partnerships. The report also stressed the importance of “good governance” principles of transparency, accountability, inclusiveness, and shared responsibility as the basis for integrated and complementary actions.

The private sector, particularly the transportation sector, is responsible for improving road safety, as road traffic crashes may become their externality (Robinson, 2008). Up to date, the contributions of the private sector, community, and NGOs, especially those related to road

safety, are mainly implemented through corporate social responsibility (CSR) programmes. The contributions are usually made in kind, as the government restricts accepting cash from the private sector. Nevertheless, instead of being sustainable, these programmes are usually just temporary. The communities and NGOs may run out of funding for road safety intervention programmes, while private sectors may have completed their term of CSR programmes.

Involving the private sector in delivering public services is a form of New Public Management (NPM) (Robinson, 2008). Furthermore, partnerships with development organisations and related entities to assist the implementation of the World Bank's recommendations to improve road safety performance are encouraged for LMICs (Bliss and Breen, 2009). Therefore, partnerships with the private sector may be applied to improve road safety management efficiency and effectiveness. The private sector has much strength in management skills. Furthermore, the private sector is assumed to have efficient and effective management such as effective monitoring, fulfilling road user needs without considering political priorities, lower costs than government projects but maintaining the quality, providing better information about their financial performance, speed of response, direct access to the source of funding; and have innovative ways to meet the consumer demand (Roth, 2006; (Aeron-Thomas et al., 2002)).

The role of these private sectors and NGOs may be maximised through the Public-Private Partnership (PPP) programme in road safety management. PPPs in road safety management expect to improve road safety financing mechanisms by involving private-sector in providing up-front funding and delivery skills. The partnership can be seen as sharing risk and responsibility between the public (government) and private sectors. The PPP is commonly used in road infrastructure sectors. For example, this type of collaboration is often found in road construction or road maintenance. However, even though the partnerships with the private

sector seem promising to improve road safety management, especially regarding road safety delivery, this scheme has not been intensively studied in LMICs.

A social impact bond (SIB) has been investigated in this research to be implemented for road safety to improve the delivery of road safety programmes. The social impact bond (SIB) is an emerging financing instrument in social sectors (Social Finance, 2010, 2015; Eames et al., 2014; Tan et al., 2019; Katz et al., 2018; Schinckus, 2015). The SIB is a form of PPPs (Kim and Han, 2015); Eames et al., 2014; (Warner, 2013). However, if PPPs were known in infrastructure projects, SIBs would be more involved in social interventions, such as rehabilitating short-term offenders in Peterborough Prison, the United Kingdom, in 2010 (Warner, 2013).

The SIB enables the public sector to share the risk in social intervention with the private sector. As road safety impacts societies and economies, SIBs may become choices for finding road safety delivery solutions. Using SIB, the mechanism between road safety stakeholders, i.e., the government and private sectors, may be established. SIB may also improve RSM by the repayment to the investors if the agreed outcomes of the programmes have been met and also require robust monitoring and evaluation ethos. Moreover, the social impacts of road safety on society have attracted external funders (philanthropy, social and commercial investors) to be involved in road safety delivery.

Due to the advantages generated by implementing SIBs in delivering public services, it is felt that SIBs may be implemented for road safety. It needs to understand how SIBs work in practice and the effects of the SIB on public service delivery, in this case, road safety delivery. However, why and how SIB should be implemented for road safety has been limited to the discussion.

Therefore, this study presents a systematic approach to this effect with Indonesia as the case study.

1.2. Research Aim and Objectives

1.2.1. Research Aim

The research aim is to provide an enhanced road safety financing mechanism by applying social impact bonds (SIBs) to promote better road safety management.

1.2.2. Research Objectives

This research assessed the possibility of using SIBs to address the lack of ineffective road safety financing. To achieve that aim, the following research objectives are as follows.

1. To examine the current road safety management in developing countries, using Indonesia as the case study.
2. To examine the current road safety financing mechanism in Indonesia.
3. To examine the possibility of implementing a social impact bond for road safety in Indonesia.
4. To develop social impact bond models for road safety in Indonesia.

1.3. Research Scope and Limitation

The study focuses on assessing road safety management performances in Indonesia at national and local levels. The study also investigates an SIB's potential use and development to deliver road safety interventions. Yogyakarta Province is used as the case study.

1.4. Innovative Features of the Research

Innovative features and contributions of this research are as follows:

1. This study adds to the existing knowledge of road safety management components that need to be assessed in more detail to set up SIBs. Provide a methodology to carry out social impact bond investments for road safety in LMICs.
2. The research adds to the existing knowledge of using public-private partnerships in road safety financing with the concern of using social impact bonds for road safety financing mechanism. It adds to a growing body of knowledge regarding social impact bonds and how they interact with service delivery processes under various contexts.
3. Develop a road safety financing mechanism by considering the outcome-based approach.

1.5. The Layout of the Thesis

This thesis is structured as follows.

1. Chapter One provides the research background, problem statement, aim and objectives, innovative features and thesis layout.
2. Chapter Two reviews the literature on the current road safety management and the previously developed social impact bonds in financing social programmes.
3. Chapter Three elaborates on 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.

4. Chapter Four explores the Indonesia RSM situation, including the government's role in its RSM and policy setup. The current practice of RSM in terms of institutional structures and funding mechanisms applied by the government is also discussed.
5. To answer the first and second objectives, Chapters Five and Six present assessments of Indonesia's RSM at national and local levels. Analysis has been made based on the data collected during interviews with key stakeholders in Indonesia. These chapters enhance our understanding of RSM practices in Indonesia and whether they are effective and efficient. The present setup and practices within the road safety management and financing mechanism in Indonesia are presented in this chapter to understand why a new financing mechanism is needed.
6. Chapters Seven, Eight, and Nine present the answer to the third objective. The conceptual framework and analysis of the investigation of the potential use of SIBs for road safety delivery have been presented. The analysis is limited to road safety programme delivery in Yogyakarta Province (Yogyakarta). The analysis uses a case study of a road safety education programme in Yogyakarta Province.
7. Chapter Ten and Eleven present the answer to the fourth objective. The proposed SIB delivery structures are presented in Chapter Ten. Chapter Eleven presents the payment structure of an SIB has been presented.
8. Chapter Twelve presents a discussion of the findings depicted in the previous chapters to develop a social impact bond model for road safety.
9. Chapter Thirteen draws conclusions and lists recommendations for future works.

CHAPTER 2. LITERATURE REVIEW

2.1. Introduction

This chapter presents the literature review by exploring the literature on road safety management and social impact bonds (SIBs). Furthermore, it investigates how the SIB for road safety should be developed to improve road safety programme delivery. It started with elaborating on understanding road safety management concepts, mainly how they work and have been managed. Aside from that, to explore the possibility of implementing social impact bonds as a road safety financing mechanism, the fundamental concepts of social impact bonds and the essential components should be provided to develop a SIB. This chapter has two main sections. The first section reviews road safety, defining a safe system, road safety management and its components. The second section reviews social impact bonds, which consist of their definition and components and the current application of SIBs.

2.2. Road Safety Management

Road safety management is a systematic process to reduce the number and severity of road-related crashes (Varhelyi, 2016). Its implementation depended on how road safety was understood (Hagenzieker et al., 2014). The paradigm of road safety has been changing over time. The change can be seen from the presumption of the cause of road crashes. The change in the paradigm also changes how to solve road crashes. The changes were also identified by Bliss and Breen (2009). Bliss and Breen identify four phases of road safety management: Phase 1 – Focus on driver interventions (1950s – 1960s); Phase 2 – Focus on system-wide interventions (1970s – 1980s); Phase 3 – Focus on system-wide interventions, targeted results

and institutional leadership (the early 1990s); Phase 4 – Focus on Safe System long-term elimination of deaths and serious injuries, and shared responsibility (the late 1990s).

The safe system approach is developing a road transport system that tolerates human error and minimises casualties due to road crashes (OECD/ITF, 2008; Larsson et al., 2010). Instead of blaming road users as the cause of road crashes, Safe System recognises them as the weakest link in the transport system; therefore, they must be protected. The components of the Safe System are safe vehicles, safe roads and roadsides, safe speed, and safer road user behaviours. The Safe System approach is designed for the transport system with a systematic method to reduce the occurrence of crashes and associated injuries.

LMICs with a lower road safety performance than HICs need to shift to Safe System projects (Bliss and Breen, 2009). Shifting to Safe System projects is suggested by the World Bank to LMICs because, with safe system projects, it is expected that apart from systematic, measurable, and accountable investments, management capacity can also be increased. At the same time, to achieve rapid improvements in road safety for all road users. Even though institutional capacity is still weak, which usually happens in LMICs, the Safe System projects can be implemented by learning by doing, however, with sufficient targeted investment.

2.2.1. Financing Road Safety

In a road safety management system, sufficient funding becomes an essential part of ensuring the sustainability of road safety programmes; if there is an absence or scarcity of funding, the process will not be delivered effectively or at all. For example, in Pakistan, due to the absence of funding, the National Road Safety Secretariat (NRSS), the lead road safety agency, has been dismissed along with the national road safety plan (Tiwari, 2014).

Funding become one of the weakest points in road safety management systems in European countries (Alfonsi et al., 2016). Problems associated with funding include no estimation of a long-term budget for road safety and a lack of formal budget allocation for road safety, especially at regional and local levels.

Furthermore, road safety funding issues become apparent at the local level, as shown by a study conducted by Gaines et al. (2013). The study shows that the typical local road safety challenge in the United States (US) is limited funding. The local roads should compete with state roads with higher traffic volume and number of crashes and fatalities. The other cause is that road safety funding is not a priority because there is no support for the decision. Therefore, the local agencies should look for other funding sources, such as Federal-Aids. In addition, local agencies should also provide up-front funding to deliver road safety programmes for government projects and reimburse the States for the expenses.

According to Assum (1998), the funding sources of road safety should not be worried as road safety has potential funders: vehicle owners. The critical issue is ensuring that funding is used solely for road safety (Assum, 1998). Eusofe and Evdorides (2016) proposed institutional models based on second-generation road funds in managing road safety funds to be used directly for road safety initiatives. The proposed model employs road safety funds, which are managed by an autonomous body programme as also suggested by Aeron-Thomas et al. (2002), i.e. road safety fund administration.

A study in Thailand by WHO (2015) shows that current funding for road safety is aimed more at curative efforts. These costs are healthcare costs and are significant in the country's economy. However, funding for preventive efforts and project-based activities is very small compared to funding for curative efforts, even though it is known that the impact of economic losses is very

large. Bishai et al. (2003) also identified a low road safety investment in LMICs. Bishai et al. (2003) researched government spending for road safety investment in Uganda and Pakistan. The government spending for road safety investment in Uganda and Pakistan is \$0.09 per capita (0.02% of GDP/capita) and \$0.07 per capita (0.015% of GDP/capita), respectively. This value is very low; moreover, compared to road safety investment in HICs, this value may be considered an under-investment. The cost of road crashes, imposed on society in LMICs, is up to 5% of GDP; however, the investment allocation for road safety is close to zero.

Funding for preventive efforts by considering to avoid detrimental impacts may be categorised as a social impact investment. The social impact investment in road safety preventive programmes is also suggested by Davies et al. (2015). Davies et al. (2015) and WHO (2015) also identified the potential funding sources that may be unlocked for the impact investments.

In addition, Davies et al. (2015) and Davies and Newman (2016) propose schemes of investments to achieve the expected impacts. Three types of social investment may be applied to road safety. The first type is asset-backed, which may be used to fund road safety interventions which concern safer roads and roadsides. The second type is impact bonds, which may fund road safety interventions that concern safer road users, post-crash response, and safety management. The third type is direct investment, which may fund road safety interventions concerning safer road users, vehicles, and road management.

Furthermore, Davies et al. (2015) also clarify the spectrum of alternative investment approaches, including financial-only, responsible, sustainable, impact, and impact-only investment. The difference among those types of investments is the focus of the investment, i.e. considering environmental, social and governance practices along with the financial returns. The extreme conditions are financial-only investments that consider financial returns with

limited or no consideration of environmental, social, and governance practices. Meanwhile, the impact-only investment addresses societal challenges that cannot generate a financial return.

Issues may also emerge once the funding is secure, as identified by WHO (2015). The issues, for example, are not knowing how to use the funds, inadequate human resources and technical skills for road safety prevention projects, lack of good projects, lack of organisations to run the projects, the potential to be abused by government officials and got political interference if the fund is managed under the government system.

2.3. Social Impact of Road Crashes

As previously stated, road safety causes losses for a country by up to 5% of the GDP for LMICs and 3% globally (World Health Organization, 2015). Road crashes cost \$2,000 billion annually, derived from the health and welfare system, the legal system, the insurance sector, the commercial and business sector and the families of those affected (International Road Assessment Programme, 2014). Those values are obtained from the calculation of road crash costs. The costs may be categorised as broader social, economic, and financial. The cost categories can be differentiated by components, such as monetary and non-monetary costs, direct and indirect costs, and social or human costs. The categories and detailed components of crash costs can be seen in **Table 2.1**.

Furthermore, an example of road crash cost components included in investment can be seen in **Table 2.2**. (Davies and Newman, 2016). The category is classified based on components commonly used in HICs and LMICs.

Table 2.1 Road crash components

Accident cost components			Authors										
			(Transport Research Laboratory, 1995)	(ICF Consulting, 2003)	(Silcock and Transport Research Laboratory, 2010)	(Sugiyanto, 2010)	(Donario and Dos Santos, 2012)	Widyastuti (2012)	Sugiyanto and Malkhamah (2015)	Davies and Newman (2016) in Australia Case	Davies and Newman (2016) in Cambodia Case	Davies and Newman (2016)	Jasa Raharja (2019)
1. Monetary costs	1.1. Direct costs	1.1.1. Medical/GP costs	x	x	x	x	x	x	x	x	x	x	x
		1.1.2. Hospital (out-patients)	x		x	x	x	x	x	x	x	x	x
		1.1.3. Hospitalisation	x				x	x	x	x		x	x
		1.1.4. Pharmaceutical/medicine			x	x		x	x	x		x	x
		1.1.5. Emergency services/ambulance	x	x	x		x	x		x	x	x	x
		1.1.6. First aid/at scene costs						x		x			x
		1.1.7. Rehabilitation										x	
		1.1.8. Disability aids/equipment/prosthetics			x			x				x	x
		1.1.9. Allied health								x		x	
		1.1.10. Long-term care								x		x	
		1.1.11. Property damage	x	x	x		x	x	x	x	x	x	
		1.1.12. Administration costs	x	x				x	x	x			
		1.1.13. Funeral costs			x		x	x					x
	1.2. Indirect costs	1.2.1. Welfare										x	
		1.2.2. Health system										x	
		1.2.3. Workforce participation	x	x		x		x	x			x	
		1.2.4. Lost income	x	x		x	x	x	x	x		x	
		1.2.5. Lost of other productivity, e.g., family members out of school and work, dependency					x			x	x	x	
		1.2.6. Costs of preventing accidents or road safety					x						
		1.2.7. Costs of accident risk					x						
		1.2.8. Insurer administrative costs					x						
		1.2.9. Value of court fees					x			x			
		1.2.10. Attorney (legal) fees					x			x			

Accident cost components			Authors									
			(Transport Research Laboratory, 1995)	(ICF Consulting, 2003)	(Silcock and Transport Research Laboratory, 2010)	(Sugiyanto, 2010)	(Donario and Dos Santos, 2012)	Widyastuti (2012)	Sugiyanto and Malkhamah (2015)	Davies and Newman (2016) in Australia Case	Davies and Newman (2016) in Cambodia Case	Davies and Newman (2016)
		1.2.11.Operating costs of courts					x			x		
		1.2.12. Costs not met by the State or insurance, costs associated with negative externalities, e.g., road congestion, costs paid by the families		x		x	x					x
2. Non-monetary costs	2.1. Social costs	2.1.1. Quality of life						x				x
		2.1.2. Poverty and Disadvantages									x	x
	2.2. Human costs	2.2.1. Preference to reduce risk	x	x				x		x		
		2.2.2. Pain, grief, and suffering	x			x	x	x	x		x	

Table 2.2 An example of crash cost components which are taken into account for road safety investment for HICs and LMICs

Accident cost components			HIC*	LMIC**
1. Monetary costs	1.1. Direct costs	1.1.1. General practitioner (GP) costs	√	√
		1.1.2. Hospital (out-patients)	√	√
		1.1.3. Hospitalisation (in-patients)	√	√
		1.1.4. Pharmaceutical/medicine	√	√
		1.1.5. Emergency services/ambulance	√	√
		1.1.6. First aid/at scene costs	√	√
		1.1.7. Rehabilitation	√	
		1.1.8. Disability aids/equipment/prosthetics	√	
		1.1.9. Allied health	√	
		1.1.10. Long-term care	√	
		1.1.11. Property damage	√	
		1.1.12. Administration costs	√	
		1.1.13. Funeral costs		
	1.2. Indirect costs	1.2.1. Welfare		
		1.2.2. Health system		
		1.2.3. Workforce participation		√
		1.2.4. Lost income	√	√
		1.2.5. Lost of other productivity, e.g., family members out of school and work, dependency	√	
		1.2.6. Costs of preventing accidents or road safety		
		1.2.7. Costs of accident risk		
		1.2.8. Insurer administrative costs	√	
		1.2.9. Value of court fees	√	
		1.2.10. Attorney fees	√	
		1.2.11. Operating costs of courts	√	
		1.2.12. Costs not met by the State or insurance, costs associated with negative externalities, costs paid by the families		
2. Non-monetary costs	2.1. Social costs	2.1.1. Quality of life		
		2.1.2. Poverty and Disadvantages		
	2.2. Human costs	2.2.1. Preference to reduce risk		
		2.2.2. Pain, grief, and suffering		

*Australian investment cases are borne by the insurance agency

**Cambodia investment case

In Australia, which has a well-developed insurance system, for investment purposes, the cost of accidents is divided into insurance claim costs, private costs, and broader social costs for HICs, such as in Victoria (The Transport Accident Commission/TAC) and New South Wales (Davies and Newman, 2016). The calculation of investment cases is based on insurance claim costs, which cover the investment period and total lifetime claim costs. The Victoria and New South Wales investment model is called an investment case insurance model (Davies and Newman, 2016). The insurance model can be implemented in Australia since the insurance participation rate is high. In this study, the components included in the investment case are the 20-year savings from the insurance claims: claims administration, ambulance/road accident rescue, hospital, medical, paramedical, long-term care costs, income, impairment, dependency, and legal.

Meanwhile, in low-middle income countries (LMICs), where the insurance participation rate is low, the investment will be made based on lesser cost components of accidents. For example, in Cambodia's road safety investment, which was reported by Davies and Newman (2016), the accident cost components were classified into economic and broader human costs. The investment takes the economic costs into account. The economic costs are medical, property damage, administration, and lost output.

2.4. Road Safety Interventions for Motorcyclists

Motorcyclist safety is the biggest concern in Southeast Asia, particularly in countries where motorcycles have become the majority transport mode, for example, Indonesia and Vietnam. Therefore, an attempt to reduce motorcycle crashes, fatalities, and injuries is urgently needed.

This section reviews the literature on alternative interventions for improving motorcycle safety, particularly education and training for novice riders.

A study by Araujo et al. (2017) provides a meta-analysis of effective interventions for motorcycles. It is referred to since it provides a comprehensive list of effective interventions for motorcycles worldwide. Araujo et al. classified the interventions in their studies into effective, potentially effective, ineffective, and poorly evaluated measures. Araujo et al. suggested that compulsory and non-mandatory pre-license training are effective measures before obtaining a license. These measures have been analysed in the study by Kardamanidis et al. (2010) on evaluating the effectiveness of motorcycle rider training. The studies included in the Kardamanidis et al. are 23 research studies up to September 2008. The components derived from the study are the type of interventions, the method used, the outcomes evaluated, and the study's result (the interventions' effectiveness).

The studies provide outcome metrics, evidence-based interventions, and evaluation methods. However, the previous study context is in developed countries, i.e., Australia, Canada, the United Kingdom (UK), the United States (US), and Taiwan. Only one study is from Thailand, which is on non-mandatory pre-license training.

A study by Yu and Tsai (2021) provides a newer and different context: the effect of road safety training class (RTC) before obtaining a license in Taiwan. The study is actual research with the data obtained from 480,114 novice motorcyclists aged up to 20. The components that can be adopted are the type of interventions, method, outcomes evaluated and the study's result (the interventions' effectiveness). Furthermore, Yu and Tsai's study includes the training design and contents, which were not clearly described in Kardamanidis et al.'s study.

The essential components reviewed from the literature can be seen in **Table 2.3**.

Table 2.3 Review of motorcycle interventions

Source	Intervention	Method	Outcomes evaluated	Result
Kardamanidis et al. (2010)	Compulsory training before obtaining license	Randomised control trials	Frequency of road crashes	One case-control study found a 14%, 21%, and 13% reduction for 6, 12, and 24 months of training, respectively; another case-control study yielded inconclusive results.
	Non-mandatory pre-license training	Randomised control trials	Fatalities, injuries	a lower frequency of injuries over one year but not over two years (Relative Risk (RR) 0.6: 10.5/1000 inhabitants; CI 95%: 9.2–12.0 versus 16.9/1000 inhabitants; CI 95%: 15.2–18.5), and there was no difference in mortality.
Yu and Tsai (2021)	Compulsory training before obtaining a license	Quasi-experiment	Offending behaviours, Frequency of road crashes	Novice riders who took road safety class (RSC) training lowered the risk of committing traffic violations by approximately 12% ~17% within one to three years after receiving their licenses. The RSC effects on reducing traffic accidents lasted only two years, approximately 11% lower in mean frequency.

2.5. Social Impact Bonds

A social impact bond (SIB) is a newly introduced funding mechanism initially intended for social issues. The first SIB has been implemented in the UK, i.e., Peterborough SIB (Social Finance, 2015). In the US market, SIB is also known as a pay-for-success bond (Eames et al., 2014). The concept of SIB is rooted in New Public Management (NPM) and New Public Governance (NPG). The prominent feature of NPM, adopted by SIBs, is outcome-based payment, and NPG is a multistakeholder partnership (Osborne, 2006; Warner, 2013; Economy, 2021). The SIB is intended to maximise the performance of public programmes by determining the payment-by-result, in which the payment to the investors is only made if the agreed targets are met. The SIB concept is also outcome-based payment in which the result focuses more on social outcomes than inputs or outputs (Mulgan et al., 2011; Belinsky and Chaskel, 2012; Fitzgerald, 2013; Warner, 2013; Social Finance, 2015). These outcomes are expected to save the government money, for instance, by reducing the costs of emergency response or the possibility of reducing some overcharging levies, for example, fuel levies, by monetising the benefits of social interventions.

SIB is a public-private partnership (Kim and Han, 2015; Eames et al., 2014; Warner, 2013). A SIB is a collaborative work (Fraser et al., 2019). SIB involves collaboration between the government and private sectors. SIBs create partnerships among government agencies, private investors and non-profit organisations (Belinsky et al., 2014).

A SIB can be understood as a three-way relationship between a government commissioner, social sector service provider, and outside investor in its most basic form. SIB projects typically involve a government agency commissioning service, a service provider delivering intervention services, and private investors paying upfront and reimbursing based on outcomes achieved

(Economy, 2021). By incorporating outcomes-based contracts into service delivery, social impact bonds enable the private sector's participation and allow for the participation of a third-sector provider. SIBs embody public-private hybrids, combining private-sector techniques and public funds without risking public money.

PPPs have been widely used in transportation sectors. However, usually PPPs are used to fund infrastructure projects with a long multi-year duration, typically 25 to 30 years (Robinson, 2008). The duration of a SIB contract is shorter than common PPPs, usually less than 10 years (Warner, 2013). SIB also is a financial instrument in which non-government investors provide up-front funding to service providers to deliver improved social outcomes (Mulgan et al., 2011).

Furthermore, Ackerman et al. (2013) and Davies et al. (2015) differentiate impact bond based on the outcome funders in road safety into Social Impact Bond (SIB) and Development Impact Bond (DIB). The funder of a SIB is a government commissioner. A DIB is funded by a donor organisation.

2.5.1. Peterborough Social Impact Bond

The first SIB was launched in March 2010 in the UK to reduce the reoffending of 3,000 short-term prisoners (less than one year at the prison) in Peterborough prison, divided into three cohorts of 1,000 prisoners, respectively (Griffiths and Meinicke, 2014; Nicholls and Tomkinson, 2013). The Ministry of Justice pays the funders if the interventions are successful through the Big Lottery Fund. The intermediary or the administrator, which manage contract and coordinates service delivery on behalf of investors, is Social Impact Partnership, a limited partnership set up by Social Finance UK. This financial intermediary manages funding from 17 investors, consisting of charities, foundations, and high-net-worth individuals.

Two targets trigger the repayment to the funders are a 10% reduction in reoffending for each cohort of 1,000 prisoners, and if the 10% target is not met for any three cohorts, a 7.5% reduction is met across all 3,000 offenders, funders will receive a payment.

The value of the payment is linked to the outcomes of the interventions, which is the number of reduced reconviction events. A 7.5% annual rate of return will be paid to the funders if the 10% target reduction in reoffending is met across three cohorts. A higher rate of return, up to 13%, will be paid if the reduction is higher than 10% for each cohort.

The first outcome payment was paid around three to four years after the interventions were delivered. The intervention, which is called One service, was delivered by non-profit organisations, which are St Giles Trust, and Ormiston Children and Families Trust. The Partnership has contracts with the Ministry of Justice, funders, and service providers. RAND Europe, an independent evaluator, has been in charge of evaluating the Peterborough SIB, and the first report was published in May 2011.

Results showed a 6% decline in the frequency of re-convictions for 100 Peterborough prisoners between 2008-2010 to 2010- 2012 (Social Finance, 2013). An overall decline of 23% was calculated, demonstrating the success of SIB (Social Finance, 2013).

2.5.2. Rikers Island Social Impact Bond

However, due to high-risk transfer to the private investors, SIB seems not attractive to the private sectors (Warner, 2013). To overcome the issue, currently SIBs target to social investors, which presumably have main interests other than profit, i.e., welfare of the society (Davies et al., 2015; Kim and Han, 2015).

One way to attract investors to a SIB is by providing guarantor in the payment scheme, such as in the Rikers Island SIB. Rikers Island SIB is the first SIB placed outside the UK (Griffiths and Meinicke, 2014; Warner, 2013). The Rikers Island SIB was intended to reduce the number of young offenders at Rikers Island correctional facility, New York City. The Rikers Island SIB is the first SIB which involved pure for-profit investors, which is Goldman Sachs, and pure social investors, which is Bloomberg Philanthropies. Bloomberg Philanthropies was the guarantor for the payment to Goldman Sachs investment in this SIB. The guarantee is \$7.2 million for their \$9.6 million investment in order Goldman Sachs to participate. Goldman Sachs got 20% return on investment if model program results are achieved.

2.5.3. Social Impact Bonds in Road Safety

The use of social impact bonds for road safety was proposed by Davies et al. (2015). Davies et al suggested that social impact bonds may be used to fund road safety interventions which concern safer road users, post-crash response, and safety management. The implementation of the social impact bond for road safety can be found in Cambodia (Davies and Newman, 2016). The intervention is delivered to address child casualties due to head injuries. It has been found that the casualty is caused by the low rate of helmets worn by children.

International institutions played more of a role in the SIB delivery structure. Asia Injury Prevention (AIP) Foundation is an international NGO that operates programmes in Cambodia, China, Thailand, Vietnam, Tanzania, and Uganda. AIP Foundation works its programme Head Safe, Helmet On (HSHO), through campaign (especially at school). Its purpose is to increase the usage of helmet for children to avoid fatal and serious injuries (FSIs). By increasing the percentages of children wearing helmet, government would be able to avoid the estimated economic cost caused by the accident or death due to road injury.

The AIP Foundation serves as the lead agency and service provider. The AIP Foundation is also part of the funders and investors together with the Development Innovation Ventures (DIV) programme at the United States Agency for International Development (USAID), the FIA Foundation, the UPS Foundation with in-kind support from US-CDC, and the Road Safety Fund. In this SIB, the role between funders and investors cannot be clearly identified. The Cambodia SIB may also be categorised as a Development Impact Bond (DIB) because the funders are international donors.

The road safety intervention concerns helmet wearing, with the expected outcome being an increase in helmet wearing from 10% (2014 base condition) to 60% by 2016. The expected impact of the increase in helmet wearing is to reduce motorcycle-related fatality, mainly due to head injury. Due to reliability in motorcycle-related injury data, the percentage of helmet wearing is used for the investment return payment instead of the expected impact on injury data.

The outcome metric tracks the effect of HSHO on helmet-wearing and links that to the number of FSIs on the roads in the relevant districts.

1. Increase of motorcycle passengers wearing a helmet.
 - a. Passenger helmet-wearing percentage (as a proxy measure).
 - b. Good evidence for the efficacy of helmets in preventing FSIs to contribute to the database.
 - c. Enable the link to be drawn to the outcome payment.
2. Decrease in head injuries and fatalities resulting from motorcycle accidents.
 - a. More directly linked to the financial and economic benefit (cost avoided).

- b. The low reliability of data on crashes and casualties in Cambodia, such that it is impossible to use this as an outcome metric in an impact bond underpinning outcomes payment.

The investment case is designed based in the year 2014 with 10% passenger helmet wearing rate. The target is to increase passenger helmet wearing rate to 60% in 2016. The payment framework is structured as follows.

1. Break Even Point (BEP) at 48% of passenger helmet-wearing rate (using economic costs avoided – without human costs) or at 37% of passenger helmet-wearing rate (using total costs avoided – with human costs)
2. Hurdle rate (minimum level of success 30% before any outcome payment)
3. Below a success rate of 30%: investors receive no payments
4. Between 30% and the ‘breakeven point’ when investors’ pre-funding of the \$1.1M programme costs are repaid: 100% of costs avoided are paid to investors.
5. Above the breakeven point, 50% of costs are avoided each to the investor and outcomes funder.

By the end of the project (2016), the helmet wearing rate exceeds 70% with avoided cost estimated to be around \$1.73 Million. The return payment is capped at \$1.4 Million or 26% return on capital invested over two years. The benefits calculated for investment purposes is based on the economic crash costs.

CHAPTER 3. RESEARCH METHODOLOGY

3.1. Introduction: Overall Approach

This chapter presents the research methodology of the study aimed at investigating the potential use of social impact bonds (SIBs) to improve road safety management. The study consists of two main parts. Part one assesses the road safety management system, including road safety financing. Part two investigates the implementation of SIBs for road safety to improve the road safety management system, which consists of assessing the suitability of SIBs to improve road safety management and develop SIB delivery and payment structures. The general methodology for this study is shown in *Figure 3.1*.

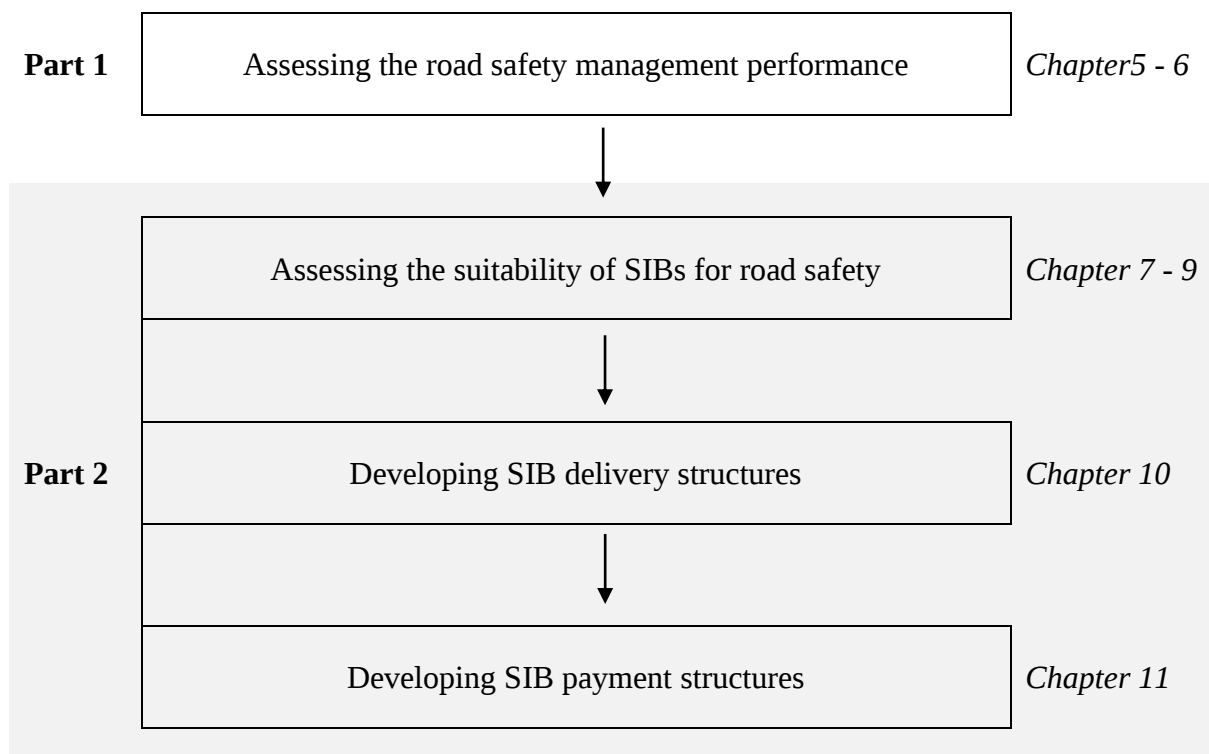


Figure 3.1 The general approach of the research methodology

3.2. Road Safety Management Performance

According to Bliss and Breen (2009), conducting a capacity review is the first step in implementing World Report Recommendations according to the country's circumstances to ensure effective and efficient road safety programmes. The conceptual framework has been developed from the assumption that road safety is a product. The process of producing road safety is road safety management. The components of road safety management are institutional management functions, interventions, and results, as illustrated in **Figure 3.2**.

The assessment mainly intended to understand the institutional management functions in implementing interventions to achieve desired results. The institutional management functions consist of result focus, coordination, legislation, funding and resource allocation, promotion, monitoring and evaluation, research and development and knowledge transfer.

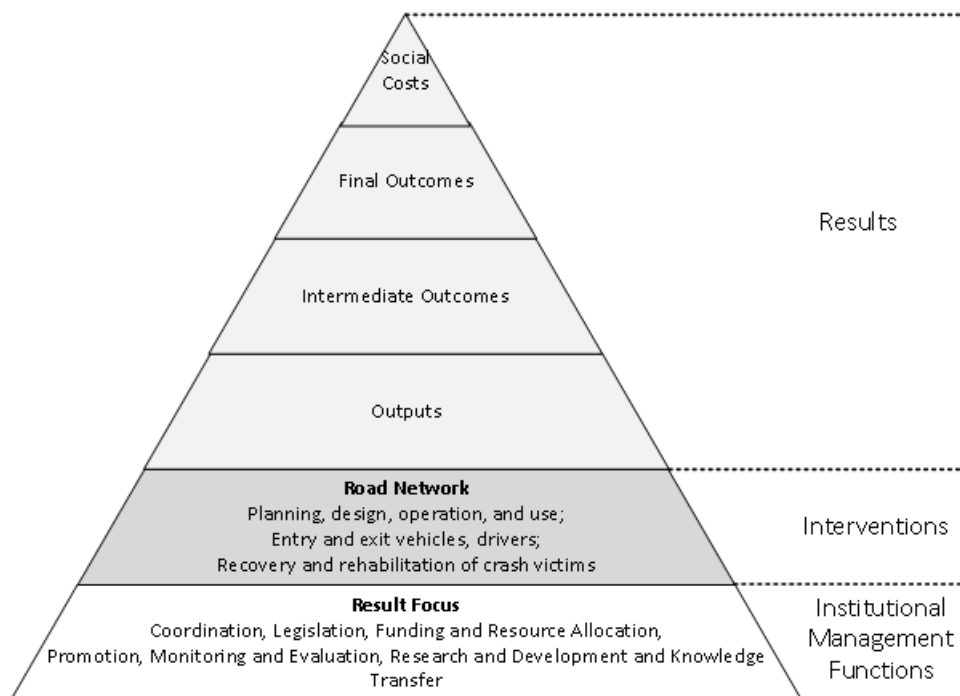


Figure 3.2 The road safety management system
Source: Bliss and Breen (2009)

The components of assessing local road safety funding, training, and technical assistance by the Federal Highway Administration (FHWA) are also used for developing the framework. The components include organisational, data, training and technical assistance, funding, and programme administration (Gaines et al., 2013).

The key components of road safety management to be examined in this study are the robustness of the road safety target, the efficiency and effectiveness of the institutional arrangement, the effectiveness of road safety intervention delivery, and the financial availability and capacity. This concept informs the formulation of the four main questions for this study to assess the performance of road safety management at the national and local government levels to improve road safety management, particularly in financing mechanisms.

1. The robustness of the road safety target – What is the formulated target, and to what extent the target has been followed and used?
2. The efficiency and effectiveness of the institutional arrangement – How is the capacity of designed institutions to deliver road safety programmes? Have they optimally used their resources? To what extent is the partnership among stakeholders utilised?
3. The effectiveness of road safety intervention delivery – How do we ensure the effectiveness of interventions?
4. The availability and strength of the financial capacity – How are the availability and financial capacity to fund the delivery of road safety programmes?

3.3. Improvement of Road Safety Management through Social Impact Bond

The literature review reveals that the concept of SIB is rooted in New Public Management (NPM) and New Public Governance (NPG). The prominent feature of NPM, adopted by SIBs,

is outcome-based payment, and NPG is a multistakeholder partnership (Osborne, 2006; Warner, 2013; Economy, 2021). Several concepts are generated from those two prominent features.

The first feature is outcome-based payment. As an outcome-based payment, in a social impact bond, the payment to the investor is made if the outcome target has been met. This feature generates consequences, a clear outcome metric, and evidence-based interventions. The outcome needs to be defined as a basis for the payment to the investors or can be linked to the payment. Furthermore, the outcome metric is required to be linked to the desired impact. The impact, subsequently, can be used to estimate the avoided costs resulting from the intervention implementation. Therefore, a robust monitoring system and evaluation method are needed to ensure that the outcome can be justified. The concepts concluded in this domain are outcome metrics, monitoring systems, and evaluation methods. An empirical evidence intervention is expected to guarantee that the target outcomes can be achieved. Its effects in reducing the issue need to be empirically proven with sound effectiveness, sample determination, and evaluation methods. The concepts concluded in this domain are the type of intervention used, i.e., best practices based on research or routine, continuity of the delivery, the effectiveness of interventions, and the quantity and quality of service providers.

The second feature adopted is multi-sectoral partnerships. Two concepts are employed in this study to define the partners involved in road safety programmes: road safety as a product and the crash cost breakdown. The safe system recognises road safety as a shared responsibility among stakeholders. The role of each stakeholder may be determined by assuming road safety as a product. By viewing road safety as a product, road safety can be considered a public good (Ver Eecke, 1998; Bliss and Breen, 2009) and a merit good (Fitzgerald, 2013). Assuming road safety is a public good, the government, as the actor responsible for providing road safety, has

three roles, i.e., service, distribution, and stabilisation (Ver Eecke, 1998). Meanwhile, assuming road safety is merit good, the government justifies sharing its role with other stakeholders, such as the private sector.

Furthermore, the accident cost is broken down into its components to identify actors borne by the costs of road crashes and FSIs and actors who may provide funds for those who have solutions to reduce crashes and injuries but do not have funds to deliver road safety programmes. Therefore, cooperation can be carried out between those actors regarding a new approach to road safety investment (Davies and Newman, 2016).

Sharing responsibility in delivering road safety programmes requires collaboration among stakeholders. Collaboration across sectors, i.e., public, private, and voluntary sector stakeholders, is a concept from New Public Governance (NPG) adopted by SIBs. The collaboration may improve performance in providing services due to allowing for joint working, which each party may contribute with the best of its expertise. However, the collaboration also has the potential to lead to tension or conflict among the stakeholders involved (Economy, 2021). Therefore, this study identifies existing and potential collaboration in delivering road safety programmes to investigate their potential to be improved by SIBs. The identification includes the programmes delivered by collaboration and the role of each stakeholder involved, for example, service provider, manager, or funder/investor.

3.4. SIB delivery structures

The reform based on the NPM and NPG concepts is translated into effective management structures. The concept adopted from the NPM is outcome-based payment, which requires a robust monitoring and evaluation system to ensure target achievement. In addition, the

evaluation made by others is considered more effective than self-evaluation (Robinson, 2008). Meanwhile, the concept adopted from the NPG is a multi-sectoral partnership. This concept allows for partnership in delivering a programme. These concepts could change the present road safety programme delivery methods, enhancing road safety management's effectiveness and efficiency. Combining outcome-based payment and multi-sectoral partnerships leads to the SIB delivery structures.

Identifying key players of road safety impact bonds depends on the avoided accident/casualty costs. The crash cost breakdown into its components is used to identify the potential funding source. The potential road safety funding sources in the study area will be assessed to seek potential investors. The crash cost breakdown identifies the parties burdened by road crashes that will be alleviated by improving road safety programme deliveries. The benefit parties can be assigned as investors (the source of up-front funding) or funders (paying the return payment) (Davies and Newman, 2016). Furthermore, from this domain, the preference of the government and investors regarding using the SIBs is discussed, which leads to the discussion of transfer risk from the government (commissioners) or providers to the investors (Fitzgerald, 2013; Giacomantonio, 2017; Del Giudice and Migliavacca, 2019).

Further analysis is the role of each stakeholder, which may be defined by assuming road safety as a merit good. The possible roles of stakeholders are commissioner, payer, manager, funder/investor, and service provider. Additional roles are evaluator and guarantor.

3.5. SIB Payment Structures

The concept of SIBs is outcome-based payment or payment by result, which means that payment can only be made if results or targets are achieved through outcome improvement, the

payment can be justified if the investment is feasible or the benefits exceed the costs. The target or the result is the outcome metric. This outcome metric should be linked with the payment, which includes benefit estimation. The outcome metrics, which are outputs, intermediate, and final outcomes, are the results of road safety management.

The impact on society as envisaged by SIBs is reducing the social issue. i.e., the economic and social costs of crashes. The economic costs are the costs of crashes, excluding the human costs, i.e., pain, grief, and suffering. The social costs are the costs of crashes to society in terms of tangible or intangible costs, including hidden costs that may not be realised or considered (Davies and Newman, 2016).

The payment structures are designed by using benefit-cost analysis. The benefit is calculated as the avoided crash costs. The crash components that will be included in the calculation depend on the investment case that will be conducted. From the commissioner's perspective, the expected benefit is avoided costs due to reduced fatalities and serious injuries multiplied by the respective costs. This is considered to be an economic case. Another expected benefit is the avoided claim payments, which each of the claim compensation types based on casualty severity. The cost is the claims that are supposed to be paid if there is no improvement in road safety performance. The latter is considered as the financial case.

From the investor perspective, the target is the expected benefit, which is the return payment if the target is achieved and maybe a reward if the target is exceeded. Hereinafter, this target is referred to as the investment target. The investor will at least get the return payment at the investment target.

The investment target may be lower than the commissioner's maximum expected benefits (under 100% of the expected benefit by the commissioner); as has been suggested by Warner

(2013), the SIB investment is structured based on lower success than the model would indicate to secure savings for the government if target outcomes are met. Therefore, there may be an exceeding of the investment target, which means the investor may get a reward because the commissioner still has savings reserves that can be paid to the investor.

The payment framework based on the outcome is structured as follows.

1. The payment can only be made if the investment target is achieved.
2. There is a hurdle rate where a minimum level of improvement must be achieved before any part of the investment is repaid.
3. After the hurdle rate, the payment increases proportionately to the cost savings generated by the intervention.
4. A reward may be paid if the target is exceeded.
5. The payment made to the investor is based on the financial case.

CHAPTER 4. ROAD SAFETY MANAGEMENT IN INDONESIA

4.1. Introduction

This chapter describes how road safety has been managed in Indonesia at the national and local levels. The profile of road safety in Indonesia and the Special Region of Yogyakarta has been presented to understand road safety circumstances in Indonesia.

4.2. Indonesia Road Safety Profile

Before focusing on developing a new financing scheme to fund road safety programmes, the existing scheme for road safety financing needs to be examined. This existing scheme is embedded in a road safety management system. Therefore, understanding its road safety management system is necessary to assess the effectiveness of implementing road safety programmes in Indonesia.

Road safety is the impact of road transportation activities. Road safety is a recurrent product, which means road safety will always occur as long as the road is operated. The administrative boundaries of road safety management in Indonesia are carried out in accordance with road network management. This study is limited to public roads managed based on administrative boundaries. The public road network in Indonesia is under the responsibility of the Ministry of Public Works and Housing, which develops and manages the infrastructure components. However, the traffic on the network has been managed by the Ministry of Transportation—furthermore, the ministries on the national road network at the national level. According to Government Regulation Number 34/ 2006, the public road networks based on their ownership have been classified into national, provincial, regency, urban, and village roads.

The administrative arrangements for the road networks in Indonesia can be seen in **Table 4.1**.

Table 4.1 Road hierarchy based on the ownership in Indonesia

Road hierarchy	Owner	Road administrator
National Road	Central government	Central government
Province Road	Provincial government	Provincial government
Regency Road	Regency government	Regency government
Urban Road	City government	City government
Village Road	Village	Village

Due to road safety, which has roots in many aspects, the road owner and the traffic manager are not the only institutions responsible for road safety. As road safety is rooted in a multidiscipline area, other institutions, such as the Ministry of Health, Education, and Industry, also have shared responsibility for road safety. The institutions responsible for those road safety interventions were identified based on the Indonesia National Road Safety Plan 2011 – 2035.

The safe system also suggests the shared responsibility for road safety. In a safe system, road safety activities are delivered through safer behaviours, safer roads, safer vehicles, and post-crash treatments.

