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MOBILITY AND TRANSPORT CONNECTIVITY SERIES

SAVING LIVES THROUGH PRIVATE INVESTMENT IN ROAD SAFETY



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Background



Road crashes are one of the leading causes of fatalities and serious injuries (FSIs), affecting more than 50 million annually worldwide, of which over 90 percent of the burden is borne by low- and middle-income countries (LMICs). The World Bank estimates a significant funding gap in road safety of US\$260 billion to achieve Sustainable Development Goal (SDG) Targets 3.6 and 11.2 in the next 10 years.¹ The World Bank recognizes that this gap cannot be closed through public funding alone, and thus mobilization of private capital is required.

The World Bank and International Finance Corporation (IFC)—together, the World Bank Group (WBG)—in partnership with the International Road Assessment Programme (iRAP) and the Fédération Internationale de l'Automobile (FIA) High Level Panel for Road Safety, have undertaken a project to investigate the potential for private capital mobilization to close this gap. To achieve this objective, the partners aim to develop business models to channel private investment in road safety projects, consisting of subnational, public-private partnerships (PPPs) and corporate investments, and leverage the growing sustainable debt market, including social and sustainability-linked financings.

The WBG identified business models and financing instruments to enable greater private investment in road safety and engaged a team of consultants from Dalberg Advisors and Cardno to further evaluate their viability, as well as to examine their potential in 10 countries spread across Latin America, Asia, and Africa. In these countries, operationalization opportunities and challenges were assessed, including through identification of potential pilot projects. In the second phase of work, Social Finance and Impact Strategists were engaged to bring an impact investment lens to this issue. To this end, a series of solutions have been designed, including eight high-impact project archetypes, a framework for designing road safety projects, and five possible investment structures. This report serves as a public facing paper that brings to the fore some of the key findings from this work.

This report presents the main analysis and conclusions derived from the project. It is based on the inputs from the specialized consultants mentioned above working under the direction of the WBG and partners. It is also based in part on findings from more than 50 stakeholder interviews with road safety experts, public sector authorities, ecosystem actors, concessionaires, asset managers, and corporate social responsibility (CSR) funds and investors active across Latin America, Sub-Saharan Africa, and South Asia.

¹ SDG Target 3.6: Halve the number of global deaths and injuries from road traffic accidents; SDG Target 11.2: Provide access to safe, affordable, accessible, and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities, and older persons.

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About the Partners



www.irap.org

iRAP is the umbrella program for Road Assessment Programs (RAPs) worldwide that are working to save lives through improved road safety. iRAP uses a robust, evidence-based approach (risk mapping, star rating, safer roads investment plans, and policy and performance tracking tools) to help inform sound investment by public and private entities worldwide into road safety.



The Fédération Internationale de l'Automobile (FIA) High Level Panel for Road Safety is an initiative that convenes global leaders to create and implement innovative solutions to road safety's most pressing challenges. The panel brings together a coalition of leaders from the global business community, international institutions, and nongovernmental organizations, with the primary objective of raising awareness and funding for road safety actions, especially in LMICs.

Executive Summary



The negative impacts of road deaths and serious injuries point to a significant market failure. Markets do not currently account for how roads and their use impact our societies and economies. Private capital and markets can and must be harnessed to address this failure. The funding gap is large and the current ways in which roads and vehicles are financed is perpetuating the problem.

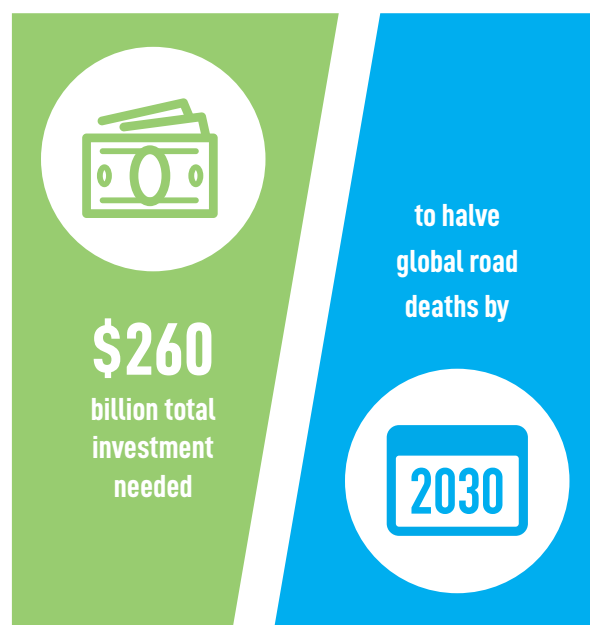
Continuing with “business as usual,” more than 375 million mostly young people will be killed and injured in road crashes over the next decade resulting in a more than US\$20 trillion loss to the global economy by 2030 (McInerney and Smith 2020). The global crisis in road safety simply cannot be ignored.

Achieving safer roads and road use is possible; it requires a realignment of incentives across safety outcomes and commercial interests. Public authorities, development actors, and private investors hold the power to change how road safety is regulated, monitored, and factored into investment decision-making. The United Nations (UN) estimates that an investment of US\$260 billion is needed to halve road deaths over the next 10 (figure E.1). Although this is a sizeable investment, it represents a fraction of the cost that will be incurred otherwise.

In September 2020, the international community reaffirmed its commitment to halving road deaths by 2030 through a Second Decade of Action for Road Safety 2021–2030, with the UN General Assembly’s adoption of the “improving global road safety” resolution.¹ The World Health Organization (WHO) and the UN regional commissions, in cooperation with other partners in the UN

Road Safety Collaboration, have developed a Global Plan for the Decade of Action to support implementation. Aligned with the global plan, this report examines the need for private capital to be mobilized to achieve those road safety goals and the opportunities for road safety to become an investable area and harness the momentum of the sustainable finance movement. The report sets out eight key road safety interventions that are more suitable for private sector engagement and examines five principal investment structures to deliver sustainable outcomes for safer roads, including in low- and middle-income countries (LMICs).

Figure E.1. Funding Gap for Road Safety



Source: Original figure produced for this publication.

¹ More information on and resources for the World Health Organization’s Decade of Road Safety 2021–2030, is available online at the WHO website: <https://www.who.int/teams/social-determinants-of-health/safety-and-mobility/decade-of-action-for-road-safety-2021-2030>.

The Invisible Global Crisis of Dangerous Roads

Unsafe roads are an invisible pandemic in our modern society. Road traffic crashes are one of the largest killers globally; however, they are preventable. With 1.35 million killed annually on the world's roads, and up to another 50 million injured, road traffic crashes represent the eighth leading cause of death—higher than HIV/AIDs or tuberculosis. Victims of road crashes are most likely to be young and working age people. Road traffic crashes are the leading cause of death globally for children and people between the ages of 5 and 29, and 64 percent of road fatalities are people under the age of 50.²² However, this crisis remains largely invisible. Road traffic crashes are frequently framed as “accidents” and “one-off” instances of human error; in reality, the overwhelming body of evidence indicates that road traffic crashes are both predictable and preventable (WHO 2018). Road traffic crashes are not an unavoidable side effect of urban and rural development. Prevention can and should rise in priority in the global agenda.

LMICs bear the highest burden, experiencing 90 percent of global road deaths despite having less than 60 percent of the vehicles (WHO 2021). While high-income countries (HICs) have made steady progress in recent decades to improve road safety, this improvement has largely left LMICs further behind. This trend is only projected to worsen with increasing rates of urbanization and motorization. Without action, the annual death toll will approach 1.5 million in LMICs by 2030. **As it stands, annual totals for fatalities from road injuries are higher than those from COVID-19 for 2020 in LMICs**—yet less than 1 percent of health development assistance to LMICs is allocated to trauma care (Stewart et al. 2019).

The impacts of road traffic crashes reach far into the economy and can cost LMICs as much as 6 percent of their GDP (McInerney and Smith 2020). The costs of a road traffic crash do not end at the roadside; they create ripple effects throughout the wider economy. Loss of income, property damage, insurance premiums, loss of taxes, and burdens on the health sector are just some of the far-reaching costs associated with road traffic crashes. Although these costs are dispersed, they add up. The total cost to LMICs is estimated at US\$1.7 trillion per year (McInerney and Smith 2020). Ultimately, these costs are mostly borne by the victims and their households. The financial burdens of road traffic crashes can trap households in poverty. There is also a gendered dimension to these costs; almost three times as many people killed in road traffic crash accidents are men, and where men are more likely to have been the primary income earners this can increase the financial burden on households. In the case of serious injuries, additional burden is placed on female family members who are more likely to be responsible for long-term care for the seriously injured (WHO 2002).

Addressing the Market Failure in Road Safety

The market's failure to appropriately account for the costs of road traffic crashes is one of the prime reasons for underinvestment by the private sector in road safety. While the economic case for better road safety is often clear, incentives are misaligned. As the costs of dangerous roads, vehicles, and road use are dispersed across the economy, little financial incentive exists to invest in safety beyond the minimum enforced standards. In cost-competitive environments, this can lead to important safety investments becoming deprioritized, even though many private and public actors benefit financially

2 Explore the World Health Organization's Global Health Observatory database for these and more road safety statistics: <https://www.who.int/data/gho/data/themes/road-safety>.

from safer roads. Those who benefit include the health care sector, insurance companies, operators of commercial fleets, and road users. Some of these beneficiaries currently face barriers to engaging in crash prevention due to a lack of discrete, investable projects or because the social and environmental costs and benefits are not being priced in by the market or are not transparent.

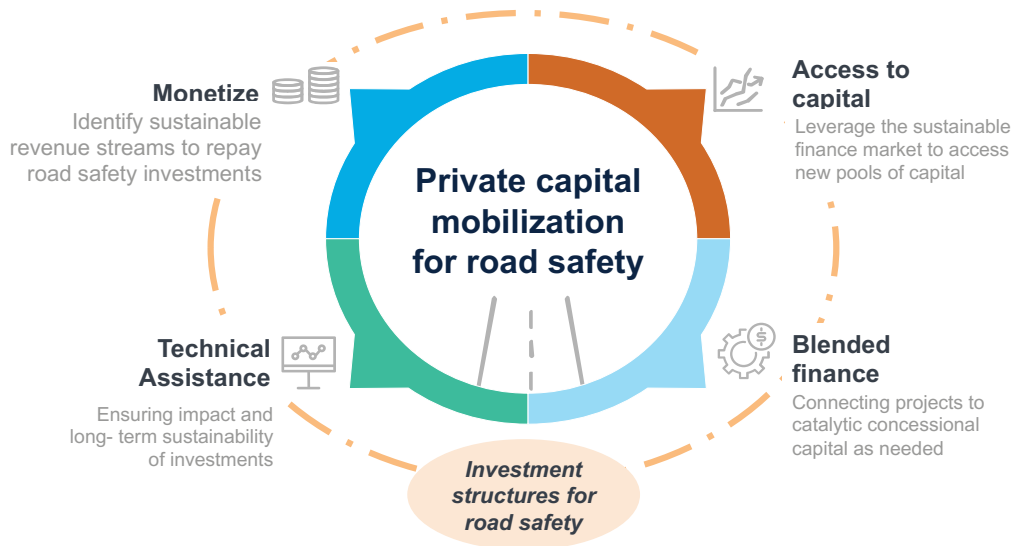
The growth of socially responsible investing and the sustainable finance market offers a new opportunity to address this market failure and translate the economic case into an investable business case for road safety investment. The sustainable finance movement seeks to capture and internalize the total cost of doing business, including the wider environmental and social impacts, thereby accounting for the negative externalities of economic development. Driven by public and investor demand, the sustainable finance movement is growing rapidly. More investors and companies are required to or are opting into reporting on their environmental, social, and governance (ESG) impact, and the sustainable finance market has seen huge growth in the number of investors seeking pro-social-investment opportunities that directly target the Sustainable Development Goals (SDGs). In 2020, new records were set with total sustainable debt issuance reaching US\$732 billion (Henze 2021). Other areas, such as climate change and COVID-19 relief, have successfully leveraged this growing market to expand their pool of available capital, including through bond markets. However, road safety, despite having a clear mandate within the SDGs, is yet to harness this movement.

For capital from the sustainable finance market to flow to road safety, road safety will need to be woven into sustainability strategies and performance targets whereby priority interventions in LMICs are structured to deliver both lifesaving

impact and a return on investment for private capital. This report defines four steps as part of this process, which can be brought together through investment structures that make it easier for investors to move into the space (figure E.2). By taking a more holistic view of the costs and benefits, and by aligning incentives to reflect them, road safety can be positioned to access capital through the sustainable finance market, such as through the issuance of social debt (bonds or loans) aimed specifically at funding road safety interventions, or sustainability-linked debt (bonds or loans), which tie the cost of financing to the attainment of road safety targets. The developing frameworks responding to and setting expectations for scaling up investments that have positive social and environmental benefit, including green and social bond principles and sustainability bond guidelines introduced by the International Capital Markets Association (ICMA), can also be applied (see the discussion on sustainable finance on the [ICMA website](#)).