Road safety management in Indonesia is embedded in road network management. Therefore, an understanding of road network management is essential. A road network is managed according to its hierarchy. Several Indonesian laws and regulations define road network classification in Indonesia. Indonesian Law Number 38/2004 on Road, Article 4 states that the scope of road regulation includes the implementation of public roads, toll roads and particular

roads. Toll roads are also included in public roads but have different characteristics and arrangements. Therefore, toll roads are not considered in this research.

Subsequently, in Article 6, public roads are classified based on system, function, status, and class. A public road can be incorporated into primary or secondary road network systems based on its system. A road would be categorised as an arterial, collector, local, or neighbourhood road based on its function. In addition, a road can be categorised as a national, provincial, regency/city, or village road based on its status. Further provisions concerning road classification are regulated in Government Regulation 34/2006. The classification based on class is regulated in Indonesian Law Number 22/2009. The road hierarchy in Indonesia can be seen in **Appendix A**.

Road network management is closely related to the classification of the road based on its status. Roads are grouped based on which level of the government manages them. The central government manages national roads. The provincial government manages provincial roads; city and regency roads are managed by city and regency governments, respectively, while the village authorities manage village roads.

Meanwhile, the road classification based on its function consists of arterial, collector, local, and neighbourhood roads. Arterial roads serve as the primary function for transport with characteristics of long trips, through traffic, high average speeds, and limited access. Collector roads serve the collection or divider transport, with characteristics of medium distance, medium average speeds, and limited access. Local roads serve local transport with characteristics of short distances, low average speeds, and unlimited access. The neighbourhood roads serve the activities of the neighbourhood with characteristics of short distances and low average speeds.

This research is limited to discussing public roads managed by the government, which include national, provincial, regency/city and village roads. Therefore, the scope area of the road safety management assessment at the national level is on the national roads, and at the local level, it is on the provincial roads.

Indonesia is categorised as a low-middle-income (LMIC) country in Southeast Asia. The nation has the largest gross economy among the ASEAN countries and is classified as a middle-income country with a medium human development score. Indonesia's economy ranks fifth in the ASEAN region, with a GDP per capita in 2019 of \$4,175 (ADB, 2020).

Indonesia is an archipelago country with the fourth largest population in the world. According to the Indonesia Statistic Agency (2021), the Indonesian population in 2020 was 270.2 million. The population growth is 1.25% from 2010 to 2020. The biggest population group is the economically active population (15-64 age group), which is 70.72% of the 2020 population.

Indonesia consists of 34 provinces spread over five main islands and four archipelagos. However, the population, the motorisation, and the infrastructure are concentrated in Java Island, which consists of six provinces, i.e., DKI Jakarta, Jawa Barat, Banten, Jawa Tengah, DI Yogyakarta, and Jawa Timur.

Along with the increasing population, motorisation has also proliferated from 55 million in 2007 to 136 million in 2020, as depicted in **Figure 4.1**. There is an increase of about 150% from 2007 vehicles. In 2020, the motorcycle was the most significant vehicle type (85%). The number of motorcycles was approximately 42 million in 2007. This number was increased to approximately 120 million in 2020. Passenger cars accounted for 12% of total vehicles, followed by trucks (3.8%) and buses (0.2%).

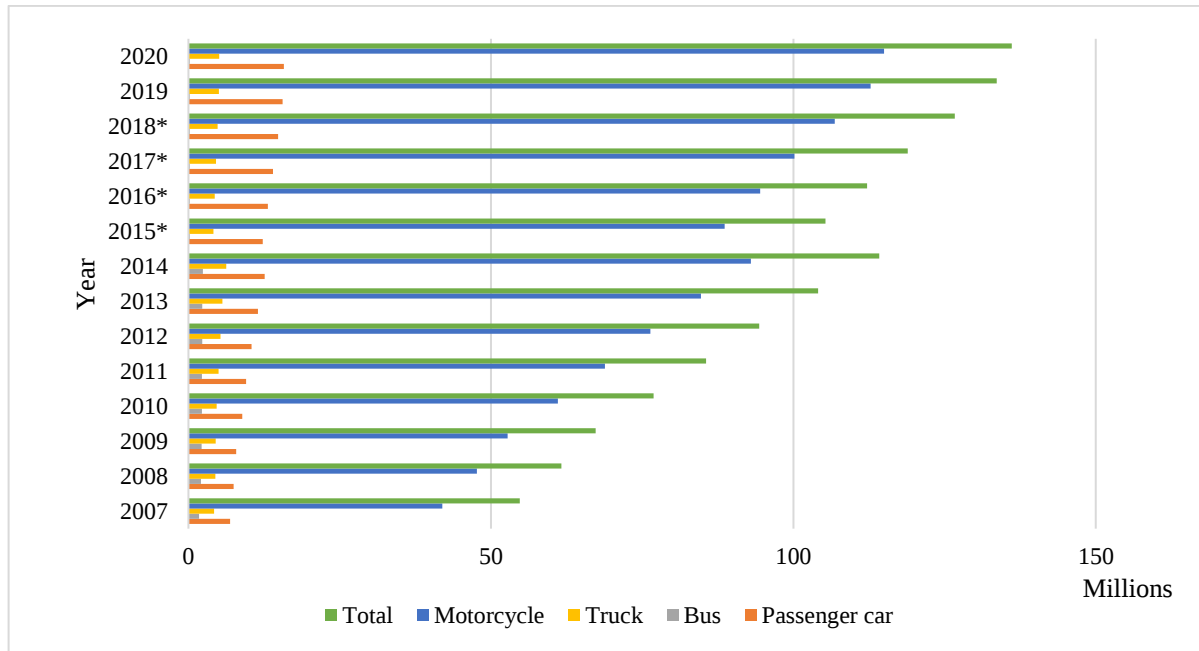


Figure 4.1 Number of motor vehicles in Indonesia

Source: The Indonesia Statistics Agency, 2023

At the same time, the infrastructure, including the road network, also has been slightly developed. Up to 2020, it is estimated that about 548,366 km of roads, including national, provincial and regency/city roads, have been constructed in Indonesia. There is an increase of 30% in length from 2007 to 2020. The development of road lengths in Indonesia can be seen in **Figure 4.2**. However, the 30% increase in the road length is still imbalanced with the 150% increase in the number of motor vehicles (see **Figure 4.3**), which triggers road safety problems (Soehodho, 2009; Jusuf, Nurprasetio and Prihutama, 2017).

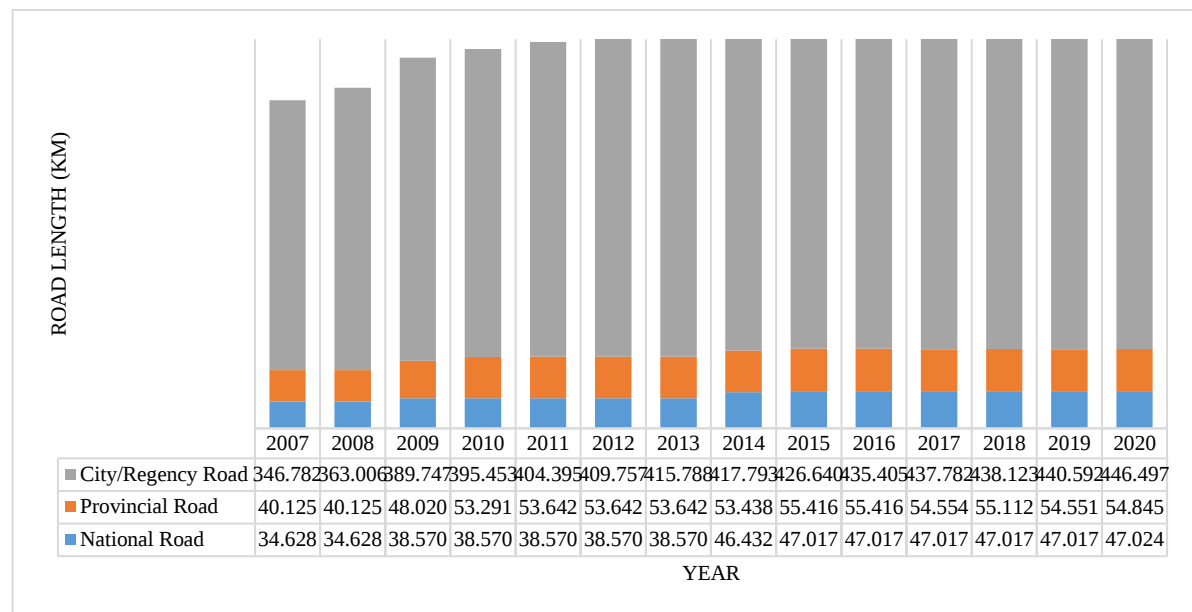


Figure 4.2 Road development in Indonesia

Source: The Indonesia Statistics Agency, 2023

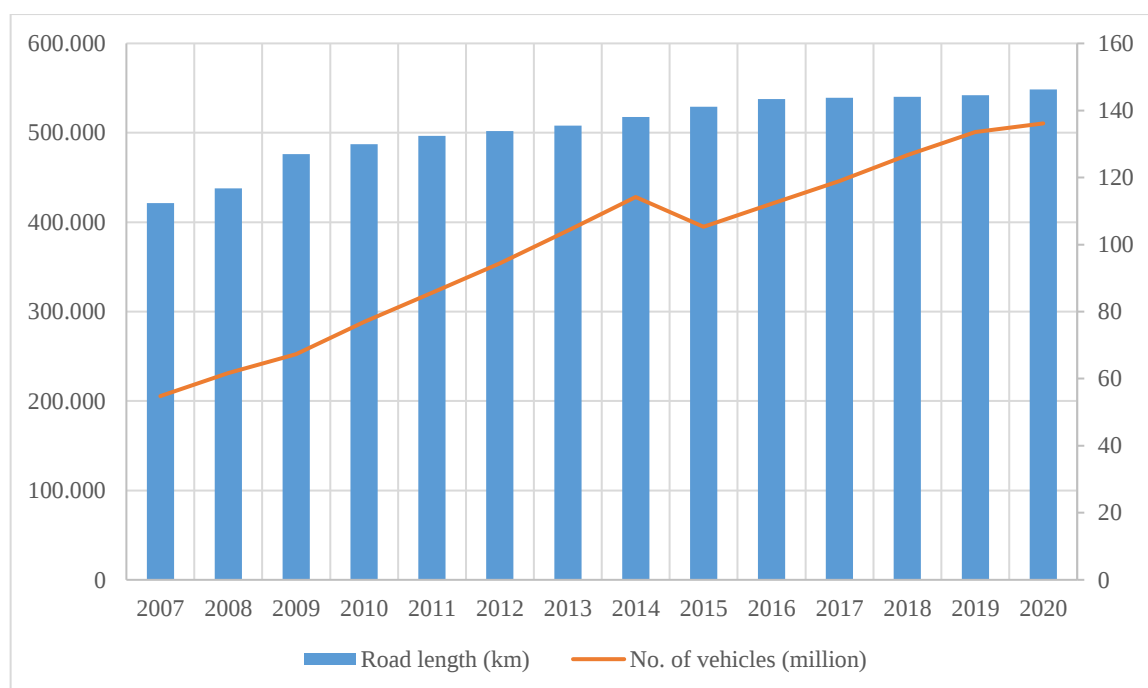


Figure 4.3 Comparison of the road length and the vehicle growth

Source: The Indonesia Statistics Agency, 2023

Rapid development in motorisation and its road infrastructure has led to an increase in the number of road crashes. According to data from the Indonesia National Traffic Police Corps (Korlantas POLRI), road crashes increase yearly. A significant increase in road crashes happened from 2010 -2011, from 66,488 in 2010 to 108,696 in 2011, as seen in **Figure 4.4**. In 2010, the Decade of Action for Road Safety was declared. Indonesia followed by declaring the Decade of Action for Road Safety in 2011. Therefore, road safety has been a priority agenda. The policy focuses on road safety improvement, including the improvement in road crash data collection through establishing road crash database system, called as Integrated Road Safety Management System (IRSMS). As a result, the concern about road crash data collection also improves, increasing the recorded number of road crashes by approximately 40,000. Recorded road fatalities also significantly increased by 50% from 2009 to 2010, from 19,979 in 2009 to 31,324 in 2010. This means that the increase in road crashes from 2010 to 2011 and road fatalities from 2009 to 2010 does not certainly reflect an increase in crashes or fatalities, but because the number of reported crashes and fatalities has increased due to better reporting or data collection systems and databases. **Figure 4.4.** also depicts changes in population, vehicles, road crashes, and fatalities in Indonesia from 2007 to 2019.

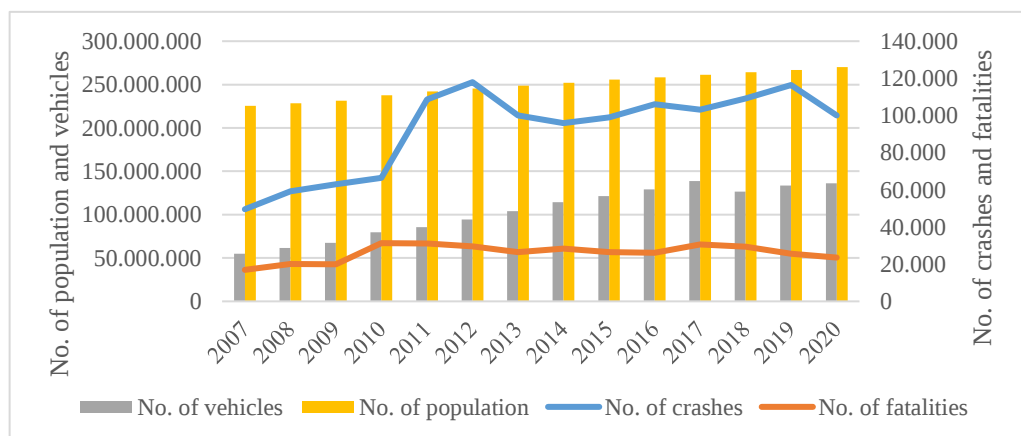


Figure 4.4 Number of populations, vehicles, road crashes, and fatalities 2007-2020 in Indonesia.

Source: The Indonesia Statistics Agency (2023); Korlantas (2023).

Even though the number of road crashes and fatalities fluctuates and tends to increase (see **Figure 4.5** and **Figure 4.6**), the fatality rate per 100,000 population and 10,000 vehicles has decreased. According to the Korlantas, the fatality rate per 100,000 population was 13.18 in 2010 and gradually decreased to 8.71 in 2020. More details of the fatality rate for the 100,000 population and 10,000 vehicles from 2010 – 2020 can be seen in **Figure 4.7** and **Figure 4.8**.

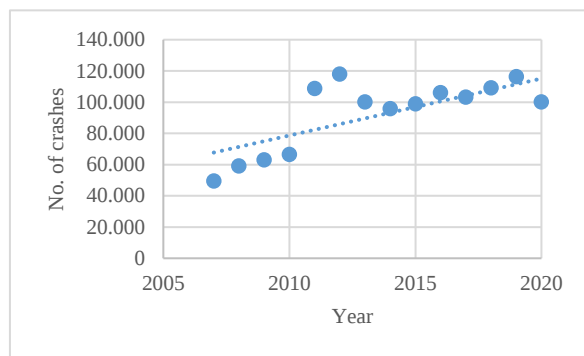


Figure 4.5 Trend of road crash number

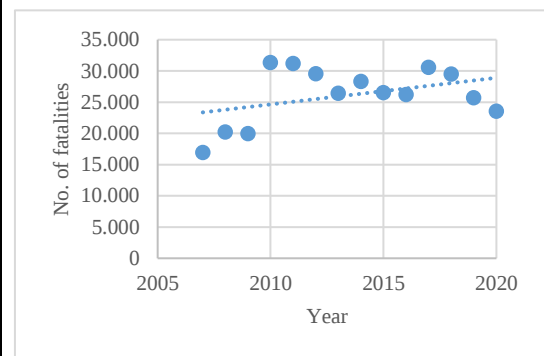


Figure 4.6 Trend of road fatality numbers

The growth of population and motorisation means the exposure to crash risk also increases, which is shown by the increasing number of road crashes. However, the fatality rate has decreased. It can be said that the delivered road safety programmes, which started to be more focused and comprehensive since the declaration of the Decade of Action for Road Safety, are impactful. Indonesia composed a long-term road safety plan called the National Road Safety Plan 2011-2035 (RUNK 2011-2035). The National Road Safety Plan includes the Decade of Action for 2011-2020. The declaration of the Decade of Action is also in line with the mandate of Law Number 22/2009 on Traffic and Road Transport Article 203 to compose a national plan on traffic and road transport safety. In addition, the Indonesian government enacted Presidential Instruction Number 4/2013 on a decade of action for road safety programmes. This regulation referred to the Decade of Action issued by the WHO. Furthermore, the National Road Safety

Plan has been judicially strengthened and revised by enacting Presidential Regulation Number 1/2022 on the National Traffic and Road Transport Safety Plan. The duration of the National Plan is for 20 years, from 2021 up to 2040. More details delivered road safety programmes will be discussed in the following sections of the survey result on institutional management functions performance.

However, different data regarding the fatality rate per 100,000 population has been found, among data from the Indonesia National Traffic Police Corps, Association of South East Asia Countries (ASEAN), and WHO. For example, in 2013, the fatality rate per 100,000 from the Indonesia National Police was 10.62, while from the ASEAN report was 15 (ASEAN, 2016). Different data also had been found for 2018 data. The fatality rate per 100,000 population in 2018 from the Indonesia National Police was 11.16, while from WHO was 12.2 (WHO, 2018). The data found from the regional and global organisations tend to be higher than data from the national data.

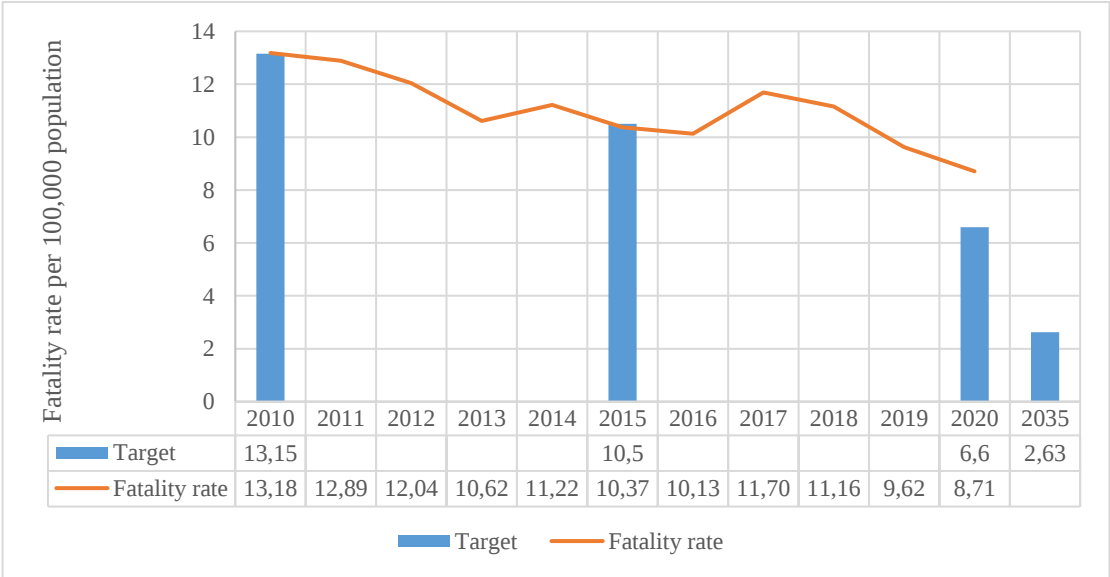


Figure 4.7 The fatality rate per 100,000 population

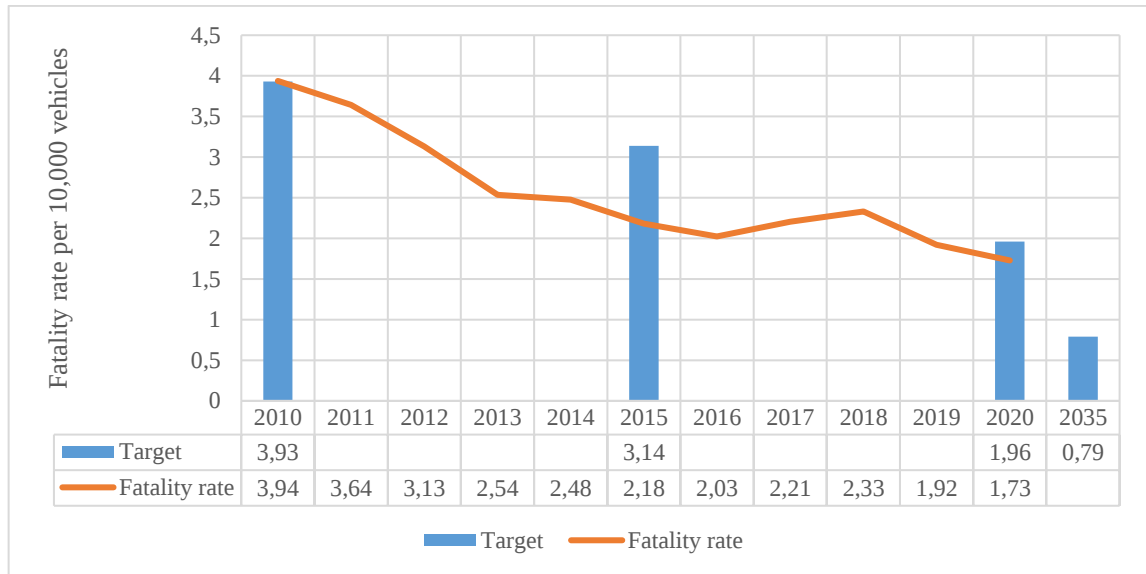


Figure 4.8 The fatality rate per 10,000 vehicles

Furthermore, the road crash profile in 2020 showed that road user fatality for drivers/passengers of motorcyclists is 81%, drivers/passengers of passenger cars are 8%, drivers and passengers of heavy trucks are 7%, cyclists is 2%, and other or unspecified users are 2%. In addition, 80% of road fatalities occurred in the productive age group (15-64 years) (Korlantas, 2023).

4.3. Yogyakarta Road Safety Profile

Every province in Indonesia has its own characteristics and has authority to manage its regions according to its conditions as it has been mandated by regional autonomy regulations. Daerah Istimewa Yogyakarta (DIY) or Special Region of Yogyakarta was chosen as the sample location for investigating the applicability of SIB for road safety. The reasons to choose DIY as the sample location because the size of the province is relatively small, thus the monitoring of road safety programmes is assumed easier than any other provinces which have larger area and longer road networks.

Daerah Istimewa Yogyakarta (DIY) is a province in Indonesia, which is located in the middle of Java Island. The total area of DIY is 3,133.15 square kilometre or 0.16 per cent of Indonesia area (Sub-directorate of Statistical Compilation and Publication, 2018). This province is relatively small comparing to any other provinces in Indonesia. DI Yogyakarta consists of one city, i.e., Yogyakarta and four regencies, i.e., Gunung Kidul, Kulon Progo, Sleman, and Bantul.

Based on the information from DIY Statistics Agency (2018), the population in 2017 was 3,762,167. Along with the increasing population, motorisation has also grown from 3 million in 2010 to 5 million in 2017.

The vehicle fleet in DIY comprised 4,616,016 units in 2017. In terms of vehicle type, the largest proportion is motorised 2- and 3-wheelers (86.24 per cent), followed by cars and 4-wheeled light vehicles (8.8 per cent), heavy trucks (3.9 per cent) and buses (1.06 per cent).

At the same time, the infrastructure, including the road network also has been developed. Up to the year 2017, it is estimated that about 4,377 km of roads, inclusive of national, provincial and regency/city roads, have been constructed in DIY. The regency/city roads have made the biggest proportion among the constructed roads (77%). Thus, the majority the traffic accidents happen on the regency/city roads (72%) (BAPPENAS, 2017). The development of the road lengths in DIY can be seen in **Figure 4.9**.

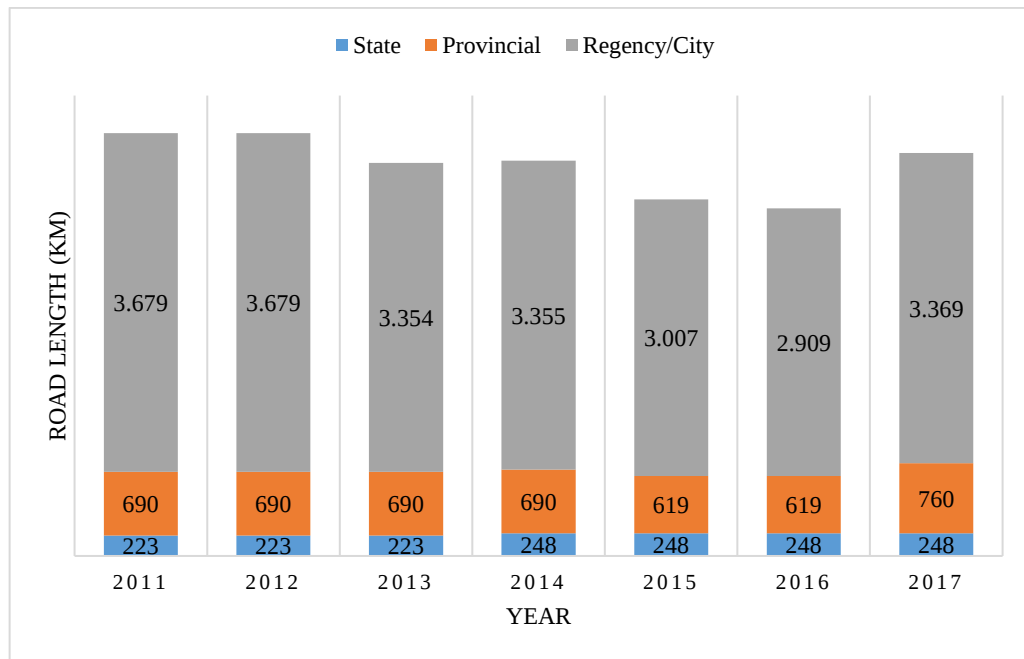


Figure 4.9 Road development in DIY

Source: Indonesia Statistics Agency, 2011, 2012, 2013, 2014, 2015, 2016, and 2017

Rapid development in transportation and its infrastructure has led to an increase in the number of road traffic crashes. This can be seen from the increasing number of road accidents from year to year (Indonesia Statistics Agency, 2011, 2012, 2013, 2014, 2015, 2016, and 2017).

Figure 4.10 depicts changes in the number of road accidents, fatalities, serious injuries, and slight injuries.

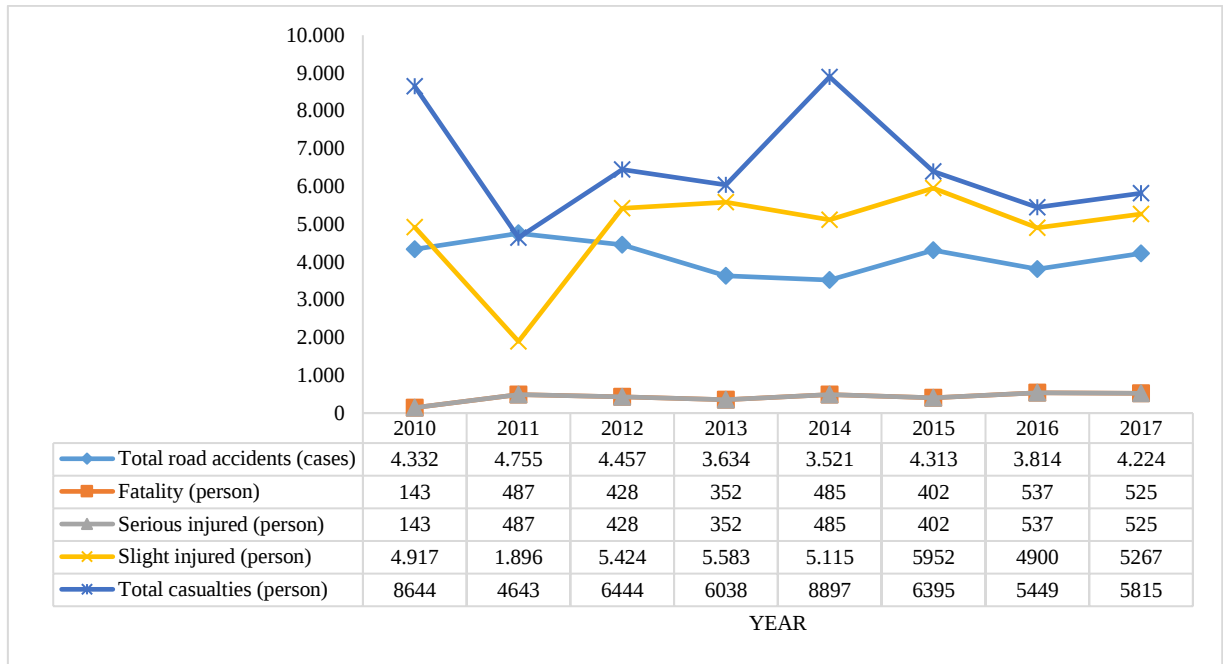


Figure 4.10 Number of road accidents, fatalities, serious injuries, slight injuries, and total casualties in DIY

Source: Indonesia Statistics Agency, 2011,2012, 2013, 2014, 2015; 2016, and 2017

The reported road accidents on different type of road network which have been reported by Directorate Traffic Provincial Police DIY, can be seen in **Table 4.2**.

Table 4.2 The reported number of road accidents on different type of road network in Yogyakarta

Type of road	Year		
	2016	2017	2018
National	760	795	925
Provincial	1244	1224	1147
Regency/City	1580	1714	2162
Village	205	298	433
Total	3789	4031	4667

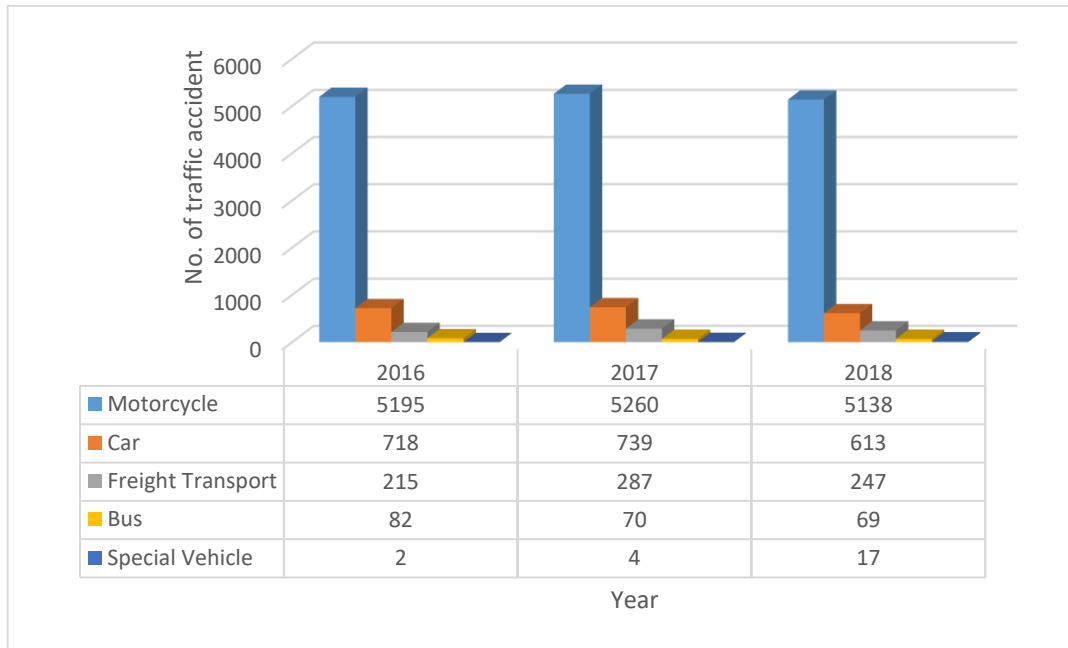


Figure 4.11 Number of road accidents based on the type motor vehicle in DIY

Source: Indonesia Statistics Agency, 2011, 2012, 2013, 2014, 2015, 2016, and 2017

In Yogyakarta, road safety interventions mainly have been conducted by Provincial Transportation Office, Public Works Office, and Health Office. For the local road safety management assessment, some items which has been assessed at the national may not available, i.e. national vision and targets. Those items will be adjusted according to the local vision and targets.

4.4. Overview of Key Stakeholders in Road Safety

4.4.1. Key Road Safety Stakeholders at National Level

Road safety organisations in Indonesia are assigned based on Presidential Instruction No. 4/2013, which comprises five government bodies as coordinators for road safety pillars.

1. Ministry of National Development Planning/ National Development Planning Agency (BAPPENAS)

The BAPPENAS is the responsible ministry for Pillar I Road Safety Management, including encouraging implementation and coordination between stakeholders and creating sectoral partnerships to guarantee the effectiveness and sustainability of the development and road safety strategy planning at a national level. Its responsibility includes determining road safety targets and carrying out evaluations to ensure road safety is implemented effectively and efficiently. However, this function is limited since even though BAPPENAS acts as the lead agency for road safety in Indonesia, legally, the lead of road safety management is the President of the Republic of Indonesia.

Furthermore, there is no specific department for road safety. The Directorate of Transportation has managed road safety. No specific function for road safety has been mandated for the directorate. Consequently, limited staff are available for road safety activities.

2. Ministry of Public Works and Housing (MoPWH)

The MOPWH focuses on the construction and maintenance of roads across Indonesia. Under this ministry, the organisations directly responsible for road construction and maintenance are the Directorate General of Highway (*Direktorat Jenderal Bina Marga*) and the Indonesia Toll Roads Authority (*Badan Pengatur Jalan Tol/BPJT*).

The DGOH is a body governed under the MOPWH directly involved in road safety by constructing and maintaining national roads throughout Indonesia. Through its Technical Unit, which consists of 33 units throughout Indonesia, the DGOH carries out and coordinates Road Safety Audits for national roads. The DGOH also carries out blackspot treatments.

Aside from the Technical Units, there is Road and Bridge Safety and Security Unit (*SubDirektorat Keselamatan dan Keamanan Jalan dan Jembatan*) under Directorate of Road and Bridge Technical Treatments (*Direktorat Bina Teknik Jalan dan Jembatan*).

Indonesia Toll Roads Authority (Badan Pengatur Jalan Tol/BPJT) has the authority to regulate toll roads in Indonesia. The management toll road is separated from the public roads managed by the DGOH.

3. Ministry of Transportation (MoT)

The Ministry of Transportation for Pillar III ensures that every vehicle used on the road has met safety standards. During 2006 – 2019, MOT had a specific directorate for land transport safety, the Directorate for Land Transport Safety (*Direktorat Keselamatan Transportasi Darat/DKTD*). However, this directorate was disbanded in 2019. Subsequently, the Sub-Directorate of Safety Management has managed land transport safety under the Directorate of Land Transport Modes. This restructuring requires the programmes and budget for road safety to be automatically reduced.

Furthermore, the National Transportation Safety Committee (*Komite Nasional Keselamatan Transportasi/KNKT*) was established in 1999 as a unit under the Ministry of Transportation, which has been charged with investigating transportation accidents, including land rail, air, and marine. The KNKT also makes recommendations to prevent the recurrence of similar accidents. Since 2012, the KNKT has been an independent agency directly under the President. According to the Government Regulation Number 62/2013 on Investigations of Transportation Accidents, land traffic accidents that are eligible to be investigated by the KNKT are traffic accidents which comprise more than eight fatalities, become public attention, raise polemic/controversy, lead to heavy infrastructure damages, recurrence at a particular vehicle brand or type in one

year, recurrence at a particular location in one year, causing environmental damages due to transport of hazardous and toxic material waste.

4. National Police of the Republic of Indonesia (*Kepolisian Republik Indonesia/POLRI*)

POLRI through its Traffic Corps (Korlantas), responsible for Pillar IV, improving road users' behaviour through traffic safety education, improving the quality of the permit test system for driving, law enforcement on the road and developing a data collection system for traffic accidents.

5. Ministry of Health (MoH)

Minister of Health for Pillar V is responsible for improving the handling of pre-accident road users' behaviour, including promoting and improving drivers' health in special circumstances/situations and handling post-accident situations with the integrated emergency management system.

Those five government bodies, the coordinator of each pillar, report this Presidential Instruction's implementation to the President through the Minister of National Development Planning/Head of the National Development Planning Agency at least once a year.

Other than the coordinator, other ministries or state-high institutions also can be found in each pillar (see **Appendix C**). *Figure 4.12* illustrates the organisational structure of road safety at the national level in Indonesia.

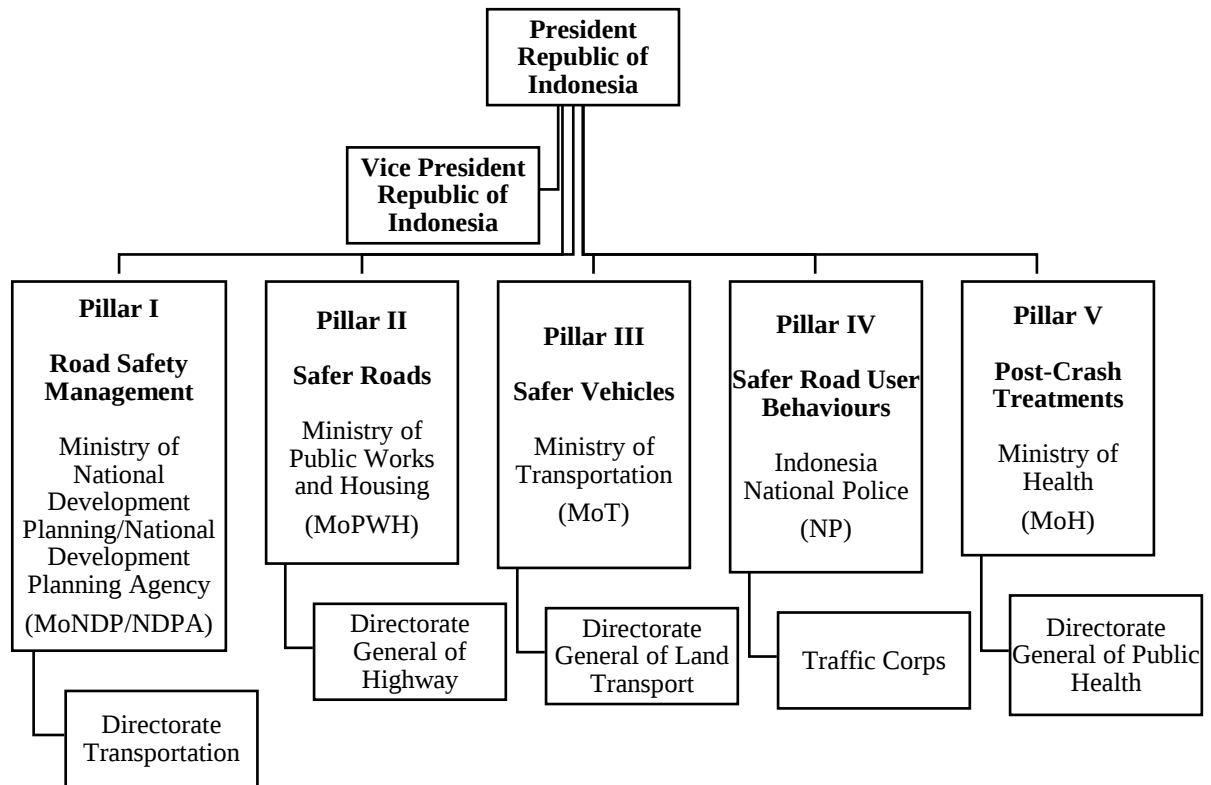


Figure 4.12 The organisational structure of road safety at the national level

Each institution has delivered road safety interventions according to its primary responsibility for road safety. There are no specific divisions or departments for road safety management in each ministry or agency. The road safety division can be found in the National Traffic Police. Furthermore, the lead agency for road safety is absent nationally. Instead, all the ministries have the same position.

Decentralisation has been more strongly implemented in Indonesia since the enactment of Law No. 22/1999 on Decentralisation and Law No. 25/1999 on Balance of Central and Local Government Finance. Accordingly, local governments have more power to manage their area, including funding. Furthermore, Law No. 23/2014 on Local Governance regulates the authority division between central and local government.

4.4.2. Key Road Safety Stakeholders at Provincial Level

At the provincial level, road safety interventions are mainly the responsibility of the Provincial Planning Agency, Provincial Transportation Department, Public Works Department, and Health Department. However, some institutions are associated with road safety activities, i.e., P.T. Jasa Raharja, One-stop Administration Services Office (*Sistem Administrasi Manunggal Satu Atap/SAMSAT*), and Insurance. One-stop Administration Services Office is integrated services among Traffic Police, Office for Management of Regional Revenue, Finance and Assets (*Dinas Pendapatan Daerah, Pengelolaan Keuangan, dan Aset*), Education, Youth, and Sports Office (*Dinas Pendidikan, Pemuda dan Olahraga*), and PT. Jasa Raharja.

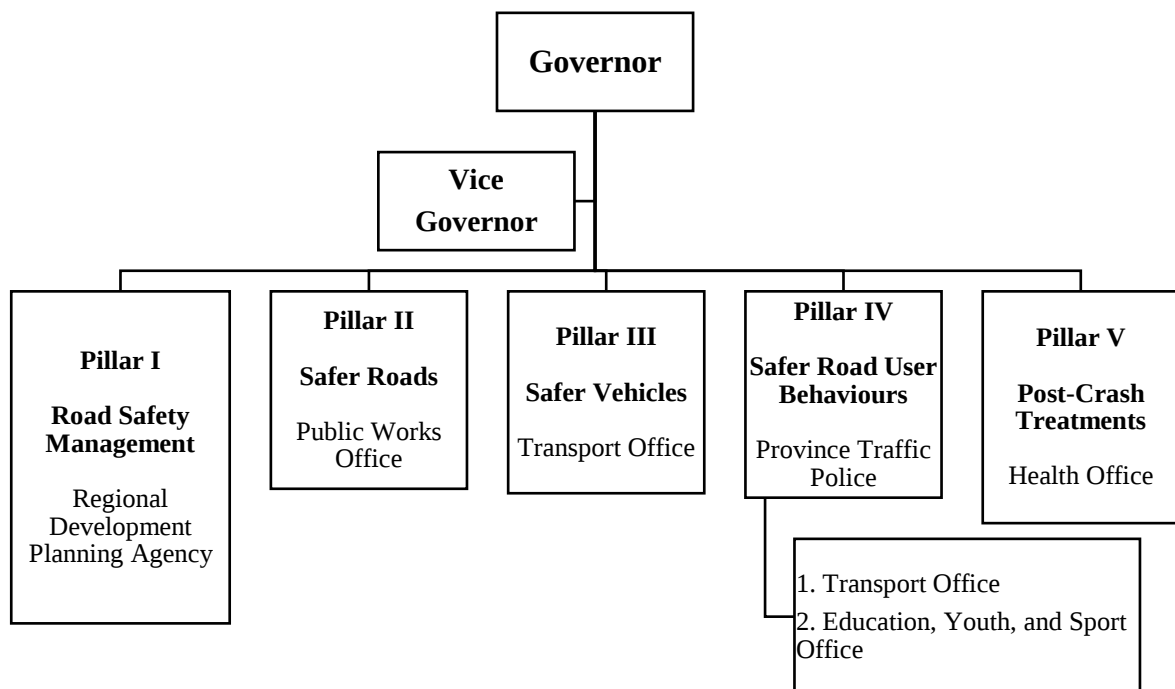


Figure 4.13 The organisational structure of road safety at the provincial level

Similar to the national level, each institution has delivered road safety interventions according to its primary responsibility for road safety. A division for road safety has been found in the Traffic Police and Transport Agency.

Unlike the national level, there is a road traffic forum consisting of the Regional Development Agency, Public Works Office, Transport Office, Province Traffic Police, and Health Office. However, the form of the forum is an ad hoc committee. They have a monthly meeting to discuss road-related issues, including road safety.

CHAPTER 5. ROAD SAFETY MANAGEMENT ASSESSMENT AT NATIONAL LEVEL

5.1. Introduction

This chapter presents a systematic analysis of the assessment of road safety management in Indonesia at a representative national level based on the concepts discussed in Chapter 3. The analysis was based on qualitative data from interviews, workshops, and document reviews. The qualitative methodological approach seems appropriate for this research since it may investigate the Indonesia road safety stakeholders on how road safety is being managed. It examined the present road safety management performance in terms of target, institutional arrangements, interventions, and financial availability and capacity in Indonesia at the national level, which may facilitate or impede road safety improvement. The assessment aims to provide insight into how funding and financing mechanisms (social impact bonds) may be needed to affect the performance of road safety management.

5.2. Research Method and Analysis

5.2.1. Research Method

As discussed in **Chapter 1**, this chapter aims to assess the performance of road safety management in LMICs. This study used Indonesia and Yogyakarta as case studies of national and local road safety management representatives.

In addition, the objective includes identifying and analysing the significant issues that support or hinder road safety management plans at the institutional level, which underpins the need for a suitable financing mechanism for road safety management.

This research used a case study approach to fulfil the objective. A detailed case study provides the opportunity for an in-depth examination of the sequence of events and relationship dynamics in Indonesia, providing a nuanced and holistic picture of a complex case (Bennett and Checkel 2014; Cartwright 2017) in (Economy, 2021).

Using a single detailed case study has advantages, as it allows for the in-depth examination of the events, processes, and relationship dynamics, providing a nuanced and holistic picture of a complex case (Economy, 2021).