Recognizing the costs and benefits of road safety can also inform innovative mechanisms to create and align incentives for investment. Where needed, blended finance can be used to support this process, offering catalytic grant funds to mitigate specific investment risks and help rebalance risk-reward profiles of pioneering, high-impact road safety investments so that they have the potential to become commercially viable over time. Finally, technical assistance can support or, where appropriate, anchor the process, assisting governments and implementers and creating the enabling environment needed to ensure the impact and long-term sustainability of road safety investments. Technical assistance can also help governments and implementers structure the investment case, blended finance mechanisms, and identify sources of revenue or allocate funding differently.

Figure E.2. Structuring Projects for Road Safety



Source: Original figure produced for this publication.

Structuring Investable Road Safety Projects

This report focuses on concrete, achievable steps that inform structuring of investable opportunities to improve road safety. The analysis draws on the existing literature and more than 50 consultations with experts and stakeholders in the ecosystem.

Eight road safety project archetypes are identified as examples of approaches that could attract private sector engagement and have strong potential to save lives. Based on a review of more than 100 road safety countermeasures, these eight project archetypes have been selected to span three of the key pillars of road safety: safer vehicles, safer roads, and post-crash response. The eight road safety project archetypes are: vehicle inspection and certification centers, commercial fleet upgrades, infrastructure upgrades on new road concessions, upgrade of protective highway infrastructure, speed management and automated enforcement, protective

infrastructure for vulnerable users, emergency medical services, and specialist trauma centers. Each has been chosen for their measurable impact on reducing fatal and serious injuries (FSIs), and for their potential to attract private sector participation.

Through these structures, the analysis highlights potential revenue sources that could support investment. Some models enable revenue streams to be generated from users and beneficiaries of safer roads, such as through increased tolls, road taxes, vehicle inspection fees, or fines for speeding. Corporates (such as a car insurance company or a commercial fleet operator) are also identified as potential funders based on the benefits they derive from savings from reduced crashes. Where it is more challenging to identify revenue streams or price in the cost of unsafe roads or vehicles, governments can ring-fence funding for road safety from a wider range of sources—such as a new fuel tax or a levy

on motor insurance premiums. As focus and regulation develop to put the spotlight on more sustainable production and investment, an opportunity arises to include requirements for minimum standards that encompass both environmental performance and safety. The choice of revenue source to support investment is not neutral; instead, it presents an opportunity to explore user charges or levies that capture negative externalities and incentivize improvements. Where impact is attributable and measurable, returns on investment can be tied to the achievement of safety outcomes, ensuring a results-driven approach is taken and that safety remains the first priority.

Five main investment structures are explored in depth in this report; each is designed to bring in a mix of investors, borrowers, and funders appropriate to the context and project. The investment structures illustrate possible permutations across the private-public spectrum of borrowers, including public-led investments, public-private partnerships (PPPs), private-led initiatives, and outcomes-based funding and financing.

Seven models are identified within these five main investment structures:

Model A: Social and sustainability bonds issued by national governments and multilateral agencies (Model A1) and by subnational governments (Model A2)

Model B: Financing of new PPPs

Model C: Additional debt financing of existing PPPs

Model D: Direct financing to corporate entities

Model E: Outcomes-based funding and financing encompassing impact bonds (Model E1), outcome funds to drive national and regional scale (Model E2), and a “last-mile” approach used in combination with Models A to D to optimize system-level and user-level road safety outcomes (Model E3).

Together, these models highlight the potential for actors to come together in different combinations and through different structures. The investment structures vary according to private or public borrower, the type of debt used, the type of revenue streams that can be engaged, and the road safety projects that are most suitable.

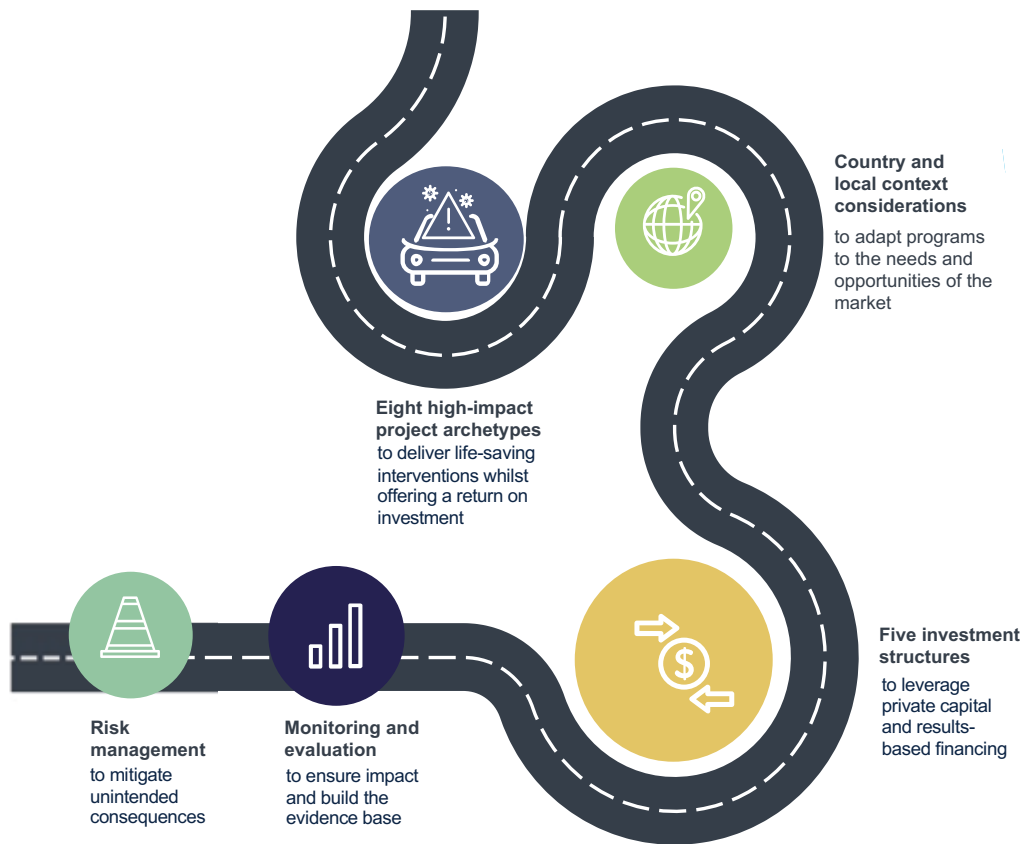
This report examines where blended finance can play a valuable role. Considerations include where it can be appropriate for funders to support the financial viability of an investment: for example, to address specific investment risks and help rebalance risk-reward profiles. In some cases, blended finance can be applied to incentivize or optimize investment structures for better achievement of road safety outcomes. Funding can also be deployed as technical assistance or to support independent evaluation or to provide additional capability such as education or enforcement capacity, which can play a critical role in driving results.

There follows further analysis of how to assess the suitability of these investment structures for different contexts, considering possible risks and mitigation strategies. Bringing together investment with road safety initiatives may involve both investment risks and impact risks that need to be managed, shown in figure E.3. Where donor or public funds are

involved, there could also be ethical risks to consider and the need to ensure probity and value for money. Each of these dimensions can be designed for and managed with clear mitigation strategies. The increasing sensitivity to reputational risk of poor impacts and risk that of insufficient management and accountability that is focused on sustainability are also considered. This report lays out some of the primary challenges, and how these can be mitigated

through robust monitoring and evaluation (M&E) processes; rigorous technical assistance; strong program, contracting, and investment design; and the strategic use of blended finance mechanisms and outcome funding to align incentives. The need for institutional capacity building, including within the public sector, to ensure improvements in road safety are sustained over the long term is also considered.

Figure E.3. Building Investable Road Safety Projects



Source: Original figure produced for this publication.

The Way Forward

Mobilizing private capital to improve road safety will require effort from public and private stakeholders. National and global efforts that focus on creating evidence to clearly define the investment case of road safety will accelerate progress. This will help connect the available evidence on the social and economic effects of road traffic incidents with transport policy, how road infrastructure is commissioned and delivered, and increasingly shed light on the externalized costs of current infrastructure and unsafe vehicles in many countries. Activating projects on the ground and sharing learnings between public, private, and development actors will build the foundations of an evidence base and demonstrate what is possible. From this base, efforts can then be scaled.

Development actors can, and will need to, lead the way, with development finance institutions (DFIs) acting as first-mover investors, and donors providing catalytic grant funds to crowd in private investment to opportunities with lifesaving impact. Public authorities hold the key to creating the necessary enabling environment. For instance, national treasuries play a vital role in breaking silos, reduced traffic collisions produce savings to public finances, and the public sector case is strong to invest in improving enforcement, regulation, and monitoring of road safety, thus setting standards in line with international best practices and holding concessionaires accountable to these standards. Public authorities also have a critical role to play in identifying road safety projects that can include private sector

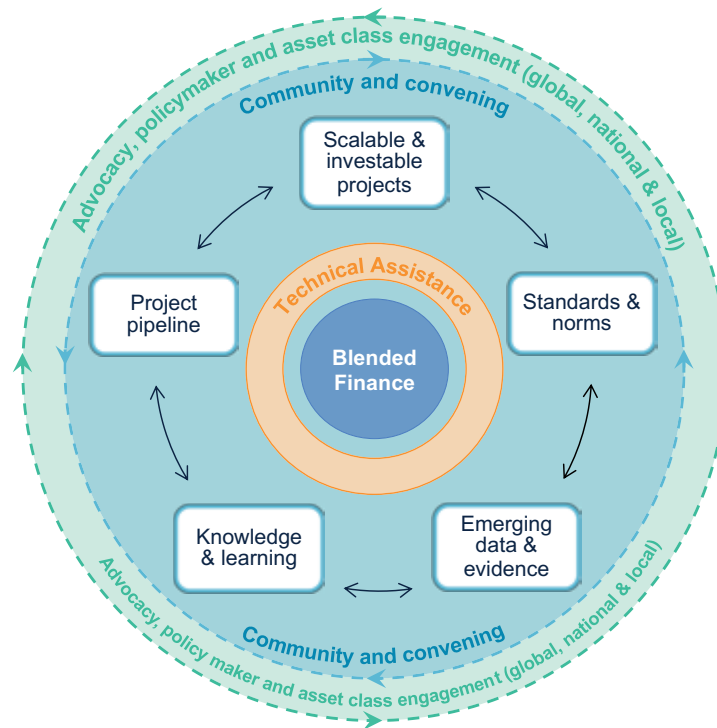
participation via PPPs and in creating the revenue streams required to pay for the services provided under these PPPs. They may also be best placed in some cases to approach markets to demonstrate the application of investment structures such as sustainability bonds. The private sector completes the puzzle by bringing new pools of capital and a critical eye toward the social impact of its activities and investments. Private sector actors can bring structuring expertise and technical assistance to the table as well as capital and project execution.

A Platform to Drive Scale

As a foundation for bringing actors together for this coordinated approach to road safety investment, the World Bank Group (WBG) is developing a platform for private capital mobilization.

As illustrated in figure E.4, this platform will build on existing measures and bring together the expertise and capacities of actors from across the ecosystem to design and implement solutions, remove barriers to private sector participation, and build the evidence base. The platform functions will include design, piloting, refinement, and scaling of road safety investments in LMICs. It is intended to provide a unified place where those seeking to improve road safety in their local market can be connected to the investments, blended finance, and technical assistance that they need to build sustainable road safety projects with private participation.

Figure E.4. A Platform to Facilitate Multi-Actor Partnerships to Scale Road Safety



Source: Original figure produced for this publication.

With less than a decade remaining to uphold the international commitment to halving road deaths, now is the time for taking action. Facilitating early transactions will be a critical first step, to be taken in parallel with a user-centered approach to the design of the platform's key pillars to ensure they meet the needs of the market and complement existing work. The recommended approach places initial focus on the design and launch of an early blended finance window to support projects that incorporate the required road safety standards and data principles. These

transactions can catalyze the market and inform a build out strategy for the platform by increasing data, examples, know-how, and convening power.

A platform anchored in the wider ecosystem can play a vital role in attracting more and different actors and driving scale. This will help position road safety investment in sustainable finance markets and support actionable progress toward meeting SDG targets and the goals set by the international community to at least halve global road deaths by 2030.