Interviews and document analysis were used in this research. The assessment has been carried out at the national and local levels. The area of study is Indonesia, to represent road safety management at the national level, and The Special Region of Yogyakarta (DIY), to represent the local level. A desk study was conducted to get the background condition of road safety in Indonesia. The following step involved a semi-structured interview with some road safety stakeholders at the national and local levels. The interview with the central government was carried out between October and December 2017. The data from the Special Region of Yogyakarta was collected through semi-structured interviews with some road safety stakeholders, which were carried out between March and May 2019. The answers provided by the interviewees were written down or recorded as audio with their permission and consent. The interview sessions were conducted face-to-face. Therefore, the researcher gained in-depth explanations of specific questions and answers from the interviewees.

Aside from the interview, the data was collected from a workshop at the national level on the progress of road safety in Indonesia, which consists of the Ministry of National Development Planning, the Ministry of Public Works, the Ministry of Transportation, the Ministry of Health, the Ministry of Education, the National Police, and Academia. The workshop was held in October 2017.

All the interviewees were selected based on the following criteria:

- a. Representatives of ministries, government agencies, private sectors, non-profit organisations, researchers, and academia were key stakeholders responsible for decision-making, formulating policy, and delivering road safety.
- b. Decision makers or experts at their organisations with experience in road safety management in Indonesia and Yogyakarta align with their respective organisations' positions. Therefore, their participation was based on expert sampling to obtain their view on road safety management in Indonesia or Yogyakarta, which added valuable input to this research.

The interview was delivered to relevant stakeholders as follows.

Table 5.1 *List of interviewees*

No.	Institutions	Designation
1	Ministry of Public Works and Housing (MOPWH)	Directorate General of Highways
2	Ministry of Public Works and Housing (MOPWH)	Research and Development Centre for Road and Bridge, Institute of Road Engineering
3	Ministry of Transportation (MOT)	Directorate of Transportation Safety
4	Ministry of National Development Planning (MONDP)/National	Directorate of Transportation

No.	Institutions	Designation
	Development Planning Agency (NDPA)	
5	Indonesia Road Safety Partnership (IRSP)	Secretary
6	Indonesia Road Safety Partnership (IRSP)	Advisor
7	Bloomberg Philanthropies (Indonesia Project)	Initiative for Global Road Safety
8	Institute for Transportation and Development Policy (ITDP)	Director
9	Institute for Transportation and Development Policy (ITDP)	Transport Planning Engineer
10	Daerah Istimewa Yogyakarta (DIY) Traffic Police	Enforcement Unit Staff
11	DIY Transport Office	Chief in Traffic Safety
12	DIY Public Works Office	Secretary
13	DIY Health Office	Chief in Public Health
14	DIY Regional Development Planning Office	Planner Staff
15	DIY state-owned insurance company	PT. Jasa Raharja
16	Universitas Gadjah Mada	Lecturer and Researcher in Road Safety
17	Universitas Gadjah Mada	Researcher

5.2.2. Research Analysis

All gathered data from the interview sessions, workshops, and document reviews were managed, analysed, and interpreted. All the interviews were supposed to be audio-recorded. However, some of the interviewees refused to be recorded. Therefore, writing-recorded has

been carried out for this case. All the records were transcribed verbatim precisely for analysis purposes. Some interview questions were also sent by email. The meeting minutes (MoM) from the workshop sessions were used.

The key components are extracted from the literature review to start the analysis. The key components used to examine this study's road safety management system are the clarity of road safety targets, the efficiency and effectiveness of the institutional arrangement, the effectiveness of road safety intervention delivery, and the financial availability and capacity.

A five-point indicative scale was applied to evaluate road safety management at the national and local levels against each criterion. The basic scoring scale was thus developed and adapted according to the key components and indicative search keywords/terms, as presented in **Table 5.2**. A list of keywords used in this analysis to determine the state and local road safety management performances across 11 criteria of the main themes is presented in **Table 5.3**. The evaluation was based primarily on a keyword search related to the four key components in the interview, workshop, document review and the nature of their performance in practice. Each keyword or concept score is developed following the study method Hughes, Falkmer and Anund (2019) and Malik, Swapan and Khan (2020).

Table 5.2 *Measuring the performance of road safety management system*

Degree of performance of keywords or terms	Score	Indicative performance category
Keywords or concepts are not found or considered.	1 (min)	Below margin (1-3)
Keywords or concepts are found in the documents or considered in the high-level meeting; however, they have not been implemented yet.	2	Evolving (3-4) Competent (4-5)
Keywords or concepts are implemented at a minimal level.	3	

Keywords or concepts are implemented comprehensively; however, sustainability is not guaranteed.	4	
Keywords or concepts are implemented comprehensively, and sustainability is guaranteed.	5 (max)	

An aggregated score was further grouped into three performance categories: below margin, evolving, and competent. A score of 1 or 2 was suggestive of an absence of adequate performance of the associated components. A score of 3 represented a minimally adequate level of performance. Therefore, a score from 1 to 3 demonstrated a position below the margin. A score from 3 to 4 represented an evolving context where the government had streamlined relevant policies/strategies for implementation but lacked implementable policy tools; above 4 was an indicator of higher competency, showing commendable performance across all 11 criteria.

The description of the criteria and explanation of the scoring methods are found in **Table 5.3**.

Table 5.3 Framework to examine the performance of road safety management system

Key components	Criteria	Description	Scale and indicative criteria		
			Below margin	Evolving	Competent
A. The robustness of road safety target	1. The set targets Keywords: Social costs, crash number, fatality number, serious injury number, crash rate, fatality rate, outcome, output, performance indicator, long-term target, medium-term target, short-term target, standard	The availability of agreed road safety targets among road safety stakeholders for the whole country or region, each region, and each programme for the long-term, medium-term, and short-term.	Lack of appropriate quantitative targets at the national and local levels	- At least one of three targets in the hierarchy is used. - National target only. - Long-term, medium, and short-term targets are found but not well-defined.	- All three targets in the hierarchy are used together — final outcomes, intermediate outcomes and outputs. - National and regional/local targets. - Final outcome targets: reduction in fatalities and serious injuries instead of fatality rate.
	2. Target measurement. Keywords: Data collection system, crash database, data collection method, data quality	The availability of a data collection system which supports comprehensive data analysis	Lack of a data collection system.	- A minimal level of a data collection system - Accountability and accessibility of the database are still limited. - A minimal quality (accuracy, reliability, completeness or representativeness) of recorded crash data	- A systematic data collection system which accountable and accessible. - Accuracy, reliability, completeness and representativeness of recorded crash data - Representative exposure data - Supplementary of crash-base data,

Key components	Criteria	Description	Scale and indicative criteria		
			Below margin	Evolving	Competent
				Minimal availability of exposure data	e.g., traffic violation, traffic conflict, safety performance indicators
	3. Periodic review Keywords: Annual progress report, interim progress report, annual target, interim target	The existence of occasion or media to report road safety performance periodically	No specific time	- At least an annual progress report. - At least the annual target. - Interim targets. - Annual targets.	- Interim targets. - Annual targets. - Annual progress report. - Interim progress report.
B. The efficiency and effectiveness of the institutional arrangement	1. Coordination Keywords: Lead agency, communication, forum, conflict, overlapping, coordination among institutions/horizontal coordination, vertical coordination	The coordination among road safety institutions and stakeholders in delivering road safety interventions	- No lead agency - Minimal level of communication among road safety - There is a conflict of interest among road safety institutions (overlapping tasks)	- There is a lead agency; however, the agency is not supported by daily office activities. - There is a minimal level of conflict of interest among road safety institutions.	- The lead agency role has been optimised and supported by dedicated funding and daily office activities. - No conflict of interest among road safety institutions
	2. Partnerships Keywords: Connect, interact, stakeholder, synergy, collaboration, conflict, complement, dependency, business sector, private sector,	Opportunity both for community and organisational partnerships	- Lack of interconnectedness, interactions, dependency, and synergy among actors and system components - No identified community or	- Medium level of interconnectedness, interactions, dependency, and synergy among actors and system components - Identified community or	- Higher level of interconnectedness, interactions, dependency, and synergy among actors and system components - Identified community or

Key components	Criteria	Description	Scale and indicative criteria		
			Below margin	Evolving	Competent
	NGOs, shared responsibility.		organisation to be a partner	organisation to be a partner but not actively engage or giving contributions to road safety programmes	organisation to be a partner and actively engage and give contributions to road safety programmes
	3. Quantity and quality of the human resources Keywords: Number of skilful staff, skilful staff commitment	The skilful human resources in road safety	No skilful staffs	A limited number of skilful staff	Sufficient numbers of skilful staff
C. The effectiveness of road safety intervention delivery	1. Evidence-based interventions Keywords: research-based interventions, empirically proven, data-driven, identified risks, road user risks, best practices, research inventory, demonstration and pilot programme, continuity	Implementing more systematic key road safety principles (recent development and recognised various road users) and interventions which have been proven to be effective empirically or by research	There is research on road safety interventions; however, it is not used in designing and implementing road safety interventions	There is research on road safety interventions; it is limited or partially used in designing and implementing road safety interventions	There is research on road safety interventions; it is used comprehensively in designing and implementing road safety interventions
	2. Monitoring and evaluation	The existence of data collection, management,	• Monitoring and evaluation are not in place.	• Monitoring and evaluation have been carried out	• Monitoring and evaluation have been carried out.

Key components	Criteria	Description	Scale and indicative criteria		
			Below margin	Evolving	Competent
	Keywords: Data collection, data management, safety rating survey, regular survey, monitoring system, evaluation system, data access	monitoring and evaluation system		No follow-up for the evaluation result.	- Evaluation method is in place to identify the relation between the programmes and the outcomes - Use the evaluation result to improve the interventions.
D. The financial availability and capacity	1. Source of funding. Keywords: general budget, Road fund, tolls, fees, insurance, risk	The availability of sustainable funding.	No funding allocated	- Funding allocated through the general government budget - Sustainable road safety funding sources have been identified but not utilised yet	- Funding allocated from a special allocation for road safety - Sustainable road safety funding sources have been utilised
	2. Capacity. Keywords: Sufficient, funded	The fund is sufficient to fund the prioritised programmes.	No funding allocated	Not all programmes are funded.	All the programmes are sufficiently funded.
	3. Formal resource allocation procedure. Keywords: Value of statistical life (VOSL), cost-effectiveness, cost benefits, incentive, reward	The funding allocation is based on the calculation of cost-effectiveness or cost-benefit analysis, in which VOSL is determined first.	No procedure.	There is a procedure. However, the procedure does not consider or partially consider VOSL, cost-effectiveness, and cost benefits.	The procedure considers VOSL, cost-effectiveness or cost benefits.

5.3. Assessment Findings: Road Safety Management at the National Level

The following sections show the results of surveys at the national level comprising the four main areas of the study.

5.3.1. The robustness of road safety target

The documents, interviews, and workshops analysis confirm several practices regarding setting up the national road safety targets, comprising the set target, target measurement, and target progress review.

1. Target set

Road safety stakeholders have agreed upon the set targets. The fatality rate or fatality index has been determined as the national target. The fatality rate is based on the number of road fatalities per 100,000 population and the number of fatalities per 10,000 vehicles. The target has been set by the agreement of all road safety institutions at the national level, which the Ministry of National Planning leads. The national targets have been set to reduce the fatality rate by as much as 80% by 2035, based on 2010 fatality numbers (31,234 fatalities). The detailed target can be seen in **Table 5.4**.

Table 5.4 *Indonesia's Road Safety Target*

Year	Target	Fatality Index per 100,000 population	Fatality Index per 10,000 vehicles
2010 (baseline)	0%	13.1	3.93
2011-2015	20%	10.5	3.14
2016-2020	50%	6.6	1.96
2021-2025	65%	4.6	1.37
2026-2030	75%	3.3	0.98
2031-2035	80%	2.,6	0.79

Source: National Development Planning Agency, 2017

The long-term target is 25 years, divided into five medium targets. Each target is a five-year target. From the evaluation of the first medium target, which is from 2011 to 2015, the targets for road safety improvement were a 20% reduction from the 2010 baseline reached by 2015. The fatality rate per 100,000 population was 10.37, and the fatality rate per 10,000 vehicles was 2.18. These numbers had surpassed the designated targets of 10.5 for the fatality rate per 100,000 population and 3.14 for the fatality rate per 10,000 vehicles.

Each responsible institution has set intermediate outcomes for road safety strategies, i.e., the Ministry of National Planning, Ministry of Public Works, Ministry of Transportation, National Police, and Ministry of Health. The details of intermediate outcomes targets can be found in the Decade of Action 2011-2020 programmes, which can be seen in **Appendix C**.

However, the target category in the National Road Safety Plan is still inconsistent among institutions. Some institutions use the intermediate outcome as the target of their programmes, while others use the outputs. For example, the Ministry of Public Works uses the time needed to repair the road hole.

Standards are in place. Standards refer to international standards, best practices, and research. For example, standard road design considers safety principles.

The interview revealed that for road construction projects with international funding, such as the World Bank, the project requires at least a 3-star safety rating road, which is also completed with a road safety audit for its stage of the project.

2. Target measurement

In addition, a web-based crash data, called Integrated Road Safety Management System (IRSMS), was developed in 2013 by the Indonesia National Police. However, Indonesia lacks eligible road fatality registration data (WHO, 2018).

The target achieved for each year from 2010 to 2016 can be seen in **Table 5.5**.

Table 5.5 Road safety targets achieved 2010-2016

Year	Total casualties	Fatality	Casualty proportion (%)			Fatality/100,000 population	Fatality/10,000 vehicles
			Fatality	Seriously Injury	Slight Injury		
2010	109,878	19,873	18	27	55	13.1	4.1
2011	175,425	31,195	18	21	61	13.5	3.8
2012	197,560	29,544	15	20	65	12.1	3.1
2013	165,302	26,416	14	15	72	10.1	2.4
2014	164,878	28,297	16	17	67	11.1	2.5
2015	161,146	26,495	15	16	69	10.37	2.18
2016	169,711	25,869	14	15	71	9.9	2.0

Source: Indonesia Statistics Agency, 2011, 2012, 2013, 2014, 2015 2015; National Development Planning Agency, 2017

Intervention output targets have been set for each strategy (see Decade of Action 2011-2020 programmes). However, a quantified target for each year has not been set yet.

3. Periodic review

All agencies responsible for improved safety performance have been identified, and they are formally held to account for performance achieved to achieve the desired focus on results. Road safety organisations in Indonesia are designated based on Presidential Instruction No. 4/2013.

The coordinator of each pillar reports the implementation of this Presidential Instruction to the President through the Minister of National Development Planning/Head of the National Development Planning Agency (BAPPENAS) at least once yearly.

Regular performance reviews are conducted to assess progress and make improvements to achieve the desired focus on results. The coordinator of each pillar reports the implementation of the road safety programmes to the President through the Minister of National Development Planning/Head of the National Development Planning Agency at least once per year.

The result of the analysis of interviews, workshops, and documents of the national-level road safety implementation on the robustness of the road safety target at the national level can be summarised as follows.

Table 5.6 *Assessment results of road safety targets*

Criteria	Score	Indicative performance category
The set target	3	Below margin
Target progress review	3	
Target measurement	2.5	
Average score	2.83	

5.3.2. The efficiency and effectiveness of the institutional arrangement

1. Coordination

As instructed by Presidential Instruction Number 4/2013, Indonesia has formed a lead agency, National Development Planning Agency, to coordinate all road safety stakeholders at the central government level. Based on Presidential Instruction Number 4/2013, the structure of the road safety organisation is formed based on institutional involvement in the five pillars' activities. The Ministry of National Development Planning/National Development Planning Agency has been instructed as the institution which should coordinate the other institutions in the five pillars, as has been stated in the Pillar I task description. The lead agency role is defined in legislation and/or policy documents and annual performance agreements to achieve the desired focus on results. The National Development Planning Agency is assigned with four other government agencies based on Presidential Instruction No. 4/2013. However, the interview reveals that a formal lead agency, supported by daily office activities and staff focused on road safety, has not been formed yet.

Furthermore, with the enactment of Government Regulation Number 37/2017 on Road Safety, inter-pillar coordination is expected to become more effective.

Ministry of National Development Planning/Bappenas has included road safety in the National Medium Term Development Plan 2015-2019 to strengthen national and local government coordination and international market competitiveness (ASEAN, 2016). Moreover, key stakeholders are implementing road safety in the government's annual plan for 2015 (ASEAN, 2016).

As for the implementation approaches concerning coordination, the study revealed that interventions are being coordinated horizontally across agencies. All the institutions involved in the five pillars have equal authority, except for local (provincial and regency/city) governments under the central government's authority. The road safety organisation in Indonesia is arranged as depicted in *Figure 5.1*.

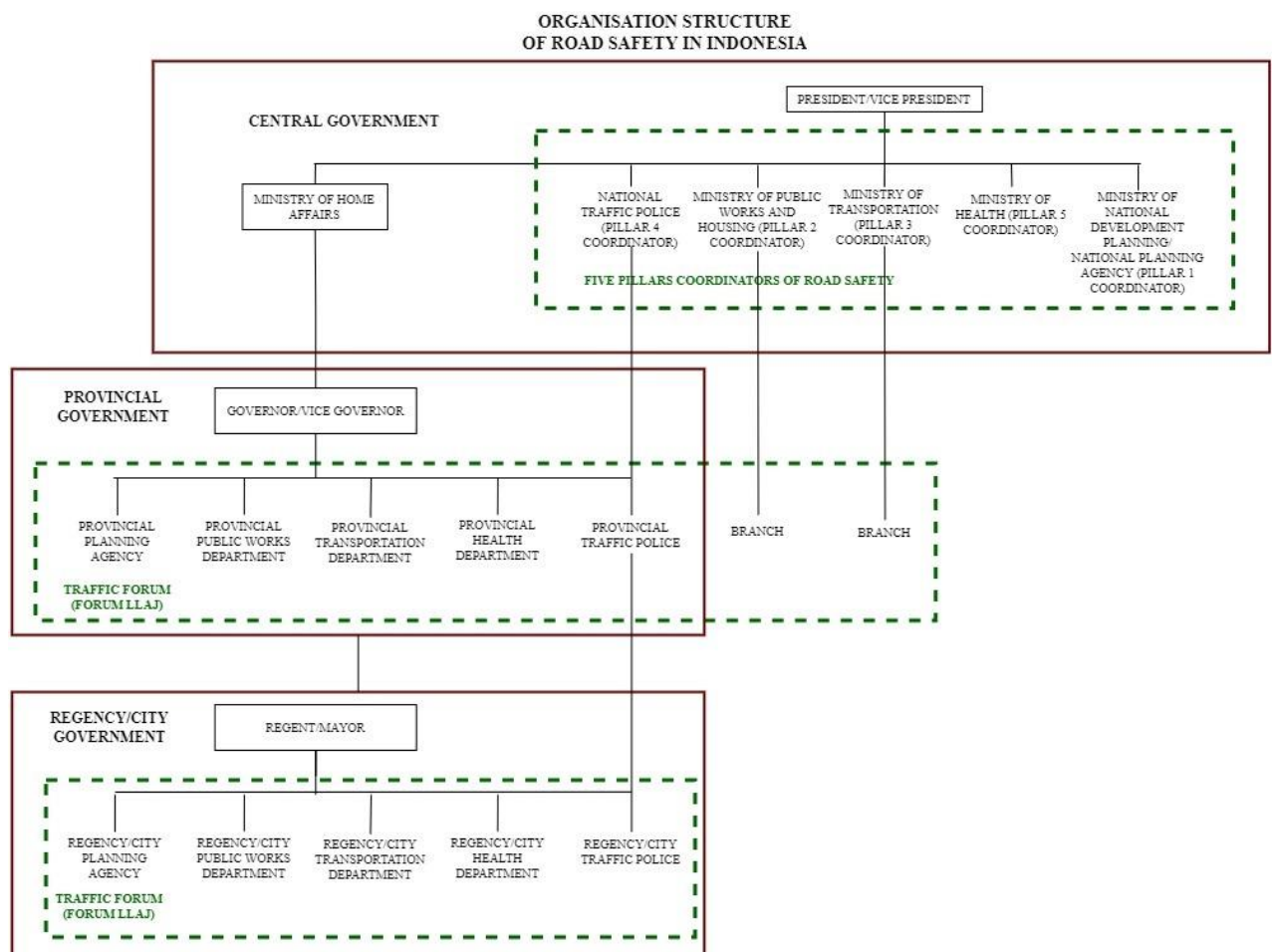


Figure 5.1 Organisational structure of road safety in Indonesia

An example of collaboration among agencies is in road safety promotion. The agency in charge of leading road safety promotion is the National Traffic Police, with supporting sectors are the Ministry of Transport, Ministry of Education, Ministry of Health, Ministry of Home Office, Ministry of Religions, community, industry, and local governments. The National Traffic

Police has coordinated with key stakeholders to socialise and establish the enforcement of road user compliance in terms of speeding, drink-driving, helmets, seat-belts, pedestrians, the usage of mobile phones, driver health conditions, and child protection, including coordinating with the Ministry of Education and Culture to include road safety education into the curriculum for primary and secondary schools (ASEAN, 2016).

Another example of collaboration between agencies is that two agencies at the national level have enforcement powers, i.e., the Traffic Police and the Directorate of Traffic and Highway Transport (DTHT), Ministry of Transport. The Traffic Police has the authority mainly to enforce road user behaviour. In contrast, DTHT has the authority to enforce vehicle specifications and functions, and both may cooperate in conducting the enforcement. When DTHT carries out the enforcement, it must be accompanied by the Traffic Police. However, the Traffic Police may do the enforcement itself.

Educational activities on road safety are conducted in cooperation between the Ministry of Education, the National Traffic Police, and the Ministry of Transport. The collaboration with the Ministry of Women's Empowerment was also identified in creating a child-friendly city programme. However, the programme has not been delivered yet.

Academics have collaborated with government agencies, such as the National Development Planning Agency, the Ministry of Research and Higher Education, the Ministry of Public Works and Public Housing, the Ministry of Transportation, and international institutions, such as the Global Road Safety Partnership (GRSP).

The coordinator and supporting agencies for each pillar can be seen in **Appendix C**.

Meanwhile, vertical interventions between national, regional, provincial and regency/city agencies have been carried out through issuing policies and regulations by national government agencies, which have been applied by provincial and city/regency governments, however, due to the implementation of Resolution of the People Representative Council No. XV/MPR/1998, each region has the right, authority, and obligation to manage its region. It aims to enable the regions to manage regional resources according to their needs.

Each aspect becomes the responsibility of the respective government institutions. Each government institution, such as the National Police, has an organisational structure that comprises national and local levels. For example, road safety promotion in Indonesia is in effect at the national and local levels, mainly through media campaigns, advertisements, and education at schools, based on the strategies formulated in the current National Road Safety Plan and Zero Vision. The local police would deliver the programmes designed by the National Traffic Police to overcome speeding.

Even though the coordination between the national and local levels seems disconnected, the road safety programmes which have been carried out at the local level are the continuation of national programmes since Ministry Regulations regulate the programmes, for example, the implementation of Safe School Zone (ZoSS) which implemented in the provincial and local levels based on the guidelines made by the Ministry of Transportation.

A road safety forum has been planned to monitor the implementation of Presidential Instructions No. 4/2013 and the National Road Safety Plan. This forum has a structure as in ***Figure 5.2.***

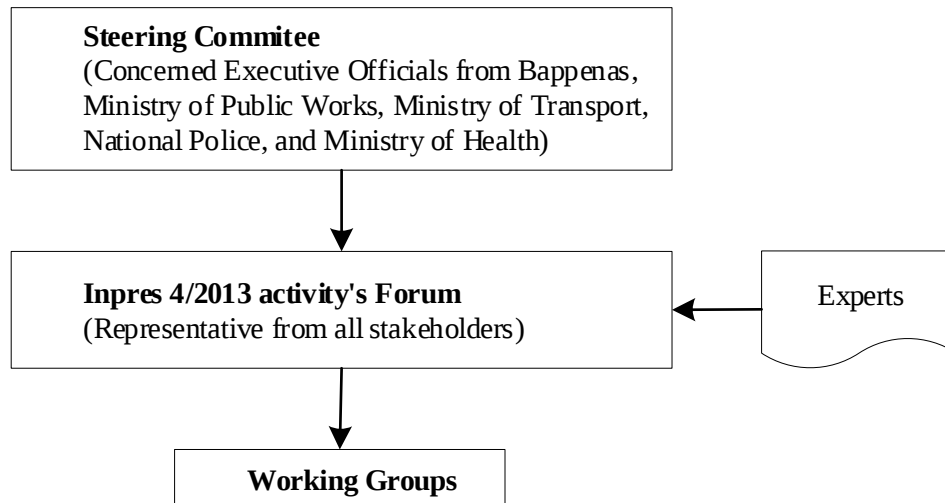


Figure 5.2 Road safety forum

Working groups on road safety have also been planned by the National Development Planning Agency (Bappenas) in 2013. The draft of the Presidential Regulation on Traffic Forum at the national level has been composed by the National Police as a derivative of Government Regulation No. 37/2011 on Traffic and Road Transport Forum. However, the national traffic forum has not yet been formed.

Based on the data from the workshop, inter-sectoral coordination, and communication in delivering programmes is generally recognised, particularly on special events, such as traffic operations during national holidays (Lebaran, Christmas). However, a formal method to communicate and coordinate is absent apart from the events.

Furthermore, the coordination faces a significant constraint due to different understandings and feelings, which are not the agencies' responsibility. However, the interview revealed that the degree of the involvement of each agency differs in a collaboration. This implies reduced attention to the road safety needs of road users.

Furthermore, overlapping programmes have been found, for example, between the police and the Ministry of Transport in terms of authority for traffic law enforcement and education.

2. Partnerships

Decade of Action Programmes clearly define industry, community and business responsibilities for improved road safety performance to achieve the desired focus on results. However, the implementations are mostly not continuous, depending on the funding availability.

Some partnerships have been established between agencies, industry, communities and the business sectors. These partnerships have been conducted between one or more government agencies with industries, communities, or the business sectors for particular road safety programmes. For example, to improve local road safety levels, an award for road safety performance intended for regency/city governments has been conducted by cooperation between Bappenas, five pillar coordinators, Adira Insurance and Swa Business Magazine. However, continuous partnerships between government agencies, industry, communities and the business sector have not yet been designed comprehensively and sustainably.

The MoU and MoA with private sectors usually work in short-term periods. The registered private sectors in Indonesia Road Safety Partnership (IRSP) are the Indonesia Red Cross (PMI), Astra Honda Motor, and Coca-Cola Bottling.

Furthermore, there are some identified partnerships between the Ministry of Transportation and some communities for delivering road safety education programmes, for example, Yayasan Sayangi Tunas Cilik for road safety education for children and Queen Rides (road safety for women). However, most road safety programmes, including stakeholder partnerships, are implemented at the regional and local levels. For example, the Road Safety Aware Community

Group (*Kelompok Masyarakat Sadar Keselamatan Jalan/KMSK*) programme. The KMSK is delivered as a partnership among the local Department of Transport, the local traffic police, schools, and the community.

3. Quantity and quality of the human resources

The interview revealed a lack of awareness and comprehensive understanding of road safety inside the main institutions responsible for road safety programmes. Not all staff have a comprehensive understanding of road safety. The lack of understanding led to road safety programmes not being delivered properly. For example, road design may not properly consider road safety principles.

Furthermore, the employee turnover system allows for rapid employee turnover, causing employees not to have enough time to develop themselves or assign the staff not based on their skills.

The result of the analysis of interviews, workshops, and documents of the national-level road safety implementation on the efficiency and effectiveness of the institutional arrangement at the national level can be summarised as follows.

Table 5.7 *Assessment results on efficiency and effectiveness of the institutional arrangement at the national level*

Criteria	Score	Indicative performance category
Coordination	3	Below margin
Partnerships	2.5	
Quantity and quality of the human resources	3	
Average score	2.83	

5.3.3. The effectiveness of road safety intervention delivery

1. Evidence-based interventions

Research-based interventions

Research concerning road safety management, including vehicle, highway, human, and institutional factors, has been conducted to support the implementation of road safety. The National Planning Agency (BAPPENAS) manages the national research on road safety. However, a national road safety research and development strategy has not been comprehensively established. The research has been conducted sporadic and not collected in a database system to be more synthesised and appropriately implemented.

The leading actor in the research activities is academics. Furthermore, each ministry has a research and development agency responsible for doing research related to the main functions of the ministry, for example, research on data collection systems by the Police, research on human behaviours by the Police and Ministry of Transportation, research on road infrastructures by the Ministry of Public Works, research on vehicle technology by the Ministry of Transport and industry, the helmet research by the National Standard Agency (*Badan Standarisasi Nasional/BSN*) for giving support to the Ministry of Industry. However, the research results have been circulated limitedly. Those also have not been documented and compiled systematically.

An independent national road safety research organisation has not been established. In the meantime, most of the research has been conducted by academics. Furthermore, a vocational school under the Ministry of Transport concerned with road safety has been established. Aside from the research conducted, the school also is expected to supply the need for qualified human

resources in road safety. The interview also revealed that a plan to build a road safety research centre has been developed. Australian sponsorship would fund the development through the Indonesia-Australia Partnership for Infrastructures (KIAT).

The research results have been used as legitimization for enacting regulations on road safety. When there is no research or empirical study based on Indonesian data, benchmarking from other countries or best practices is used instead by considering Indonesia's condition. The instruments to support the demonstration and simulation on a laboratory scale are still limited. Mainly, simulation has been directly conducted in actual conditions. This method is suitable for examining human factors and institutional factors. However, vehicle, highway, and human factors are sometimes more effective to be conducted on a laboratory scale. The academics implement the research results through community services. With community services, the research findings can be applied directly to the community, and the community may experience the impacts directly.

Examples of road safety interventions

In the National Road Safety Plan (RUNK) 2011-2035, there are 81 activities which are the responsibility of ministries and agencies. The detailed activities can be seen in **Appendix C**.

The Ministry of Transportation has issued a Ministry Regulation regarding speed limits. It is working toward issuing Ministry Regulations regarding abolishing vehicle scrapping and safety management systems on public transport entities. The study on speed limits was conducted comprehensively in 2013. The study has been conducted in some cities in Indonesia, representing metropolitan, big, middle, and small cities.

Road safety programmes are designed at a national level; however, the implementation might be delivered by national and/or local authorities. Local authorities may design their own road safety programmes, which refer to national programmes. For example, at a national level, to reduce the number of road crashes because of speeding, some programs which cover all aspects of safety, i.e. engineering, enforcement, education, training, publicity, and emergency preparedness, were designed.

The road safety programme conducted by the Ministry of Transportation, for example, is the Integrated Urban Road Safety Program (IURSP), which aims to improve the safety of roads on a regional basis as a pilot project in several cities such as Bali, Bandung, Medan, and Pekanbaru. These pilot projects are designed to improve safety in urban transport based on national standards. Overall, this program is very promising. However, the program was discontinued due to the unavailability of funds, technical problems, and the absence of an institution or figure to lead the program.

The National Traffic Police has been socialising and establishing the enforcement of road user compliance in terms of helmets, safety belts, and child protection. Campaigns are conducted on a continuous basis. However, the campaigns are mostly conducted on a pilot basis.

Promotional activities are conducted by the Ministry of Transport and the National Police at the national level and the Department of Transport and local policies at the local level. Driver training is conducted by driving schools and training under police supervision.

The concepts are implemented in evidence-based interventions but are not comprehensive yet. Some programmes, standards, and regulations are delivered and established based on research, identified road user risks, and best practices from other countries or regions. However, the research results still lack empirical evidence. The study areas are still limited; for example, by

taking five (5) cities to represent 514 cities and regencies in a study, adopting best practices from other countries without adjusting to local conditions. However, in the research design, the conditions have been represented by regions representing the typical city, such as metropolitan, big, middle, and small cities. Furthermore, not all area of research gets sufficient attention and have not been explored yet, such as institutional factors, compared to road, vehicle, and human factors. The research also has not been systematically inventoried. In addition, some programmes had been conducted as pilot programmes without continuity.

2. Monitoring and evaluation

Sustainable systems to collect and manage data on road crashes, fatality and injury outcomes, and all related road environment/vehicle/road user factors for each category of roads (national, regional, provincial, city) are in place. The National Traffic Police developed the Integrated Road Safety Management System (IRSMS) to collect and manage data on road crashes, fatality and injury outcomes, and all related road environment/vehicle/road user factors. However, under-reporting accidents have been suspected, especially accidents that do not induce casualties or slight injuries.

Sustainable systems are in place to collect and manage data on road network traffic, vehicle speeds, safety belts, and helmet-wearing rates for each road category (national, regional, provincial, and city). The MOT has collected and managed data on road network traffic, vehicle speeds, safety belts and helmet-wearing rates. However, safety belt and helmet-wearing rates are collected occasionally for vehicle speeds.

Systematic and regular safety rating surveys are undertaken to ensure adherence to specified safety standards and rules for each category of roads (national, regional, provincial, and city).

By 2015, the Ministry of Public Works and Public Housing had implemented safer road programmes such as audits programmes for all stages of road construction, inspections of existing roads, blackspot investigations programmes, and road worthiness assessments for both new and existing roads. The ministry has also already implemented an inspection/star rating to assess the safety rating of the national road networks.

Systems to collect and manage data on the output quantities and qualities of safety interventions implemented for each category of roads (national, regional, provincial, and city) are in place. Eighty-one (81) road safety activity outputs are reported in the annual progress report by each pillar ministry and agency. The Ministry of Public Works conducts safety engineering treatments at the national level at the national road network only. Police operations are managed by the National Traffic Police and its branches at each local government level. Ministry of Transport conducts vehicle inspection, implementing signing and marking.

Systematic and regular safety rating surveys undertaken to quality assure adherence to the specific safety standards and rules for each category of vehicles and safety equipment (private, commercial, public, helmets). The Ministry of Transportation has conducted vehicle testing and inspection. However, not every vehicle testing procedure complies with AsiaCAP's standards.

Systematic and regular safety rating surveys undertaken to quality assure adherence to the specific safety standards and rules for each category of post-crash service (pre-hospital, hospital, long-term care), for example, by providing emergency call numbers (112 or 118) and reducing time to crash locations. The Ministry of Health conducts emergency medical services at the national level, and the Department of Health at the local level. Call centres for pre-hospital emergency medical services have been established in some provinces, such as DKI Jakarta, West Java, DIY, Central Java, East Java, and DI Aceh. The Ministry of Health also has

developed a web-based system for reporting and checking drivers. The ministry also plans to extend the availability of systems for vital registration and new technologies for injury-based surveillance systems in emergency rooms.

Systems to monitor and evaluate safety performance against targets regularly are in place. BAPPENAS has carried out annual monitoring and evaluation for all pillars' implementation of road safety.

Not all participating agencies' external partners and stakeholders can access all data collected. The formal mechanism to access the data from each agency is not in place. An agency may ask other agencies directly if they need particular data. Furthermore, according to Law No. 22/2009, the data related to road safety is managed by the police. Other institutions may access and ask the data by request to the police.

Regular surveys of road users and community attitudes to road safety interventions have not been taken comprehensively.

Indonesia has been developing a data centre for road safety by the BAPPENAS. The data centre would collect all the data from all institutions responsible for road safety activities, including all five pillars of road safety coordinators and the supporting institutions.

All the stakeholders collect and manage the data according to their authority. They report the progress to the lead agencies. However, the data has not been managed and used optimally in a holistic manner.

The result of the analysis of interviews, workshops, and documents of the national-level road safety implementation on the effectiveness of road safety interventions at the national level can be summarised as follows.

Table 5.8 *Assessment results on the effectiveness of road safety interventions at the national level*

Criteria	Score	Indicative performance category
Evidence-based interventions	3	Below margin
Monitoring and evaluation	2.5	
Average score	2.75	

5.3.4. The financial availability and capacity

1. Source of funding

The interview revealed that the Indonesian government has been allocating budgets for road safety. The funding for road safety programmes has been channelled to each ministry and agency.

Sources of funding for road safety may be classified based on the ownership of the road networks. The central government is responsible for providing funding for national roads. Respectively, the provincial government is for the provincial roads, and the regency/city government is for the regency/urban roads.

The current organisational arrangement for road safety funding mechanisms at the national can be seen in **Figure 5.3**.

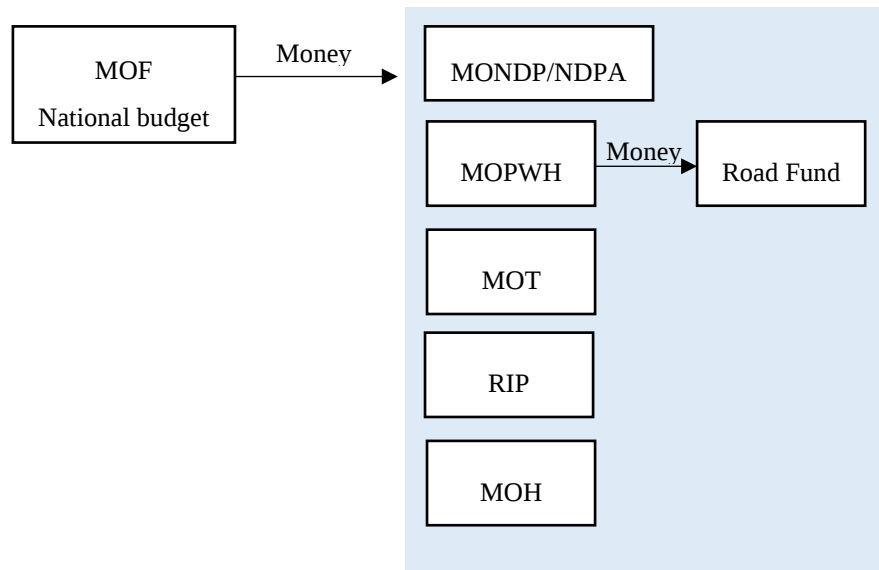


Figure 5.3 Organisational arrangement for budget allocation for road safety at the national level

There might be a road fund allocated, an inclusive road safety fund. This fund is managed by the Ministry of Public Works, which has the authority to manage the road network in Indonesia. However, the Ministry only manages national roads, whereas local governments manage local roads through their public works department. Therefore, the road fund only applied for the national roads. In the Ministry of Public Works, the coordinator for Pillar 2 Safer Road, road safety programmes are not stand-alone yet attached to other programmes. For example, a road safety audit must be carried out for new road construction. However, the budgets are allocated for the new road construction, and the budget for the road safety audit is included. Likewise, for the existing road, the road safety programmes are translated into functional road worthiness assessments, road safety inspections, blackspot investigations programmes and road safety audits for the operational stage. The budgets usually are included in maintenance budgets for routine or periodic maintenance.

In Indonesia, some fees should be paid by public transport passengers and vehicle owners. Law No. 33 and 34/1964 have been used as a legal basis to establish a state-owned insurance company that collects money from public transport passengers and vehicle owners. The company is known as PT. Jasa Raharja collects the levies in two manners.

- a. The levy which is collected from public transport passengers, including railways, air transports, and buses, is called Iuran Wajib Dana Kecelakaan (IWDK) or compulsory contributions of accident fund that has already been included in public transport tariff that passengers have paid. The legal basis for compulsory contributions is Compulsory Insurance Fund on Passenger Accidents Law Number 33/1964 Clause 3 Article 1 jo Terms of Implementation of Compulsory Insurance Fund on Passenger Accidents Government Regulation Number 17/1965 Clause 2 Article 1. This contribution is not charged to inner city public transport and short-distance railway passengers. Rates of road accident funding contributions according to Ministry of Finance Regulation Number 15/PMK.010/2017 can be seen in **Table 5.9**.

Table 5.9 Rates of road accident funding contributions according to Ministry of Finance Regulation Number 15/PMK.010/2017

No.	Contribution type	Tariff (IDR)
1	Land public transport passengers:	
	Motor vehicle public transport	60
	Railways	120
2	Rivers/lake public transport passengers:	
	Tariff up to 2,500 IDR	100
	Tariff >2,500 IDR	200
3	Ferries/crossings/sea public transport passengers	
	Tariff up to 2,500 IDR	100
	Tariff >2,500 IDR – 5,000 IDR	200
	Tariff >5,000 IDR – 10,000 IDR	400
	Tariff >10,000 IDR – 25,000 IDR	800
	Tariff >25,000 IDR	2,000
4	Air public transport passengers	5,000

b. The levy which is collected from vehicle owners is called Sumbangan Wajib Dana Kecelakaan Lalu Lintas Jalan (SWDKLLJ) or compulsory donations of road accident fund system, which has been paid annually by vehicle owners. The legal basis for mandatory donation is Road Accident Funds Law Number 34/1964 Clause 2 Article 1 jo Terms of Implementation of Road Accident Funds Government Regulation Number 18/1965 Clause 2 Article 1. Rates of road accident funding donations according to Ministry of Finance Regulation Number 16/PMK.010/2017 can be seen in **Table 5.10**.

Table 5.10 Rates of road accident funding donations according to Ministry of Finance Regulation Number 16/PMK.010/2017

Group	Vehicle type	Tariff (IDR)	Total Tariff (plus card/certificate replacement costs) (IDR)
A	Motorcycle < 50 cc, ambulance, hearse, fire truck.	0	3,000
B	Tow truck and its kind.	20,000	23,000
C1	Motorcycle, moped, and scooter >50 cc-250 cc and three-wheeled vehicle	32,000	35,000
C2	Motorcycle >250 cc	80,000	83,000
DP	Freight car up to 2,400 cc, private car, jeep.	140,000	143,000
DU	Public transport cars up to 1,600 cc	70,000	73,000
EP	Private buses and microbus	150,000	153,000
EU	Public transport bus and microbus, and public transport car >1,600 cc	87,000	90,000
F	Truck, tanker, trailer, freight car >2,400 cc, truck container, and the like	160,000	163,000

All the tariffs are imposed by card/certificate replacement costs, as much as 3,000 IDR.

The levy compensates road accident victims for slight, heavy, and fatal injuries. PT Jasa Raharja paid the compensation after the beneficiaries completed all required documents. The compensation is given to both non-public and public transport drivers and passengers.

However, single accident victims cannot claim compensation. Compensation is not given for property damage, only for accidents and other infrastructure damages. However, the collected funds have not been dedicated to fund road safety interventions.

Other sources of road safety funding may be obtained from international and national grants, such as the World Bank and Asian Development Bank, and national automotive companies, such as PT Astra Honda Motor, through its corporate social responsibility (CSR).

2. Capacity.

However, the national budget only partially covers the budgets needed for the national road safety strategies to reduce 50% of fatalities (2011-2020). Although the government provides the budget, the value may fluctuate depending on political decisions. Furthermore, the interviews revealed that the budget is insufficient and unsustainable due to competition with other strategic sectors in the government.

3. Formal resource allocation procedure

Currently, road safety programmes have been translated from each ministry or agency's main tasks and functions, which are being translated into the Ministry Decree on Ministry Organisation and Working Procedures. However, there is no clear identification of whether cost-effectiveness or cost-benefit method has been used to prioritise the programmes.

An official value of statistical life (VOSL) and related value for injuries to guide resource allocation decisions have not been formally determined. However, the value of compensations paid to accident victims and beneficiaries has been determined by the government and paid by PT. Jasa Raharja. The recent regulations for the value of the levies and the compensations are Ministry of Finance Regulation No. 15/2017 on compensation and obligatory contribution

value of accident mandatory coverage fund for public transport passengers on land, rivers/lakes, ferries/crossings, sea, and air and Ministry of Finance Regulation No. 16/2017 on compensation and obligatory donation value of road accident fund. The value of the compensations can be seen in **Table 5.11** and **Table 5.12**.

Table 5.11 Ministry of Finance Regulation No. 15/2017 on compensation and obligatory contribution value of accident mandatory coverage fund for public transport passengers on land, rivers/lakes, ferries/crossings, sea, and air

No	Casualties	Compensations (IDR)
1	Land, rivers/lakes, ferries/crossings, and sea public transport passengers	
	Beneficiary of a fatal passenger	50,000,000
	Passengers with permanent disabilities (based on a certain percentage, maximum)	50,000,000
	Passenger who needs treatments and medications	20,000,000
2	Air public transport	
	Beneficiary of a fatal passenger	50,000,000
	Passengers with permanent disabilities (based on a certain percentage, maximum)	50,000,000
	Passenger who needs treatments and medications	25,000,000
3	Fatal passenger without any heir (burial costs)	4,000,000
4	Additional benefits	
	First aid cost reimbursement (maximum)	1,000,000
	Ambulance cost reimbursement (maximum)	500,000

Table 5.12 Ministry of Finance Regulation No. 16/2017 on compensation and mandatory donation value of road accident fund

No	Casualties	Compensations (IDR)
1	Accident casualties	
	Beneficiary of fatal casualty	50,000,000
	Permanent disability casualty (based on a certain percentage, maximum)	50,000,000
	Treatments and medications costs (maximum)	20,000,000
2	Burial costs (if there is no heir)	4,000,000

No	Casualties	Compensations (IDR)
3	Additional benefits	
	First aid cost reimbursement (maximum)	1,000,000
	Ambulance cost reimbursement (maximum)	500,000

Both the public transport passengers and non-public transport passengers who suffer permanent disability due to road accidents may get compensation, which amount is calculated on the percentage number from the amount of compensation for fatal casualty, as determined in Article 3 of Paragraph 10 of the Governmental Regulation No. 17/1965 and 18/1965.

The funding mechanism has been conducted according to the following procedure. Usually, each ministry proposes the programme planning years before to the parliament for approval. Some programmes might not be approved from this stage. The approved budgets, then, are channelled first to each ministry, which subsequently allocates them to the directorate concerned.

Road safety programmes as public goods have been planned as any other government programme. The planning process would take a similar pathway at the national and local levels.

The government programmes may be categorised as the national long-term development plan (RPJPN) (20 years), the national medium-term development plan (RPJMN) (5 years), and the government Workplan (Rencana Kerja Pemerintah/RKP) (1 year). The government work plan is the foundation for national budget allocation.