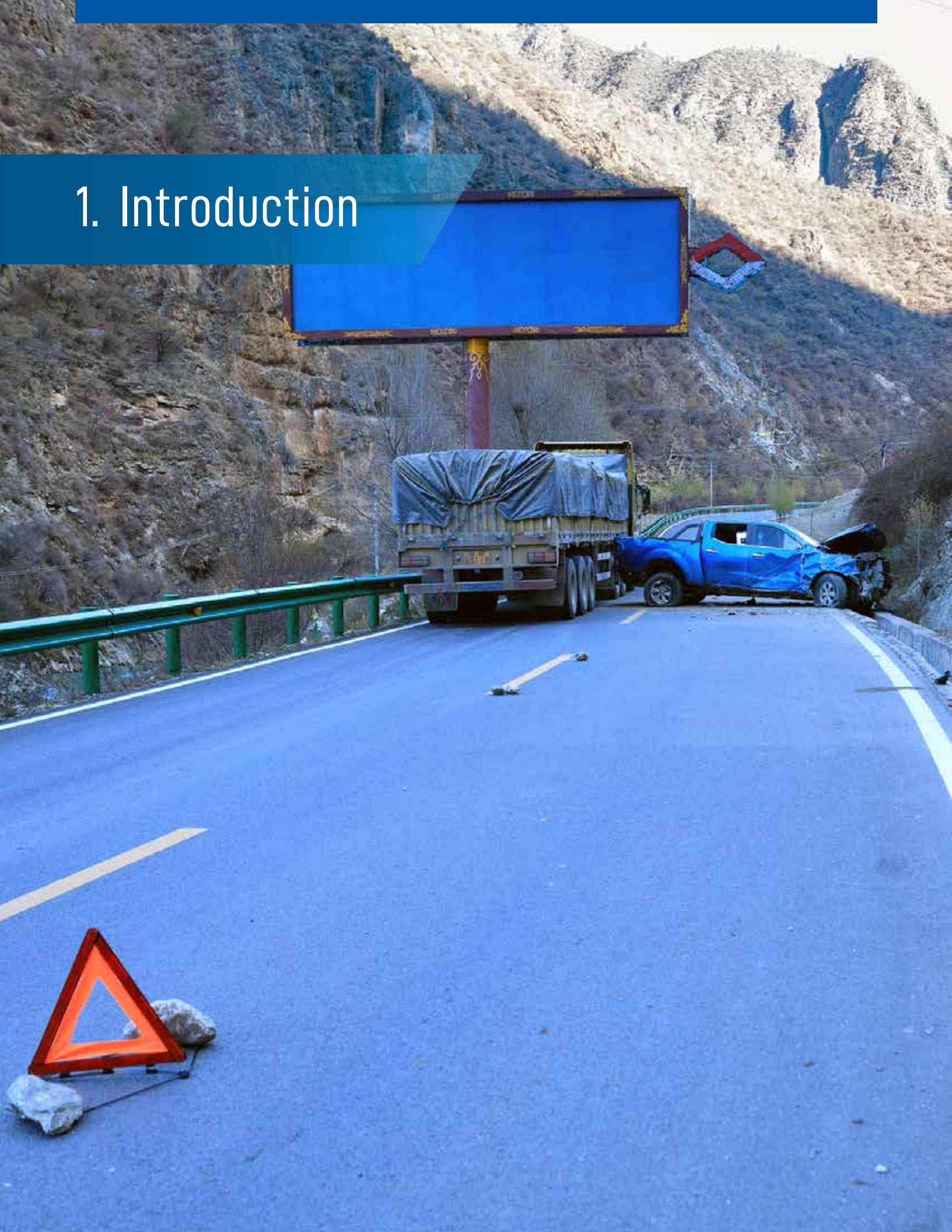
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Abbreviations and Acronyms

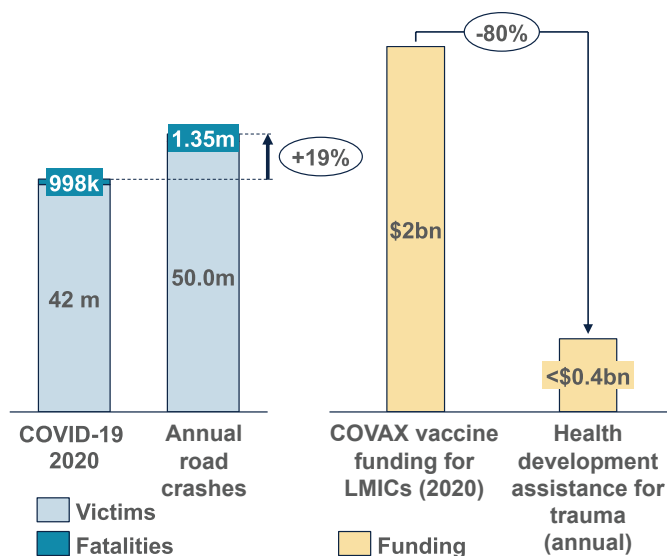
AIPF	Asia Injury Prevention Foundation	LIC	low-income country
ARTESP	Agência de Transporte do Estado de São Paulo	LMIC	low- and middle-income country
AASA	Automobile Association of South Africa	M&M	Mahindra & Mahindra
BIGRS	Bloomberg Initiative for Global Road Safety	MIC	middle-income country
BCR	benefit-cost ratio	MIGA	Multilateral Investment Guarantee Agency
CDC	(U.S.) Centers for Disease Control and Prevention	M&E	monitoring and evaluation
CSR	corporate social responsibility	MDB	multilateral development bank
DFI	development finance institution	MDB WGST	Multilateral Development Banks Working Group on Sustainable Transport
DRIVER	Data for Road Incident Visualization Evaluation and Reporting	NGO	nongovernmental organization
EMS	Emergency Medical Services	ODA	official development assistance
ESG	Environmental, Social, and Governance	PIARC	Permanent International Association of Road Congresses
EU	European Union	PiPa	Piracicaba-Panorama
FSI	fatal and serious injury	PSW	Private Sector Window
FIA	Fédération Internationale de l'Automobile	RTI	road traffic incident
GDP	gross domestic product	SDG	Sustainable Development Goal
GNI	gross national income	SLB	sustainability-linked bond
GRSF	Global Road Safety Facility	SLL	sustainability-linked loan
HIB	Humanitarian Impact Bond	SPI	Safety Performance Indicator
HIC	high-income countries	TA	technical assistance
ICMA	Institute of Cost and Management Accountants	TAC	Transport Accident Commission
ICRC	International Committee of the Red Cross	UN	United Nations
IDA	International Development Association	VGF	viability gap funding
IFC	International Finance Corporation	WHO	World Health Organization
iRAP	International Road Assessment Programme	ZFC	Zero Fatality Corridor
IRR	Internal Rate of Return		
KPI	key performance indicator		

1. Introduction



With 1.35 million people killed in road crashes every year, road safety is a global health crisis deserving urgent international attention and action. Beyond the 1.35 million fatalities, a further 50 million suffer injuries, including lifelong disabilities (WHO 2020). Road crashes are the eighth leading cause of death globally, and the leading cause of death for children and youth aged 5 to 29 years, making road injuries more fatal than tuberculosis or HIV/AIDs (WHO 2018). The burden of road fatalities and injuries is also disproportionately high in low- and middle-income countries (LMICs), which bear 90 percent of global road deaths despite having less than 60 percent of the vehicles. The annual toll of road crash victims and fatalities exceeded that of COVID-19 in LMICs in 2020, yet road safety received only a fraction of the development assistance (see figure 1.1). Dangerous roads are a health crisis projected to only worsen with increasing urbanization, yet in many contexts, it remains an invisible crisis low on the public agenda.