The national budget allocation was planned a year before its implementation, i.e., the budget allocation 2019 was planned in 2018. The Ministry of Finance has arranged a national budget allocation draft by considering inputs from each ministry and other government agencies. Each ministry and other government agency have a maximum budget allocation, which should be

considered when they propose their budget allocation to the Ministry of Finance. The maximum budget allocation has been set by the Ministry of Finance and the Ministry of National Planning and Development/National Planning and Development Agency. House Representatives will subsequently approve the draft. In this case, the House Representatives do not approve the draft of the budget allocation that the Ministry of Finance has proposed. The government may use the last fiscal year's budget allocation. The budget allocation will apply for one fiscal year, i.e., from 1 January to 31 December. All the government programmes have been planned according to the scheme. The programmes may be delivered from 1 January and will be ended on 31 December.

Road safety programmes of several ministries and government agencies will be placed in the post "ministries and agencies expenditure". In delivering its road safety programmes, each ministry and agency will need funding to prepare and execute the programmes. The ministries and agencies will claim the budgets based on the list of budget implementation entries (Daftar Isian Pelaksanaan Anggaran/DIPA) that must be submitted to the Ministry of Finance. Once the budget has been issued, the ministries and agencies may deliver their programmes. The budget is issued in several terms in one fiscal year. The budget issuing process may take several months from the beginning of the fiscal year. In this situation, the ministries and the agencies may deliver their programmes despite the absence of the budgets or wait until the Ministry of Finance has issued the budget and the programme's delivery has been delayed.

There are two types of programmes to be delivered. The programmes may be conducted internally by the government agency or by appointing external institutions. In the case of appointing the external institutions, because the budget is issued in several terms, the external institutions will receive part of the predetermined budget after they fulfil the requirements. The

external institutions may pay for all their activities when they receive their payments, i.e. when the term is due. Before that, the external institutions should pay for their activities with their budgets. Nevertheless, the performance criteria used to get the approval are based on the use of the fund to deliver activities that are not user oriented.

The following diagram is the flowchart that shows the relationship between central and local governments in developing national and local planning documents and budgets. There are two different relationships related to developing programmes and budgeting.

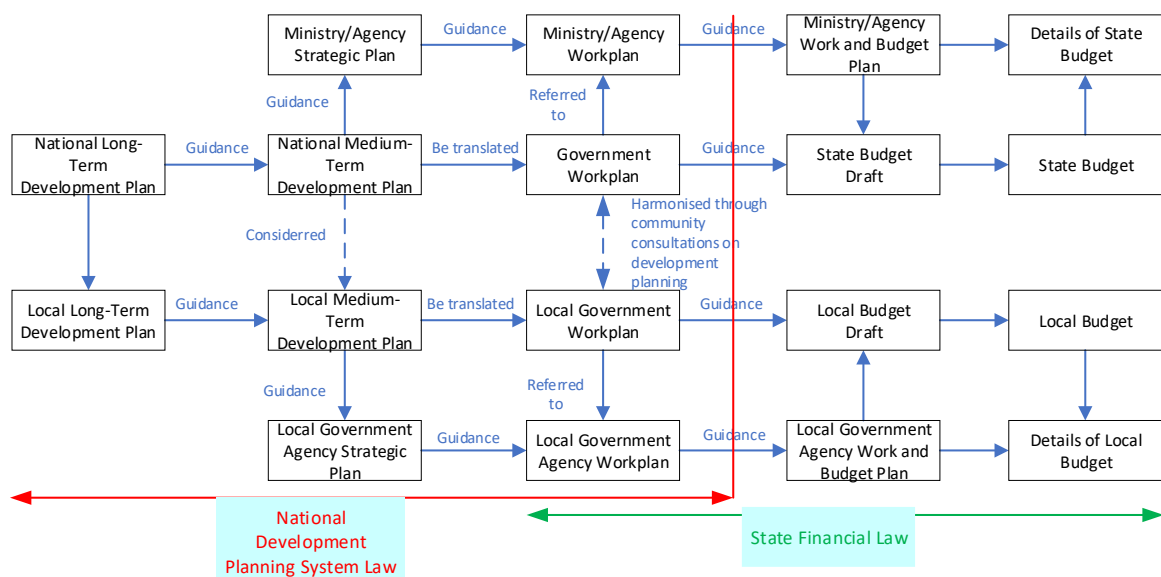


Figure 5.4 Relationship between central and local governments in developing development plans and budgets

The figure shows that the central government guides the local governments regarding programme deliveries, including how to conduct the programmes and the performance that needs to be met.

The result of the analysis of interviews, workshops, and documents on the national level road safety implementation on the financial availability and capacity at the national level can be summarised as follows.

Table 5.13 Assessment results on the financial availability and capacity at the national level

Criteria	Score	Indicative performance category
Source of funding	2.5	Below margin
Capacity	3	
Formal resource allocation procedure	2.5	
Average score	2.67	

5.3.5. The assessment results summary

Overall, the assessment result of road safety management at the national level is that road safety management is evolving. The detailed results can be seen in **Table 5.14**.

Table 5.14 Summary of assessment results of road safety management at the national level

	Criteria	Score	Indicative performance category
The robustness of road safety targets	The set targets	3	Below margin
	Target progress review	3	
	Target measurement	2.5	
	Average score	2.83	
The efficiency and effectiveness of the institutional arrangement	Coordination	3	Below margin
	Partnerships	2.5	
	Quantity and quality of the human resources	3	
	Average score	2.83	
The effectiveness of road safety interventions	Evidence-based interventions	3	Below margin
	Monitoring and evaluation	2.5	
	Average score	2.75	
The financial availability and capacity	Source of funding	2.5	Below margin
	Capacity	3	
	Formal resource allocation procedure	2.5	
	Average score	2.67	
Average score of all criteria		2.77	Below margin

CHAPTER 6. ROAD SAFETY MANAGEMENT ASSESSMENT AT LOCAL LEVEL

6.1. Introduction

This chapter presents a systematic analysis of the assessment of road safety management in Yogyakarta as the representative of the local level. The method used in this chapter is the same as road safety management at the national level in Chapter 5. The analysis was based on qualitative data from interviews and document reviews. The qualitative methodological approach seems appropriate for this research since it may investigate the Yogyakarta road safety stakeholders on how road safety is being managed. It examined the present road safety management performance in terms of Yogyakarta's results, interventions, and institutional management functions, which may facilitate or impede road safety improvement. The assessment focused on the present institutional arrangements for road safety management in Yogyakarta to provide insight into how funding and financing mechanisms/social impact bonds may be needed to affect the performance of road safety management.

6.2. Assessment Findings: Road Safety Management in Yogyakarta

The following sections show the results of surveys at the provincial level, i.e., Daerah Istimewa Yogyakarta or Yogyakarta, comprising the four main areas of the study.

6.2.1. The robustness of road safety target

The documents, interviews, and workshops analysis confirm several practices regarding setting up the local road safety targets, comprising the set target, target measurement, and target progress review.

1. Target set

Yogyakarta has adopted a national vision through its Regional Medium-Term Development Plan (*Rencana Pembangunan Jangka Menengah Daerah/RPJMD*), which subsequently have been translated into the Yogyakarta government strategies—the road safety targets at the local level support the national targets. Overall vision and goals align with national vision and goals on road safety.

However, if at the national level, the targets are the fatality index per 100,000 population and the fatality index per 10,000 vehicles, the target at Yogyakarta is road crashes per kilometre.

Furthermore, the budget is disbursed based on fee-for-service or delivered programmes, for example, hours in delivering road safety education and the number of officers enforcing the traffic regulations.

Unlike at the national level, the intermediate outcomes target has not yet been formulated locally. However, at-risk group targets have been considered in developing road safety programmes at the local level. Likewise, industry and social cost targets have not yet been considered nationally.

2. Target measurement

Data on road deaths and injuries is readily available in the Directorate of Traffic Police of Yogyakarta (Ditlantas POLDA DIY). Even though the database is stored in IRSMS, the accessibility is still limited to the public. The public and other agencies may request the data manually from the police by sending a letter. Detailed data on road crashes may not be provided, leading to difficulties in evaluating delivered interventions, such as monitoring and evaluation by the Department of Transport and Department of Planning (Bappeda) (Interview, Bappeda).

3. Periodic review

A three-month evaluation was conducted to check the progress and budget absorption of the programmes. In this evaluation, each agency may get a reward according to its performance.

The result of the analysis of interviews, workshops, and documents of the local-level road safety implementation on the robustness of the road safety target at the local level can be summarised as follows.

Table 6.1 *Assessment results of road safety targets*

Criteria	Score	Indicative performance category
The set targets	3	Below margin
Target progress review	3	
Target measurement	2.5	
Average score	2.83	

6.2.2. The efficiency and effectiveness of the institutional arrangement

1. Coordination

The agencies responsible for road safety at the local level are derived from the agencies at the national level, i.e. Provincial Development and Planning Agency, Provincial Department of Public Works, Provincial Department of Transport, and Provincial Department of Health. However, there is no lead agency in delivering road safety in DIY. All the agencies are on the same level. They work together to address road safety problems through the Traffic and Road Transport Forum. The Provincial and Regency/City Department for Transport supports road safety campaigns by conducting road safety education to schools and communities. There is industry, community, and business involvement in road safety activities. However, likewise, their involvement has not been structured at the national level.

There is no intervention across agencies horizontally. However, there is still coordination between inter-agencies through the Traffic and Road Transport Forum, which will be held according to the needs of one of the agencies.

At the local level, the forum has been working based on the Governor/Regent/Mayor Decree. The functions of the traffic forum, as the lead for the local level, have not been optimised yet. However, vertical coordination has not worked since the national traffic forum has not yet been formed.

The interventions from the national government are limited since the local government has autonomous authority based on the autonomous law. However, the national government still has authority over the local government based on the implementation of government regulations or ministry regulations in some areas.

2. Partnerships

Some partnerships exist between government agencies, industries/business sectors, and communities. However, the partnerships have been established informally. The partnerships have not been designed comprehensively and sustainably yet. Parliamentary committees and procedures supporting the coordination process have not been identified.

3. Quantity and quality of the human resources

Usually, resources are from the police and the Department of Transport, sometimes from PT. Jasa Raharja also joins the team to give education on road safety, such as safety behaviours. The allocation of the resources has been carried out without considering staff skills in road safety. However, the agencies responsible for road safety programmes have main tasks and functions which ensure the road safety programmes are being implemented. The agency leading road safety promotion at DI Yogyakarta is the police through the Provincial Police Directorate of Traffic. The supporting sectors are the Provincial Department for Transport, the Department of Education, and communities. At the local level, it has been conducted in cooperation between the Department of Education, local police, and the Department of Transport at each local level (province, regency, or city). However, enforcement is difficult due to the limitation of resources.

The result of the analysis of interviews, workshops, and documents of the local-level road safety implementation on the efficiency and effectiveness of the institutional arrangement at the local level can be summarised as follows.

Table 6.2 *Assessment results on efficiency and effectiveness of the institutional arrangement at the local level*

Criteria	Score	Indicative performance category
Coordination	3.5	Evolving
Partnerships	3	
Quantity and quality of the human resources	2.5	
Average score	3	

6.2.3. The effectiveness of road safety intervention delivery

1. Evidence-based interventions

Police agencies conduct road safety campaigns on a continuous basis, followed by enforcement.

Specific interventions have been conducted according to the riskiest target group, i.e., motorcyclists. Even though at the national level, the specific target groups have been identified, which are speeding, drink-driving, helmets, seatbelts, pedestrians, the usage of mobile phones, and driver health conditions, not all target groups can be imposed by the campaigns. The majority of campaigns are intended for helmets and seatbelts. The campaigns for speeding have been conducted.

For the other target groups, the campaign proportion is still lacking. Moreover, most campaigns have been conducted for children in kindergarten and elementary school age.

A road safety research and development strategy in DIY is conducted by each department that is responsible for road safety, for example, research on blackspots conducted by the Transportation Agency. There is no independent road safety research organisation at the local level, which the DIY government manages. Besides being conducted by each department responsible for road safety, the research has also been conducted by academia and research

agencies of universities that are concerned with road safety. Primarily, simulation has been directly conducted in real conditions. For example, by establishing road safety villages. At the local level, the research and development from research agencies have been disseminated as inputs to decision-makers.

Similarly, at the national level, the main legislation to be used for enforcement at local levels is Law No. 22/2019 on Traffic and Road Transport. In addition, other regulations which have been applied are Presidential Instruction Number 4/2013 on Decade of Action for Road Safety 2011-2020 and Government Regulation Number 37/2017 on National Road Safety Plan, which is derived from Law No. 22/2009 Clause 203 and 205. Legislative instruments and procedures supporting interventions and institutional management functions are regularly reviewed and reformed at the national level, such as drafting a regulation on the usage of mobile phone and enacting of Government Regulation No. 37/2017 to support the management functions.

2. Monitoring and evaluation

At the DI Yogyakarta, the accident data, including road crashes, fatality and injury outcomes, and all related road environment/vehicle/road user factors on provincial roads are collected and managed through the implementation of the Integrated Road Safety Management System (IRSMS) by the DI Yogyakarta policies. However, under-reporting accidents have been suspected, especially accidents that do not induce casualties or slight injuries.

Road network traffic, vehicle speeds, safety belts and helmet-wearing rates have been collected and managed by the DI Yogyakarta Department for Transport on provincial roads. However, vehicle speeds, safety belts and helmet-wearing rates are collected occasionally. Regular safety rating surveys have not been conducted yet at DI Yogyakarta, but the Public Works Office has carried out general regular inspections to ensure the network functions.

A system solely intended to monitor and evaluate safety performance in general has not been identified. The monitoring and evaluation functions have been conducted as tasks and functions monitoring and evaluation of each working unit. The measurement is the programmes delivered that working units have conducted. The accident data may be accessed through the police agency. The data is accessed manually by requesting specific data from the police. At the local level, the Department of Public Works of each province, regency or city collects and manages data on the output quantities and qualities of safety interventions related to safety engineering treatments. Currently, the education has been conducted occasionally at the special events at school. However, the evaluation has not been carried out following the road safety campaigns. In DIY, every three months, each agency at the provincial level will receive its performance reports. The agencies which succeed in delivering their programmes will get incentives. In contrast, the agencies that do not succeed in doing so will receive a "red report", and these will be announced in the local newspaper.

The result of the analysis of interviews, workshops, and documents of the local-level road safety implementation on the effectiveness of road safety interventions at the local level can be summarised as follows.

Table 6.3 *Assessment results on the effectiveness of road safety interventions at the local level*

Criteria	Score	Indicative performance category
Evidence-based interventions	2.5	Below margin
Monitoring and evaluation	3	
Average score	2.75	

6.2.4. The financial availability and capacity

1. Source of funding

The funding source for road safety programmes at the local level mostly comes from government budgets, either local government budgets or national government budgets. The current funding source for road safety at the local level is local government budget allocation (APBD), mainly consisting of local taxation, non-tax revenue, and inter-government transfer. Furthermore, due to the special status of DI Yogyakarta, the central government has granted Special Budget Allocation (DAK).

The allocated budget is then distributed to the local government working units (SKPD) responsible for road safety programmes. Formal resource allocation procedures and institutional management functions are not in place to achieve the desired focus on results.

The current funding source for road safety at the local level is local government budget allocation (APBD), mainly consisting of local taxation, non-tax revenue, and inter-government transfer.

a. Local taxation

Local taxation consists of provincial and regency/city taxes (Law No. 28/2009). The provincial tax includes annual vehicle tax, transfer of vehicle name fees, vehicle fuel tax, surface water tax, and cigarette tax.

While regency/city tax consists of hotel tax, restaurant tax, entertainment tax, advertisement tax, street lighting tax, tax on non-metal and rock minerals, parking

retribution, groundwater tax, swallow's nest tax, rural and urban land and building tax, and fee for the acquisition of rights on land and buildings.

b. Inter-government transfer

The inter-government transfer from the central government is the dominant source of budget allocation for local governments; on average, it is 70 to 80 per cent of local government revenues (Aritenang, 2020).

Aside from the annual government budget allocation, which has political interference, the possible funding sources from road users may be optimally utilised to fund road safety. At the local level, the road user fees that can be charged are annual vehicle license fees, fuel fees, driving license fees, insurance, and traffic fines.

a. The annual vehicle license fees

The annual vehicle license fees have been paid to the One-stop Administration Services Office (*Sistem Administrasi Manunggal Satu Atap/SAMSAT*). The annual vehicle license fees consist of tax and non-tax components. The tax components are vehicle tax (*Pajak Kendaraan Bermotor/PKB*) and change vehicle ownership fees (*Bea Balik Nama Kendaraan*). The non-tax components are fees to issue vehicle identification number-letter (*Surat Tanda Nomor Kendaraan/STNK*), vehicle identification number (*Tanda Nomor Kendaraan Bermotor/TNKB*), and vehicle ownership certificate (*Buku Pemilik Kendaraan Bermotor/BPKB*), and accident contribution fees (*Sumbangan Wajib Dana Kecelakaan Lalulintas Jalan/SWDKLLJ*).

b. Fuel fees

Consumers have paid the fuel fees to the oil companies, then transferred the money to the governments.

c. Driving license fees

Driving license fees have been paid by users who to the police.

d. Insurance premiums

Insurance premiums may be consisting of vehicle insurance premiums and road user insurance premiums. Road users have paid both premiums to the insurance companies.

e. Traffic fines

Fines of traffic regulation have been paid by traffic violators to the local governments when they prefer courts processes or pay directly to the police officer on duty. However, the value of traffic fines may be considered low to be included as the funding source for road safety interventions (Robinson, 2008).

f. The accident contribution fees

The contribution fees are paid by the vehicle owner each year and also the passenger of public transport every time they buy a public transport ticket which collected dan managed by PT. Jasa Raharja. The detailed explanation regarding the fees can be found in the *Chapter 5*.

2. Capacity

The budget allocated for road safety has fluctuated due to its dependency on political decisions. Therefore, it affected the sustainability of road safety programmes and outcomes. The relationship between the fluctuating budget allocation for road safety and road safety indicators can be seen in **Figure 6.1**, which shows the budget allocation for road safety in the Yogyakarta Transportation Agency and the number of accidents and fatalities.

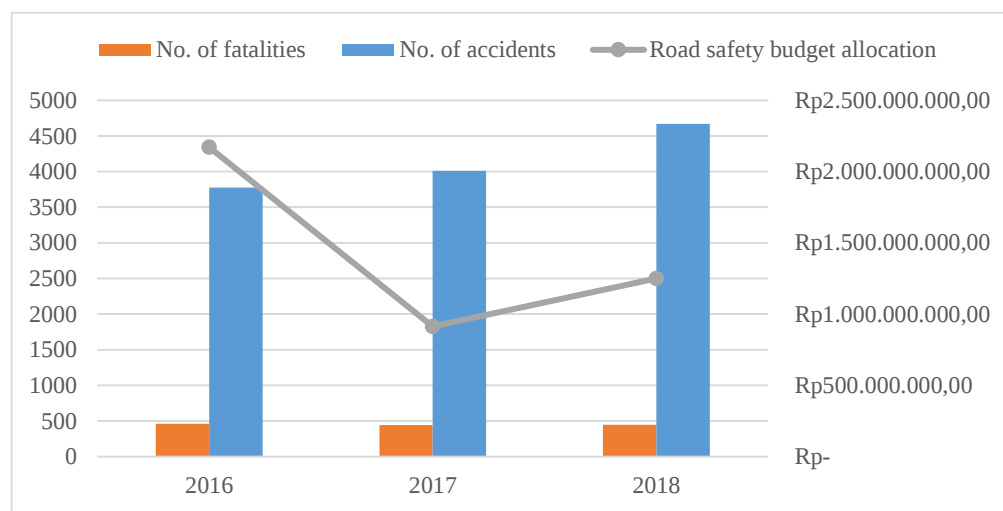


Figure 6.1 Road safety budget allocation of Yogyakarta Transportation Agency VS the Number of Accidents and Fatalities

3. Formal resource allocation procedure

Likewise, at the national level, the official value of statistical life and related value for injuries to guide resource allocation decisions has not been determined formally. The interview revealed that usually department plan all the activities including all their costs. The department send the plan to the Planning Agency. Then, Planning Agency bring all the department planning to the local parliaments which will decide to run the programmes. The process may take two years.

The result of the analysis of interviews, workshops, and documents on the local level road safety implementation on the financial availability and capacity at the local level can be summarised as follows.

Table 6.4 *Assessment results on the financial availability and capacity at the local level*

Criteria	Score	Indicative performance category
Source of funding	3	Below margin
Capacity	3	
Formal resource allocation procedure	2.5	
Average score	2.83	

6.2.5. The assessment results summary

Overall, the assessment result of road safety management at the local level is that road safety management is evolving. The detailed results can be seen in *Error! Reference source not found.*.

Table 6.5 *Summary of assessment results of road safety management at the local level*

	Criteria	Score	Indicative performance category
The robustness of road safety target	The set targets	3	Below margin
	Target progress review	3	
	Target measurement	2.5	
	Average score	2.83	
The efficiency and effectiveness of the institutional arrangement	Coordination	3.5	Evolving
	Partnerships	3	
	Quantity and quality of the human resources	2.5	
	Average score	3	

	Criteria	Score	Indicative performance category
The effectiveness of road safety interventions	Evidence-based interventions	2.5	Below margin
	Monitoring and evaluation	3	
	Average score	2.75	
The financial availability and capacity	Source of funding	3	Below margin
	Capacity	3	
	Formal resource allocation procedure	2.5	
	Average score	2.83	
Average score of all criteria		2.85	Below margin

CHAPTER 7. EXPLORING THE POTENTIAL USE OF SOCIAL IMPACT BONDS FOR ROAD SAFETY FINANCING

7.1. Introduction

This chapter investigates the potential use of social impact bonds for road safety financing in Indonesia. The inquiry will be elaborated on in more detail in the following sections. The context-driven exploration of how the SIB model may be implemented to deliver a road safety programme using a case study on road safety education in Yogyakarta Province.

The framework offers a method to investigate whether the SIB can be implemented. It also may define the type of SIB that can be used in the current conditions or what components need to be provided to improve the SIB. Applying this framework to road safety delivery in Indonesia provided insight into how each feature of the SIB model affected processes of road safety as public service delivery.

7.2. Conceptual Framework

This chapter investigates the potential of SIBs to be implemented in road safety delivery. This study translated the concepts from SIBs into a road safety context. In addition, the analysis also focuses on the effects of SIBs on road safety systems, whether impeding or facilitating. The literature review reveals that the concept of SIB is rooted in New Public Management (NPM) and New Public Governance (NPG). The prominent feature of NPM, adopted by SIBs, is outcome-based payment, and NPG is a multistakeholder partnership (Osborne, 2006; Warner, 2013; Economy, 2021). Several concepts have been generated from those two prominent features.

7.2.1. Outcome-based payments

The first feature is outcome-based payment. As an outcome-based payment, in a social impact bond, the payment to the investor is made if the outcome target has been met. This feature generates consequences as follows.

1. A clear outcome metric.

The outcome needs to be defined as a basis for the payment to the investors or can be linked to the payment. Furthermore, the outcome metric is required to be linked to the desired impact. The impact, subsequently, can be used to estimate the avoided costs resulting from the intervention implementation. Therefore, a robust monitoring system and evaluation method are needed to ensure that the outcome can be justified. The concepts concluded in this domain are outcome metrics, monitoring systems, and evaluation methods.

2. An evidence-based intervention.

An empirical evidence intervention is expected to guarantee that the target outcomes can be achieved. Its effects in reducing the issue need to be empirically proven with sound effectiveness, sample determination, and evaluation methods. The concepts concluded in this domain are the type of intervention used, i.e., best practices based on research or routine, continuity of the delivery, the effectiveness of interventions, and the quantity and quality of service providers.

7.2.2. Multi-sectoral partnerships

The second feature adopted is multi-sectoral partnership. Two concepts are employed in this study to define the partners involved in road safety programmes: road safety as a product and the crash cost breakdown.

The safe system recognises road safety as a shared responsibility among stakeholders. The role of each stakeholder may be determined by assuming road safety as a product. By viewing road safety as a product, road safety can be considered a public good (Ver Eecke, 1998; Bliss and Breen, 2009) and a merit good (Fitzgerald, 2013). Assuming road safety is a public good, the government, as the actor responsible for providing road safety, has three roles, i.e., service, distribution, and stabilisation (Ver Eecke, 1998). Meanwhile, assuming road safety is merit good, the government justifies sharing its role with other stakeholders, such as the private sector. The roles of road safety stakeholders based on road safety as a product can be seen in **Table 7.1**.

Table 7.1 *The role of government and private sectors*

Role	Public Good	Merit Good
Service	Government	Private
Distribution	Government	Private
Stabilisation	Government	Government

Furthermore, the accident cost is broken down into its components to identify actors borne by the costs of road crashes and FSIs and actors who may provide funds for those who have solutions to reduce crashes and injuries but do not have funds to deliver road safety programmes. Therefore, cooperation can be carried out between those actors regarding a new approach to road safety investment (Davies and Newman, 2016).

Sharing responsibility in delivering road safety programmes requires collaboration among stakeholders. Collaboration across sectors, i.e., public, private, and voluntary sector stakeholders, is a concept from New Public Governance (NPG) adopted by SIBs. The collaboration may improve performance in providing services due to allowing for joint

working, which each party may contribute with the best of its expertise. However, the collaboration also has the potential to lead to tension or conflict among the stakeholders involved (Economy, 2021). Therefore, this study identifies existing and potential collaboration in delivering road safety programmes to investigate their potential to be improved by SIBs. The identification includes the programmes delivered by collaboration and the role of each stakeholder involved, for example, service provider, manager, or funder/investor.

7.2.3. Funding

Identifying key players and investors of road safety impact bonds depends on the avoided accident/casualty costs. The potential road safety funding sources in the study area will be assessed to seek potential investors. The crash cost breakdown into its components is used to identify the potential funding source.

The crash cost breakdown identifies the parties burdened by road crashes that will be alleviated by improving road safety programme deliveries. The benefit parties can be assigned as investors (the source of up-front funding) or funders (paying the return payment) (Davies and Newman, 2016). Furthermore, from this domain, the preference of the government and investors regarding using the SIBs is discussed, which leads to the discussion of transfer risk from the government (commissioners) or providers to the investors (Fitzgerald, 2013; Giacomantonio, 2017; Del Giudice and Migliavacca, 2019).

7.3. Research Method and Analysis

Interviews and document analysis were used in this research. The assessment has been carried out at the national and local levels. The area of study is Indonesia, to represent road safety management at the national level, and The Special Region of Yogyakarta (DIY), to represent

the local level. A desk study was conducted to get the background condition of road safety in Indonesia. The following step involved a semi-structured interview with some road safety stakeholders at the national and local levels. The interview with the central government was carried out between October and December 2017. The data from the Special Region of Yogyakarta was collected through semi-structured interviews with some road safety stakeholders, which were carried out between March and May 2019. The answers provided by the interviewees were written down or recorded as audio with their permission and consent. The interview sessions were conducted face-to-face. Therefore, the researcher gained in-depth explanations of specific questions and answers from the interviewees.

All the interviewees were representatives of government and non-government agencies, researchers, and academia with experience in road safety management in Yogyakarta aligned with their respective organisations' positions. Therefore, their participation was based on expert sampling to obtain their view on road safety management in Yogyakarta, which added valuable input to this research.

The interview was delivered to relevant stakeholders, as seen in **Table 7.2**.

Table 7.2 *List of interviewees*

No.	Institutions	Designation
1	Daerah Istimewa Yogyakarta (DIY) Traffic Police	Enforcement Unit Staff
2	DIY Transport Office	Chief in Traffic Safety Division
3	DIY Public Works Office	Secretary
4	DIY Health Office	Chief in Public Health
5	DIY Regional Development Planning Office	Planner Staff
6	DIY Public insurance company	PT. Jasa Raharja
7	Universitas Gadjah Mada	Lecturer and Researcher in Road Safety
8	Universitas Gadjah Mada	Researcher

All gathered data from the interview sessions, workshops, and document reviews were managed, analysed, and interpreted. All the interviews were supposed to be audio-recorded. However, some of the interviewees refused to be recorded. Therefore, writing-recorded has been carried out for this case. All the records were transcribed verbatim precisely for analysis purposes. Some interview questions were also sent by email.

The analysis was conducted through thematic analysis (template analysis technique). Thematic analysis is commonly used in qualitative research by extracting the data to get core themes within and between the transcripts (Bryman, 2012).

The evaluation was based primarily on a keyword search related to the three domains in the interview, workshop, document review and the nature of their performance in practice. The key components are extracted from the literature review to start the analysis: outcome-based payment, multi-sectoral partnerships, and funding. A list of keywords used in this analysis to determine the suitability of SIBs for road safety financing across 16 keywords: setting the target, evaluation method of interventions, evaluator, data quality, data type, database system, intervention delivery, programme status, target population, human resources, division roles among partners, collaboration, funding source, funder/investor preference, government financial capacity, and payment mechanism. A scale of 1 - 5 indicates how well the component's condition supports the implementation of SIBs. In cases where a component does not have a scale (score 1 - 5), it can be interpreted that the presence of the component in the context indicates suitability for using a good SIB. However, the suitability is low if these components or concepts are not found in the context.

Therefore, the components in the presented conceptual framework have been used to investigate whether the SIBs may be implemented to improve road safety delivery in Indonesia. The

framework compares the suggested criteria of SIBs with the current conditions in Indonesia, as seen in *Table 7.3*.

Table 7.3 The suitability framework of SIBs for the road safety financing scheme

Domain	Components	Result
1. Outcome-based payment	Setting the target	Outcome target: 5 Input target: 3
	Evaluation method of interventions	• No evaluation: 0 • Simple ex-post verification: 2 • Post analysis or historical comparison: 3 • Quasi experimental: 4 • Randomised Control Trial (RCT): 5
	Evaluator	No evaluator: 0 Internal (within the organisation): 2 Inter-organisation evaluator: 4 External evaluator: 5
	Data quality	Complete (all has been recorded; consider integration with other institutions): 5 Incomplete: 2
	Data type	Aggregate: 1 Disaggregate: 5
	Database system	Accessible: 5 Limited accessible: 3 non-accessible: 1 No database: 0

<i>Domain</i>	<i>Components</i>	<i>Result</i>
	Intervention delivery	Evidence of efficacy: • Empirically proven • Theoretically proven
		Method to choose interventions: • Cost-effectiveness • Cost benefits
		Continuity of the interventions: • Pilot • Continuous • Innovative • Need to scale-up
	Programme status	• Statutory • Essential • Additive/complementary
	Target population	Clearly defined cohort: 5 Not clear: 0
	Human resources	Quality: • Competent service providers • Skilful staff
		Quantity: • Adequate • Limited number of staff • Multiple roles

<i>Domain</i>	<i>Components</i>	<i>Result</i>
2. Multisectoral-partnerships	Role division	The government agency conducts all roles: 1 The non-government agency conducts some roles: 2 (e.g., Local service providers) The government as the owner: 5
	Collaboration	• Internal collaboration • external collaboration
		Conflicts or tensions in a collaboration
3. Funding	Funding source	Government Donors Investors
	Funder/investor preference	Grant or investment (including social investment) Transfer risk: The funder holds all, partial, and none risks.
	Government financial capacity	Sufficient Sufficient, but with a complex procedure. Not Sufficient.
		The need for funding up-front
	Payment mechanism	Outcome-based payment Performance-based Service-based (input-based)
		Incentives

The findings of the analysis using the framework are presented in the next chapter.

CHAPTER 8. YOGYAKARTA ROAD SAFETY PROFILE

8.1. Introduction

This chapter presents the road safety profile in Yogyakarta to give a context for further analysis of the implementation of SIBs for road safety.

8.2. Identified Social Issue

Literature reveals that identifying social issues is the first step to establishing a SIB (Bolton and Savell, 2010; Mulgan et al., 2011; Liebman and Sellman, 2013; Ackerman et al., 2013; Eames et al., 2014; Griffiths and Meinicke 2014; Noya and Galitopoulou, 2016). Furthermore, according to Davies and Newman (2016), an impact bond depends on context. Therefore, providing a context for developing a social impact bond is essential. This study uses Yogyakarta as the context of the study, i.e., Yogyakarta road safety issue.

Road safety issue identification has been done by looking at Yogyakarta's accident profile and associated road and traffic data during 2016-2018. The accident profile is presented in terms of number of accidents for each type of road and vehicle. The traffic violation data also has been accounted for in this study.

The data was derived from Yogyakarta Traffic Police and PT. Jasa Raharja. Data from Yogyakarta Traffic Police consists of accident-based data and traffic violations data. While data obtained from PT. Jasa Raharja are casualty data based on claims from accident victims.

From Yogyakarta Traffic Police data, the number of traffic accidents, casualties, and violations is increasing each year, as seen in **Figure 8.1**. Most traffic violations are committed by private

employees, followed by students and university students, as seen in **Figure 8.2**. Accident victims mainly occurred in the 16-25 age group, followed by the 51-60 age group, as seen in **Figure 8.3**.

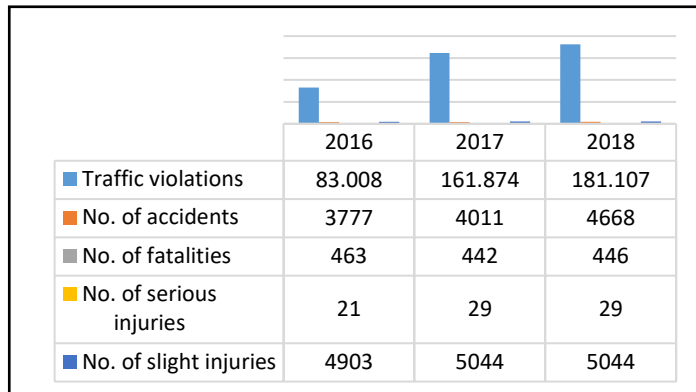


Figure 8.1 Traffic accident, casualty, and violations number
Source: Yogyakarta Traffic Police, 2019

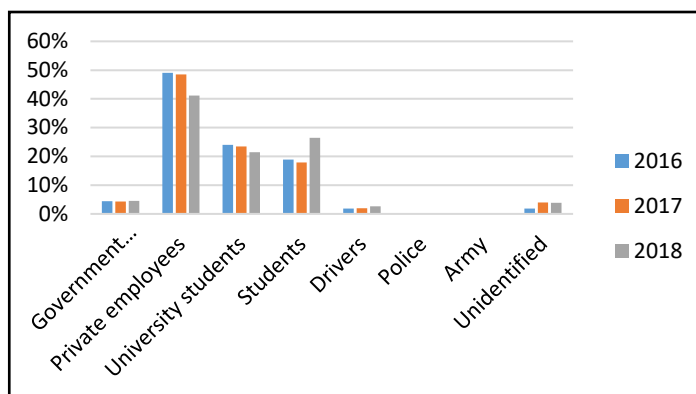


Figure 8.2 Traffic violations based on occupation
Source: Yogyakarta Traffic Police, 2019

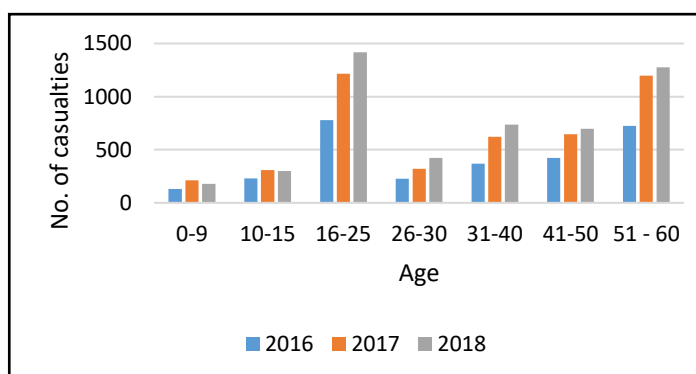
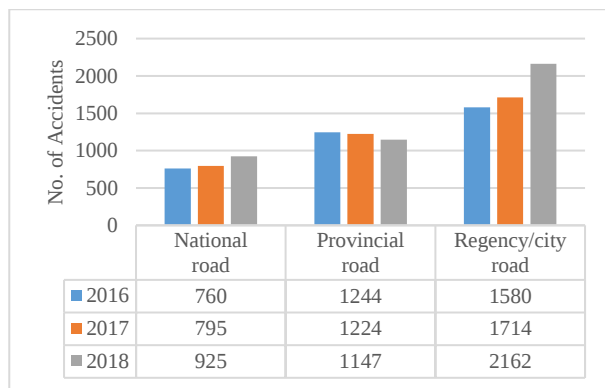
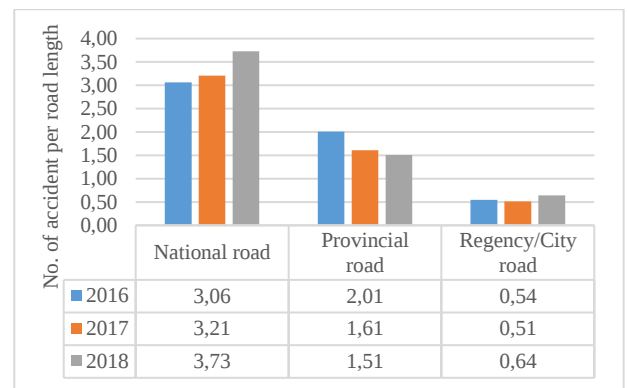


Figure 8.3 Number of casualties for each age group
Source: Yogyakarta Traffic Police, 2019

The number of accidents on different types of road networks in Yogyakarta, which Directorate Traffic Provincial Police DIY has recorded, can be seen in **Figure 8.4**. The number of accidents on regency/city roads is the highest. However, the length of the regency/city road is also the longest among other types of roads. Essentially, the accident rate or the number of accidents per road length for regency/city roads is the lowest comparing other road types, which was 0.64 accidents/km in 2018. The highest rate in 2018 was 3.73 accidents/km for national roads. The accident number per km road length for each road type can be seen in **Figure 8.4 (b)**.



(a) The recorded number of accidents on different types of road networks in Yogyakarta



(b) The accident number per kilometre road length for each road type

Figure 8.4 The accident number for each road type

Source: Indonesia Statistics Agency, 2017,2018,2019; Yogyakarta Traffic Police, 2019

Accidents involving motorcycles are the most prominent among the vehicles involved in accidents, as seen in **Figure 8.5**.

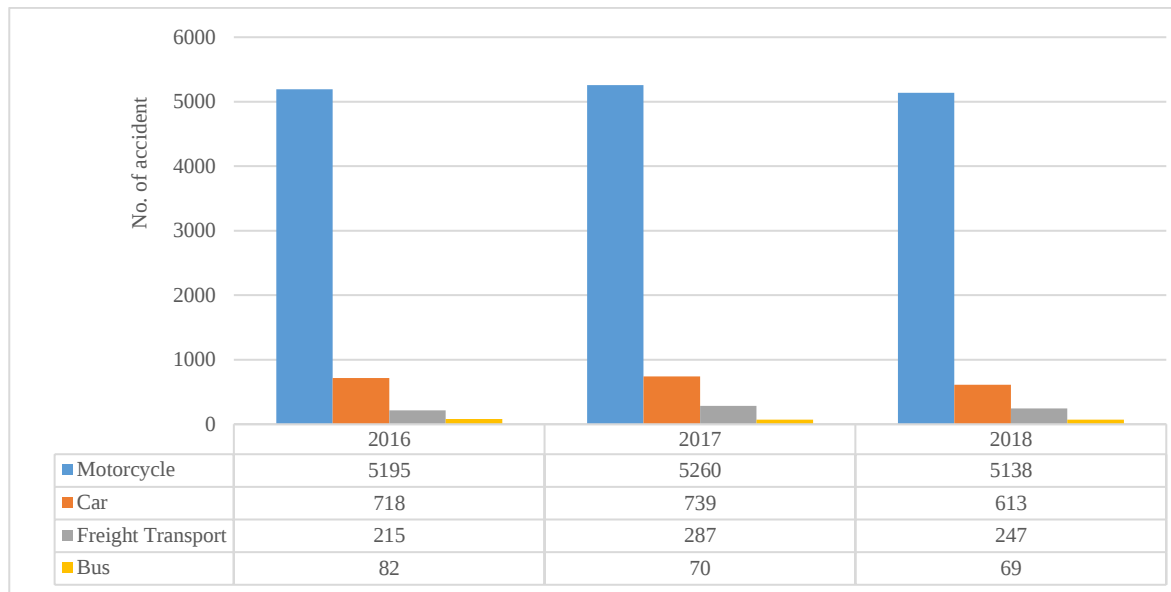


Figure 8.5 Number of road accidents based on the type of motor vehicle

Source: Indonesia Statistics Agency, 2017,2018,2019; Yogyakarta Traffic Police, 2019

The human factor is the biggest contributor to the accidents in Yogyakarta based on data recorded by the police (see **Figure 8.6**). The human factor consists of careless driving, fatigue, drowsiness, illness, undiscipline behaviours, psychological pressure, drug, alcohol, and speeding. Undisciplined behaviours are the most significant factor causing accidents in the reported data from the police, which is around 60%-70% of all human factors—followed by speeding and careless driving, around 18% respectively. In the study by Susilo et al. (2015), undisciplined behaviours include pushing the motorcycle through a (very) narrow gap, speeding, driving recklessly, and overtaking on the wrong side.

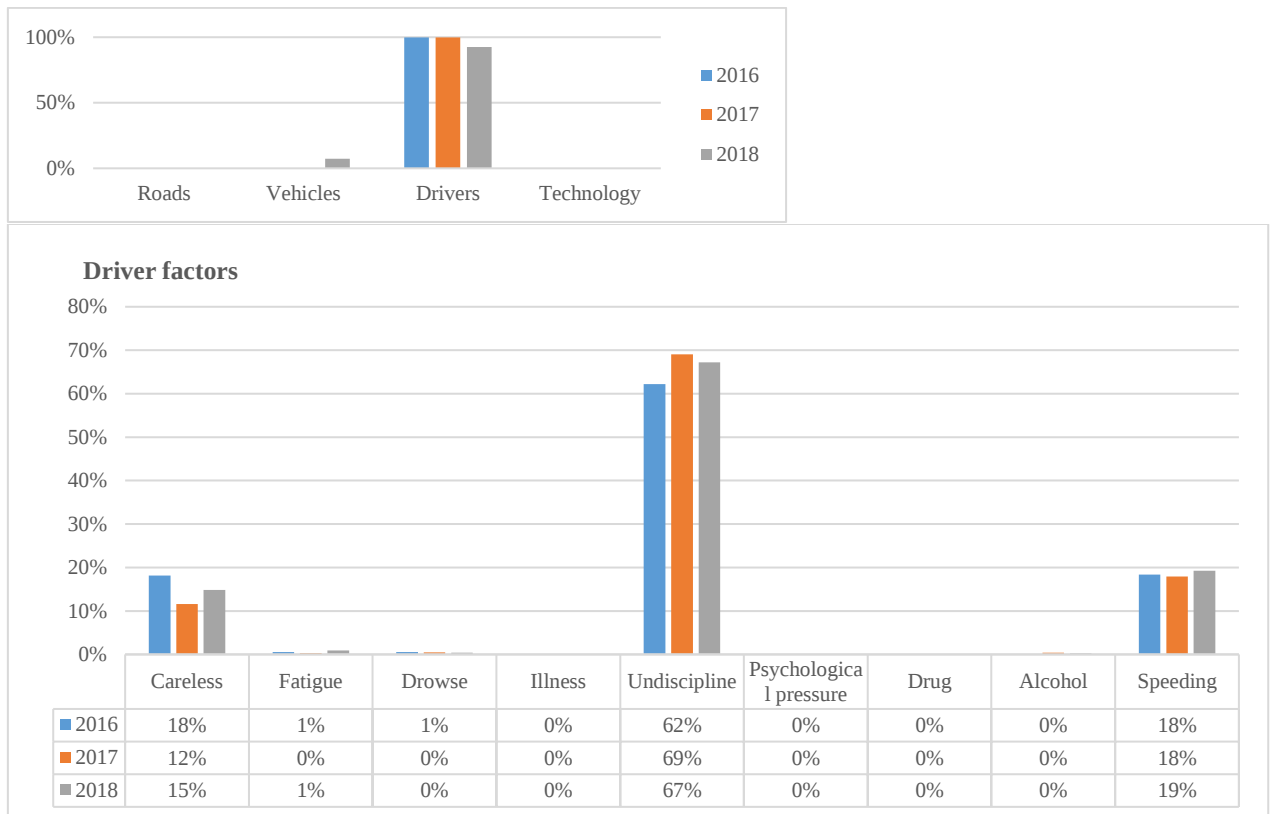


Figure 8.6 Accident contributing factors
Source: Yogyakarta Traffic Police, 2019

Based on the data from PT. Jasa Marga for the number of claims for road accident compensations, claims from motorcyclists is prominent among other types of vehicles, which can be seen in **Figure 8.7**. From the high claims filed for motorcycle victims, it can be seen that road safety losses caused by motorcyclists are high.

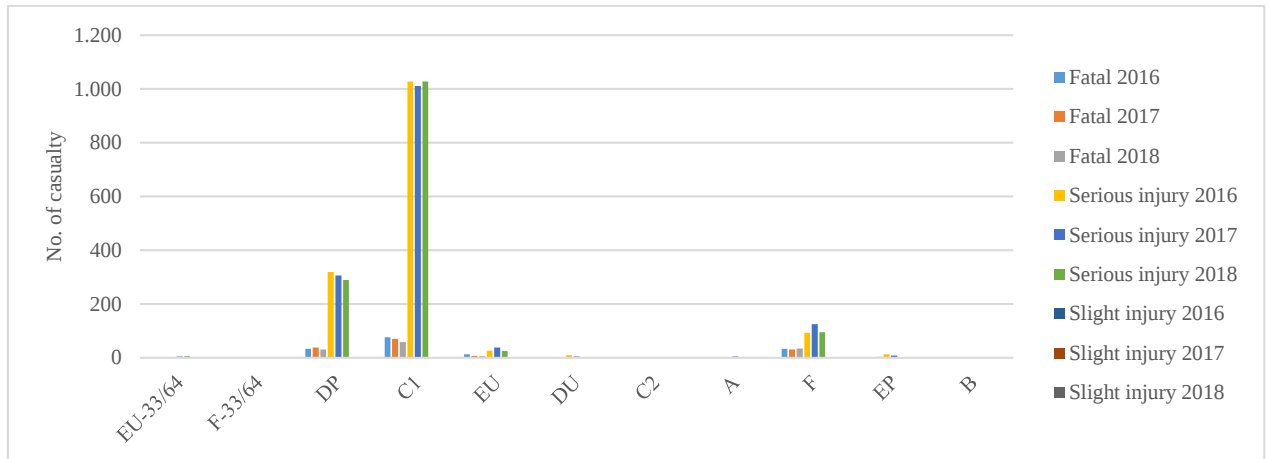


Figure 8.7 Number of casualties based on vehicle type

Source: PT. Jasa Raharja

Note:

- A Motorcycle up to 50 cc, ambulance, hearse, and fire trucks
- B Tractor, bulldozer, forklift, tow trucks, excavator, crane, and its kind
- C1 Motorcycle, moped, and scooter above 50 cc up to 250 cc and 3-wheeled motorised vehicle
- C2 Motorcycle and scooter more than 250 cc
- DP Pick-up/freight cars up to 2,400 cc, sedans, jeeps, and non-public transportation passenger cars
- DU Public transport passenger cars up to 1,600 cc
- EP Bus and Microbus which are not public transportation
- EU Public transport buses and microbus, as well as other public transport passenger cars above 1,600 cc
- F Trucks, tankers, trailer trucks, freight cars over 2,400 cc, container trucks, and the like

From the previous description, it can be concluded that the road safety problems that need to be addressed immediately in Yogyakarta are safety problems that occur to motorcyclists.

In addition, interventions also need to be carried out in the young age group, seen from the number of accident victims, which mainly occur in the 16-25 age group and many accident casualties are students, both students and university students, and also in the working age group (employees). This aligns with the study by Susilo et al. (2015), which also shows that young adults and students mainly carry out traffic violations. Therefore, addressing youth

motorcyclists needs to be prioritised. In Indonesia, a license for riding a motorcycle up to 200cc may be obtained from a 17-year-old.

The casualty data from the Yogyakarta Police was also synchronised with the claim data from PT. Jasa Raharja Yogyakarta Branch Office for the same duration, from 2016 to 2018 (see **Figure 8.8**). This synchronisation is intended so that the data for further data analysis are recorded on both parties. It can be seen that there are differences in the number of fatalities and injuries—however, data from PT. Jasa Raharja will be used for further analysis, which needs PT. Jasa Raharja data, since a claim was submitted to PT. Jasa Raharja should be verified by the police first.

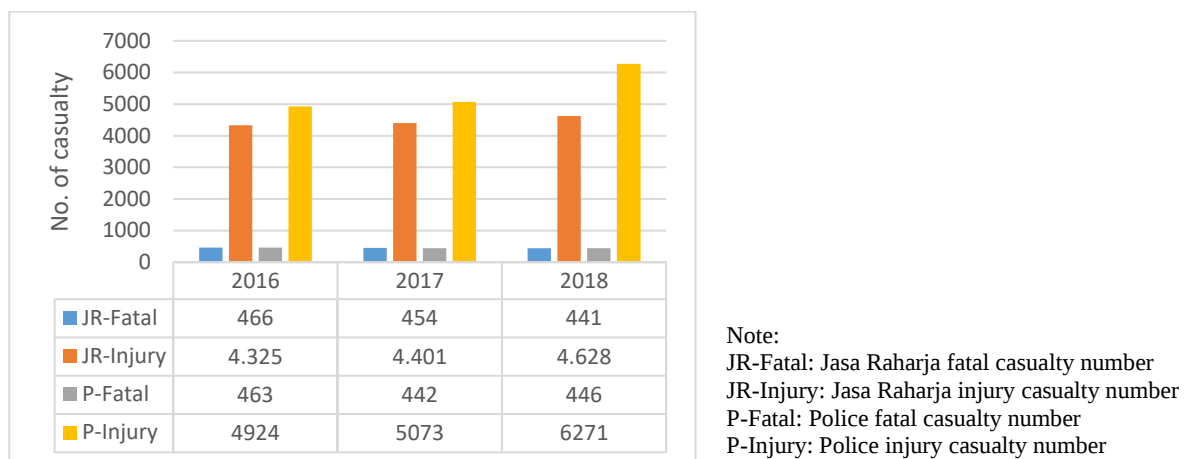


Figure 8.8 Casualty data from Yogyakarta Police and PT. Jasa Raharja

CHAPTER 9. THE INVESTIGATION OF THE POTENTIAL USE OF SOCIAL IMPACT BONDS FOR ROAD SAFETY FINANCING

9.1. Introduction

This chapter presents the findings from the investigation of the potential use of SIBs for road safety financing within the context of road safety in Yogyakarta in delivering road safety education, particularly for young adults.

9.2. Findings

9.2.1. Target Setting

Agreed targets and performance measurement metric

According to the Department of Transport's annual planning for 2018, the target for road safety intervention has been set as the number of road crashes per kilometre of the Provincial Road Network. For example, the target of the intervention by the Department of Transport in road safety education for Fiscal Year 2018 is 0.37% of 0.95 road crashes per km for the whole programme of improving road safety. The target set was based on the Provincial Medium-Term Development Plan (*Rencana Pembangunan Jangka Menengah Daerah/RPJMD*), which is five years (Interview, Bappeda). The target becomes a reference in program planning and implementation by the operational unit (*Satuan Kerja Perangkat Daerah/SKPD*), i.e., the Department of Transport. The SKPD created a strategic plan based on the RPJMD, which is realised in activities to reach the target.

The Regional Planning Agency and the Department of Transport have also agreed upon the target: the input of activities, such as for a road safety education programme, the targets are the budget absorption (cash flow), the delivered activities, such as the number of socialisations delivered, and the number and category of population targets. For road safety campaigns and education, delivered through local television programmes (talk shows), road safety advertisements, and documentary films, the target is ten shows with a budget of IDR 200 million. Furthermore, the interviewee stated they could not precisely determine the impact target of the television talk shows and advertisements.

Meanwhile, the Police and PT. Jasa Raharja does not have a particular target for its educational activities.

Furthermore, the link between the outcome and input targets cannot be established, i.e. the target of the intervention by the Department of Transport in road safety education for Fiscal Year 2018 is 0.37% of 0.95 road crashes per km for the whole programme of improving road safety. However, the 0.37% target was not checked to see whether it was achieved.

9.2.2. Intervention delivery

Road safety education is an intervention based on data derived from the Traffic Police. The reason for choosing road safety education is to change people's mindsets because almost 90% of road crashes in DI Yogyakarta and Indonesia generally happen due to human error (Interview, Department of Transport).

The Department of Transport, Traffic Police, and PT Jasa Raharja have conducted road safety education in schools. Department of Transport conducts road safety education for elementary and high school students. Traffic Police conducts road safety education for elementary school and university students. PT. Jasa Raharja complements the Department

of Transport and Traffic Police. An overlapping population target may arise among the Department of Transport, Traffic Police, and the Local (Regency/City) Department of Transport. Coordination is needed among agencies and the population targets to address the issue.

By giving early traffic education to the students at elementary schools, the Department expects to reach family-level audiences, for children are the best agents to infuse traffic awareness in the family. They will not hesitate to remind their parents and other family members of any misconduct related to traffic, such as when the helmet is amiss while riding the motorcycle or when the seatbelt is not properly bolted while driving the car.

The most significant point in this direct socialisation is to increase road safety awareness. Safety is essential not only for the individual but also for society at large. The children's future may face hindrances due to neglecting safety on the road. For example, the tendency of parents to allow their underage children to ride motorcycles or to drive without proper guidance and without driving licences. In the short term, casualty may not necessarily happen, but the effect may be extreme when mishaps happen.

Meanwhile, students in high schools have been the most prominent victims and offenders of road traffic. These inexperienced young drivers tend to neglect the traffic rules such as speeding, driving without licences, and wearing no helmet. Accident data in POLDA DIY is dominated by young drivers between the ages of 15 and 30, the age of students in high school and young adults.

Persuasive action is added to the socialisation of these young adults. The Transportation Department, in partnership with the Traffic Police Agency, implement legal persuasive action against students who are proven to be breaking the traffic rules on the road.

Therefore, for high school students, instead of being done directly on the road, the persuasive action is done at school—the Department of Transport and the Police Agency are both present for socialisation and inspection. Students who come to school using a vehicle yet have no licence or do not even equip themselves with proper amenities such as helmets will receive an evaluation from the Police Agency. In some cases, their parents may be called by the authorities. This action is meant as shock therapy for the students. Thus, no real fine or legal action is taken, but they are persuaded to equip themselves better on the road to ensure their own safety.

- ***Socialisation contents***

To keep the students' focus, videos are presented during the socialisation. The videos contain examples of how to become safe road users and the impact of neglecting safety on the road. The comparisons seen in the video provide a better explanation for the spoken example given previously. The combination of written, spoken, and interactive media is anticipated to create the awareness and the urgency of being safe road users, whether as drivers, cyclists, or pedestrians. Public service advertisements are distributed to the audiences, and they can share them with their network. Each session lasts around 45 minutes, in which a speaker delivers.

In addition to talk shows, training and short courses are available for the public. The participants, such as students, parents, and teachers, are usually targeted. The training and short courses may take one full day or a few days, and speakers from each stakeholder are invited to explore the importance of traffic safety from various perspectives and backgrounds, such as the Department of Transport, Police Agency, Department of Health, PT. Jasa Raharja, and even the Regional Representatives Council members. Each speaker prepares their own materials and method of presentation. Some

may combine theories and videos; others may mix theories and pictures. The goal is to keep the participants' attention and provide them with comprehension of the traffic safety-related topic being discussed.

There is no specific guidance for the presentation, but there is time to adjust according to the available slot. The courses are designed to allow participants to share their opinions and experiences. Thus, each speaker needs to allocate some presentation time for the participants, including the session for question and answer.

The Department of Transport also socialises by using interactive media, such as talk shows and advertisements, to reach wider audiences. Interactive media is chosen in accordance with the current trend of society, in which social media is becoming the source of information, and smartphones are becoming the most necessary communication tool. Public service advertisements are designed to conform to the characteristics of the small screen of smartphones. According to the interviewee, the reason for delivering the interventions through television and advertisements is the expected broader scope of the intervention impacts. The social media method also has been used by PT. Jasa Raharja.

Theoretically or empirically proven interventions. However, it is flexible and can be adjusted.

The socialisation contents for elementary schools are obtained from the material prepared by Gachon University based on the experience of Korea but with adjustment of local conditions in cooperation with the Department of Transport and UGM. The material is for Grades 1 up to 4. Department of Transport uses this material for elementary school socialisation with some modifications.

- ***Cost-effectiveness and preventative interventions***

The Department of Transport has been conducting road safety education for high school students. The interventions were selected based on the common practices with the content considered unsafe traffic behaviours in society—lack of consideration of the effect of interventions based on empirical studies or best practices even though the selection of the interventions considers the expected target. Furthermore, a cost-effectiveness analysis is not carried out in selecting the interventions. However, the intervention is preventive in nature.

- ***Continuity (pilot or continuous programmes) and scaling up of the delivery***

The explicit road safety education programme by the Department of Transport has been conducted since 2018. In 2019, the program has been improved by providing and scaling up a dedicated budget for road safety education. In 2018, the budget for traffic safety programmes, including road safety campaigns, was IDR 1.2 billion. In 2019, the budget for road safety education was IDR 3 billion. Previously, in 2016, road safety education focussed on conducting student competitions to be a pioneer in road safety.

- ***Statutory or additive/complementary programmes***

The main role of the Department of Transport in road safety pillars is to ensure safer vehicles. The programmes included vehicle tests and inspections. In general, the main function of the Department of Transport is traffic management. The dedicated division for road safety was established in 2017 after the disbandment of the Air Transport Division. Likewise, the road safety division in the Department of Transport structure is

vulnerable to change. The change in the division may affect the allocated budget and programme priority. Furthermore, aside from the Department of Transport, the Traffic Police are also the main actors in road safety education. In the Traffic Police structure, road safety education is part of the Society Security and Safety Division. The main task of the Division is enforcement. Therefore, it can be said that road safety education, both in the Department of Transport and Traffic Police, may be assumed as an additive/complementary programme.

- ***Service providers: staff quantity, skills, and capacity building***

The Department of Transport - The Road Safety Division has seven staff members with three sub-divisions: safety, transportation safety and technology. Transportation safety will deal with safety projects and programmes, while transportation technology will deal with technology to ease transportation problems, such as Automatic Traffic Control Systems (ATCS). None of them has certified skills in road safety education. Even though the material to be delivered exists, there is no specific method to deliver socialisation. It depends on personal skills, which usually depend on their experience. Furthermore, the limited staff still need to carry out day-to-day activities, such as meetings or administration activities. Staff also has multiple roles. Therefore, they have difficulties managing the time to deliver the programme.

One of the important aspects of traffic safety projects is human resources. Yet, there are no specific human resources allocations for the project. The project in the region is implemented as the answer to the Governor's Policy. The lack of staff related to the project also hinders the execution of the project well. For example, the Transportation Department has seven staff, including the head of the Traffic Division. These seven staff

members will need to continue socialising almost daily. As a result, some office work related to traffic, in general, gets delayed.

Socialisation itself needs some skills, especially related to children and youth. Patience and attention are needed to educate these students. Good communication skills are highly required. However, the staff in the Transportation Department have no prior experience teaching students. Thus, adaptation is needed, and some may face difficulty in doing so.

Knowledge transfer happens within the organisation. Therefore, they may substitute for one another without a qualification standard.

9.2.3. Monitoring system

Monitoring and evaluation of the activities and staff performance are also carried out each month in the Department of Transport, which is expected to address the emerging issues and for future improvement. Monitoring and evaluation are also intended as capacity building to increase the staff's capacity and quality and to strengthen teamwork. During the evaluation, each personnel, including the head of the division, presented the result of the program, the content, the target, the SWOT, and the solution for any problems that arose. The head division will give the evaluation for the staff, while the head of the department will evaluate the head of the division.

- ***Incentives***

Monitoring by the Governor is held trimonthly. The departments under the provincial government with good performance (grade 1) may receive additional support for their programmes and incentives for each staff member. The performances of each department

are graded by the accomplishment of each of the proposed programmes. For example, the Department of Transport proposed ten safety programmes during the period of three months, and if all those programmes were realised, it means the department achieved full marks. But, if only 10% of the programmes are realised, the department may receive red marks (low performance). This grading also relates to the funding provided by the Provincial Government since the programmes, including traffic safety programmes, are mostly funded through APBD (local government budget), which needs to be approved by DPRD (Regional Representatives Council). Therefore, the accountability of the proposed program under APBD funding is quite strict and inflexible. The failure to provide the results of the programmes may result in budget cuts for the related department.

- ***Monitoring for intervention delivery: data quality, database system, data integration, baseline data, external evaluator***

Even though the Regional Planning Agency knows monitoring and evaluating the programmes is essential, they argue that they could not get proper data for evaluation purposes. The data derived from the Police Agency is aggregate data (e.g. crash numbers in Yogyakarta), making evaluating the effects of specific interventions difficult. The interview revealed that studies on road safety, such as blackspot studies, are used to evaluate the effects of the delivered programmes since measuring the programme's effects felt difficult to do (Interview, Department of Transport).

At the end of implementation, the Regional Planning Agency will evaluate the performance of the SKPD regarding the reference targets. For example, for a road safety education programme, the components evaluated are the budget absorption (cash flow), the delivered activities, such as the number of socialisations delivered, and the number and category of population targets.

Evaluation has also been done to discover the challenges faced during the implementation. The evaluation results are used as the input for the following plan. The evaluation also can be carried out through other studies on road crash reduction. The interview revealed that because they have difficulties determining the baseline, the overall target is evaluated by monitoring road crash rate reduction.

The measurement also has been done in terms of safety performance indicators. For example, in the persuasive method conducted by the Department of Transport and Police Agency, by looking at the students who come to school riding a vehicle yet have no licence or do not even equip themselves with proper amenities such as helmets.

Furthermore, the target population is set without a robust statistical method. Moreover, the interventions have been carried out in a limited number of high schools. The target population is determined by the capacity of the staff and budget consideration, i.e., in 2018, there were 50 schools as the target. The selection process is based on the area prone to traffic violations. For example, the area that is remote but is not supported by good public transport. Therefore, the school allows the students to ride motorcycles, even though they do not have a licence yet. The target was then followed up on by coordinating with schools.

In addition, the evaluation is not properly recorded. For example, one of the focuses of socialisation is helmet-wearing. However, the evaluation regarding helmet wearing due to the programme has not yet been done. The pre-and post-tests after the delivery socialisation have not yet been done. Even though, based on general observation on the road, the wearing rate for adults is approximately 85%. However, it found that the wearing rate of children is still low. The awareness of wearing a helmet, particularly on children, is still lacking.

Meanwhile, the Police Agency and PT. Jasa Raharja, which also delivers road safety education, since they do not have particular target, evaluates their programmes based on the reduced number of traffic violations and crashes in general.

9.2.4. Multi-sectoral partnerships

Road safety is a multidisciplinary field which involves many actors. In the case of road safety education delivery in Yogyakarta, several actors have been involved. The involvement is stand-alone or through partnerships. The findings in terms of multi-sectoral partnerships can be seen as follows.

1. Role division

Most road safety programmes, including road safety education, have been delivered by government agencies. For example, in the persuasive method for young adult socialisation for high school students, the Department of Transport partners with the Traffic Police Agency. Since the Department of Transport owns the programme, it also provides the budget. The Department also manage the budget and delivers the programme to the population target. Subsequently, the Department is also responsible for evaluating its programme, whether it is successful or not. The evaluation is also conducted by other government agencies, i.e., Regional Development Agency and Inspectorate Agency. Other government agencies that provide socialisation are the Traffic Police, the Department of Health, the Department of Education, and a state-owned company - PT. Jasa Raharja, also the commercial sector, i.e., Astra Honda Motor (AHM), support the Department of Transport in delivering the programme.

PT. Jasa Raharja, which collected the contribution fees from the vehicle owner, must pay basic protection to the crash victims or families on a third-party basis. As a state-owned

company, PT. Jasa Raharja is allowed to invest to get profits. Therefore, the rest of the collected funds have been invested with profit-oriented purposes. However, the investment in road safety has never been done yet—the contribution of PT. Jasa Raharja is limited to corporate social responsibility (CSR) to carry out preventive road safety programmes, e.g., road safety campaigns, to schools and universities in collaboration with the Traffic Police. PT. Jasa Raharja has a role as the funder and provider of the programme.

Aside from collaborating with the Department of Transport in delivering socialisation, AHM established a safety riding centre for motorcycle riding training through its CSR. The training is free of charge for the public. They also conduct one-day training on how to ride a motorcycle properly and safely. They also collaborate with high schools and universities as their training target. In delivering the training, they also collaborate with the Red Cross.

Collaboration among the Department of Transport, Traffic Police, Universitas Gadjah Mada and Gachon University South Korea mainly conducts socialisation for road safety education in early childhood education, kindergarten, and elementary schools. The funding is from Gachon University. The Department of Transport, Traffic Police, Universitas Gadjah Mada and Gachon University South Korea are all speakers on socialisation.

2. Collaboration

During socialisation, the Department of Transport also collaborates with other government agencies. The collaboration is conducted with the Traffic Police, the Department of Health, the Department of Education, Universities, PT. Jasa Raharja, and AHM.

For example, the collaboration conducted with the Department of Health in providing medical information, i.e., during accidents, when motorcycle riders do not wear helmets, the

fatal casualty may become the result of head injuries. The Department of Health will explain further this fatality and the importance of the helmet as a head protector during riding.

The Department also designs direct socialisation by collaborating with education agencies, such as elementary and high schools. In the case of high schools, the Department of Transport, in partnership with the Traffic Police, implements legal persuasive action against students who are proven to be breaking the traffic rules on the road. The Police's role is to support socialisation and have legal authority in road traffic enforcement.

AHM, one of the biggest motorcycle distributors in Indonesia, also joins this action. AHM, which also has a driving training centre, sponsored the socialisation programmes by providing helmets as prizes during the socialisation. They also conduct socialisation on how to ride a motorcycle properly and safely.

Collaboration conducted with PT. Jasa Raharja, the state-owned company which collected contribution fees for road crashes, shared information regarding the compensation from PT. Jasa Raharja for road crash casualties. PT. Jasa Raharja, through its CSR, gives supporting tools for road safety education, such as helmets and campaign props.

Collaboration was also conducted with the local television broadcast station, ADITV, by producing documentary films and talk shows. The allotted budget for this partnership is 200 million on average for ten broadcast slots for documentary films and talk shows. The audience for the talk shows is open to the public. At the same time, the speakers come from various backgrounds related to traffic, such as the Traffic Police, the Department of Transport, the Department of Health, Insurance Providers, and Academia. The broadcast station will design the theme of the talk shows and invite related stakeholders to become the keynote speakers, but the content must strictly relate to traffic safety. The participants or the

audiences, such as students, can be targeted, but it is usually open to the public or society, depending on the theme.

Like talk shows, training and short courses open an opportunity for collaboration among all traffic safety stakeholders, from the Traffic Police Agency and Department of Transport to Academic Institutions.

A foreign collaborator from South Korea joins the training by providing a grant for the traffic safety project for children in Yogyakarta for the period of 2017 – 2019. The grant is from KOICA (Korea International Corporation Agency) and delivered through Gachon University in partnership with Universitas Gadjah Mada. This collaboration focuses on the children's well-being amid the uncertainty of traffic. The partnership is built among Gachon University, UGM, the Traffic Police, the Department of Transport, and the Department of Education, Culture, and Youth of Yogyakarta.

During this collaboration, in addition to safety short courses for parents and teachers, academic modules related to traffic safety are provided and published for elementary school students. The distribution is done in partnership with the Department of Education, Culture, and Youth and the Department of Transport. The context of this international collaboration is adapting the lesson learned from Korea to Yogyakarta. Training is provided for students of Universitas Gadjah Mada in class and on the field. Traffic safety for children becomes one of the modules in this higher institution, and the students will have the opportunity for field socialisation experience at schools and villages around the Yogyakarta region.

9.2.5. Funding

1. Funding sources

Funding sources are from the Regional Government Budget (APBD). The interview revealed that they felt they did not have difficulties regarding funding. The budget is sufficient to run the programmes since it is planned and granted before implementation. Road safety education programme by the Department of Transport has been conducted since 2018. In 2019, the programme has been improved by scaling up the budget. In 2018, the budget for traffic safety programmes, including road safety campaigns, was IDR 1.2 billion. In 2019, the budget for road safety education was IDR 3 billion.

- ***Grants***

Furthermore, there are also grants from the partners, such as from the partnership with Gachon University, AHM, and PT. Jasa Raharja. However, the grants can only be realised in kind, e.g. books, helmets, campaign props, and technical assistance in socialisation. Cash support is not allowed due to violation of regulations.

- ***Corporate Social Responsibility (CSR)***

One example of CSR carried out by commercial companies is CSR carried out by AHM with the AHM Safety Riding Centre (AHM SRC). In this case, AHM SRC provides education and training to ride motorcycles. This education and training are intended for the public at no charge. All costs incurred for this activity come from AHM's CSR, including infrastructure (venue), facilities (motorcycles, simulators, materials), and instructors. In implementing education and training, AHM SRC also includes emergency response materials and instructors from the Red Cross (Indonesian Red Cross/PMI). The main target

of AHM SRC is high school students, considering that at this age, they are starting to actively use motorbikes as a means of transportation and getting a driver's license.

2. Funding mechanism

The programmes were designed and planned two years before implementation. For implementation in 2020, the programme has been planned two years before (Interview, Regional Planning Agency).

The allocated budget is disbursed in February. The earliest start of programmes is in May of the respective year. For 2018, the Department of Transport completed the road safety education programme in August. However, the budget absorption is evaluated at the end of the programme and every three months due to three-month performance evaluations. The evaluation of budget disbursement is also seen from the cash flow. The cash flow will be checked every three months.

There are three categories of three months evaluation results, i.e. grades 1, 2, and 3. Grade 1 is the best performance, meaning the budget absorption is according to the plan, including cash flow and timing.

3. Payment mechanism

The interview revealed that the payment of the intervention is fee-for-service-based. The budget disbursement is based on the number of road safety socialisation events and participants, ten (10) events and 500 participants, including society, elementary, junior high, and high schools. Five hundred participants consist of 100 students from each elementary, junior high, and high school, 50 teachers and parents from each elementary, junior high and high school, and 50 society members. The target was met in April 2018. Target is evaluated

to determine whether the realisation of the activities and budget absorption match the Department Budget Plan.

Furthermore, the procedure to disburse the government budget is complex. For example, the campaign props' quantity must match the number of participants, such as the number of participants is 500. Therefore, the number of helmets which will distributed should match. Suppose the number of distributed helmets is less - due to limited funding to provide the helmets. In that case, the helmets can be distributed to the Department of Education from the Department of Transport through a grant mechanism, which may not reach the intended population target. The solution is to collaborate with PT. Jasa Raharja and AHM will provide the helmets in a small quantity, such as for prizes in socialisation events.

An auction was conducted for a large input quantity with a minimal IDR of 200 million. The auction takes a long process, up to 2 months, including preparing auction documents and the selection of the vendors. This process delays the implementation, which usually can be done earlier. In the auction method, the budget will be disbursed after the agreed input has been procured. The vendors will receive upfront funding, i.e. 30%. Other payments will be made in terms-based, with regard to the conditions fulfilled by the vendors. It can be said that in the case of government agencies, up-front funding is not an issue. The Department always has the budget for up-front funding as long as the allocation has been stated in the budget proposal and has been granted before the programme implementation.

Furthermore, as the budget disbursement uses input procurement-based, sometimes a procurement has been made; however, the property is not delivered to the target because of concerns about making procedural errors. The safekeeping happens due to unclear budget disbursement procedures from the Inspectorate Agency, which leads to multi-interpretation.

9.3. The Suitability of SIBs for Road Safety Financing

The analysis of the suitability of SIBs for road safety financing in Yogyakarta is as follows.

There are three categories of conditions regarding the support to the SIB implementation:

“Support”, “Limited support”, and “Not support”.

Table 9.1 Analysis of the suitability of SIBs for road safety financing in Yogyakarta

Domain	Components	Result	Description
1. Outcome-based payment	Setting the target	Outcome target: 5 Input target: 3	Two targets have been set: the outcome and the input target. However, there is no link between the input and outcome targets.
			Not support. The metric needs to be modified to link the measurement metric and the outcomes.
	Evaluation method of interventions	- No evaluation: 0 - Simple ex-post verification: 1 - Post analysis or historical comparison: 2 - Quasi experimental: 3 - Randomised Control Trial (RCT): 4	There is no evaluation of the effects of the interventions. Evaluation has been done for the input of the activities.
			Not support. The evaluation method needs to be upgraded into a more statistical method.
	Evaluator	No evaluator: 0 Internal (within the organisation): 2 Inter-organisation evaluator: 4 External evaluator: 5	There are internal (within the organisation) and Inter-organisation evaluators
			Support. However, an external evaluator may be considered to improve the accountability.

Domain	Components	Result	Description
	Data quality	Complete (all has been recorded; consider integration with other institutions): 5 Incomplete: 2	There are differences between police and PT. Jasa Raharja data.
			Limited support. The data needs to be synchronised with other sources of data, i.e., police, hospitals, insurance companies, and PT. Jasa Raharja.
	Data type	Aggregate: 1 Disaggregate: 5	The crash data from the Police is an aggregate form.
			Limited support. Since the data is in aggregate form, however, there is a possibility to disaggregate the data.
	Database system	Accessible: 5 Limited accessible: 3 non-accessible: 1 No database: 0	The data is currently limited to being accessed by the public. The request to the police, sometimes the given data, is unexpected.
			Limited support. The access to the database needs to be improved/updated.
	Intervention delivery	Evidence of efficacy: • Empirically proven • Theoretically proven	There is no evidence of efficacy from the chosen interventions.
			Not support.
		Method to choose interventions: • Cost-effectiveness • Cost benefits	Currently, the interventions chosen by considering the issue; however, without considering the effectiveness of the interventions.
			Not support.
		Continuity of the interventions: • Pilot • Continuous • Innovative • Need to scale-up	Current road safety education has been conducted for many years with the conventional approach, such as the in-class method. Some innovations, such as employing social media,

Domain	Components	Result	Description
			have also been tried. However, the effect is unknown.
			Limited support.
	Programme status	• Statutory • Essential • Additive/complementary	Road safety education is the programme of the Traffic Safety Division of the Department of Transport. However, the existence of the Traffic Safety Division is vulnerable to change.
			Support. Since the programme can be categorised as an additive/complementary programme.
	Target population	Clearly defined cohort: 5 Not clear: 0	The method to determine the population target is not statistically proper. However, the cohort may be clearly defined.
			Limited support. The current method of determining the cohort can be improved.
	Human resources	Quality: • Competent service providers • Skilful staff	Not all the staff can do the socialisation.
		Quantity: • Adequate or • a limited number of staff, • Multiple roles	A limited number of staff with multiple roles.
			Not support. It needs more qualified staff.
2. Multisectoral -partnerships	Role division	The government agency conducts all roles: 1 The non-government agency conducts some roles: 2 (e.g., Local service providers) The government as the owner: 5	The Department of Transport conducts all the roles, i.e., payer, manager, and provider. Other agencies act either as funders or providers.
	Collaboration	• Internal collaboration • external collaboration	There are internal and external collaboration
		Conflicts or tensions in a collaboration	No conflicts or tensions have been found

Domain	Components	Result	Description
			Support. However, the role of each party needs to be improved.
3. Funding	Funding source	Government Donors Investors	The funding source is mainly from the government (APBD). Another funding source is grants. However, the number is not significant compared to APBD.
	Funder /investor preference	Grant or investment (including social investment) Transfer risk: The funder holds all, partial, and none risks.	The current preference of the funders is a grant, which means they are not profit-oriented and do not consider the risk.
			Limited support. It needs to explore other potential funding or upgrading grants into investments.
	Government financial capacity	Sufficient Sufficient, but with a complex procedure. Not Sufficient.	The funding is felt sufficient; however, the procedure to get it is complex and not politically free.
	The need for funding up-front		There is a need for funding up-front, and if there is any, it can be fulfilled by the allocated budget.
			Limited support. It needs to find other funding sources with simpler procedures and are politically free.
	Payment mechanism	Outcome-based payment Performance-based Service-based (input-based)	Input-based payment.
	Incentives		There is incentives for better performances.
			Limited support. Need to change to outcome-based payment.

Regarding the system, the SIBs may be suitable to be implemented in road safety financing in Yogyakarta. Out of 16 components, three are supported, eight are limited-supported, and five are not supported components. The components which are limited or not supported can be improved or upgraded. The improvement and upgrading may be assumed to be efforts to improve the road safety management system.

CHAPTER 10. PROPOSED SOCIAL IMPACT BOND MODELS FOR ROAD SAFETY FINANCING

10.1. Introduction

This chapter presents proposed SIB models for road safety programme delivery based on the concepts of the SIB as a form of New Public Management (NPM) and New Public Governance (NPG). This concept may lead to the delivery of road safety programmes with collaboration/partnership and outcome-based payment. This chapter focuses on Yogyakarta Province, Indonesia, as the focus area from where specific information was retrieved. The models also consider the findings from the investigation of the potential use of SIBs for road safety financing within the context of road safety in Yogyakarta in delivering road safety education, particularly for young adults. The methodology and models depicted in this study may have broader applications, notwithstanding the local conditions that necessitate adaptation before implementation.

10.2. Road safety management reform

The reform based on the NPM and NPG concepts is translated into effective management structures. The concept adopted from the NPM is outcome-based payment, which requires a robust monitoring and evaluation system to ensure target achievement. In addition, the evaluation made by others is considered more effective than self-evaluation (Robinson, 2008). Meanwhile, the concept adopted from the NPG is a multi-sectoral partnership. This concept allows for partnership in delivering a programme. These concepts could change the present road safety programme delivery methods, enhancing road safety management's effectiveness and

efficiency. The study conducted and presented in the previous chapter shows that in the delivery of road safety programmes, an organisation may be the sole actor in terms of funder, manager, and provider. This situation leads to ineffective and inefficient delivery, for example, self-evaluation, multiple tasks due to a limited number of staff, and unqualified human resources. Furthermore, the input-based (fee-for-service) payment leads to the agreed target not being achieved due to a lack of close monitoring of the implementation to achieve the desired targets. Therefore, dividing roles by optimising the partnership and outcome-based payment is considered to enhance road safety management in Yogyakarta.

The present road safety programme delivery structure in Yogyakarta is shown in **Table 10.1**.

Table 10.1 Road Safety Education Programme delivery structures

Type	Manager	Funder	Provider
Type 1	Department of Transport	Department of Transport	Department of Transport
Type 2	Department of Transport	Department of Transport	• Department of Transport • Traffic Police • Department of Education
Type 3	Donor	Donor	• Donor • Department of Transport • Traffic Police

10.3. Proposed SIB delivery structures

The models are delivery structures of road safety programmes, which consist of the roles of each actor in the programme delivery system. The arrangement is formed by optimising partnership and collaboration between several parties concerned and carrying out road safety

activities. The arrangement aims to deliver the programmes with more effective and efficient management to achieve the desired target.

10.3.1. Proposed Model 1

Model 1 consists of 2 (two) organisations. Organisation 1 is an organisation that has its own resources to fund a safety programme designed to have a social impact, as shown by outcome indicators used as outcome metrics. This organisation possesses the ability to implement the programme by itself or employ other parties.

Furthermore, Organisation 1 collaborates with Organisation 2, i.e., the government (national or regional) or stakeholders who would benefit if the program implemented is successful. The agreement between Organisation 1 and Organisation 2 is that Organisation 1 will receive payment from Organisation 2 if the agreed target is achieved.

Because it only consists of 2 (two) organisations, this model is relatively simple and easy to set up; therefore, transaction and unexpected costs will be cheaper. The possibility of conflict between parties is also smaller.

However, this model requires an Organisation 1 with high performance in implementing safety programs (e.g., staff with expertise in programme planning, implementation, monitoring, and evaluation). Apart from that, one must also have sufficient funds to implement the program first. Organisation 1 will also bear all risks if the agreed program targets are not achieved due to the absence of payment from Organisation 2.

The existence of payments that refer to mutually agreed target outcomes based on an outcome metric requires a strong monitoring and evaluation process from Organisation 1. This encourages a better monitoring and evaluation culture.

The source of funds used by Organisation 2 to pay Organisation 1 if the agreed target is achieved comes from funds owned by Organisation 2 in the form of existing fund allocations (for example, from the APBD/government budget) or payment savings incurred due to an increase in safety performance.

Table 10.2 Proposed SIB Model 1

	Role
Organisation 1	• Funder • Manager • Service provider
Organisation 2	Payer

10.3.2. Proposed Model 2

Model 2 is more complex than Model 1 because it consists of more organisations, i.e. 3 (three) organisations. In Model 2, Organisation 1, as the organisation responsible for implementing activities, does not have funds or the funds it has are insufficient to implement the program. For this reason, there is an additional organisation, namely a funding organisation (Organisation 3). 3 Funding organisations can come from philanthropy or the private market. Organisation 1 can also take part as a funder. Organisation 1 can implement the program itself or employ other parties. Organisation 2, as in Model 1, is the organisation that will pay returns to Organisation 3 (and Organisation 1 if it participates as a funder) if the agreed targets are achieved.

In Model 2, risks can be shared between more parties, i.e., between Organisation 1 and Organisation 3. Apart from that, there is also the opportunity to open new sources of funds in implementing the safety program, i.e., with Organisation 3 providing funds.

However, the potential for conflict will be greater, especially between Organisation 1 and 3, related to views on the problems faced (including implementation techniques in the field). These problems can be mitigated with clear protocols or by contracting with an organisation that can manage the program.

Payments by Organisation 3 can be made to Organisation 2 directly or to Organisation 1. If payment is made by Organisation 3 to Organisation 1, then there is no relationship between Organisation 3 (commissioner) and Organisation 2 (funder).

For Model 2, maintenance is relatively simple and low for funders (Organisation 3) and commissioners (Organisation 2). However, the risk for Organisation 1 is large, especially if Organisation 1 needs to pay Organisation 3 (funder) regardless of performance (regardless of the target achieved or not).

Table 10.3 Proposed SIB Model 2

	Role
Organisation 1	• Funder* • Manager • Service provider
Organisation 2	Commissioner/Payer
Organisation 3	Funder

**No or partial (depend on financial capability)*

10.3.3. Proposed Model 3

Model 3 is the most complex. In this model, each organisation only has one role, each being an organisation that functions as provider, payer, funder, and manager. The service providers also can be more than one for a large SIB or specialised delivery. This model may be more flexible

since each organisation focuses on one role. However, conflicts tend to arise because there are more actors.

Organisation 4, the manager, will manage all the contracts, connect all the other organisations, and ensure the interventions being implemented efficiently and effectively to achieve the agreed target. Organisation 4 receives funding from the funders. Organisation 4 will then pass this funding to the service providers as their up-front funding to deliver the programmes. Organisation 4 will receive payment from Organisation 2 and pass it to Organisation 3 if the agreed target is achieved.

In the case of road safety, Organisation 4 is a lead agency, which can be a road safety board or an intermediary organisation.

Table 10.4 *Proposed SIB Model 3*

	Role
Organisation 1	Service provider
Organisation 2	Payer
Organisation 3	Funder
Organisation 4	Manager

10.4. Implementation in Yogyakarta

For implementation, it is necessary to divide roles. The roles that need to be provided are:

1. Payers are the owners of activities, which will later pay funders if the target is achieved.
2. Funders who provided the up-front funding.
3. Service providers who deliver the interventions.

4. A manager organisation which manages the activities to deliver the interventions efficiently and effectively.

This division of roles can be made if the actors are identified. The actors can be identified by breaking down the crash cost into components, particularly for the funder and commissioner/payer roles.

The example of identifying the SIB actors is based on crash cost components in Yogyakarta, which consider human costs.

Table 10.5 *Crash cost components*

Cost components		Paid by
Direct costs	Medical costs	• Crash victims or families • Insurance company • PT. Jasa Raharja • Social Security Agency (<i>Badan Penyelenggara Jaminan Sosial / BPJS</i>).
	Vehicle repair costs	• Insurance company • Crash victims or families
	Administration costs	• Crash victims or families • Government • Insurance
Indirect costs	Loss of productivity	• Crash victims or families • Government, • Employers (industry, etc.)
Intangible costs	Pain, grief, and suffering	• Road victims and families
	The preferences of people to reduce risk, the value of statistical life/injury	• Society

For the transportation industry workers (i.e., on-duty crashes, e.g., freight transport drivers, commercial/public transport, industries, commerce, agriculture, etc.), the companies usually pay the costs of traffic crashes during work hours.

Based on a study of accident data in Yogyakarta in 2015 (Ministry of Transport, 2015), the largest proportion of accident costs is loss of productivity, approximately 93 per cent. The second largest proportion is immediate medical costs, approximately 6 per cent. Followed by vehicle repair and administration costs, approximately 0.5 per cent, respectively. This calculation does not consider human costs, i.e., pain, grief, and suffering. If the human cost is included in the crash costs, the human cost is approximately 30 per cent. In comparison, the loss of productivity is approximately 67 per cent, followed by medical costs of 2.4 per cent, vehicle repair costs of 0.2 per cent, and administration costs of 0.1 per cent.

The loss of productivity consists of productive days lost due to having to stay in hospital or cases of accidents resulting in disability, coupled with reduced productivity due to disability. Mainly, the victims or families bear the loss of productivity and medical costs due to low insurance participation. However, to date, the Social Security Agency provides National Health Insurance, which also can be accessed by poor and disadvantaged citizens.

10.4.2. Commissioner/Payer

The payer is the party which will get savings from the programmes, which can be used as the payment if the target is met.

Aside from the government, which has the responsibility to provide road safety- in the case road safety is assumed as a public good - as the party that benefits if the safety program succeeds in achieving targets by reducing the number of crashes and fatal and serious injuries (FSIs), PT

Jasa Raharja can save expenses in the form of reducing the amount of compensation issued to accident victims. With the contribution fee collected from the vehicle owner each year, PT. Jasa Raharja has significant funding that can be utilised as a road safety fund.

In addition, as a state-owned company, PT Jasa Raharja is required to invest in fields that provide profits with a minimum limit of expected profits (profit-oriented investment). Therefore, the investment in road safety programmes should produce a significant profit for PT. Jasa Raharja may become a funder or investor in road safety programmes. However, road safety investment is considered a socially oriented field. Therefore, this prevents PT Jasa Raharja from being a funder or investor in road safety. Furthermore, with the status as stated-owned, it is more suitable for PT. Jasa Raharja to become a payer.

A similar situation as PT. Jasa Raharja has also applied to the Social Security Agency (BPJS). There are two types of BPJS: health and workforce—the National Health Insurance (*Jaminan Kesehatan Nasional/JKN*) is one of the programmes of the BPJS on health. The JKN is a universal healthcare system that provides healthcare for Indonesian citizens. The members of the JKN should pay premiums every month. JKN members can use facilities according to the class their JKN type can access. There are three types of JKN: workers with salary, non-receiving wage workers and non-workers, and beneficiaries of Health Insurance Contribution Assistance. Beneficiaries of Health Insurance Contribution Assistance are participants classified as poor and disadvantaged people whose contributions are paid by the government. Regarding the medical and hospital care expenses in the crash cost components, the victims or families may use the JKN. Therefore, if there is a reduction in the number of crashes and FSIs, there is a reduction in costs that the BPJS should pay. Consequently, for this reason, it can be justified that BPJS can act as a payer.

Other insurance companies may also become funders, as they will benefit by reducing paying claims due to traffic crashes.

Furthermore, the road safety fund board may be established to fulfil this role. The board will collect and manage funds based on the cost recovery concept, i.e., fee-for-service. The board may be under the government or an autonomous body. However, the discussion of establishing a road safety fund board is beyond this study.

10.4.3. Funder/Investor

The funder's role can also be proposed by the parties that contribute to the crash exposure as a part of the externalities of traffic activities, for example, motorcycle distributor companies and road users. The funder can also be from organisations or individuals concerned about social issues in general or road safety issues.

10.4.4. Service Provider

The role of the provider can be proposed from the current or other potential providers of road safety programmes. Non-governmental Organisations (NGOs) with expertise in transportation, particularly road safety, may become the service providers.

10.4.5. Manager

The manager is a party which manages all the activities in order for the interventions to be implemented efficiently and effectively. The activities include managing the contracts with the service providers, payers, and funders, ensuring the interventions can be implemented, and monitoring and evaluating the implementation to achieve the agreed targets.

10.4.6. Model 1 Implementation

As previously described, Model 1, even though simpler, Model 1 requires a strong organisation in terms of funding, management, and skill to deliver the interventions. Model 1 requires an organisation that has good capabilities in terms of funding and program implementation.

The model may be possibly implemented by involving NGOs in transportation activities. The international transportation NGO is assumed to have the ability in financial, expertise, and management skills. The international transportation NGOs operate in Indonesia, such as The Institute for Transportation and Development Policy (ITDP), GIZ, and the World Research Institute (WRI). The Asia Injury Prevention Foundation (AIP Foundation), which established a SIB in Cambodia, may also be considered.

Therefore, for the implementation of Model 1, which consists of two types of organisations, Organisation 1 is the Manager, Funder and Provider; these roles can be conducted by the NGOs, which have the ability of those three roles. Meanwhile, the Commissioner/Payer can be the Government Agency, such as the Department of Transport or the Traffic Police, by utilising their budget or PT. Jasa Raharja or BPJS or insurance companies.

Table 10.6 *Model 1 implementation*

Type of organisation	Roles	Filled by
Organisation 1	Manager, Funder, Provider	International Transport/Road Safety NGOs
Organisation 2	Commissioner/Payer	• Government • PT. Jasa Raharja • BPJS • Insurance companies

10.4.7. Model 2 Implementation

In Model 2, Organisation 1, the Manager, Provider and Funder in Model 1, has smaller funding, which means none or partially and not adequate to deliver the interventions. Organisation 1 may be a national NGO in transportation with expertise in road safety interventions and management skills; however, there is a lack of funding. Therefore, it needs to seek another organisation to provide the funding up-front. This organisation has a role as the Funder. Examples of national NGOs are the Indonesia Transportation Change and Transport Study Institute (*Institute Studi Transportasi/INSTRAN*).

As the funder, there may be motorcycle distributor companies and road users. The funder can also be from organisations or individuals concerned about social issues in general or road safety issues. For example, AHM, the largest motorcycle distributor in Indonesia, may be involved as the Funder. The social funding organisations that are not bound for a profitable investment but are more interested in improving social welfare, for example, the National Alm Agency (*Badan Amil Zakat National/BAZNAS*) or crowd-funding platforms.

Therefore, for implementing Model 2, which consists of three types of organisations, Organisation 1 is the Manager, Provider, and partially/not Funder; the national NGOs can conduct these roles. Meanwhile, the Commissioner/Payer is similar to Model 1 and can be the Government Agency, such as the Department of Transport or the Traffic Police, by utilising their budget or PT. Jasa Raharja or BPJS. The Funders can be AHM, BAZNAS, and/or individuals who may be through crowd-funding platforms.