Figure 1.1. Point of Comparison, Road Trauma vs. COVID-19



Source: Gavi 2020; Our World in Data: "Total Confirmed COVID-19 Cases"; Our World in Data: "Total Confirmed COVID-19 Deaths"; WHO 2021a.

While some important advances were made, progress fell short of the targets set by the United Nations (UN) to halve global road deaths by 2020. The Decade of Action for Road Safety was an ambitious international commitment by the UN General Assembly to stabilize and then reduce global road deaths between 2011 and 2020. This commitment was bolstered in 2015 with the Sustainable Development Goals (SDGs), which set the official target of halving global road deaths by 2020. These international commitments made positive steps in raising global awareness about road safety, helping to stabilize the global rate of road deaths, and bringing several countries' road safety laws in line with international best practices (WHO 2021a). Furthermore, over the decade, there was a considerable decline in traffic deaths in some geographical areas, including the European Union (EU), Brazil, and the Russian Federation (WHO 2021b). However, road deaths globally increased over this period and the target to halve global road deaths is yet to be reached.

There is a great deal to be learned from a decade of international efforts on road safety, and lessons and best practices are beginning to emerge. This World Bank report focuses on the following three lessons from the past Decade of Action for Road Safety:

- **Low- and middle-income countries (LMICs) must be supported to curb rising trends in road crashes and fatalities.** Progress on the Decade of Action has largely left LMICs behind. Whereas road traffic deaths have steadily fallen in most high-income countries (HICs), they have continued to rise in LMICs on average, spurred by rapid urbanization and motorization within weak policy and enforcement environments.

- **Greater investment is needed to close the US\$260 billion funding gap over the next 10 years.** The Decade of Action has shown that while policy changes are crucial, these must be reinforced through investments. Financing is needed to improve infrastructure, fund enforcement, and develop traffic management capacity. Investment can also act as an incentive to update national policies and standards. The UN estimates a sustained investment of US\$26 billion each year over the next decade will be needed to achieve the SDG targets on road safety and inclusive transport by 2030 (SDG Targets 3.6 and 11.2) (UN Road Safety Fund 2016).¹
- **The private sector must be engaged to play a role in changing the road safety landscape.** Given the size of the funding gap, road safety cannot be championed by the public sector alone. Furthermore, infrastructure investments fail to account for the externalities that road traffic incidents (RTIs) impose, which can cost up to 6 percent of GDP in LMICs through costs to health care, emergency response, property damage, and loss of output (McInerney and Smith 2020). Annually, more than US\$800 billion is invested in roads around the world, on which a mere 3 percent in additional investment on safety would suffice to close the gap (see figure 1.2).²

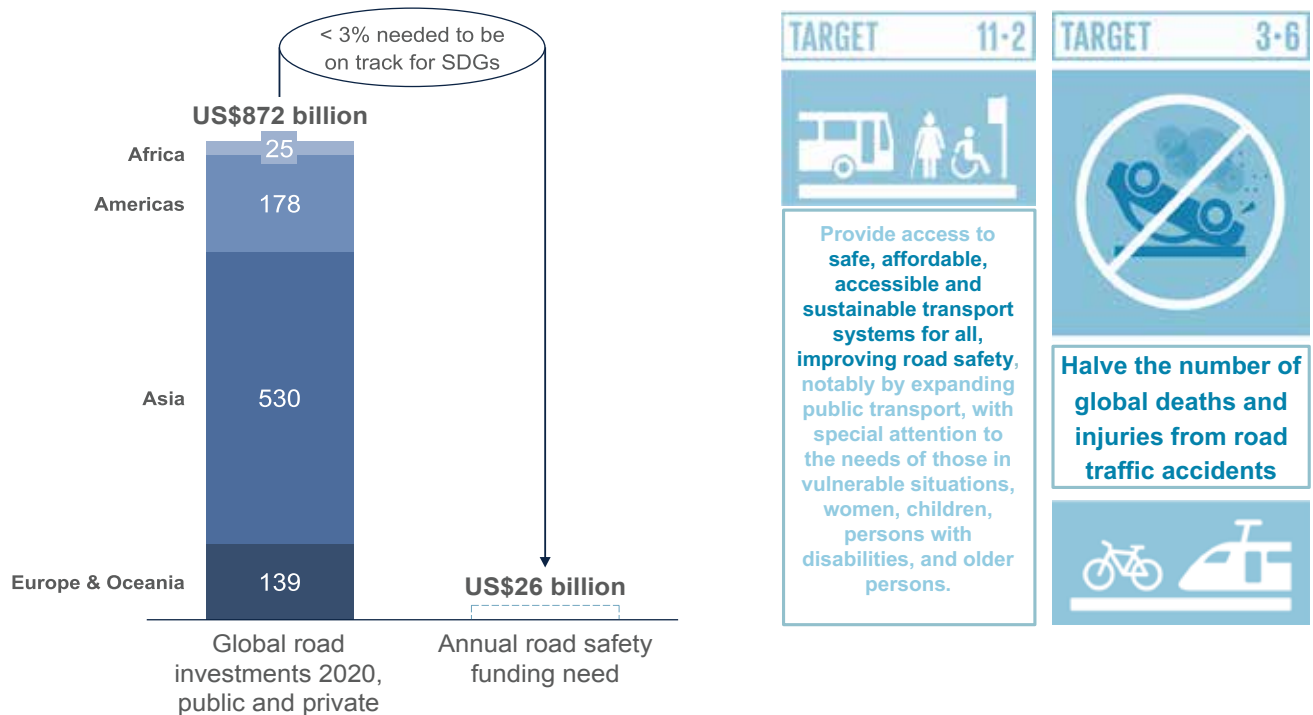
Several important initiatives are already underway as part of the newly launched Global Plan for the Decade of Action 2021-2030 around coordination, data generation, and public capacity strengthening. Acknowledging that efforts had

been insufficient to meet SDG Target 3.6 (halving the number of global road deaths and injuries by 2020), the 2020 Stockholm Declaration emphasized that with just 10 years left to deliver on the SDGs, member states and stakeholders share a responsibility to recommit to road safety. With 2021-2030 now officially recognized as the Second Decade of Action for Road Safety, key regional and global actors have already begun work under this reaffirmed mandate and toward the 12 UN voluntary road safety performance targets (see box 1.1). At the coordination level, the World Health Organization (WHO), together with UN regional commissions and partners of the UN Road Safety Collaboration, will support the engagement with member states on regional, national, and local implementation of the plan and associated monitoring.