Table 10.7 Model 2 implementation

Type of organisation	Roles	Filled by
Organisation 1	Manager, Provider, Funder*	National Transport/Road Safety NGOs
Organisation 2	Commissioner/Payer	• Government • PT. Jasa Raharja • BPJS • Insurance companies
Organisation 3	Funder	• AHM • BAZNAS • Individuals through crowd-funding platforms

*Note: *partially or not*

10.4.8. Model 3 Implementation

Model 3 is the most complex model, with each role being conducted by a different organisation. The significant difference with Model 1 and 2 is that Organisation 1 only delivers the interventions (service provider). Organisation 1 may be a national or local NGO with no or limited management skills but has expertise in delivering the interventions. Organisation 2 and 3 are similar with Model 2. Another significant difference is that an organisation will specifically handle the manager role. The organisation may be a road safety board or an international intermediary organisation, such as Social Finance, which is the intermediary for Peterborough SIB. The discussion of making road safety boards is beyond this research.

Table 10.8 *Model 3 implementation*

Type of organisation	Roles	Filled by
Organisation 1	Provider	National/local Transport/Road Safety NGOs
Organisation 2	Commissioner/Payer	• Government • PT. Jasa Raharja • BPJS • Insurance companies
Organisation 3	Funder	• AHM • BAZNAS • Individuals through crowd-funding platforms
Organisation 4	Manager	• Road safety board • International intermediary organisations

The partnership between the government, public agencies, the private sector, and NGOs needs to be supported by a legal basis. In Yogyakarta, the guidance for public-private partnerships involving NGOs has also been developing (Interview, Bappeda). Additional actors, such as evaluators, can be from the research centre or academia.

CHAPTER 11. DEVELOPMENT OF OUTCOME-BASED PAYMENT SCHEME USING SOCIAL IMPACT BOND APPROACH FOR ROAD SAFETY

11.1. Introduction

This chapter demonstrates the payment structure using the outcome-based payment concept of SIB investment for road safety. As the SIB depends on context, this study uses the same context as the analysis presented in the previous chapters, which uses actual data from Yogyakarta in delivering road safety education for young adults, particularly motorcyclists.

11.2. Conceptual Framework

11.2.1. The Concept of SIBs

The concept of SIBs is outcome-based payment or payment by result, which means that:

1. Payment can only be made if results or targets are achieved through outcome improvement.
2. The payment can be justified if the investment is feasible or the benefits exceed the costs.
3. The target or the result is the outcome metric. This outcome metric should be linked with the payment, which includes benefit estimation.

An illustration of these concepts can be seen in *Figure 11.1*.

Therefore, for the investment case, the outcome metric as the basis of the payment should be defined first. The outcome metrics can be the number of crashes, fatalities, or serious injuries. Furthermore, the targets can be reducing the number of crashes, fatalities, or serious injuries.

The impact on society as envisaged by SIBs is reducing the social issue. i.e., the economic and social costs of crashes. In this study, the economic costs are the costs of crashes, excluding the human costs, i.e., pain, grief, and suffering. The social costs are the costs of crashes to society in terms of tangible or intangible costs, including hidden costs that may not be realised or considered (Davies and Newman, 2016).

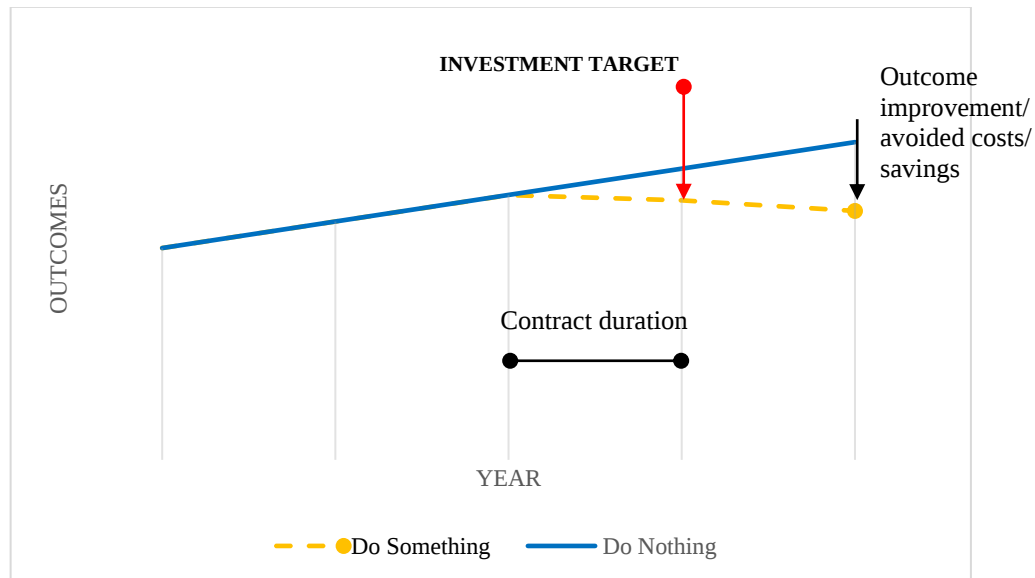


Figure 11.1 Outcome-based payment concept

From the commissioner's perspective, the expected benefit is avoided costs due to reduced fatalities and serious injuries multiplied by the respective costs, as seen in **Table 11.3**. This is considered to be an economic case. Another expected benefit is the avoided claim payments, which each of the claim compensation types based on casualty severity can be seen in **Table 11.4**. The cost is the claims that are supposed to be paid if there is no improvement in road safety performance. The latter is considered as the financial case.

From the investor perspective, the target is the expected benefit, which is the return payment if the target is achieved and maybe a reward if the target is exceeded. Hereinafter, this target is referred to as the investment target. The investor will at least get the return payment at the investment target.

The investment target may be lower than the commissioner's maximum expected benefits (under 100% of the expected benefit by the commissioner); as has been suggested by Warner (2013), the SIB investment is structured based on lower success than the model would indicate to secure savings for the government if target outcomes are met. Therefore, there may be an exceeding of the investment target, which means the investor may get a reward because the commissioner still has savings reserves that can be paid to the investor.

The payment framework based on the outcome is structured as follows.

1. The payment can only be made if the investment target is achieved.
2. There is a hurdle rate where a minimum level of improvement must be achieved before any part of the investment is repaid.
3. After the hurdle rate, the payment increases proportionately to the cost savings generated by the intervention.
4. A reward may be paid if the target is exceeded.
5. The payment made to the investor is based on the financial case.

For example, all expected commissioner's benefits will be achieved at a 100% participation rate in road safety classes (RSC). However, the investment target is set at a 60% participation rate of RSC since, at this rate, the investor's up-front funding is already at the break-even point

(BEP). The investor may get a reward if the performance reaches a higher than 60% participation rate.

The investment target is an agreement between the commissioner and potential investors at a certain outcome improvement rate and associated benefits. The illustration of the payment structure can be seen in *Figure 11.2*.

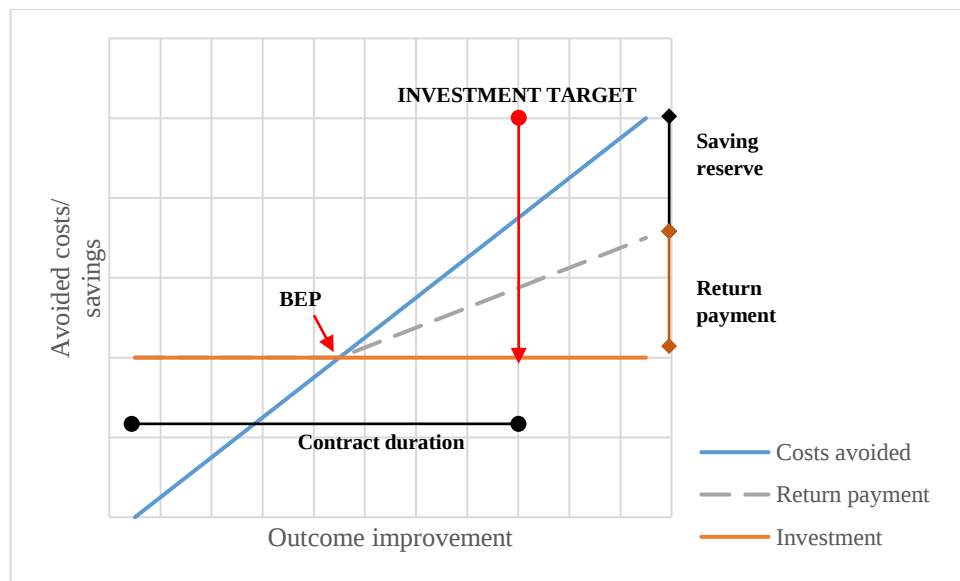


Figure 11.2 Payment framework

From the commissioner's perspective, the benefit can be economic, which is the avoided crash costs or financial, which is the avoided cash payment. The cost is the payment that should be made. The commissioner will calculate the proportion of the actual benefit paid to the investors if the investment target is achieved. The payment can be less than the benefit produced to secure the savings. The savings can be used to reward investors if the target is exceeded.

From the investor's perspective, the expected benefit is the return payment and the reward. The cost is the up-front funding for intervention implementation. The benefit is calculated by

considering the applicable discounted rate (bank rate). The investment rate of return is expected to be higher. Then, the maximum cost the investor is willing to invest may be calculated.

Subsequently, for the purpose of investment implementation and feasibility, the study needs to demonstrate that the expected benefits are greater than the costs spent using the SIB mechanism.

The benefit-cost analysis has been conducted for this purpose.

This study demonstrates the scheme using Yogyakarta data for a more transparent illustration.

Data that needs to be provided to illustrate the implementation of a SIB is as follows.

1. The social issue:
 - a. Specific crashes, fatalities, and serious injuries (FSIs), e.g., the number and type of motorcycle crashes at baseline year.
 - b. The costs of the social issue, i.e., the financial, economic and social costs of motorcycle crashes.
2. The intervention data includes:
 - a. The costs of the interventions.
 - b. The evidence base: to define and measure outcomes (outcome metrics: final outcome, intermediate outcome, link between the outcome metric and payment), including baseline and target, e.g., reduction of motorcycle crashes and FSIs.

11.2.2. Social Issues

1. Defining population target

SIB is context-dependent (Davies and Newman, 2016). The context needs to be determined to capture the social issue and where the necessary data is obtained. A particular road safety issue

has been analysed to provide the context. The issue involves certain types of accidents, fatalities and serious injuries and their financial and broader social impacts. From here, the target or the at-risk population can be determined by identifying individuals or groups who are the targets of positive social impacts.

The social issue may be identified by:

- Crash data

This data represents the final outcomes. Granular data regarding crash types and injuries is essential to identify the key causes of crashes and FSIs (Davies and Newman, 2016).

- Traffic violation data

This data may represent intermediate outcomes.

Furthermore, the road safety targets would be the group of crashes, fatalities, injuries, or traffic violations which the road safety measures will influence. Therefore, the number of crashes, fatalities, injuries, and traffic violations that road safety interventions would affect should be estimated.

2. The costs of road traffic crashes

The crash cost used in this study is based on the Gross Output (Human Capital) Method. Subsequently, to understand the actual cost, the bears of the costs need to be discovered by breaking down the crash into its components.

1. Property damage is assumed as the vehicle repair costs.
2. Administration includes costs for traffic police investigation, reporting, and courts.
3. Medical cost is the cost of medical treatment and medication while staying in the hospital.

4. Lost output/loss of productivity is the cost of no working day, a loss of work wage.
5. The human cost is pain, grief, and suffering.

The breakdown of crash costs is also used to identify the components that need to be included in the investment case.

For this study, the components included in the calculation can be seen in **Table 11.1**.

Table 11.1 *Crash cost components considered for the study*

Crash cost components	The time the costs incurred
1. Property damage 2. Administration 3. Medical costs	immediate
4. Lost output	immediate long-term

11.2.3. Determining the interventions

The intervention is determined by the fundamental cause of FSIs in the target population. To meet the criteria from a road safety perspective, the intervention chosen focuses on elements of the safe system in this study, for example, road safety education as a behaviour-based intervention. While fulfilling the social impact bond perspective criteria, the interventions should be non-statutory or additive programmes (Fraser et al., 2019) and based on evidence which has been proven empirically (Mulgan et al., 2011). The SIBs are also used when innovative interventions or programmes need to be scaled up; however, the commissioner government lacks resources, e.g. funding and skilful staff.

The fundamental data needed from the interventions is the evidence base to support how outcomes could be defined and measured, including evaluation methods, baselines, and targets. The costs of the interventions are also essential to estimate their feasibility.

1. Designing the outcome metric

The outcome is the expected improvement or positive social impact from the social issue identified among the target population. As SIB is a payment by result, outcomes will become the indicators of the success of the programmes. The outcomes used in this study are categorised into final outcomes and intermediate outcomes. The final outcomes, i.e., the number of crashes, fatalities or serious injuries, can be directly linked to the payment. However, if the outcome metric is intermediate outcomes, i.e., reduction in risky behaviours, the metric should represent the benefits imposed by the interventions.

2. Aligning the measurement metric with the payment

Aside from the indicator of the success of the programmes, the outcome metric also indicates the payments to the investor. The outcome metric for a SIB should be linked to a change in society's values and a direct cost to the public sector (Bolton and Savell, 2010). Therefore, the metric should be linked to the calculation of the payment to the investor. The link between the outcome metrics and the number of FSIs (as the basis for the payment calculation) should be established. The link between outcome metrics and payment may be established using a logic mapping for an intervention (Department for Transport, 2011).

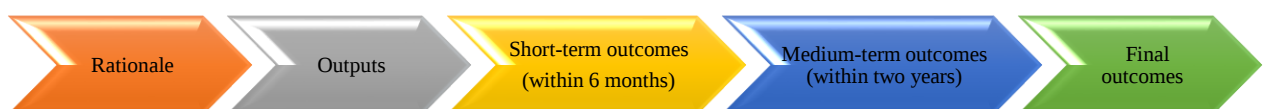


Figure 11.3 Logic Mapping

3. The intervention costs

The investment value depends on the total amount of road safety intervention costs that the owner bears. The owner will transfer this value to the investors. Therefore, the total costs of road safety interventions should be identified first to decide the investment size.

The intervention cost includes commissioning, set-up costs and ongoing service delivery costs, including programme management (planning, design, monitoring and evaluation) and law enforcement (Stevenson et al., 2008; Chisholm et al., 2012).

Costs for the analysis were calculated from study records or the relevant government agencies. In the case of a SIB, the costs include additional transaction costs to establish a SIB (Giacomantonio, 2017). Giacomantonio gives an example of the transaction cost of 5 per cent of the total cost of the interventions for additional legal and administrative costs.

11.2.4. The investment cases- payment structures

The payment structure is developed to demonstrate that the investment is feasible to be carried out and the payment return of investment. The payment is calculated from the prevented road crashes, casualties, and intervention costs. The expected return payment to the investors affects the components included in estimating avoided costs. Therefore, three components need to be provided to calculate the payment in the investment case, i.e., the number of road fatalities and serious injuries that can be prevented, the crash costs, and the costs of the interventions.

Break down crash costs is conducted to determine and justify which components are included in the calculation: direct costs, indirect costs, or broader societal benefits; immediate or long-term costs. The broader economic cost is obtained from the final outcome (broader crash cost, including human cost) multiplied by the number of final outcome metrics. The economic cost

is obtained from the final outcome (crash cost without human costs) multiplied by the number of final outcome metrics. Another investment case using the valuation of crash cost with a more financially sound basis (i.e., state-owned insurance company perspective) has also been presented

The investment decision may be formulated using a cost-benefit analysis. Furthermore, as has been suggested by Warner (2013), the SIB investment is structured based on lower success than the model would indicate to secure savings for the government if target outcomes are met.

11.3. Analysis

The analyses are conducted to determine whether the return for the determined social issue can be justified. The analysis for social issue identification uses crash data from the Police and PT. Jasa Raharja by using descriptive statistical analysis. The analysis for cost component breakdown is based on the Gross Output Method; however, it excludes human costs (pain, grief, and suffering). The intervention was designed by adopting a best practice, including the measurement metric and how to align the measurement metric to the payment. The analysis for payment structure uses benefit-cost analysis between benefits accrued after the intervention affected and the intervention delivery costs.

11.4. Results

11.4.1. Social Issues

1. Defining population target

The data used for defining the population target are:

1. Crash data 2018: claims data from PT Jasa Raharja that match the Yogyakarta Police data are classified into fatal and serious injury claims.
2. The new registrant of motorcycle driving licence is the Police.

Table 11.2 Population target data

Base year	2018	Sources
No. of crashes	4,668	Police data
No. of MC crashes	3,942	Police data
No. of MC fatalities	59	JR data
No. of MC serious injuries	1,028	JR data
No. of MC traffic violations	156,226	Police data
No. of MC driving licence new registrant	5,000	Police data

2. The costs of road traffic crashes

This study used two types of crash costs: based on a study by the Ministry of Transport 2015 and compensation from PT. Jasa Raharja.

The crash costs from the Ministry of Transport are used to identify who bears the costs and demonstrate the investment case by considering the social benefits. The investment case may be developed, including medical costs, property damage, administration costs, and lost output.

While compensation data from PT. Jasa Raharja is used to demonstrate the investment case by considering cash savings in terms of monetary savings. Visible cash savings from road safety improvements may be generated from avoided compensation payments by PT. Jasa Raharja. The saving for PT. Jasa Raharja is the reduction in paying claims to the crash victims and families. The claims consist of fatal casualty claims, injury claims, permanent disability claims, funeral costs contributions, ambulance service reimbursement, and first aid—however, the generated savings for PT. Jasa Raharja is relatively tiny compared to the savings that may be generated.

Table 11.3 *The crash cost for motorcycles in Yogyakarta (2015) in IDR*

Severity classes	Without human costs	With human costs
Fatal	581,745,462	814,443,646
Serious injury	67,094,875	120,770,776
Slight injury	15,023,541	17,277,072

Table 11.4 *Compensation of accident casualties PT. Jasa Raharja*

No	Casualties	Compensations (IDR)
1	Accident casualties	
	Beneficiary of fatal casualty	50,000,000
	Permanent disability casualty (based on a certain percentage, maximum)	50,000,000
	Treatments and medications costs (maximum)	20,000,000
2	Burial costs (if there is no heir)	4,000,000
3	Additional benefits	
	First aid cost reimbursement (maximum)	1,000,000
	Ambulance cost reimbursement (maximum)	500,000

The breakdown of crash cost components in Yogyakarta, which considers human costs, is as follows.

Table 11.5 *Crash cost components*

Cost components		Paid by
Direct costs	Medical costs	• Crash victims or families • Insurance company • PT. Jasa Raharja • Social Security Agency (<i>Badan Penyelenggara Jaminan Sosial / BPJS</i>).
	Vehicle repair costs	• Insurance company • Crash victims or families
	Administration costs	• Crash victims or families • Government • Insurance
Indirect costs	Loss of productivity	• Crash victims or families • Government • Employers (industry, etc.)
Intangible costs	Pain, grief and suffering	• Road victims and families
	The preferences of people to reduce risk, the value of statistical life/injury	• Society

The breakdown of the crash costs into its components. The lost output is the most significant component of the crash costs. Followed by the human costs. Vehicle repair is the smallest due to a motorcycle's reparation costs being relatively cheaper than other types of vehicles. The breakdown of crash components based on the casualty types can be seen in **Figure 11.4**.

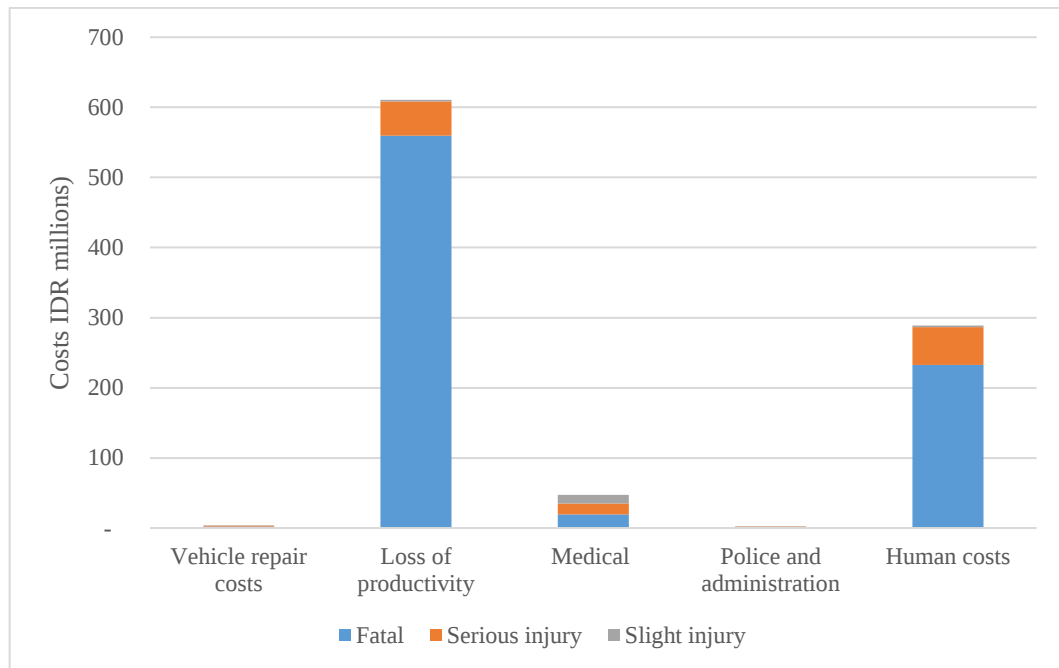


Figure 11.4 *Distribution of crash cost components*

11.4.2. Defining the interventions

To address the prominent issue of safety, which is motorcycle safety in young or novice riders, the Department of Transport and Traffic Police of Yogyakarta has conducted road safety education, which is a behaviour-based intervention. The population target of the Department of Transport is middle and high school students. At the same time, Traffic Police's population target is preschool, kindergarten, and university students. However, some concerns regarding the programmes need to be improved as follows.

1. Difficulty scaling up the target population of the programmes due to limited resources, including limited quantity and quality of staff and limited funding.
2. The target of programmes is service-based delivery. Therefore, the effectiveness of the programmes regarding road safety performance, for example, reducing the number of crashes, casualties, or traffic violations, cannot be justified by a lack of monitoring and evaluation of programmes.

3. The innovation of programmes is complex to realise since the regulation limits. For example, in the case of the difficulty of the Department of Transport in giving helmets to the school campaign participants due to the number of helmets and the participants not matching, the mechanism allowed is through donations or grants (see *Chapter 5*).

Furthermore, a concern about the interventions suitable for SIB is that an SIB is more suitable for additive or complementary programmes, not statutory programmes, which should be delivered by the government (Fraser et al., 2019). Therefore, this study uses a programme considered an additive programme. To identify whether the programme is statutory or additive, it is obtained from the government agencies' function description and programme priority (see *Chapter 5*). From the review of road safety management in Yogyakarta, it has been found that road safety education has been the programme of both the Department of Transport and the Traffic Police. The programmes are delivered as routine programmes. In addition, the programme seems to be considered a complementary programme as it is not the main function of the agencies. Therefore, conducting the programme is not a priority and is subject to the available budget.

Furthermore, the effectiveness of the intervention is seen in preventing road crashes or casualties (fatality and injury). To prove the effectiveness, the intervention is supported by an evaluation method. However, designing interventions is beyond this study. Therefore, the best practice intervention is used due to the limited database on interventions. As one of the fortes of SIB is for the trial of innovative interventions that have never been used before, the best practice may be tried using the SIB scheme.

A road safety class (RSC) programme by Yu and Tsai (2021) has been adopted to demonstrate the SIB scheme in Yogyakarta. The adopted components are the type of interventions, method,

outcomes evaluated and the study's result (the interventions' effectiveness). The intervention aims to reduce offending behaviours and the frequency of road crashes. The intervention is compulsory training before obtaining a license. The evaluation method used is quasi-experiment, which is considered relatively robust to monitor the resulting outcomes of the intervention. However, the effectiveness (11% for reducing the frequency of crashes, which is effective 1-2 years after obtaining the licence and 12%-17% for reducing traffic violations, which is effective 1-3 years after obtaining the licence) is considered moderate.

1. Designing the outcome metrics

The outcome metrics are derived from the logic mapping, as shown in Figure 11.5. There are three outcome metrics: the reduction of the frequency of motorcycle crashes, the reduction of traffic violations and the percentage of participants in RSC. The characteristics of the outcome metrics may be seen in *Table 11.6*.

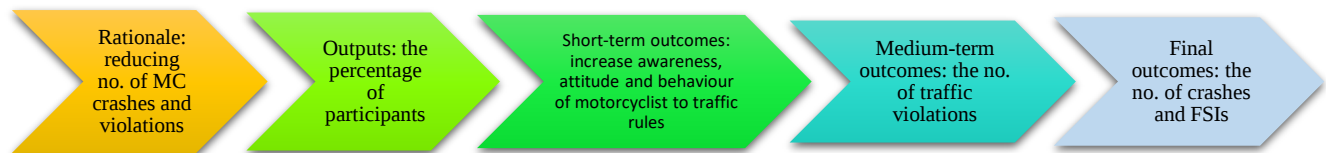


Figure 11.5 Logic mapping for road safety class (RSC) intervention

Table 11.6 The characteristics of outcome metrics

Outcome metric	Availability	Recommendation
The percentage of RSC participants	Not available yet	Will be derived from the licence registration data from the Traffic Police
Reduction of the number of violations	Limited availability Aggregate data	• Need to be disaggregated • Need a system to track the record of individual road user • Source of data: the Traffic Police

Outcome metric	Availability	Recommendation
Reduction of the number of crashes	Limited availability Aggregate data	• Need to be disaggregated • Need a system to track the record of individual road user • Source of data: the Traffic Police

Reducing the number of violations was not used in calculating the investment case. The investment case is calculated by reducing the number of crashes since it is easier to link the data to a number of FSIs.

2. Aligning the measurement metric with the payment

The feasibility analysis would be based on the final outcome, which is the avoided costs due to reducing the number of FSIs. The outcome metric is the reduction in the number of motorcycle crashes. The link between the number of crashes and FSIs can be made using the factor from the comparison between the number of motorcycle fatalities and crashes. Likewise, for serious injuries, use the factor from the comparison between the number of motorcycles with serious injuries and crashes.

3. The intervention costs

The intervention cost is based on the Department of Transport data on delivering a school road safety campaign in 2018. It is assumed for one person trainee. The cost is IDR 150,000 per hour of training. Therefore, for the proposed intervention, in which the training will be delivered for two hours, the cost per person is IDR 300,000. The costs also include setting up the SIB, which is assumed to be 5- 10% of the intervention costs.

11.4.3. The investment case – Payment structures

There are two types of payment structures. Type 1 is based on the economic costs (avoided crash cost based on the Ministry of Transport crash cost, excluding the human costs). Type 2 is based on PT. Jasa Raharja's claim payment is based on the SIB delivery structure from the previous chapter. PT. Jasa Raharja may act as a funder since PT. Jasa Raharja will get benefits if road safety improves, which is PT. Jasa Raharja will get a reduction in claim payments.

Assumptions applied for the investment case are:

1. The baseline participation rate in year 0 (before the intervention) is 0%.
2. The element of the RSC programme (implementation, monitoring, and evaluation) was implemented on time and within budget.
3. Measurement points are after one year of obtaining the licence after full implementation of RSC.
4. The outcome payment would be made at the breakeven point (BEP) when investors' up-front funding is repaid by 100% of costs avoided. Above the BEP, 50% of the cost is avoided each to investors and outcome funders.

The general data used for the calculation can be seen in **Table 11.7**.

Table 11.7 Data for investment case calculation

Population target (persons)	4,878
No. of MC crashes	3,942
Outcome metric	• Number of participants in RSC • Reduction of traffic crashes: 11%

Reduction no. of MC crashes after one year of obtaining the licence	434
Reduction no. of fatalities after one year of obtaining the licence	6
Reduction no. of serious injuries after one year of obtaining the licence	113
Reduction no. of MC crashes after two years of obtaining the licence	386
Reduction no. of fatalities after two years of obtaining the licence	6
Reduction no. of serious injuries after two years of obtaining the licence	101

The total intervention cost is assumed as the intervention costs and the setting up cost of SIB, which is 5% of the intervention costs.

The intervention cost = cost per person * the number of new licence registrants

= IDR 300,000*4,878

The setting up cost = 5% * the intervention cost

The total intervention cost = IDR 1,536,441,587

1. Investment case based on the economic costs (avoided crash cost based on the Ministry of Transport, excluding the human costs)

The calculation is conducted for one year after obtaining the licence, where the intervention effect is affected. The participation rate is the road safety class (RSC) participation. The crash cost in the calculation is the cost without considering the human cost: medical cost, loss output/productivity, vehicle repair fee (property damage), and administration.

Table 11.8 Investment case using the economic costs of crashes

Participation rate	FSIs prevented	Costs avoided
100%	120	11,362,616,546
90%	108	10,226,354,891
80%	96	9,090,093,237
70%	84	7,953,831,582
60%	72	6,817,569,927
50%	60	5,681,308,273
40%	48	4,545,046,618
30%	36	3,408,784,964
20%	24	2,272,523,309
10%	12	1,136,261,655
0%	-	-

The break-even point (BEP) is achieved at a 14% participation rate one year after obtaining the licence. The maximum return payment at 20% of the participation rate is 48%. However, to secure the funds for the commissioner/funder, the return payment is shared between the funder and the investor. Therefore, the return payment to the investor is proposed to be 24%.

2. Investment case based on PT. Jasa Raharja claim payments

The calculation is also conducted for one year after obtaining the licence. The participation rate is the road safety class (RSC) participation. The crash cost in the calculation is the claim payments of PT. Jasa Raharja. The average value for calculating fatal injuries is IDR 51,909,046; for serious injuries, it is IDR 11,213,830.

Table 11.9 Investment case using financial costs of crashes (based on claim payment of PT. Jasa Raharja)

Participation rate	FSI prevented	Costs avoided
100%	120	1,604,949,550
90%	108	1,444,454,595
80%	96	1,283,959,640
70%	84	1,123,464,685
60%	72	962,969,730
50%	60	802,474,775
40%	48	641,979,820
30%	36	481,484,865
20%	24	320,989,910
10%	12	160,494,955
0%	0	-

The break-even point (BEP) is achieved at a 96% participation rate one year after obtaining the licence. The maximum return payment at 100% of the participation rate is 4%. However, to secure the funds for the commissioner/funder, the return payment is shared between the funder and the investor. Therefore, the return payment to the investor is proposed to be 2%.

The investment cases are based on economic costs and PT. Jasa Raharja claim payments are illustrated in **Figure 11.6**. Meanwhile, the return payment which is based on PT. Jasa Raharja's claims can be seen in **Figure 11.7**. This figure shows the share payment rate to investors after BEP between the funder and investors, which is less than the maximum avoided costs that may be achieved.

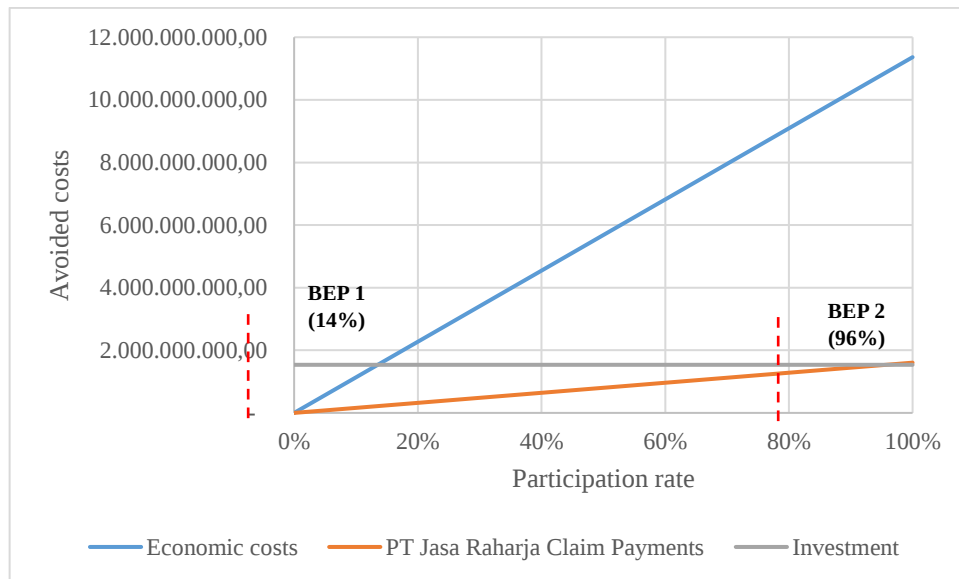


Figure 11.6 Investment case based on economic costs and PT. Jasa Raharja claim payments

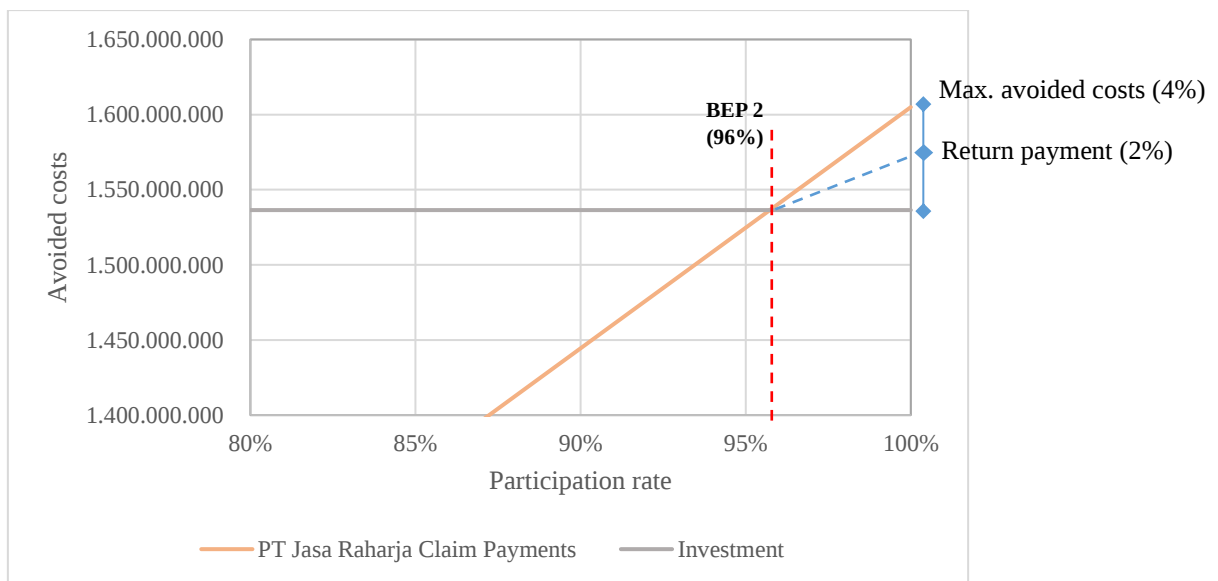


Figure 11.7 Payment structure based on PT. Jasa Raharja claim payments

The investment case using economic costs shows that the investment will return the payment lower than using claims of PT. Jasa Raharja. However, in this case, the crash costs are borne by several parties. The victims or families bear the most significant component, i.e., the loss of output, medical costs, and property damage. The government only pay a small part of the

components, e.g., the administration costs. Consequently, the government is not justified as the payer of the return payment to the investors. A government system, e.g., a healthcare, welfare, and insurance system, is not yet available or identified to pay for the effects of crashes unless road safety is considered a merit good that is the government's responsibility to its citizens.

Other potential institutional funders or investors, such as insurance companies or employers, have not yet been identified or significantly involved.

In the case of investment calculation using the claim payment of PT. Jasa Raharja, the investment will make a return payment by the end of year 1 in RSC's 100% participation rate. It clearly shows that PT. Jasa Raharja will pay for the return payment to the investor if the intervention meets the targets.

CHAPTER 12. DISCUSSION

12.1. Introduction

This chapter presents the discussions of the results of the study. The study aims to enhance road safety financing mechanisms by implementing social impact bonds (SIBs). This study has brought in the concept of outcome-based payment and multistakeholder partnership in the form of SIBs to improve road safety management. This study assessed road safety management in Indonesia to justify the need for SIBs. The potential use of SIBs for road safety also has been investigated. The proposed structure and investment feasibility of delivering road safety programmes using SIBs have also been demonstrated. The findings in this study may be used as a stepping stone to move forward and as an introduction to the concept initiated in this study for better road safety programme delivery.

12.2. Road Safety Management Performance

The study assessed the road safety management performance at the national and local levels in Chapter 5 and Chapter 6. The assessment was conducted on the robustness of road safety targets, the efficiency and effectiveness of the institutional arrangement, the effectiveness of road safety interventions, and the financial availability and capacity. The results show that the national and local levels are below the margin. Nonetheless, the scores are approaching 3 (2.77 for the national level and 2.85 for the local level), which means the performance of the road safety management concepts assessed is at a minimal level of implementation. The local level has a slightly higher score than the national level.

Regarding the robustness of road safety targets, both levels have identical values. Target measurement has a low score. The main target is the final outcome, which is the crash rate. There are also targets in the form of intermediate outcomes; for example, the Ministry of Public Works: speed of response time to reports of handling potholes, decrease time from reporting to implementation of pothole closure. However, not all agencies measure targets in the form of intermediate outcomes. In addition, there is no link between intermediate and final outcome targets; therefore, the effect of the safety program efforts that have been implemented is unknown. Because the link between the conducted activities and the targets cannot be established, the funding allocated to the activities also cannot be aligned with targets, especially outcome targets.

For institutional arrangements, the local level has a better score. Coordination and partnerships at the local level are better because the traffic forum functions better. Many safety programs are carried out in partnerships, for example, road safety education and campaigns conducted by the Department of Transport and Traffic Police. However, human resources at the local level have a lower value due to the lack of staff number and staff with specific expertise in road safety.

The national level has more studies on road safety programmes and research institutions on international and national scales that assist in the research and implementation of these programmes. Meanwhile, at the local level, the studies carried out are more limited, and the research institutions that assist with research are also limited. Both also have limitations in monitoring and evaluating the programs implemented. Monitoring and evaluation of the implementation of road safety programs at both the national and local levels are more or less the same; therefore, both get the same score. It seems that what has been said previously is

that the evaluation of program implementation cannot be connected between the targets set per agency and the main target, i.e., reducing the rate of crashes or casualties. However, the agency's performance is monitored every three months in Yogyakarta. Agencies considered to have good performance will be given incentives as rewards. It can be seen that there is a direct relationship between performance and incentives.

The local level also has better scores related to financial availability. Various funding sources can be explored, although they have not been used to date. At the national level, funding sources are more limited. Currently, there is only funding from the government. However, if road user-based funding sources can be managed centrally and used specifically for road safety, the national and local levels will have the same funding sources. Payment mechanisms at both the national and local government levels still use conventional methods, i.e., based on fee-for-service. Moreover, politically influenced budget allocation leads to fluctuating funding.

These findings align with those of Bliss and Breen (2009), who identified weak road safety management in LMICs. Bliss and Breen categorised road safety management into four phases: Phase 1 – Focus on driver interventions; Phase 2 – Focus on system-wide interventions; Phase 3 – Focus on system-wide interventions, targeted results and institutional leadership; Phase 4 – Focus on Safe System long-term elimination of deaths and serious injuries and shared responsibility. In phase 4, when road safety management is approached by a safe system, the interventions are system-wide, which is also target-oriented and considers the road safety network sustainability in terms of air pollution and other environmental components.

Therefore, based on those phase classifications, road safety management in Indonesia may be considered between Phase 2 and Phase 3. In Phase 2, the system-wide intervention has been recognised. The policy has shifted from focusing on drivers in the pre-crash to including in-crash protection from roadside hazards and vehicle malfunctions and post-accident care. Nevertheless, the focus remains at the level of systematic but separate interventions. It does not directly address the institutional management functions that generate these interventions, opportunities to analyse interactions between key risk elements (e.g. roads and vehicles) or the relationships between potential intervention activities to improve desired outcomes. Meanwhile, in Phase 3, the system-wide interventions are completed with numerical outcome targets based on monitoring and evaluation. Institutional management functions became more practical, institutional leadership roles were identified, inter-governmental coordination processes were established, and funding and resource allocation mechanisms and processes were better aligned with the outcome targets. As a comparison, the best practice countries, such as Sweden, Netherlands, and Australia, are now in Phase 4. Phase 4 countries have system-wide interventions, long-term elimination of fatal and serious injuries, shared responsibility, and an emphasis on speed management. In this system, instead of blaming the road users, the traffic system is designed to protect the road users. The formulation of legislation, education, and enforcement considers the vulnerability of road users.

LMICs need to leap and not experience what HICs have taken to HICs's current road safety performance. LMICs need to shift to the current phase of the HICs. Therefore, it needs more concrete actions. Unlocking new funding sources with an enhanced financing mechanism which optimises partnership and is result-oriented (e.g., outcome-based payment) can be justified to support the effort of LMICs to achieve better road safety performance. SIBs may be qualified to be tried as a financing mechanism for road safety since SIBs emphasise

outcome-based payment with a robust monitoring and evaluation culture (Mulgan et al., 2011; Economy, 2021).

The assessment method used in this study is based on the concept developed by Bliss and Breen (2009), which consists of institutional management functions, interventions, and results. However, this study modified those concepts into more practical use by reducing the components of institutional management functions. It is conducted since the original model seems more suitable for the strategic or country levels. Since the study was also conducted at the local level, the components are reduced to more suitable for a minor system, i.e. road safety management at the local level. The additional components are added to reflect the local and project level, for example, the quantity and quality of staff (Gaines et al., 2013).

12.3. Suitability of SIBs for Road Safety Financing Mechanism in Indonesia

The investigation of the suitability of SIBs for road safety has been conducted in Chapter 9. The SIB is context-dependable. Therefore, the study takes Yogyakarta as the context for implementing SIBs.

The SIB is rooted in new public management (NPM) and new public governance (NPG). Most components are rooted in NPM, which supports the concept of outcome-based payment; the component rooted in NPG is multisectoral partnerships (Osborne, 2006; Warner, 2013; Economy, 2021). A list of keywords is generated from the domains NPM and NPG. The list is used in this analysis to determine the suitability of SIBs for road safety financing across 16 keywords: target setting, evaluation method of interventions, evaluator, data quality, data type, database system, intervention delivery, programme status, target population, human

resources, division roles among partners, collaboration, funding source, funder/investor preference, government financial capacity, and payment mechanism.

Out of 16 components, three are supporting components, eight are limited support components, and five are not support components. The supporting components are the evaluator, programme status, and multi-sectoral partnerships (roles of each partner, collaboration, and conflicts and tensions in the collaboration). The components that support in a limited way are data quality, type and accessibility, continuity of the interventions, target population, funder/investor preference, government financial capacity, and payment mechanism. No-support components are target-setting, evaluation method, evidence of the efficacy of interventions, method to choose the interventions and quality and quantity of staff.

The components that provide no support need immediate improvement for SIB implementation. The following improvement priority shall be the components which provide limited support. The improvement may be conducted as a pre-requirement of SIBs or may be addressed by SIBs. Most of the components needing improvement are from the outcome-based payment domain.

Outcome-based payments

Setting the target, which includes establishing a link between the outcome metric and the outcome used to calculate the impact, is essential in a SIB. The targets set in Yogyakarta are quantitative. However, the relationship between the efforts made and the targets set cannot be explained. Therefore, a link is needed between the efforts and targets set. The link can be a middle target that can be measured more easily, for example, safety performance indicators.

The best target-setting practice can be found in New Zealand (Bliss and Breen, 2009). Targets are set based on hierarchy, i.e., output, intermediate outcome, final outcome, and social costs. The social impact bond implemented in Cambodia uses an intermediate outcome, i.e., passenger helmet-wearing rate, as the outcome metric to link with the final outcome of the interventions, which is reducing the number of crash fatalities due to head injury (Davies and Newman, 2016).

In this study, efforts were made by illustrating target-setting based on logic mapping (Department for Transport, 2011) and the road safety class (RSC) study in Taiwan (Yu and Tsai, 2021), i.e. participation rate in RSC, reducing the number of traffic violations, and reducing the number of crashes of RSC participants. The link between the participation rate of RSC, reducing the number of traffic violations, and reducing the number of crashes of RSC participants can be established.

Choosing interventions based on evidence of efficacy and cost-effectiveness and supported by a robust evaluation method is also crucial. All these components need a robust database and data monitoring system. The improvement in outcome-based payment may support the safe system, especially in result-focused activities (Bliss and Breen, 2009).

Furthermore, to ensure that the intervention is right on target, determining the target population so that there is no cream-skimming or cherry-picking can be done by implementing a high-fidelity intervention, as in the case of Essex, but this will burden the front staff/providers (Economy, 2021). The method also will limit the flexibility of the service providers to make innovations.

This study attempted an effective intervention in another country: road safety class (RSC) to reduce traffic violations and crashes among young novice motorcyclist riders, conducted in

Taiwan. This intervention is equipped with implementation steps, from determining the target population to measuring the level of success. This intervention may be binding, but providers can still innovate by providing material at RSC.

This effort is expected to improve the implementation of road safety education. Currently, the target population is determined randomly, without any scientific or statistical basis. Then, the results of implementing activities are not measured for their effectiveness. For this reason, we can add to the database of effective intervention implementation (evidence-based) by implementing clearer scientifically and measuring the results of their implementation to determine the effectiveness level.

A clear cohort was established in this study. The cohort determination method is in accordance with the cohort implemented at the Peterborough SIB. The Peterborough SIB has 3,000 short-term prisoners (less than one year at the prison) in Peterborough prison, divided into three cohorts of 1,000 prisoners for intervention and monitoring of intervention results (Griffiths and Meinicke, 2014; Nicholls and Tomkinson, 2013). In the case of SIB Cambodia, the cohort was students in a school where the intervention was carried out, and to find out the results of the intervention, observations were made at the school gate for the level of helmet use (Davies and Newman, 2016). In this study, the cohort is the number of participants in RSC (Yu and Tsai, 2021) who are new licence registrants.

Multi-sectoral partnerships

Nonetheless, the components already considered support to the implementation of SIBs may still need improvement, for example, in terms of multi-sectoral partnerships. The division roles among partners are how SIBs would be implemented. With the SIBs, the roles of each actor will be separated according to their expertise, i.e., owner/commissioner/funder, service

providers, investor, or manager—the role division in the proposed SIB delivery structure in Chapter 10. This division of roles will open up opportunities and pathways for collaboration with parties outside the government in implementing safety programmes. This supports the concept of shared responsibility in delivering road safety programmes envisaged by the safe system approach. However, the multi-sectoral partnerships may ignite conflict and tension among partners (Economy, 2021). Relationships and cooperation that have been well established before implementing the SIB can reduce this unexpected impact. In Yogyakarta, relations and cooperation between stakeholders in road safety have been well established, including through the traffic forum and cooperation between agencies.

Funding and SIB delivery structures

The study shows the breakdown of crash costs. The breakdown can be used to identify parties who bear the costs that benefit from improving road safety. Chapter 11 shows that the victim or victim's family is the one who bears the greatest costs resulting from an accident, resulting from loss of productivity. Because the victims or families of traffic accident victims will bear the greatest costs if an accident occurs, it means that if safety improvements are made, they will get the greatest benefits. Because they will get the greatest benefits, it can be said that they also have the greatest priority in paying for safety improvement efforts. This concept applies to goods/products considered public goods, in which users who use more will pay more. It is also known as the cost recovery concept. This concept will be based for a fee for utility or road user fees (Evdorides and Eusofe, 2014).

However, as previously stated, people in LMICs are the ones who suffer the most from the impacts caused by road accidents. Therefore, it will be very burdensome for the people if they are asked to pay more than the costs they currently pay. There will be high resistance if there

is an increase in fees. As is known from previous studies (Davies and Newman, 2016), the poor struggle to pay medical costs; therefore, they must sell almost all their assets. As also stated by Abagale et al. (2013) in Kasenna District in Ghana, the percentage of costs incurred in their overall income by communities with a weak economic level is much greater than by communities with a higher economic level.

For this reason, the government's role is needed in providing road safety. Road safety here is a right of every citizen. Or it can be said to be the minimum limit of a country, such as the national defence and legal system (minimal state tasks) (Ver Eecke, 1998), which the country must fulfil first. Therefore, there is a minimum limit for road safety conditions. Once the minimum condition is fulfilled, a utility fee can be applied.

Assuming that it is the government's job to provide a minimum limit of road safety conditions, it is for this reason that the government must "give" these road safety conditions to its people. This provision is made to provide more prosperous conditions. This concept is called merit goods (Ver Eecke, 1998; Fitzgerald, 2013). This concept also justifies that merit goods financing comes from general revenue, which each person may contribute based on their ability (ability to pay), not depending on the benefits they obtain from using a facility.

In the state's activities to provide this provision, the state may invite other parties to provide the best service, as is the case with the provision of preventive health in Australia (Fitzgerald, 2013). For example, if the government does not have enough funds to pay investors, it can share with potential funders, e.g., PT. Jasa Raharja. PT. Jasa Raharja may act as a guarantor of a collaboration with philanthropy institutions, e.g., Bloomberg Philanthropy, as in the case of Rikers Island (Warner, 2013). Likewise, with service providers, if it is felt that the state

cannot carry out the program competently, the state may invite other parties to work on the programme.

In the case of Cambodia SIB, international institutions played more of a role in the SIB delivery structure (Davies and Newman, 2016). Asia Injury Prevention (AIP) Foundation is an international NGO that operates programmes in Cambodia, China, Thailand, Vietnam, Tanzania, and Uganda. The AIP Foundation serves as the lead agency and service provider. The AIP Foundation is also part of the funders and investors together with the Development Innovation Ventures (DIV) programme at the United States Agency for International Development (USAID), the FIA Foundation, the UPS Foundation with in-kind support from US-CDC, and the Road Safety Fund. The commissioner is the Cambodian government. The role between funders and investors cannot be clearly identified in this SIB. The Cambodia SIB may also be categorised as a Development Impact Bond (DIB) because the funders are international donors (Ackerman et al., 2013; Davies and Newman, 2016).

For Indonesia, there is the possibility of implementing the DIB because Indonesia has experience working on road safety projects with grants from Bloomberg Philanthropies Initiative for Global Road Safety (BIGRS), which were implemented in 2015 - 2019 in Bandung, West Java. However, funding from international grants is considered less sustainable (Evdorides and Eusofe, 2014). What is more sustainable is if funds can be collected from within the country, such as road user fees or donations from mandatory accident fund contributions, which PT. Jasa Raharja has managed. These funds can be allocated for improving road safety, and it can be proposed that these funds be managed by an autonomous body that is not influenced by politics, for example, a road safety fund board. Because all this time PT. Jasa Raharja is only obliged to use these funds to compensate third

parties if they are involved in a traffic accident. For this reason, forming a road safety fund board is deemed necessary before implementing SIBs. With the existence of this body, funding schemes using SIBs will ensure the sustainability of funding.

Furthermore, PT. Jasa Raharja is obliged to pay compensation costs to third parties if they are involved in a traffic accident. Therefore, if road safety conditions improve and accidents and FSIs decrease, it means PT. Jasa Raharja also benefits from reduced compensation costs paid to victims or victims' families. In this case, PT. Jasa Raharja also has the potential to become a funder or investor. However, from the interview results, it was discovered that in managing mandatory accident fund donations, PT. Jasa Raharja, like other state-owned companies, is given the opportunity to invest if the company has a profit. The investment that can be made must meet certain conditions, including meeting the minimum investment value and providing a profit. To date, the investments that PT. Jasa Raharja has made investments in infrastructure projects. There has never been any investment in road safety because there has never been an investment opportunity in this field.

It is deemed inappropriate if PT. Jasa Raharja acts as an investor because it will be PT. Jasa Raharja 's obligation with funds collected from road users for road safety purposes. Therefore, it is appropriate that the funds collected be used for road safety programmes without profit consideration but with broader benefits for road users.

For this reason, it may be necessary to amend statutory regulations because of PT. Jasa Raharja's obligations are regulated by law. This change is related to the arrangements for collecting, managing and using funds collected from road users to benefit road users' road safety.

Apart from that, it needs to be supported by establishing a road safety fund board to manage funds from road users as collected by PT. Jasa Raharja, as previously mentioned. Therefore, the funds collected by PT. Jasa Raharja can be channelled to the road safety fund board to be managed for efforts to improve road safety.

Other parties who may benefit are private companies, such as vehicle distribution companies (e.g. Astra Honda Motor /AHM), expeditions and logistics, and other companies that use transportation processes. Big companies, such as in the oil and gas sector, i.e., Exxon and Pertamina, carry out risk analysis for their distribution fleets' routes. Therefore, they also will get benefits if road safety improves.

These companies are currently contributing to efforts to improve road safety, either independently or in collaboration with the government through CSR schemes, which, of course, do not expect financial benefits but only for better benefits for society and the company's brand image. CSR is carried out in the form of grants or in-kind. Apart from that, the government is also prohibited from accepting aid in the form of money directly because it may be categorised as bribery.

The challenge for implementing SIBs is to attract these companies to shift their contributions from grants to investments. With investment, it is hoped that the work ethic will be more competitive to increase efficiency and effectiveness. This is also supported by the current condition where investment using SIBs is deemed less successful in attracting the private sector to participate as investors (Fitzgerald, 2013; Giacomantonio, 2017; Del Giudice and Migliavacca, 2019). Giacomantonio (2017) concluded that rather than being a conventional form of investment, SIB is a tool for maximising grants.

In addition, as previously presented, government agencies cannot receive funds directly from outside parties, either in the form of grants or investments, so a legal entity specifically formed to accommodate and manage these funds is needed.

Although many things must be prepared to implement SIB well, SIB can still be implemented to improve road safety management performance. It has been expected that along with improving the components needed for SIB, road safety management will also automatically improve efficiency and effectiveness. Efficiency will occur because the limited government budget can be used according to the desired target outcome. Effectiveness will occur because the agreed target can be more guaranteed to be achieved because of the efforts made by providers to achieve the agreed target so that funders can get the desired benefits. This aligns with the statement by Belinsky et al. (2014) and Economy (2021), in which SIB aims to improve the implementation of public services instead of adding funding. However, although they may not add the funds, the SIB scheme may unlock new funding sources and increase awareness to participate in road safety efforts (Davies et al., 2015; Davies and Newman, 2016).

12.4. Investment case using SIBs

One of SIB's objectives is to guarantee a program's effectiveness by making payments if the activity targets in the form of outcomes are achieved. For this reason, the target outcome must be identified and measured using a metric. In this research, two outcome metrics are used, i.e., output and final outcome. SIB requires a relationship between payments and targets for activities that can be measured.

Output is used as a metric because output can be linked to final outcomes, which will then be used to calculate benefits. At least intermediate outcomes should be used as metrics, such as in the Cambodia SIB, to see that the interventions successfully improve society's social conditions regarding road safety. However, using output is also justified as a starting point to improve the crash and injury database's quality, as Bliss and Breen (2009) suggested. The challenge faced in this part is to establish a clear identification and grouping between outputs and outcomes (short-, medium-, and long-term). The theory of change may be used to address this issue by implementing sound logic mapping (Department for Transport, 2011).

SIB in road safety has a clear social impact (Davies and Newman, 2016). The social costs of crashes show this social impact. However, these costs vary depending on the method of measuring crash costs. The human capital method usually shows a smaller value than the results of willingness to pay.

This study demonstrates the outcome-based payment scheme using road safety data in Yogyakarta. The target population is novice motorcyclists just about to register for a license. Interventions were selected based on best practices from Taiwan. One of the things SIB offers is that it can be applied to try new interventions (Mulgan et al., 2011; Ackerman et al., 2013). This opportunity was used to try successful interventions in Taiwan to be implemented in Yogyakarta.

Furthermore, this study also shows that the investment case uses two methods, i.e., based on the economic and financial cases. For the financial case, the return payment can be justified as cash payment due to the reduction of PT. Jasa Raharja's claim payments. However, the rate of return is low, at 2%. This is below the bank rate (4.25 - 6%, the Indonesia Central Bank Rate). This may make SIB investment unattractive to potential investors, as Giacomantonio (2017)

identified. Based on the economic costs of crashes, the investment case generates a higher return payment, at 24%. However, the benefits of this model are spread to many stakeholders. Apart from challenging to monetise, it is also difficult to receive and distribute payments to the right parties, for example, the medical, long-term care, and hidden costs paid by victims' families. Furthermore, the medical care percentage is low, meaning there is a possibility of hidden costs borne by society. The costs borne by society are higher than the ones included in the calculation for investors. This is due to most of the costs the accident victims pay not being recorded. For example, the government or insurance companies do not pay for medical expenses due to road crashes as in the developed countries with sound welfare systems. Therefore, many accident cost components in LMICs are not included in the estimation of payment to investors. In HICs, these costs will be borne by insurance companies. Developing a welfare and healthcare system may address uncaptured costs in payment structures (Davies and Newman, 2016). The BPJS – the state healthcare system- may pay some medical expenses for each citizen for the premium. However, not all citizens are members of the BPJS. The BPJS also pay the basic healthcare costs, which means there is a possibility not all healthcare costs will be recorded in the system.

CHAPTER 13. CONCLUSIONS AND FURTHER RESEARCH

13.1. Conclusions

The general conclusions that may be drawn from this research are as follows:

A. The Assessment of Road Safety Management Performance in Indonesia

1. Road safety management performance in Indonesia is still below the margin at the national and local levels, as assessed by its target, institutional arrangement, intervention delivery, and financial availability and capacity.
 - a. Targets can not be linked to the payment of the interventions.
 - b. Missing link between the targets and the interventions, which need to track the effectiveness of the delivered programmes by measuring output and intermediate outcomes.
 - c. The measurement of the target needs improvement monitoring and evaluation system, which includes a database system and evaluation method.
 - d. Regarding coordination, the national lead agency has not optimally worked. At the local level, there is no lead agency. The coordination has been conducted through a traffic forum, which is only ad hoc.
 - e. Partnerships are identified. However, the partnership also delivers road safety programmes on an ad hoc basis. Non-government partners have not yet been explored and utilised optimally.
 - f. The quantity and quality of the human resources in road safety are limited, particularly at the local level.

- g. Limited data on delivered interventions due to weak monitoring and evaluation systems.
 - h. The main funding source is the government budget, which is highly politically dependent.
 - i. The budget allocation is disbursed using a fee-for-service basis, which does not ensure the effectiveness of the delivered programmes achieving the set targets, let alone improving social welfare.
 - j. Alternative funding sources have been identified but have not been used yet due to the unavailability of a mechanism for contribution.
2. Local road safety management has better performance than the national level. This is mainly due to better coordination since the traffic forum functions better than the national level. In addition, more potential funding sources can be explored locally than at the national level, which only has a general budget or occasionally grants.
 3. The road safety management performance assessment results may justify any effort to improve road safety management performance in this study by implementing social impact bonds (SIBs).

B. The Potential Use of SIBs for Road Safety in Indonesia

SIBs may be implemented for road safety financing in Indonesia based on the assessment of suitability, which comprises 16 keywords: target setting, evaluation method of interventions, evaluator, data quality, data type, database system, intervention delivery, programme status, target population, human resources, division roles among partners, collaboration, funding source, funder/investor preference, government financial capacity, and payment mechanism.

However, besides SIB, which will eventually improve road safety management performance to be more effective and efficient by encouraging outcome-based payment and multi-sectoral partnership, several components of road safety management need to be improved pre-requirement of SIBs, i.e., a re-enforcing database system for crash data and delivered interventions.

C. Social Impact Bond Models for Road Safety in Indonesia.

1. Three models of SIB delivery structures have been proposed. The implementation depends on the readiness of the context. Enacting regulation for PPP for non-infrastructure programmes, particularly at the local level, is needed before the implementation. An autonomous body is needed to manage road safety funds and programmes on a daily basis to improve coordination among partners. Identifying and encouraging a qualified service provider is also necessary since there are limited non-government service providers.
2. Investment cases using SIB schemes are justified based on economic and financial models.
3. The financial model could not capture the broader benefits of road safety improvements since it does not represent the costs of road crashes. Detail components are not found in PT Jasa Raharja's claims. Therefore, it cannot portray the actual costs of road crashes to society. However, it may show the potential investment in road safety.
4. The investment case is very reliant on data. Therefore, a robust database is essential. More detailed and comprehensive data can be provided, and the investment which portrays social impact can be justified. A systematic data collection is needed to provide a robust database, including traffic (volume, speed, registered vehicle, km vehicle travelled, driving licence, violations), crashes, casualties, and delivered interventions.
5. Hidden costs or broader social and human costs may be included in the justification of the road safety investment. However, when these costs are considered, the financial capability

of the funders or commissioners should be more robust since the return is higher compared to the investment case with the economic or financial costs consideration. The government need to provide a robust welfare and healthcare system for this purpose.

13.2. Further Research

This study has investigated the potential use of social impact bonds to improve road safety delivery. However, limitations still emerge and need further analysis. Therefore, it is felt that further work may explore and address the following aspects:

1. Crash cost data, including improving the road crash database with more granular data to identify accident cost bearers as well as further investigation of the hidden road crash costs.
2. The inventory, monitoring, and evaluation of the delivered road safety interventions implemented in Indonesia, including the effectiveness of road safety countermeasures.
3. Further analysis to differentiate and categorise output and intermediate outcomes.
4. The implementation of a SIB pilot programme.
5. The development of an autonomous body as the lead agency.
6. The development of road safety funds.
7. The society's expectation of road safety services.

REFERENCES

A

- Abagale, M.D., Akazili, J., Welaga, P., et al. (2013) The effects of road traffic accidents on society. The case of the Kassena Nankana districts, Ghana: a quantitative survey. *The Lancet*, 381: S3. doi:10.1016/S0140-6736(13)61257-X.
- Ackerman, X., Rose, P., Steer, L., et al. (2013) Investing in Social Outcomes: Development Impact Bonds. Available at:

https://www.google.co.za/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&ved=0CCoQFjAA&url=http://www.cgdev.org/sites/default/files/DIB_WG_REPORT.pdf&ei=w9iiUr_WBKaL7AbF6oHgCg&usg=AFQjCNHmEP11LXIIfWqLV0U2NU5bD4fJcGg&sig2=D44K5I8pSTkL2eHCSQnMzQ&bvm=bv.5775.
- Aeron-Thomas, A., Downing, A., Jacobs, G., Fletcher, J., Selby, T., & Silcock, D. (2002). Review of road safety management practice Final report. DFID GRSP TRL Ross Silcock, Babbie Group Ltd.
- Alfonsi, R., Persia, L., Antonino, T., et al. (2016) Advancements in Road Safety Management Analysis. *Transportation Research Procedia*, 14: 2064–2073.

doi: 10.1016/j.trpro.2016.05.105.
- Araujo, M., Illanes, E., Chapman, E., et al. (2017) Effectiveness of interventions to prevent motorcycle injuries: systematic review of the literature. *International Journal of Injury Control and Safety Promotion*, 24 (3): 406–422. doi:10.1080/17457300.2016.1224901.
- Aritenang, A.F. (2020) The effect of intergovernmental transfers on infrastructure spending in Indonesia. *Journal of the Asia Pacific Economy*, 25 (3): 571–590. doi:10.1080/13547860.2019.1675352.

ASEAN (2016) ASEAN Regional Road Safety Strategy.

Assum, T. (1998). Road Safety in Africa. Appraisal of Road Safety Initiatives In Five African Countries. The World Bank. Africa Region.

B

Belinsky, M. and Chaskel, S. (2012) Designing a Social Impact Bond in the Tropics.

Belinsky, M., Eddy, M., Lohmann, J., et al. (2014) The application of social impact bonds to universal health-care initiatives in South-East Asia. *Journal of Public Health*, 3 (December): 219–225.

Bishai, D., Hyder, A.A., Ghaffar, A., et al. (2003a) Rates of public investment for road safety in developing countries: Case studies of Uganda and Pakistan. *Health Policy and Planning*, 18: 232–235. doi:10.1093/heapol/czg028.

Bishai, D., Hyder, A.A., Ghaffar, A., et al. (2003b) Rates of public investment for road safety in developing countries: Case studies of Uganda and Pakistan. *Health Policy and Planning*, 18: 232–235. doi:10.1093/heapol/czg028.

Bliss, T. and Breen, J. (2009a) Country Guidelines for the Conduct of Road Safety Management Capacity Reviews and the Specification of Lead Agency Reforms, Investment Strategies, Investment Strategies and Safe System Projects. Washington, DC. Available at: http://siteresources.worldbank.org/EXTTOPGLOROASAF/Resources/traffic_injury_prevention.pdf.

Bliss, T. and Breen, J. (2009b) Country Guidelines for the Conduct of Road Safety Management Capacity Reviews and the Specification of Lead Agency Reforms, Investment Strategies, Investment Strategies and Safe System Projects. Washington, DC.

Bolton, E. and Savell, L. (2010) Towards a new social economy: Blended value creation through Social Impact Bonds. London: Social Finance, (March). Available at: <http://www.socialfinance.org.uk/resources/social-finance/towards-new-social-economy-blended-value-creation-through-social-impact-bonds>.

C

Clarke, A., & Dawson, R. (2000). *Evaluation Research. An Introduction to Principles, Methods, and Practices* (1 ed.). London: Sage Publications Ltd.

Commonwealth of Australia (2022) International road safety comparisons 2020.

D

Davies, T. and Newman, J. (2016) *INVESTING TO SAVE LIVES: An Impact Investment Case for Preventing Road Trauma*. London.

Davies, T., Newman, J., Hill, R., et al. (2015) *Breaking the Deadlock: A Social Impact Investment Lens on Reducing Costs of Road Trauma and Unlocking Capital for Road Safety*. Available at:

<http://www.socialfinance.org.uk/wp-content/uploads/2015/07/breaking-the-deadlock.pdf>.

Del Giudice, A. and Migliavacca, M. (2019) Social Impact Bonds and Institutional Investors: An Empirical Analysis of a Complicated Relationship. *Nonprofit and Voluntary Sector Quarterly*, 48 (1): 50–70. doi:10.1177/0899764018797480.

Department for Transport (2011) *Delivery of Local Road Safety*, (124). Available at: www.dft.gov.uk/pgr/roadsafety/research/rsrr.

Donario, A.A. and Dos Santos, R.B. (2012) *The Economic and Social Cost of Road Accidents*.

Downing, A. (2004). Addressing the Challenge of Road Safety. In A. M. Pierre-Louis , F. A. Akala, & H. S. Kara (Eds.), *Public Health in the Middle East and North Africa MEETING THE CHALLENGES OF THE TWENTY-FIRST CENTURY* (pp. 97-114). Washington, DC: The International Bank for Reconstruction and Development / The World Bank.

E

Eames, S., Terranova, V., Battaglia, L., et al. (2014) *A Review of Social Impact Bonds : Financing Social Service Programs through Public-Private Partnerships.*

Economy, C.L. (2021a) *Innovation in public service delivery : Essays on the Social Impact Bond.* University of Oxford.

Elvik, R. (2010). Sources of Uncertainty in Estimated Benefits of Road Safety Programmes. *Accident Analysis and Prevention*, 42(Elsevier), 2171-2178.

Eusofe, Z. and Evdorides, H. (2016) Assessment of road safety management at institutional level in Malaysia: A case study. *IATSS Research*, (2016). doi:10.1016/j.iatssr.2017.03.002.

Evdorides, H. and Eusofe, M.Z. (2014) “Options for road safety funding in Malaysia.” In 9th Malaysian Road Conference 2014 and PIARC International Seminar on Slopes, Road Foundation Drainage and Storm Water Management. 2014.

F

Fitzgerald, J.L. (2013) Social impact bonds and their application to preventive health. *Australian Health Review*, 37 (2): 199–204. doi:10.1071/AH12238.

Fraser, A., Tan, S. and Mays, N. (2019) To SIB or not to SIB? A comparative analysis of the commissioning processes of two proposed health-focused Social Impact Bond financed interventions in England. *Journal of Economic Policy Reform*, 00 (00): 1–16. doi:10.1080/17487870.2019.1572508.

G

Gaines, D., Waldheim, N. and Herbel, S. (2013) Assessment of local road safety funding, training, and technical assistance. Washington, DC.

Giacomantonio, C. (2017) Grant-Maximizing but not Money-Making: A Simple Decision-Tree Analysis for Social Impact Bonds. *Journal of Social Entrepreneurship*, 8 (1): 47–66. doi:10.1080/19420676.2016.1271348.

Griffiths, A. and Meinicke, C. (2014) Introduction to Social Impact Bonds and Early Intervention., (April).

H

Hagenzieker, M.P., Commandeur, J.J.F. and Bijleveld, F.D. (2014) The history of road safety research: A quantitative approach. *Transportation Research Part F: Traffic Psychology and Behaviour*, 25 (PART B): 150–162. doi:10.1016/j.trf.2013.10.004.

Hughes, B., Falkmer, T. and Anund, A. (2019) The Relevance of Australasian Road Safety Strategies in a Future Context. *Journal of Road Safety*, 30 (1): 34–45. doi:10.33492/JACRS-D-18-00101.

Hyder, A.A., Allen, K.A., Peters, D.H., et al. (2013) Large-scale road safety programmes in low- and middle-income countries: an opportunity to generate evidence. *Global Public Health*, 8: 504–18. doi:10.1080/17441692.2013.769613.

Hyder, A.A., Allen, K.A., Di Pietro, G., et al. (2012) Addressing the implementation gap in global road safety: Exploring features of an effective response and introducing a 10-country program. *American Journal of Public Health*, 102 (6): 1061–1067. doi:10.2105/AJPH.2011.300563.

Hyder, A.A. and Bishai, D. (2012) Road Safety in 10 Countries: A Global Opportunity. *Traffic Injury Prevention*, 13 (sup1): 1–2. doi:10.1080/15389588.2011.650023.

I

ICF Consulting (2003) Costs-Benefit Analysis of Road Safety Improvements.

International Road Assessment Programme (2014) Safer Roads Investment Plans: The iRAP Methodology.

International Transport Forum (2022) The Safe System Approach in Action.

J

Jusuf, A., Nurprasetio, I.P. and Prihutama, A. (2017) Macro Data Analysis of Traffic Accidents in Indonesia. *Journal of Engineering and Technological Sciences*, 49 (1): 132–143. doi:10.5614/j.eng.technol.sci.2017.49.1.8.

K

Katz, A.S., Brisbois, B., Zerger, S., et al. (2018) Social Impact Bonds as a Funding Method for Health and Social Programs: Potential Areas of Concern. *American Journal of Public Health*, 108 (2). doi:10.2105/AJPH.2017.304157.

Kim, J. and Han, M. (2015) Education Financing and Public-private Partnership Development Assistance Model. *Procedia - Social and Behavioral Sciences*, 177 (July 2014): 100–103. doi:10.1016/j.sbspro.2015.02.345.

Kopits, E. and Cropper, M. (2005) Traffic fatalities and economic growth. *Accident Analysis and Prevention*, 37 (1): 169–178. doi:10.1016/j.aap.2004.04.006.

L

Larsson, P., Dekker, S.W.A. and Tingvall, C. (2010) The need for a systems theory approach to road safety. *Safety Science*, 48: 1167–1174. doi:10.1016/j.ssci.2009.10.006.

Li, X., Wu, L. and Yang, X. (2018) Exploring the impact of social economic variables on traffic safety performance in Hong Kong: A time series analysis. *Safety Science*, 109 (November 2017): 67–75. doi:10.1016/j.ssci.2018.05.010.

Liebman, J.B. and Sellman, A. (2013) *A Guide for State and Local Governments*.

M

Malik, S., Swapan, M.S.H. and Khan, S. (2020) Sustainable mobility through safer roads: Translating road safety strategy into local context in western australia. *Sustainability (Switzerland)*, 12 (21): 1–20. doi:10.3390/su12218929.

Muhlrad, N., Vallet, G., Butler, I., et al. (2016a) Analysis of Road Safety Management Systems in Europe. *Traffic Safety*, (April 2014): 1–17. doi:10.1002/9781119307853.ch1.

Muhlrad, N., Vallet, G., Butler, I., et al. (2016b) Analysis of Road Safety Management Systems in Europe. *Traffic Safety*, (April 2014): 1–17. doi:10.1002/9781119307853.ch1.

Mulgan, G., Reeder, N., Aylott, M., et al. (2011a) Social impact investment: the challenge and opportunity of social impact bonds. Young Foundation, (March): 1–38. Available at: <http://youngfoundation.org/wp-content/uploads/2012/10/Social-Impact-Investment-The-opportunity-and-challenge-of-Social-Impact-Bonds-March-2011.pdf>.

Mulgan, G., Reeder, N., Aylott, M., et al. (2011b) Social impact investment: the challenge and opportunity of social impact bonds. Young Foundation, (March): 1–38.

N

Nicholls, A. and Tomkinson, E. (2013) The Peterborough Pilot - Social Impact Bonds., (October): 50.

Noya, A. and Galitopoulou, S. (2016) Understanding Social Impact Bonds., pp. 1–36. doi:30 October 2015.

O

OECD/ITF (2008) TOWARDS ZERO: Ambitious Road Safety Targets and the Safe System Approach.

Osborne, S.P. (2006) The new public governance? Public Management Review, 8 (3): 377–387. doi:10.1080/14719030600853022.

Q

-

R

Robinson, R. (2008). Restructuring Road institutions, Finance and Management. Volume 1: Concepts and Principles. The University of Birmingham.

Roth, G. (1996). Roads in a Market Economy.

S

Schinckus, C. (2015) The valuation of social impact bonds: An introductory perspective with the Peterborough SIB. Research in International Business and Finance, 35. doi:10.1016/j.ribaf.2015.04.001.

Silcock, R. and Transport Research Laboratory (2003) Guidelines for Estimating the Cost of Road Crashes in Developing Countries.

Social Finance (2010) Social Impact Bonds are an Innovative Way of Attracting New Investment that Benefits Individuals and Communities.

Social Finance (2015a) Introduction to Social Impact Bonds., (February). Available at: <http://www.socialfinance.org.uk/wp-content/uploads/2015/05/Introduction-to-Social-Impact-Bonds.pdf>.

Soehodho, S. (2009) Road Accidents in Indonesia. IATSS Research, 33 (2): 122–124. doi:10.1016/S0386-1112(14)60250-8.

Stevenson, M., Yu, J., Hendrie, D., et al. (2008) Reducing the burden of road traffic injury: Translating high-income country interventions to middle-income and low-income countries. Injury Prevention, 14 (5): 284–289. doi:10.1136/ip.2008.018820.

Sub-directorate of Statistical Compilation and Publication (2018) Statistik Indonesia 2018. Statistical Yearbook of Indonesia 2018. BPS-Statistics Indonesia.

Sugiyanto, G. (2010) Biaya Kecelakaan Lalulintas Jalan di Indonesia dan Vietnam. Jurnal Transportasi, 10 (2): 135–148.

Susilo, Y.O., Joewono, T.B. and Vandebona, U. (2015) Reasons underlying behaviour of motorcyclists disregarding traffic regulations in urban areas of Indonesia. Accident Analysis and Prevention, 75: 272–284. doi:10.1016/j.aap.2014.12.016.

T

Tan, S., Fraser, A., McHugh, N., et al. (2019) Widening perspectives on social impact bonds. Journal of Economic Policy Reform, 00 (00): 1–10. doi:10.1080/17487870.2019.1568249.

Tiwari, G. (2014) The decade of action for road safety - progress in research. International journal of injury control and safety promotion, 21 (2): 101–2. doi:10.1080/17457300.2014.925666.

Transport Research Laboratory (1995) Overseas Road Note 10. Costing Road Accidents in Developing Countries.

U

-

V

Varhelyi, A. (2016) Road Safety Management – The Need for a Systematic Approach. The Open Transportation Journal, 10 (1): 137–155. doi:10.2174/1874447801610010137.

Ver Eecke, W. (1998a) The concept of a “merit good” the ethical dimension in economic theory and the history of economic thought or the transformation of economics into socio-economics. Journal of Socio-Economics, 27 (1): 133–153. doi:10.1016/S1053-5357(99)80081-X.

W

Warner, M.E. (2013) Private finance for public goods: social impact bonds. Journal of Economic Policy Reform, 16 (4): 303–319. doi:10.1080/17487870.2013.835727.

Wetteland, T. & Lundebye, S., 1997. Financing of Road Safety Action. Washington, D.C., USA: World Bank.

WHO (2015) Alternative, innovative and sustainable source of financing for injury prevention and safety promotion: learning from case studies.

WHO (2018) Global Status Report on Road Safety 2018. Geneva, Switzerland: World Health Organization.

WHO (2022) World Health Statistics 2022 (Monitoring health of the SDGs).

World Bank (2022) Saving Lives Through Private Investment in Road Safety.
doi:10.1596/37039.

World Health Organization (2015) Global Status Report on Road Safety 2015.
doi:10.1136/injuryprev-2013-040775.

X

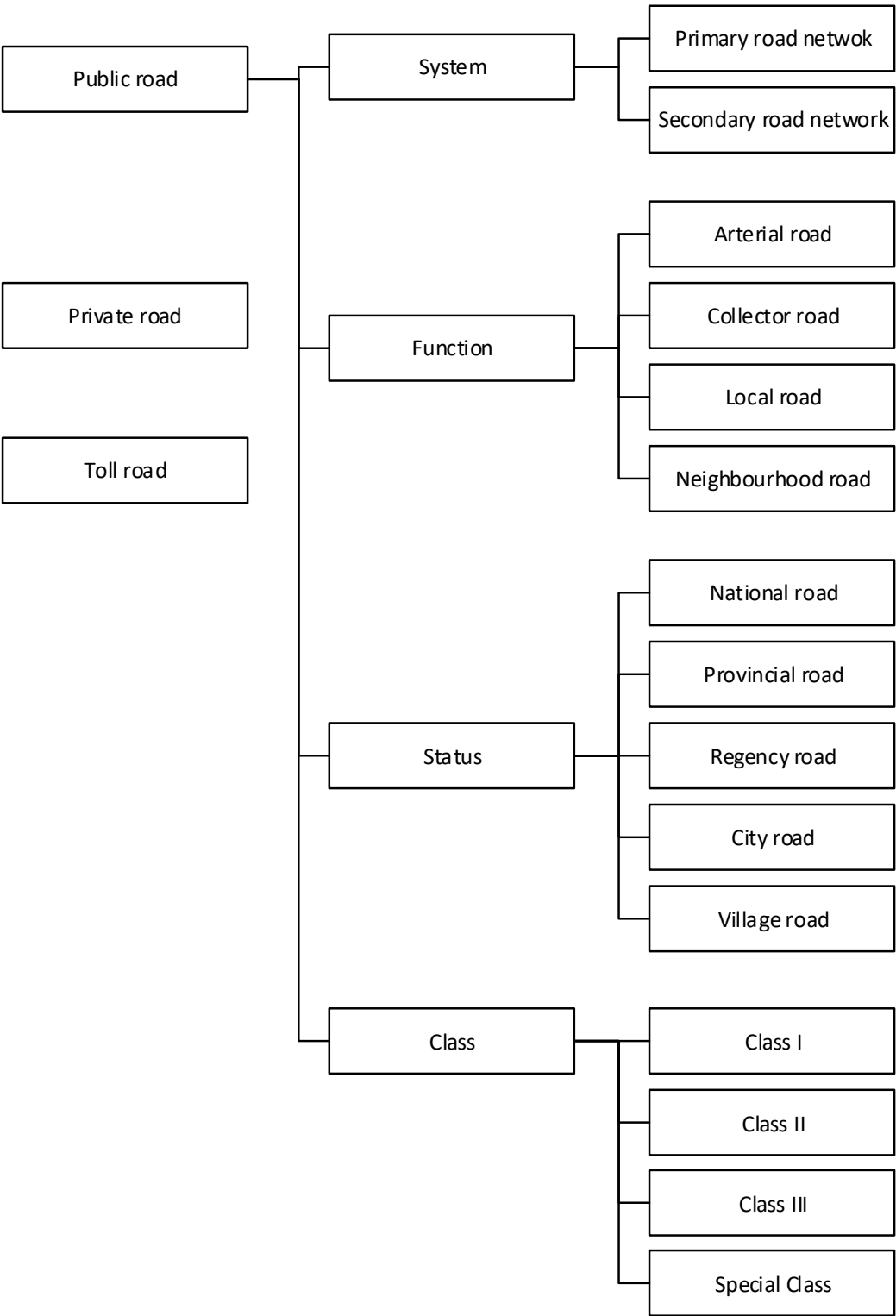
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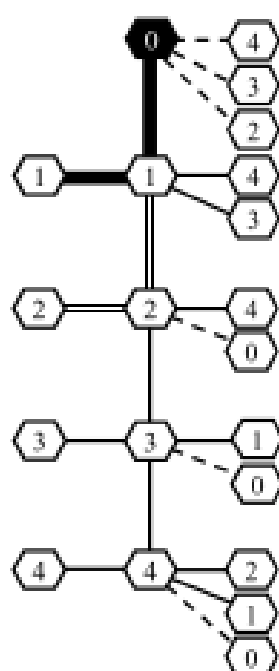
Y

Yu, S. and Tsai, W. Der (2021) The effects of road safety education on the occurrence of motorcycle violations and accidents for novice riders: An analysis of population-based data. *Accident Analysis and Prevention*, 163. doi:10.1016/j.aap.2021.106457.

APPENDICES

ROAD HIERARCHY IN INDONESIA





Note:

-  = Neighbouring countries
-  = Capital of the province
-  = Capital of the regency/district
-  = Capital of sub-district
-  = City/village
- - - = National strategic road
-  = National road [Primary: artery, collector]
-  = Provincial road [Primary: collector]
-  = Regency road [primary: local, secondary: artery, collector, local]

APPENDIX B

THE IMPLEMENTATION OF SOCIAL IMPACT BONDS WORLDWIDE

No	Stage	Country	Location	Social Issue	Outcome Payer	Contract Duration (years)	Outcome Payment (in millions)	Investemnt Needed or Raised (in millions)	Last Update
1	Design	Argentina	Buenos Aires	Vulnerable low income youth	Government of Buenos Aires, IADB				
2	Implementation	Australia	New South Wales	Intensive Family Support Services	New South Wales Department	7	19.5 AUD	10 AUD	7/21/2016
3	Implementation	Australia	New South Wales	New Parent and Infant Family Support	New South Wales Government	7	18.2 AUD	7 AUD	7/21/2016
4	Implementation	Australia	South Australia	Homelessness	Government of South Australia	7.75	16.9 AUD	9 AUD	3/10/2017
5	Design	Australia	New South Wales	Recidivism	New South Wales Government	5			7/18/2016
6	Design	Australia		Drug & Alcohol Addiction and Young People Transitioning from Out of Home Care	Victorian Government				7/25/2016
7	Implementation	Austria	Upper Austria	Female Victims of Domestic Violence	Ministry of Social Affairs	3	0.82 EUR	0.8 EUR	7/21/2016
8	Implementation	Belgium	Brussels	Unemployment Among Young Migrants	Actiris, Brussels Agency for Employment	3	0.29 EUR	0.23 EUR	7/21/2016
9	Design	Brasil		Deshospitalization of Chronically	Vice Governor of the State of Ceara				7/21/2016

No	Stage	Country	Location	Social Issue	Outcome Payer	Contract Duration (years)	Outcome Payment (in millions)	Investemnt Needed or Raised (in millions)	Last Update
				Sick Patients					
10	Design	Cameroon	Yaounde	Avoidable Blindness from Cataract	Conrad N. Hilton Foundation; Fred Hollows Foundation; Sightsavers	5		2.5 USD	11/9/2016
11	Design	Cameroon	Littoral, Centre, North, and potentially also Adamaoua and Southwest Regions	Child and Maternal Health	World Bank GFF/Cameroon government. Grand Challenges Canada. Other ongoing discussions	3 – 4		4.5 – 6	11/9/2016
12	Implementation	Canada	Saskatchewan	Supported Living Home for At-Risk Single Mother	Government of Saskatchewan (Ministry of Social Services)	5	1.3 CAD	1 CAD	7/21/2016
13	Implementation	Canada	Toronto and Vancouver	Health: Hypertension	Public Health Agency of Canada	3.5	Undisclosed	2 CAD	3/14/2017
14	Implementation	Canada	Saskatchewan	School Performance and Graduation	Government of Saskatchewan	5	1.16 CAD (est by SF)	1 CAD	3/14/2017
15	Design	Chile	Santiago	Reducing Recidivism					9/3/2015
16	Design	Colombia	Bogota, Cali, Pereira	Unemployment Among Vulnerable Populations	Prosperidad Social, SECO	1		0.7 USD	11/8/2016
17	Design	Costa Rica	San Jose	Water Conservation	Board education				9/3/2015
18	Implementation	Finland	Helsinki	Workplace Absenteesim	Public Sectors Employers: South West Finland	3		0.7 EUR	7/21/2016

No	Stage	Country	Location	Social Issue	Outcome Payer	Contract Duration (years)	Outcome Payment (in millions)	Investemnt Needed or Raised (in millions)	Last Update
					Magistrate Savo Consortium for Education Municipality of Nurmijavi Aleksia				
19	Design	Finland		Employment of Immigrants					12/9/2015
20	Implementation	France	Country-wide	Job Creation in Vulnerable Areas	The Ministry Economy and Finance	10	1 EUR		3/14/2017
21	Implementation	France	Country-wide	Rural Employment	The Ministry Economy and Finance	6	1.5 EUR		3/14/2017
22	Implementation	Germany	Augsburg	Education and Employment for Young People	Bavarian State Ministry of Labour and Social Affairs, Family and Integration	2	0.3 EUR	0.3 EUR	7/21/2016
23	Implementation	India	Rajasthan	Education	Children Investment Fund Foundation	3	0.31 USD	0.27 USD	7/21/2016
24	Design	India	Rajasthan	Child and Maternal Health	USAID; Merck for Mother; Government of Rajasthan	3			11/9/2016
25	Implementation	Ireland	Dublin	Homelessness	Dublin City Council	1		0.5 EUR	5/25/2015
26	Implementation	Israel	Country-wide	Reducing Type II diabetes in High Risk Pre-Diabetes	Two Israeli Health Maintenance Organisations (Clalit and	3		5.5 USD	7/21/2016

No	Stage	Country	Location	Social Issue	Outcome Payer	Contract Duration (years)	Outcome Payment (in millions)	Investemnt Needed or Raised (in millions)	Last Update
					Leumit) and the National Insurance Institute				
27	Implementation	Israel	Tel Aviv	Reducing Drop-Out Rates from Higher Education	Haifa University; Tel aviv Yaffo Academic College	8	3 USD	2.1 USD	7/21/2016
28	Design	Israel		Workforce Development for Ultraorthodox Jews					9/3/2015
29	Design	Israel		Workforce Development for Arab Citizens of Israel					9/3/2015
30	Design	Israel		Recidivism					9/3/2015
31	Design	Mexico	Jalisco	Poor Female Household Heads					11/25/2015
32	Design	Mozambique	Maputo Province	Malaria. Public Health	Goodbye Malaria. Underwritten by Nandos and other corporates	3			11/9/2016
33	Design	Multiple	Multiple	Integration refugees into Job Market	TBD (Red Cross)	2 – 4		20 – 50 USD	11/9/2016
34	Design	Multiple (Conflict and Post-Conflict)	Multiple	To provide physical rehabilitation services to thousands of disabled people in countries that	Government of Belgium and others	5		28 EUR	11/8/2016

No	Stage	Country	Location	Social Issue	Outcome Payer	Contract Duration (years)	Outcome Payment (in millions)	Investemnt Needed or Raised (in millions)	Last Update
				suffer from conflicts and violence					
35	Implementation	Netherlands	Rotterdam	Youth Employment	Municipality of Rotterdam	5		3 EUR	7/21/2016
36	Implementation	Netherlands	Utrecht	Youth Employment	Municipality of Utrecht	6		2.1 EUR	7/21/2016
37	Implementation	Netherlands	Country-wide	Recidivism	Ministry of Security and Justice	2.5	1.3 EUR	1.2 EUR	7/21/2016
38	Implementation	Netherlands	Utrecht	Youth Employment	Municipality of Utrecht	4	Undisclosed	0.73 EUR	7/21/2016
39	Implementation	Netherlands	Rotterdam	Youth Employment	Municipality of Rotterdam	2	0.85 EUR	0.7 EUR	7/21/2016
40	Implementation	Netherlands	Enschede	Workforce Development	Municipality of Enschede	2.5		1.1 EUR	11/10/2016
41	Implementation	Netherlands	Eindhoven	Youth Employment	Municipality of Eindhoven	3		1.7 EUR	11/21/2016
42	Implementation	New Zealand	South Auckland	Employment Service to People with Mental Health Conditions	Government of New Zealand	5		1.75 NZD	3/10/2017
43	Design	Palestine		Youth Employment	World Bank				2/11/2016
44	Implementation	Peru	Peruvian Amazon Region	Cocoa and Coffee Production	Common Fund for Communities	1	Undisclosed	0.11 USD	7/21/2016
45	Implementation	Portugal	Lisbon	School Performance	Municipality of Lisbon	1	Undisclosed	0.12 EUR	7/21/2016
46	Design	South Africa	Western Cape	Early-Childhood Development – Health	Western Cape Government and Treasury	3.5			11/9/2016
47	Design	South Africa	Western Cape	Early-Childhood Development – Social	Western Cape Government and Treasury	3			11/9/2016

No	Stage	Country	Location	Social Issue	Outcome Payer	Contract Duration (years)	Outcome Payment (in millions)	Investemnt Needed or Raised (in millions)	Last Update
				Development					
48	Implementation	South Korea	Seoul	Child Welfare	Department of Women and Family Policy; Office of Children and Young People, Seoul Metropolitan Government	3	9.4 USD		5/2/5/2016
49	Implementation	Sweden	Norrkoping	Early Childhood Development	Rotterdam Municipality	4	12 SEK	10 SEK	7/21/2016
50	Implementation	Switzerland	Bern	Integration Refugees into Job Market	The Canton of Bern Department Health and Welfare	5	0.29 CHF	0.27 CHF	7/21/2016
51	Design	Uganda		Sleeping Sickness		8			4/7/2015
52	Implementation	United Kingdom	Peterborough	Recidivism	Ministry of Justice, UK	7	8 GBP	5 GBP	7/21/2016
53	Implementation	United Kingdom	Essex County	Foster Care	Essex County Council, UK	8	7 GBP	3.1 GBP	7/21/2016
54	Implementation	United Kingdom	Greater Merseyside	Workforce Development	Department of Work and Pensions	3.5	Undisclosed	1.5 GBP	7/21/2016
55	Implementation	United Kingdom	East London	Workforce Development	Department of Work and Pensions	3.5	3.2 GBP	0.9 GBP	7/21/2016
56	Implementation	United Kingdom	East London	Workforce Development	Department of Work and Pensions	3.5	1.3 GBP	0.37 GBP	7/21/2016
57	Implementation	United Kingdom	West Midlands (Birmingham)	Workforce Development	Department of Work and Pensions	3.5	3.4 GBP	3 GBP	7/21/2016
58	Implementation	United	Nottingham City	Workforce	Department of	3.5	2.9 GBP	1.7 GBP	7/21/2016