Further political leadership and commitment is expected as part of the UN General Assembly high-level meeting on improving global road safety scheduled to take place in July 2022 alongside the UN high-level political forum on sustainable development (IISD 2022). Several actors are also expanding the evidence base for road safety interventions, such as the UN Road Safety Fund, which funds road safety pilots in LMICs. Others, such as the Global Road Safety Facility (GRSF) and the Bloomberg Initiative for Global Road Safety (BIGRS), are working with traffic authorities around the world to improve road safety management capacity and policy, and aggregating insights from the growing evidence base for road safety interventions, such as in the recent report *Guide for Road Safety Interventions: Evidence of What Works and Does Not Work* and in the creation of a new

1 SDG Target 3.6: Halve the number of global deaths and injuries from road traffic accidents; SDG Target 11.2: Provide access to safe, affordable, accessible, and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

2 Global estimate for total private and public investment compiled by Oxford Economics in 2017. Additional road safety investment data generated by Global Infrastructure Hub's "Infrastructure Outlook" database, available online: <https://outlook.gihub.org/>.

Figure 1.2. Annual Road Safety Funding Gap vs. Global Road Investments

Source: Global estimate for total private and public investment compiled by Oxford Economics in 2017; other road safety data collected from Global Infrastructure Hub's Infrastructure Outlook: <https://outlook.gihub.org>; and UN Road Safety Fund 2016.

Road Safety Calculator tool to assist implementers in choosing appropriate interventions (Turner, Job, and Mitra 2020). The Fédération Internationale de l'Automobile (FIA Foundation), in addition to providing significant start-up funding for the UN Road Safety Fund and supporting the work of the FIA High Level Panel, is investing approximately US\$10 million per year in Safe System interventions, primarily for road and vehicle safety design assessments and advocacy (FIA Foundation 2018).

The Multilateral Development Banks Working Group on Sustainable Transport (MDB WGST)—which has

previously pledged to provide more than US\$175 million in loans and grants for transport in LMICs between 2012 and 2022—has also reconfirmed its commitment to road safety through the Second Decade of Action.³ However, initiatives to mobilize private capital specifically for road safety are yet to be developed.

The World Bank Group (WBG) seeks to lead on mobilizing private capital for road safety—an essential piece of the puzzle that has yet to be fully defined or activated. Many of the financial savings associated with improving road safety are

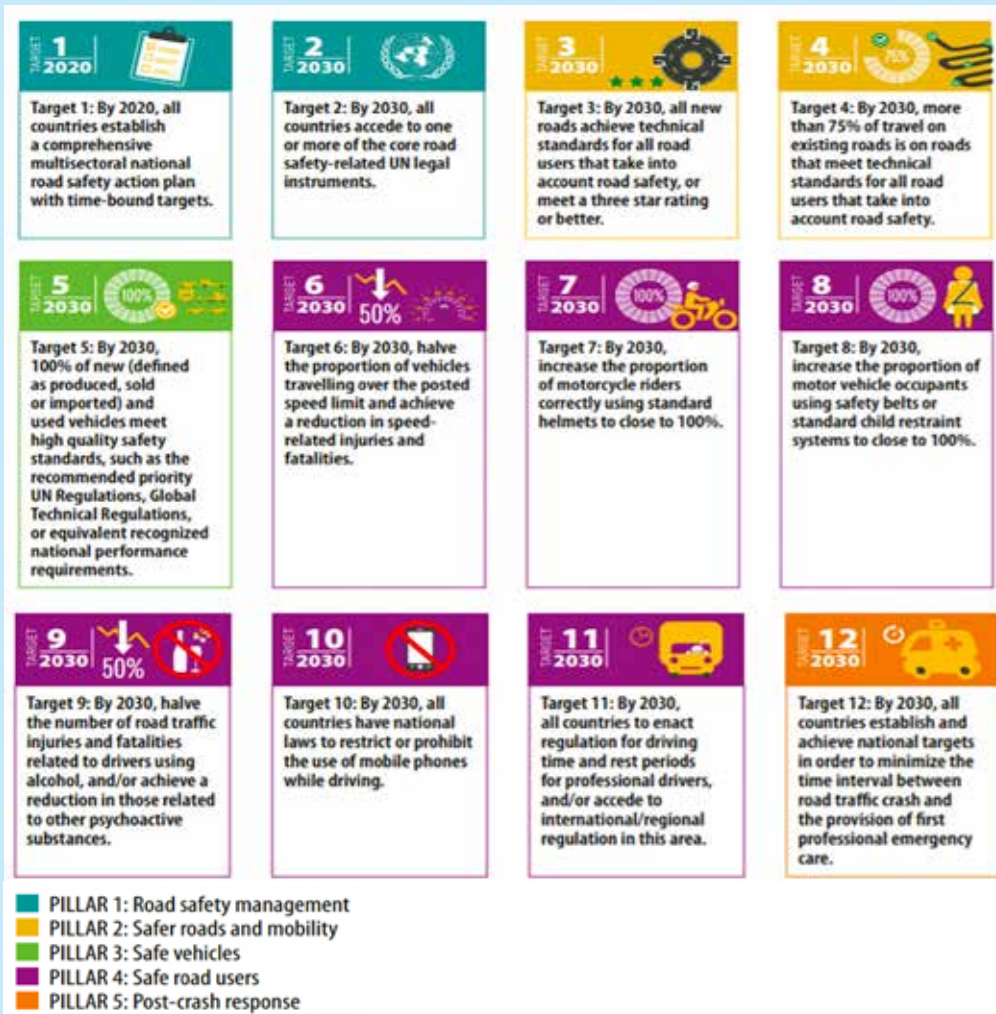
³ A group of ten multilateral development banks, including: African Development Bank, Asian Development Bank, CAF- Development Bank of Latin America, European Investment Bank, Inter-American Development Bank, Islamic Development Bank, and the World Bank.