No	Stage	Country	Location	Social Issue	Outcome Payer	Contract Duration (years)	Outcome Payment (in millions)	Investemnt Needed or Raised (in millions)	Last Update
		Kingdom		Development	Work and Pensions				
59	Implementation	United Kingdom	Perthshire and Kinross, Scotland	Workforce Development	Department of Work and Pensions	3.5	1.2 GBP		7/21/2016
60	Implementation	United Kingdom	West London	Workforce Development	Department of Work and Pensions	3.5	3 GBP		7/21/2016
61	Implementation	United Kingdom	Cardiff and Newport	Workforce Development	Department of Work and Pensions	3.5	1.9 GBP	0.4 GBP	7/21/2016
62	Implementation	United Kingdom	Greater Manchester (Manchester, Salford, Bolton, Oldham, Tameside)	Workforce Development	Department of Work and Pensions	3.5	3.3 GBP	0.8 GBP	7/21/2016
63	Implementation	United Kingdom	Thames Valley (South West England)	Workforce Development	Department of Work and Pensions	3.5	3.7 GBP	0.9 GBP	7/21/2016
64	Implementation	United Kingdom	London	Homelessness	Greater London Authority, Department for Communities and Local Development (DCLG)	3	2.4 GBP	1.2 GBP	7/21/2016
65	Implementation	United Kingdom	London	Homelessness	Greater London Authority, Department for Communities and Local Development (DCLG)	3	2.4 GBP	1.2 GBP	7/21/2016

No	Stage	Country	Location	Social Issue	Outcome Payer	Contract Duration (years)	Outcome Payment (in millions)	Investemnt Needed or Raised (in millions)	Last Update
66	Implementation	United Kingdom	Country-wide	Adoption	Local Authorities and Social Outcomes Fund	10	Undisclosed	2.4 GBP	7/21/2016
67	Implementation	United Kingdom	Newcastle	Long-term Health Condition	NHS NWCCG; Big Lottery Fund and The Cabinet Office's Social Outcomes Fund	7	3 GBP	1.7 GBP	7/21/2016
68	Implementation	United Kingdom	Greenwich; Machester; Oldham; and Rochadale	Youth Homelessnes NEETs	Department of Communities and Local Government and The Cabinet Office's Social Outcomes Fund	3	1.6 GBP	0.6 GBP	7/21/2016
		United Kingdom	West Yorkshire	Youth Homelessnes NEETs	Department of Communities and Local Government and The Cabinet Office's Social Outcomes Fund	3	Undisclosed	0.9 GBP	7/21/2016
		United Kingdom	Newcastle, Northumberland, South Tyneside, North Tyneside, Gateshead, Durham, and Sunderland	Youth Homelessnes NEETs	Department of Communities and Local Government and The Cabinet Office's Social Outcomes Fund	3	2.1 GBP	0.5 GBP	5/25/2015
		United Kingdom	Liverpool and Knowsley	Youth Homelessnes NEETs	Department of Communities and Local Government and The Cabinet	3	1.2 GBP	0.6 GBP	7/21/2016

No	Stage	Country	Location	Social Issue	Outcome Payer	Contract Duration (years)	Outcome Payment (in millions)	Investemnt Needed or Raised (in millions)	Last Update
					Office's Social Outcomes Fund				
		United Kingdom	Gloucestershire, Tewkesbury, Forest of Dean, Stroud, Cheltenham, Gloucester City and Cotswold	Youth Homelessnes NEETs	Department of Communities and Local Government and The Cabinet Office's Social Outcomes Fund	3	1.5 GBP	0.3 GBP	7/21/2016
		United Kingdom	Birmingham, Coventry, Solihull, Walsall and Wyre Forest	Youth Homelessnes NEETs	Department of Communities and Local Government and The Cabinet Office's Social Outcomes Fund	3.5	2.5 GBP	1 GBP	7/21/2016
			Leicester, Leicestershire, Derby and Derbyshire	Youth Homelessnes NEETs	Department of Communities and Local Government and The Cabinet Office's Social Outcomes Fund	3	3 GBP	0.6 GBP	7/21/2016
			Greater Merseyside	Youth Engagement	Cabinet Office, Department of Work and Pensions and the Ministry of Justice	3	4 GBP**	1.4 GBP	7/21/2016
			London	Youth Engagement	Cabinet Office, Department of Work and Pensions and the Ministry of	3	4 GBP**		7/21/2016

No	Stage	Country	Location	Social Issue	Outcome Payer	Contract Duration (years)	Outcome Payment (in millions)	Investemnt Needed or Raised (in millions)	Last Update
					Justice				
			Sheffield	Youth Engagement	Cabinet Office, Department of Work and Pensions and the Ministry of Justice	3	4 GBP**	0.9 GBP	7/21/2016
			Great Manchester	Youth Engagement	Cabinet Office, Department of Work and Pensions and the Ministry of Justice	3	3 GBP	0.9 GBP	7/21/2016
			Haringey, Staffordshire & Tower Hamlet	Mental Health and Employment	Cabinet Office Social Outcomes Fund Haringey Council and CCG Tower Hamlet CCG Staffordshire County Council and CCGs	3	Undisclosed	0.4 GBP	7/21/2016
			Worcestershire	Social Isolation	Clinical Commissioning Groups, Worcestershire County Council and the Cabinet Office	4.5	2 GBP	0.85 GBP	7/21/2016
			Birmingham	Foster Care	Birmingham City Council, Big Lottery Fund, Commissioning Better Outcomes	4	Undisclosed	1 GBP	7/21/2016

No	Stage	Country	Location	Social Issue	Outcome Payer	Contract Duration (years)	Outcome Payment (in millions)	Investemnt Needed or Raised (in millions)	Last Update
					Fund, Cabinet Office Social Outcomes Fund				
			Manchester	Foster Care	Manchester City Council, Cabinet Office Social Outcomes Fund	8	Undisclosed	1.2 GBP	7/21/2016
			North East	Long-Term Health Condition	Cabinet Office		1 GBP		3/19/2015
				Children at the Edge of Care	Cabinet Office		0.188 GBP		3/19/2015
			London and West Midlands	Mental Illness	Cabinet Office		1.3 GBP		6/2/2015
			West Midlands – Birmingham, Wolverhampton and Sandwell	Gangs-Related Crime					6/22/2015
			Lambeth (London)	Special Education Needs	Lambeth Council and Big Lottery Commissioning Better Outcomes Fund	1	Undisclosed	0.42 GBP	3/14/2017
69		United States	Chicago	Early Childhood Development	City of Chicago Board of Education and City of Chicago	4	34.5 USD	16.9 USD	7/21/2016
			Massachusetts	Recidivism	Commonwealth of Massachusetts	7	27 USD	18 USD	7/21/2016
			New York City	Recidivism	New York City	3	11.7 USD	9.6 USD	7/21/2016
			New York State	Employment for Formerly Incarcerated	US Dept. Labor and New York State	5.5	21.5 USD	13.5 USD	7/21/2016
			Salt Lake County, Utah	Early Childhood Development	United Way of Salt Lake, Salt	7		7 USD	7/21/2016

No	Stage	Country	Location	Social Issue	Outcome Payer	Contract Duration (years)	Outcome Payment (in millions)	Investemnt Needed or Raised (in millions)	Last Update
					Lake County (1 st Year) and Sate of Utah				
			Cuyahoga County, Ohio	Housing and Child Welfare	County of Cuyahoga	6	5 USD	4 USD	7/21/2016
			Massachusetts	Homelessness	Commonwealth of Massachusetts	6	6 USD	3.5 USD	7/21/2016
			Fresno, California	Asthma Management	California Endowment	2	1.1 USD		5/25/2015
			Denver	Homelessness	City and County of Denver	5	11.4 USD	8.7 USD	7/21/2016
			Santa Clara County, California	Homelessness	County of Santa Clara	6	8 USD	6.9 USD	17/2/2016
			South Carolina	Child and Maternal Health	State of South Carolina	4	7.5 USD	30 USD	7/21/2016
			Connecticut	Family Stability, Substance Abuse	Connecticut Department of Children and Families	4.5		12.5 USD	2/17/2016
			Massachusetts, Michigan, New York, Utah and Tennessee	Asthma Management					19/5/2015
			Illinois	Child Welfare	State of Illinois				3/11/2015
			Massachusetts	Adult Basic Education	Commonwealth of Massachusetts				4/30/2015
			New York State	Child and Maternal Health for People in Poverty	New York State	4			
			Salt Lake, Utah	Maternal and Child Health	Salt Lake County				
			Salt Lake, Utah	Criminal Justice	Salt Lake County	6	5.95 USD		3/4/2017

No	Stage	Country	Location	Social Issue	Outcome Payer	Contract Duration (years)	Outcome Payment (in millions)	Investemnt Needed or Raised (in millions)	Last Update
				Recidivism					
			Salt Lake, Utah	Homelessness	Salt Lake County	6	5.5 USD		3/4/2017
			Los Angeles County, California	Reducing recidivism and homelessness				23.5 USD	5/31/2016
			Alameda County, California	Reducing unemployment and substance abuse and increasing access to health care and education among recidivism				10.8 USD	5/31/2016
			Baltimore	Helping vulnerable seniors remain independent at home					11/17/2016
			Ventura County, California	Reducing Recidivism				2.7 USD	5/31/2016

References

Humphries, Kevin W. 2015. *NOT YOUR OLDER BROTHER'S BONDS: THE USE AND REGULATION OF SOCIAL-IMPACT BONDS IN THE UNITED STATES*.

<https://www.hks.harvard.edu/news-events/news/alumni/instiglio-an-idea-with-social-impact> accessed by 16.15 22/3/2017

INDONESIA ROAD SAFETY STRATEGIES

Table 1 Decade of Action Programmes

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
	PILLAR I: ROAD SAFETY MANAGEMENT				To realise road safety mainstreaming as national priority	Ministry of National Development/National Development Agency		
1	Road safety harmonization and coordination	a. Formatting of transportation safety forum.	The formation of transportation forum	2013	Harmonisation of road safety implementation		Ministry of National Development/National Development Agency	Ministry of Transport, National Police, Ministry of Public Works, Ministry of Health, Ministry of Communication and Informatics, Ministry of Research and

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
								Technology, Ministry Education and Culture, Ministry of Industry
		b. Provisioning of work and management procedure for safety coordination forum/agency	The provision of work and management procedure for safety coordination forum/agency	2013				
		c. Provisioning working group for road accident treatment	The provision of working group for road accident treatment for each pillar	2013				
		d. Establishing priority and ensure the effectivity and sustainability of road safety programmes	Implementation of road safety programmes	2013				
2	Emergency vehicle protocol	a. Composing a guideline for emergency vehicles	Guideline for emergency vehicles	2013	Willingness of all parties to run the protocol		National Police	Ministry of Transport, Ministry of Public Works,

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
								Ministry of Health, Ministry of Communication and Informatics
		b. Organizing simulations and dissemination of operating protocols	Implementation of simulations and dissemination of operating protocols	2013				
3	Road safety research	a. Institutionalization of research governance	Integrated of institutional research governance	2013	Research which supports road safety improvement		Ministry of Research and Technology	Ministry of Transport, National Police, Ministry of Public Works, Ministry of Health
		b. Conducting of research for road accident causes	Research in road accident causes	2014				
		c. Conducting of research which is suitable with road safety needs	Research which is suitable with road safety needs	2014				

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
4	Injury surveillance and integrated information system	a. Collecting and development of accident data structure and types	Provision of accident data structure and type (data of accident contributing factor, casualties, surveillance)	2013	Accurate information for planning and decision making		National Police	Ministry of Transport, Ministry of Public Works, Ministry of Health, Ministry Communication and Informatics
		b. Consolidation of accident data from various parties	Availability of accident data from various parties	2014				
		c. Developing of safety management information system	Availability of safety management information system	2015				
		d. Disseminating of annual accident report	The dissemination of annual accident report	2016				
		e. Developing of data and information centres (physical and virtual)	Availability of data and information centres	2017				

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
			(physical and virtual)					
5	Road safety funding	a. Establishing of road safety funds' management institutions	The establishment of road safety funds' management institutions	2015	The use of road safety fund effectively and efficiently		Ministry of National Development Planning/National Development Planning Agency	Ministry of Transport, National Police, Ministry of Public Works, Ministry of Health, Ministry of Finance, Ministry of Communication and Informatics, Ministry of Research and Technology, Ministry of Education and Culture, Ministry of Industry
		b. Provision of road safety funds	Availability of road safety funds	2013				
6	Road safety partnership	a. Composing of guidelines for managing	Availability of guidelines for managing	2013		Increased proportion of funds	Ministry of National Development	Ministry of Transport, National

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
		partnerships with the business community and society	partnerships with the business community and society			managed by partnerships	Planning/National Development Planning Agency	Police, Ministry of Public Works, Ministry of Health, Ministry of Finance, Ministry of Communication and Informatics, Ministry of Research and Technology, Ministry of Education and Culture, Ministry of Industry
		b. Implementation of road safety partnership initiatives	The implementation of road safety partnership initiatives	2013				
7	Public transport safety management system	a. Safer public transport business	The implementation of safe public transport business	2015	Decreasing the number of casualties of public transport accidents		Ministry of Transport	Ministry of Labour and Transmigration, Regional and Local Government

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
		b. Implementation of public transport crew assurance	Facilities for public transport crew assurance	2015				
8	Improving road safety regulations	a. Review and development of new traffic regulations that accommodate safety aspects	Availability of traffic regulations that accommodate safety aspects	2014	Regulations that are responsive to road safety		Ministry of Transport	Ministry of National Development Planning/ National Development Planning Agency, National Police, Ministry of Public Works, Ministry of Health, Ministry of Communication and Informatics, Ministry of Research and Technology, Ministry of Education and Culture, Ministry of Industry, Regional

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
								and Local Government
		b. Dissemination of improved and new traffic regulations	The dissemination of improved and new traffic regulations	2014				
PILAR II: SAFER ROAD					Forgiving road	Ministry of Public Works		
1	Safer carriageway	a. Provision of road improvement management procedures related to safety	The provision of road improvement management procedures related to safety	2013	Safer carriageway		Ministry of Public Works	Ministry of Transport, Regional and Local Government
		b. Implementation of pothole closure	Pothole closure 7 x 24 hour	2016				
		c. Implementation of puddle repairments	Puddle repairs 7 x 24 hour	2016				
		d. Slippery road treatment	Slippery road treatment 7 x 24 hour	2016				
		e. Road shoulder repairs	The road shoulder repairs	2016				

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
2	Planning and implementation of safer road works	a. Provision of safer road planning guidelines	The provision of safer road planning guidelines	2013	Improvement of self-explaining road		Ministry of Public Works	Ministry of Public Works, National Police, Provincial and Regency/ City Government
		b. Provision of safer road work implementation guidelines	The provision of safer road work implementation guidelines	2013				
		c. Safer road planning	Safer road planning implementation (from planning up to detailed design)	2016				
		d. Safer road works	Safer road works implementation	2016				
		e. Road safety inspection	Road safety inspection implementation	2013				
		f. Inventory and research on	Inventory and research on	2016				

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
		accident blackspots	accidents blackspots					
		g. Treatment of accident blackspots	Treatment of accident blackspots	2016				
3	Planning and implementation of road features	a. Planning for road feature needs	Availability of road feature needs planning	2015				
		b. Procurement of road features	Road feature availability and installation	2018				
		c. Inspection of road safety features	Implementation of road safety feature inspections	2013				
4	Speed management implementation	a. Preparation of speed management guidelines	Availability of speed management guidelines	2013	The implementation of speed regulation on all national roads		Ministry of Transport	National Police, Ministry of Public Works, Provincial and Regency/ City Government
		b. Speed limit determination	Implementation of speed limits	2015				

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
		c. Road feature installation	Road feature installation	2018				
		d. Implementation of speed management	Speed management (including traffic calming)	2020				
5	Improvement of standards for safer roadworthiness	a. Provision of standards for safer roadworthiness	Availability of standards for safer roadworthiness	2013	Improvement of self-enforcing road		Ministry of Public Works	Ministry of Transport, Provincial and Regency/ City Government
		b. Provision of guidelines for safer road management	Availability of guidelines for safer road management	2013				
		c. Implementation of safer road management	Safer road management	2014				
6	Safer road environment	a. Provision of procedures for controlling and managing road conditions related to safety	Availability of procedures for controlling and managing road conditions related to safety	2013	Increased in safer road environment		Ministry of Public Works	Ministry of Transport, National Police, Provincial and Regency/ City Government,

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
								Ministry of Internal Affairs, Ministry of Environment
		b. Controlling of roadside function	Implementation of controlling of roadside function	2014				
		c. Provision of pedestrian facilities	Availability of pedestrian facilities (including fencing)	2014				
7	Safer roadside activities	Controlling of roadside activities	The implementation of controlling of roadside activities	2014			Ministry of Internal Affairs	Ministry of Transport, Ministry of Public Works, National Police, Provincial and Regency/ City Government, Ministry of Environment
PILAR III: SAFER VEHICLES					Fulfilment of safety	Ministry of Transport		

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
					equipment in vehicles to reduce fatality			
1	Implementation and improvement of periodic and type test procedures	a. Improving of procedures and manuals for periodic and type tests	Availability of procedures and manuals for periodic and type tests	2013				
		b. Developing of techno-based test system	Availability of techno-based test system (including the use of information technology/web-based for type test services)	2014				
		c. Periodic and type test system evaluation	Periodic and type test system evaluation (human resource competency, transparent periodic and type test, completeness of infrastructure and equipment test, data collection of information)	2014				

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
			system, application of testing unit accreditation system, and testing staff certification)					
		d. On-the-spot vehicle inspections	On-the-spot vehicle inspections to ensure the fulfilment of technical requirements and roadworthiness, ensure the physical suitability of the vehicle with design and engineering that has been approved	2013				
2	Speed limitation on vehicles	Speed limitation on vehicles	Availability of speed limit guidelines in accordance with the road technical design and the application of technology to a	2013	Reduction of vehicle speed		Ministry of Transport	Ministry of Research and Technology, National Police, Provincial and Regency/

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
			vehicle to control speed					City Government
3	Overloading handling	a. Organizing community participation in the “Say No to Overloading” movement	The participation of community, drivers, freight transport companies, and property owners in the “Say No to Overloading” movement	2014	Overloading control		Ministry of Transport	Ministry of Public Works, National Police, Ministry of Communication and Informatics, Ministry of National Development Planning/ National Development Planning Agency, Ministry of Research and Technology, Provincial and Regency/ City Government
		b. Good governance on overloading handling	The operation of a consistent weighbridge	2014				

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
		c. Improvement of weighbridge functions	More effective and efficient cargo control on the weighbridges	2014				
		d. Implementation of intelligent transport system (ITS) in freight transport	ITS availability in freight transport and information technology application (e-enforcement) in weighbridges	2016				
		e. Setting the dimensions and volume of the hauling space (mixer, tub, and tank) on the freight vehicles in the test of motorised vehicle type	Availability of regulations on permitted maximum dimensions and volume for hauling space in freight transport	2015				
4	Vehicle scrapping	Vehicle scrapping	Decreasing in the number of vehicles on the road because they are removed from the registration list due to	2017	Controlling of number vehicle on the road		Ministry of Transport	Ministry of Industry, National Police, Provincial and Regency/

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
			request from vehicle owners, heavily damaged vehicles, and vehicle owners who do not re-register at least two years after the validity period of the vehicle number certificate (STNK).					City Government
5	Setting of safety standard for public transport	Setting of safety standard for public transport	Fulfilment of public transport to safety standard	2013	Public transport which complies to the safety standard		Ministry of Transport	National Police, Ministry of Industry
PILAR IV: SAFER ROAD USERS					Fulfilment of skill and health requirements of vehicle users	National Police		
1	Vehicle operation compliance	a. Inspection of vehicle operation compliance	Inspection of vehicle operation compliance	2013	Fulfilment of traffic operation order		National Police	Ministry of Transport
		b. Inspection of safety equipment	Inspection of safety equipment	2013				

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
		installation compliance	installation compliance					
		c. Setting of handling speed violation procedure	Availability of handling speed violation procedure	2013				
		d. Provision of enforcement technology	Availability of enforcement technology	2014				
2	Driver condition checking-up	a. Conducting patrols on behavioural that endanger safety	The conduct of patrols on behavioural that endanger safety	2013	Fulfilment of safer driver conditions		National Police	Ministry of Health
		b. Setting restrictions on driving rights related to driver conditions	Availability of regulations regarding driving rights	2013				
3	Drivers health checking up	Driver's health checking up	Driver's health checking up when getting a driving licence	2013	Fulfilment of safer driver health		Ministry of Health	National Police
4	Improvement of facilities and infrastructure for driving	a. Improvement of quality of driving licence test material	Improved driving licence test material	2013	Improved driver's skills		National Police	Ministry of Transport, Ministry of Research and Technology,

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
	licence test system							Provincial and Regency/ City Government
		b. Improvement of quality and quantity of driving licence instructors	Improved quality and quantity of driving licence instructors	2015				
		c. Implementation of electronic driving licences (e-driving licence)	Implementation of electronic driving licences (e-driving licence)	2017				
5	Improvement of driving licence test procedure	a. Determination of level for driving licence	Availability of regulation to determine driving licence level	2017	Improved driver's skills		National Police	
		b. Implementation of demerit point system	Implementation of demerit point system	2017				
6	Technical coaching for driving school	a. Organizing driving school accreditation	Accredited driving school	2017	Improved driver's skills		Ministry of Transport	Ministry of Education and Culture, Provincial and Regency/

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
								City Government
		b. Determination of standards for driving school technical coaching	Availability of standards for driving school technical coaching	2017				
		c. Training for driving school human resources	Training for driving school human resources	2017				
		d. Guaranteed the implementation of driving school	Driving school implementation	2017				
7	Treatment of five key plus risk factors	a. Enforcement for helmet usage violators for motorcyclists	Legal actions for helmet usage violators for motorcyclists	2013	Reduction the number of fatality caused by non-compliance		National Police	Ministry of Transport, Provincial and Regency/ City Government
		b. Enforcement for safety belt usage violators	Legal actions for safety belt usage violators	2013				
		c. Enforcement for speed limit violators	Legal actions for speed limit violators	2013				

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
		d. Enforcement for drink driving drivers	Legal actions for drink driving drivers	2013				
		e. Enforcement for violators who use safety equipment which are intended for vulnerable road users	Legal actions for violators who use safety equipment which are intended for vulnerable road users	2013				
		f. Enforcement for cell-phone usage violators	Legal actions for cell-phone usage violators	2013				
8	Implementation of electronic enforcement	Implementation of electronic enforcement	Implementation of electronic enforcement	2015	More convenient in recording and giving legal actions for violators		National Police	Ministry of Transport, Ministry of Research and Technology
9	Formal education in road safety	Formal education in road safety	The implementation of formal education in road safety	2014	Introduction to road safety education since the early age		Ministry Education and Culture	National Police, Ministry of Transport
10	Road safety campaign	Road safety campaign for:	Road safety campaign for five keys plus risk factors and	2013	The suitable road safety campaign for community on		National Police	Ministry of Transport, Ministry of Education

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
		1) Five keys plus risk factors (helmet, safety belt, speed limit violation, vulnerable road users, cell phone usage). 2) Healthy behaviour on the road	healthy behaviour on the road		five keys plus risk factors and healthy behaviour on the road			and Culture, Ministry of Internal Affairs, Provincial and Regency/ City Government
PILLAR V: PRE- AND POST-CRASH TREATMENTS					Availability of effective pre- and post-crash treatments	Ministry of Health		
1	Pre-crash treatment	a. Promotion of healthy behaviour on the road	1) Media promotion for health aspects of road safety. 2) Community empowerment on health aspects of road safety through active alert villages	2013	Creating conditions which reduce the likelihood of accidents		Ministry of Health	National Police, Ministry of Transport, Ministry of Public Works, Provincial and Regency/ City Government
		b. Driver's health check-up in special	Implementation of driver's health check in	2013				

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
		circumstances or situations	special circumstances or situations					
2	Post-crash treatments	Establishment of an integrated emergency management system in each regency/city	1) Availability of a hotline service centre. 2) Availability of trained personnel in handling emergency casualties. 3) Availability of a public safety centre.	2014	Optimisation of golden period in road casualty treatments		Ministry of Health	Ministry of Communication and Informatics, National Police, Ministry of Transport, Ministry of Public Works.
3	Road casualty assurance treated in referred hospitals	a. Development of a tiered referral system from primary to tertiary health facilities.	Availability of a tiered referral system from primary to tertiary health facilities.	2013	Every road accident casualty is guaranteed to get optimal treatment at the hospital		Ministry of Health	Ministry of Finance, National Police, Insurance Companies, Provincial and Regency/ City Government
		b. Determination of regulation on	Availability of regulations on	2013				

No.	Programme	Actions	Output	Completion Target	Objectives	Coordinator	Agency in charge	Related agencies
		assurance of road casualty treated at the hospital	assurance of road casualty treated at the hospital					
4	Allocation of some part insurance premiums for road safety funds	Allocation of some part insurance premiums for road safety funds	Availability of road safety fund from accident insurance premiums	2016	Availability of road safety funds for road safety improvement programmes		Ministry of National Development Planning/National Development Planning Agency	National Police, Ministry of Transport, Ministry of Finance, Insurance Companies.
5	Research on pre-and post-crash on road casualties	Research on pre-and post-crash on road casualties	Implementation of researches that support the improvement in road casualty treatments	2013	Research findings which support the improvement in road casualty treatments		Ministry of Health	Community, Universities

In summary, there are 35 road safety programmes and 81 actions which consist of eight programmes and 21 actions for pillar I, seven programmes and 26 actions for pillar II, five programmes and 12 actions for pillar III, 10 programmes for pillar IV and 15 actions, five programmes and 7 actions for pillar V. The detail of number of programmes and actions for each pillar can be seen in ***Tabel 2***.

Table 2 Number of programmes for Indonesia decade of actions for road safety

Pillar	No. of programmes	No. of actions for each program	Total no. of actions
I	8	4; 2; 3; 4; 2; 2; 2; 2	21
II	7	5; 7; 3; 4; 3; 3; 1	26
III	5	4; 1; 5; 1; 1	12
IV	10	4; 2; 1; 3; 2; 4; 6; 1; 1; 1	15
V	5	2; 1; 2; 1; 1	7
TOTAL	35		81

APPENDIX D

INDONESIA ROAD SAFETY TARGETS

In Road Safety National Plan, each action has its own target. The targets for each action can be seen in *Table 1*.

Table 1 Road safety targets

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
PILLAR I ROAD SAFETY MANAGEMENT						Successful/not successful					
1	Road safety harmonization and coordination		Harmonisation in road safety management	Ministry of National Development/ National Development Agency	Ministry of Transport, National Police, Ministry of Public Works, Ministry of Health, Ministry of Communication and Informatics, Ministry of Research and Technology, Ministry Education and Culture, Ministry of Industry	Effective and sustainable					
		a. Formatting of transportation safety forum.	The formation of transportation forum			Available/Not Available	√		Evaluation		
		b. Provisioning of work and management	The provision of work and management			Available/Not Available	√		Evaluation		

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
		procedure for safety coordination forum/agency	procedure for safety coordination forum/agency								
		c. Provisioning working group for road accident treatment	The provision of working group for road accident treatment for each pillar			Available/Not Available	√		Evaluation		
		d. Establishing priority and ensure the effectivity and sustainability of road safety programmes	Implementation of road safety programmes			Delivered/Not Delivered	√	√	√	√	√
2	Emergency vehicle protocol		Willingness of all parties to participate	National Police	Ministry of Transport, Ministry of Public Works, Ministry of Health, Ministry of Communication and Informatics	Works/ Not works					
		a. Composing a guideline for emergency vehicles	Guideline for emergency vehicles			Available/Not Available	√		Evaluation		
		b. Organizing simulations and	Implementation of simulations and			Delivered/Not Delivered	√	√	√	√	√

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
		dissemination of operating protocols	dissemination of operating protocols								
3	Road safety research		Research findings which support road safety improvements	Ministry of Research and Technology	Ministry of Transport, National Police, Ministry of Public Works, Ministry of Health	Implemented/ Not implemented					
		a. Institutionalization of research governance	Integrated of institutional research governance			Available/Not Available	√		Evaluation		
		b. Conducting of research for road accident causes	Research in road accident causes			Delivered/Not Delivered	√	√	√	√	√
		c. Conducting of research which is suitable with road safety needs	Research which is suitable with road safety needs			Delivered/Not Delivered	√	√	√	√	√
4	Injury surveillance and integrated information system		Accurate information for planning and decision making	National Police	Ministry of Transport, Ministry of Public Works, Ministry of Health, Ministry Communication and Informatics	Supportive/ not supportive					

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
		a. Collecting and development of accident data structure and types	Provision of accident data structure and type (data of accident contributing factor, casualties, surveillance)			Available/Not Available	√				
		b. Consolidation of accident data from various parties	Availability of accident data from various parties			Available/Not Available		√	√	√	√
		c. Developing of safety management information system	Availability of safety management information system			Available/Not Available		√	√	√	√
		d. Disseminating of annual accident report	The dissemination of annual accident report			Delivered/Not Delivered		√	√	√	√
		e. Developing of data and information centres (physical and virtual)	Availability of data and information centres (physical and virtual)			Delivered/Not Delivered		√	√	√	√

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
5	Road safety funding		Effectivity and efficiency of the road safety funds	Ministry of National Development Planning/National Development Planning Agency	Ministry of Transport, National Police, Ministry of Public Works, Ministry of Health, Ministry of Finance, Ministry of Communication and Informatics, Ministry of Research and Technology, Ministry of Education and Culture, Ministry of Industry	Optimal/not optimal					
		a. Establishing of road safety funds' management institutions	The establishment of road safety funds' management institutions			Available/Not Available		√	√		
		b. Provision of road safety funds	Availability of road safety funds					50%	60%	75%	100 %
6	Road safety partnership		Increasing the number of funds which manage by partnership	Ministry of National Development Planning/National Development Planning Agency	Ministry of Transport, National Police, Ministry of Public Works, Ministry of Health, Ministry of Finance, Ministry of Communication and Informatics, Ministry of Research and Technology, Ministry	% total of the needs for road safety funds		20%	25%	35%	50%

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
					of Education and Culture, Ministry of Industry						
		a. Composing of guidelines for managing partnerships with the business community and society	Availability of guidelines for managing partnerships with the business community and society			Available/Not Available		√			
		b. Implementation of road safety partnership initiatives	The implementation of road safety partnership initiatives			The number of active partners		10 in 10 years	20 in 15 years	30 in 20 years	40 in 25 years
7	Public transport safety management system		Reduction in number casualties from public transport accidents	Ministry of Transport	Ministry of Labour and Transmigration, Regional and Local Government	% reduction in number casualties		30%	50%	65%	75%
		a. Safer public transport business	The number of public transport company which participate			% participation		50%	60%	75%	100 %
		b. Implementation of public transport	Facilities for public transport crew assurance			Available/Not available		50%	60%	75%	100 %

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
		crew assurance									
8	Improving road safety regulations		Regulations which are responsive toward road safety			% fundamental problems that have been solved	20%	40%	60%	80%	100 %
		a. Review and development of new traffic regulations that accommodate safety aspects	Availability of traffic regulations that accommodate safety aspects	Ministry of Transport	Ministry of National Development Planning/National Development Planning Agency, National Police, Ministry of Public Works, Ministry of Health, Ministry of Communication and Informatics, Ministry of Research and Technology, Ministry of Education and Culture, Ministry of Industry, Regional and Local Government	Available/Not available	√	√	√	√	√
		b. Dissemination of improved and new traffic regulations	The dissemination of improved and new traffic regulations			Delivered/Not delivered	√	√	√	√	√
PILLAR II SAFER ROAD			Forgiving road			Roads which can control the rate of fatality	30%	50%	65%	75%	80%

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
1	Safer carriageway			Ministry of Public Works	Ministry of Transport, Regional and Local Government	Safer carriageway					
		a. Provision of road improvement management procedures related to safety	The provision of road improvement management procedures related to safety			Available/Not available	√		Evaluation		
		b. Implementation of pothole closure	Response to treat the potholes			Response time	7x24 hour	5x24 hour	3x24 hour	2x24 hour	1x24 hour
		c. Implementation of puddle repairs	Response to treat/fix the drainage system			Response time	7x24 hour	5x24 hour	3x24 hour	2x24 hour	1x24 hour
		d. Slippery road treatment	Response to treat the slippery roads			Response time	7x24 hour	5x24 hour	3x24 hour	2x24 hour	1x24 hour
		e. Road shoulder repairs	The road shoulder usage improvement			% minimum of usage	40%	60%	75%	85%	90%
2	Planning and implementation of safer road works		Self - explaining improvement	Ministry of Public Works	Ministry of Public Works, National Police, Provincial and Regency/City Government	Safer roads					

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
		a. Provision of safer road planning guidelines	The provision of safer road planning guidelines			Available/Not available	√		Evaluation		
		b. Provision of safer road work implementation guidelines	The provision of safer road work implementation guidelines			Available/Not available	√		Evaluation		
		c. Safer road planning	Safer road planning implementation (from planning up to detailed design)			% minimum of compliance	30%	50%	80%	100 %	100 %
		d. Safer road works	Safer road works implementation			% minimum of compliance	50%	100 %	100 %	100 %	100 %
		e. Road safety inspection	Road safety inspection implementation			% minimum of compliance	30%	50%	80%	100 %	100 %
		f. Inventory and research on accident blackspots	Inventory and research on accidents blackspots			% minimum of compliance	30%	50%	80%	100 %	100 %
		g. Treatment of accident blackspots	Treatment of accident blackspots			% minimum of compliance	30%	50%	80%	100 %	100 %

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
		h. Provision of support for emergency situations because of traffic accidents and disasters	Support for emergency situations because of traffic accidents and disasters			% minimum of compliance	30%	50%	75%	85%	100 %
3	Planning and implementation of road features					Not available in National General Planning on Road Safety					
		a. Planning for road feature needs	Availability of road feature needs planning								
		b. Procurement of road features	Road feature availability and installation								
		c. Inspection of road safety features	Implementation of road safety feature inspections								
4	Speed management implementation		Speed reduction when road crashes take place	Ministry of Transport	National Police, Ministry of Public Works, Provincial and Regency/City Government	Minimum % reduction of fatalities		20%	30%	40%	50%
		a. Preparation of speed	Availability of speed			Available/Not available		√			

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
		management guidelines	management guidelines								
		b. Speed limit determination	Implementation of speed limits								
		c. Road feature installation	Road feature installation								
		d. Implementation of speed management	Speed management (including traffic calming)			% minimum of compliance	60%	100%	100%	100%	100%
5	Improvement of standards for safer roadworthiness		Self-enforcing improvements	Ministry of Public Works	Ministry of Transport, Provincial and Regency/City Government						
		a. Provision of standards for safer roadworthiness	Availability of standards for safer roadworthiness			Available/Not available	√		Evaluation		
		b. Provision of guidelines for safer road management	Availability of guidelines for safer road management			Available/Not available	√		Evaluation		
		c. Implementation of safer	Safer road management			% minimum of compliance		60%	75%	90%	100%

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
		road management									
6	Safer road environment	Safer road environment improvements		Ministry of Public Works	Ministry of Transport, National Police, Provincial and Regency/City Government, Ministry of Internal Affairs, Ministry of Environment	Safer roads					
		a. Provision of procedures for controlling and managing road conditions related to safety	Availability of procedures for controlling and managing road conditions related to safety			Available/Not available	√		Evaluation		
		b. Controlling of roadside space	Implementation of controlling of roadside space			% controlled roadside space	40%	60%	70%	80%	100%
		c. Provision of pedestrian facilities	Availability of pedestrian facilities (including fencing)			% of minimum protected	30%	40%	60%	80%	100%

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
7	Safer roadside activities	Improvements in safer roadside activities		Ministry of Internal Affairs	Ministry of Transport, Ministry of Public Works, National Police, Provincial and Regency/City Government, Ministry of Environment	Safer roads					
		Controlling of roadside activities	The implementation of controlling of roadside activities			% of controlled roadside functions	40%	60%	80%	100 %	100 %
PILLAR III SAFER VEHICLE											
1	Implementation and improvement of periodic and type test procedures			Ministry of Transport	Ministry of Industry, National Police, Provincial and Regency/City Governments	% of compliance	60%	70%	80%	90%	100 %
		a. Improving of procedures and manuals for periodic and type tests	Availability of procedures and manuals for periodic and type tests			Available/Not available	√		Evaluation		
		b. Developing of techno-based test system	Availability of techno-based test system (including the use of information technology/we			Available/Not available					√

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
			b-based for type test services)								
		c. Periodic and type test system evaluation	Periodic and type test system evaluation (human resource competency, transparent periodic and type test, completeness of infrastructure and equipment test, data collection of information system, application of testing unit accreditation system, and testing staff certification)			Delivered/not delivered	√	√	√	√	√
		d. On-the-spot vehicle inspections	On-the-spot vehicle inspections to ensure the fulfilment of technical requirements			Minimum % of delivered inspection	10%	15%	20%	25%	25%

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
			and roadworthiness , ensure the physical suitability of the vehicle with design and engineering that has been approved								
2	Speed limitation on vehicles		Speed reduction when crashes take place	Ministry of Transport	Ministry of Research and Technology, National Police, Provincial and Regency/City Government	Minimum % of fatality reduction		20%	30%	40%	50%
		Speed limitation on vehicles	Availability of speed limit guidelines in accordance with the road technical design and the application of technology to a vehicle to control speed			Available/Not available		√			
3	Overloading handling		Overloading controlling	Ministry of Transport	Ministry of Public Works, National Police, Ministry of Communication and Informatics, Ministry of National	Minimum % of overloading violence		30%	20%	10%	0%

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
					Development Planning/ National Development Planning Agency, Ministry of Research and Technology, Provincial and Regency/City Government						
		a. Organizing community participation in the “Say No to Overloading ” movement	The participation of community, drivers, freight transport companies, and property owners in the “Say No to Overloading” movement			Available/Not available		√	√	√	√
		b. Good governance on overloading handling	The operation of a consistent weighbridge			Maximum %					
		c. Improvemen t of weighbridge functions	More effective and efficient cargo control on the weighbridges								
		d. Implementat ion of	ITS availability in freight								

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
		intelligent transport system (ITS) in freight transport	transport and information technology application (e-enforcement) in weighbridges								
		e. Setting the dimensions and volume of the hauling space (mixer, tub, and tank) on the freight vehicles in the test of motorised vehicle type	Availability of regulations on permitted maximum dimensions and volume for hauling space in freight transport								
4	Vehicle scrapping	Vehicle scrapping	Decreasing in the number of vehicles on the road because they are removed from the registration list due to request from vehicle owners, heavily damaged vehicles, and vehicle owners	Ministry of Transport	Ministry of Industry, National Police, Provincial and Regency/City Government						

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
			who do not re-register at least two years after the validity period of the vehicle number certificate (STNK).								
5	Setting of safety standard for public transport	Setting of safety standard for public transport	Fulfilment of public transport to safety standard	Ministry of Transport	National Police, Ministry of Industry						
PILLAR IV: SAFER ROAD USERS											
1	Vehicle operation compliance	a. Inspection of vehicle operation compliance	Inspection of vehicle operation compliance	National Police	Ministry of Transport						
		b. Inspection of safety equipment installation compliance	Inspection of safety equipment installation compliance								
		c. Setting of handling speed violation procedure	Availability of handling speed violation procedure								

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
		d. Provision of enforcement technology	Availability of enforcement technology								
2	Driver condition checking-up	a. Conducting patrols on behavioural that endanger safety	The conduct of patrols on behavioural that endanger safety	National Police	Ministry of Health						
		b. Setting restrictions on driving rights related to driver conditions	Availability of regulations regarding driving rights								
3	Drivers health checking up	Driver's health checking up	Driver's health checking up when getting a driving licence	Ministry of Health	National Police						
4	Improvement of facilities and infrastructure for driving licence test system	a. Improvement of quality of driving licence test material	Improved driving licence test material	National Police	Ministry of Transport, Ministry of Research and Technology, Provincial and Regency/City Governments.						
		b. Improvement of quality and quantity of driving	Improved quality and quantity of								

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
		licence instructors	driving licence instructors								
		c. Implementat ion of electronic driving licences (e-driving licence)	Implementation of electronic driving licences (e-driving licence)								
5	Improvement of driving licence test procedure	a. Determinati on of level for driving licence	Availability of regulation to determine driving licence level	National Police							
		b. Implementat ion of demerit point system	Implementation of demerit point system								
6	Technical coaching for driving school	a. Organizing driving school accreditation	Accredited driving school	Ministry of Transport	Ministry of Education and Culture, Provincial and Regency/City Governments						
		b. Determinati on of standards for driving school technical coaching	Availability of standards for driving school technical coaching								

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
		c. Training for driving school human resources	Training for driving school human resources								
		d. Guaranteed the implementation of driving school	Driving school implementation								
7	Treatment of five key plus risk factors	a. Enforcement for helmet usage violators for motorcyclists	Legal actions for helmet usage violators for motorcyclists	National Police	Ministry of Transport, Provincial and Regency/City Governments						
		b. Enforcement for safety belt usage violators	Legal actions for safety belt usage violators								
		c. Enforcement for speed limit violators	Legal actions for speed limit violators								
		d. Enforcement for drink driving drivers	Legal actions for drink driving drivers								

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
		e. Enforcement for violators who use safety equipment which are intended for vulnerable road users	Legal actions for violators who use safety equipment which are intended for vulnerable road users								
		f. Enforcement for cell-phone usage violators	Legal actions for cell-phone usage violators								
8	Implementation of electronic enforcement	Implementation of electronic enforcement	Implementation of electronic enforcement	National Police	Ministry of Transport, Ministry of Research and Technology						
9	Formal education in road safety	Formal education in road safety	The implementation of formal education in road safety	Ministry Education and Culture	National Police, Ministry of Transport						
10	Road safety campaign	Road safety campaign for: 1) Five keys plus risk factors (helmet, safety belt, speed limit	Road safety campaign for five keys plus risk factors and healthy behaviour on the road	National Police	Ministry of Transport, Ministry of Education and Culture, Ministry of Internal Affairs, Provincial and Regency/City Governments.						

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
		violation, vulnerable road users, cell phone usage). 2) Healthy behaviour on the road									
PILLAR V: PRE- AND POST-CRASH TREATMENTS											
1	Pre-crash treatment	a. Promotion of healthy behaviour on the road	1) Media promotion for health aspects of road safety. 2) Community empowerment on health aspects of road safety through active alert villages	Ministry of Health	National Police, Ministry of Transport, Ministry of Public Works, Provincial and Regency/City Governments						
		b. Driver's health check-up in special circumstances or situations	Implementation of driver's health check in special circumstances or situations								

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
2	Post-crash treatments	Establishment of an integrated emergency management system in each regency/city	1) Availability of a hotline service centre. 2) Availability of trained personnel in handling emergency casualties. 3) Availability of a public safety centre.	Ministry of Health	Ministry of Communication and Informatics, National Police, Ministry of Transport, Ministry of Public Works.						
3	Road casualty assurance treated in referred hospitals	a. Development of a tiered referral system from primary to tertiary health facilities.	Availability of a tiered referral system from primary to tertiary health facilities.	Ministry of Health	Ministry of Finance, National Police, Insurance Companies, Provincial and Regency/City Governments.						
		b. Determination of regulation on assurance of	Availability of regulations on assurance of road casualty								

No.	Programme	Actions	Indicators	Agency in charge	Related agencies	Parameters	Target (for each 5 year)				
							1	2	3	4	5
		road casualty treated at the hospital	treated at the hospital								
4	Allocation of some part insurance premiums for road safety funds	Allocation of some part insurance premiums for road safety funds	Availability of road safety fund from accident insurance premiums	Ministry of National Development Planning/National Development Planning Agency	National Police, Ministry of Transport, Ministry of Finance, Insurance Companies.						
5	Research on pre- and post-crash on road casualties	Research on pre- and post-crash on road casualties	Implementation of researches that support the improvement in road casualty treatments	Ministry of Health	Community, Universities						

TRANSPORT RESEARCH LABORATORY FORMULAS TO CALCULATE ROAD CRASH COSTS

There are casualty costs and crash costs.

1. Casualty costs

Casualty costs = medical costs + loss of productivity

*Medical costs = (hospitalisation + medical treatment costs) * average length of stay in hospital*

Loss of productivity

- Fatal casualty

- a. Length of person's year loss

Length of person's year loss = average length of stay in hospital + (average retired age – average casualty age)

- b. Loss of productivity

*Loss of productivity = (average length of stay in hospital * daily average wage) + Present Value (annually average wage for the length of person's year loss)*

- Serious injury casualty

For serious injury casualty, the result would be without disability or with disability

Without disability

- a. Length of person's day loss

Length of person's year loss = average length of stay in hospital

- b. Loss of productivity

$$\text{Loss of productivity} = \text{Length of person's day loss} * \text{daily wage rate}$$

With disability

- a. Length of person's year loss

$$\text{Length of person's year loss} = \text{average length of stay in hospital} + (\text{average retired age} - \text{average casualty age})$$

- b. Loss of productivity

$$\begin{aligned} \text{Loss of productivity} = & +8\% * \{(\text{average length of stay in hospital} * \text{daily average wage}) \\ & + \text{Present Value (annually average wage for length of} \\ & \text{person's year loss)}\} \end{aligned}$$

Note:

⁺8% because it is assumed that in a serious injured casualty, the person still manages to work, even though in a small portion comparing with normal people

- Slight injury casualty

- a. Length of person's day loss

$$\text{Length of person's day loss} = \text{average length of stay in hospital} + \text{no. of days of not working}$$

- b. Loss of productivity

$$\text{Loss of productivity} = \text{length of person's day loss} * \text{daily wage rate}$$

Pain, grief, and suffering are calculated by modifying the TRL percentage (Transport Research Laboratory, 1995). This percentage will be multiplied by the sum of medical costs, loss of productivity, vehicle repair costs, and administration costs.

Table 1 The percentage of pain, grief, and suffering

Accident type	Pain, grief, and suffering percentage
Fatal accident	40%
Serious accident	80%
Slight accident	15%

2. Crash costs

*Accident costs = casualty costs for the number of casualties per number of vehicles +
vehicle repair costs + administration costs*

Note:

Vehicle repair costs = spare parts costs + labour (based on primary surveys)

Administration costs = based on interviews with accident victims or families and police