not enjoyed by the agent funding the intervention. In some areas, such as vehicle safety or design of road infrastructure for safe use, this is an archetypal example of externalizing social and environmental costs. In some cases, the costs and benefits are dispersed throughout the economy (such as in the insurance or health sector)—a situation that can cause a critical misalignment of incentives. Competition to keep costs low and maximize profits can lead to vital road safety investments being sidelined. This calls for the creation of financial models that reflect the true cost on a more holistic basis, price in costs of unsafe roads and vehicles, and realign incentives, including where appropriate, by capturing and channeling some of the potential financial savings from reduced RTIs back to investors. Such opportunities exist under the rapidly growing sustainable debt and impact investment market, which several other causes under the SDG mandate—such as climate change and health funding—have successfully leveraged to expand their pool of resources. However, the road safety agenda has yet to engage fully with these developments. This WBG report examines how to bring models from the sustainable debt market and impact investment market to road safety to finance interventions that save lives. Chiefly, this report will: (1) identify road safety project areas that lend themselves to private sector participation, (2) identify the potential to create revenue streams or utilize blended finance solutions to overcome barriers to investment, and (3) showcase how tools from the growing sustainable finance markets can be leveraged to make road safety a viable focus for responsible and impact-conscious investors.

The remainder of the report is organized in four parts: Chapter 2 introduces the scale of the global crisis in road safety, the disproportionate burden borne by LMICs, and the market failures that have led to the prevalence of dangerous roads. Chapter 3 shows how sustainable finance and impact investment alternatives can bring about the necessary realignment of incentives, introducing a four-part process to direct more capital to better road safety outcomes, namely by defining sustainable revenue streams, accessing sustainable capital, bridging viability gaps with blended finance, and securing impact through technical assistance. Chapter 4 takes a deeper look at how to apply these concepts at the project level, putting forward eight project archetypes and five potential investment structures, as well as key considerations regarding the local context, how to mitigate risks, and how to build a robust results framework. Chapter 5 presents the steps that need to be taken by private sector, public sector, and development actor stakeholders to scale up sustainable finance for road safety. In chapter 6, the report concludes by laying out a plan for a mobilization platform that will bring these stakeholders together and alongside a strategy for data, learning, and catalytic funding, ensure that the final decade remaining to deliver on the SDGs is one of action.

Box 1.1. The 12 Global Road Safety Performance Targets of the United Nations

Following a request by the UN General Assembly, on November 22, 2017, UN member states reached consensus on 12 global road safety performance targets, which are voluntary additions to those mandated in the Sustainable Development Goals (SDGs). These 12 targets span the five pillars of safe systems action: (1) road safety management, (2) safer roads and mobility, (3) safe vehicles, (4) safe road users, and (5) post-crash response. See figure B1.1.1 for more details.

Figure B1.1.1. UN Global Road Safety Voluntary Performance Targets

Source: United Nations.

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2. Road Injuries and Fatalities: The Invisible Crisis

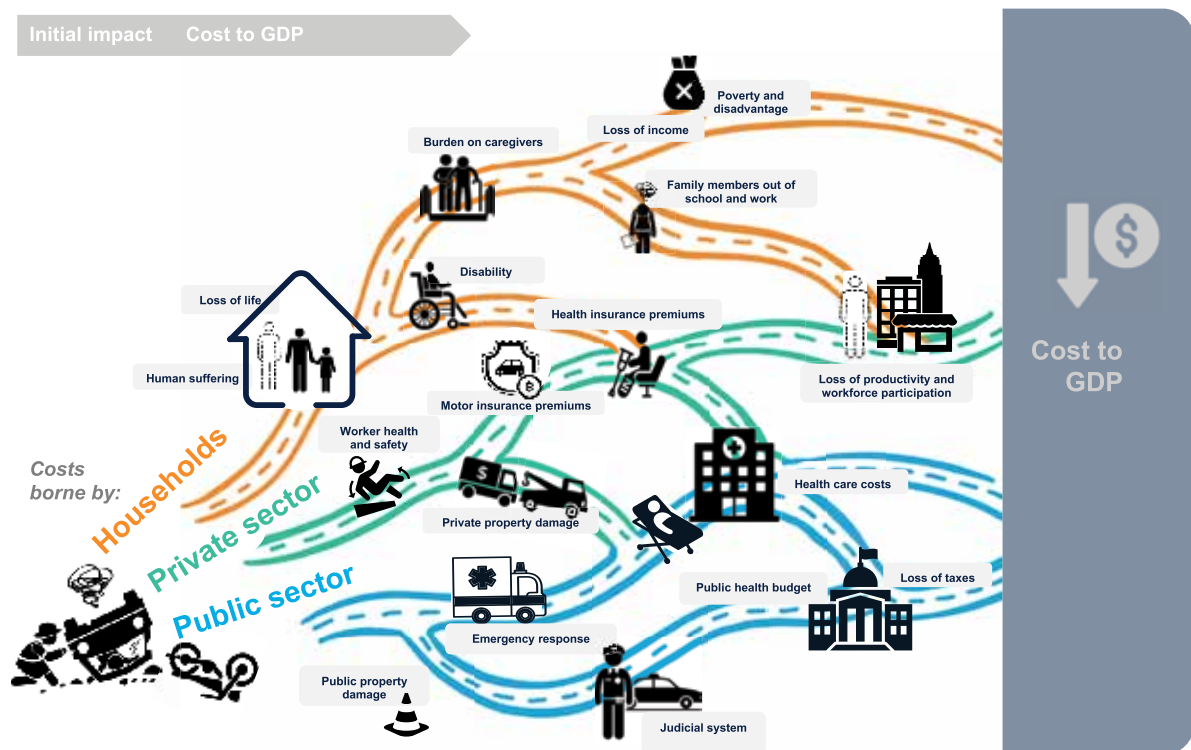


The Far-Reaching Costs of Road Crashes

The costs of a road traffic crash do not end at the roadside but instead have a far-reaching impact on society and the economy. Every day, 3,700 people die on the world’s roads, and approximately 148,000 more suffer injuries (WHO 2018). Each of these road traffic incidents (RTIs) has the potential to create complex and long-term implications for those affected and create ripple effects of social and economic costs throughout society. The potential chain of costly events set off by an RTI are laid out in figure 2.1, and incur costs borne by the affected households and communities, by the public sector,

and the private sector. Fatalities and serious injuries (FSIs)—the human cost—are the most significant, often resulting in loss of income, increased health care costs, and burden on caregivers in the household. In addition, private and public property damage, the costs of emergency response and health care, strains on the enforcement and judicial system, and the long-term loss of productivity and income resulting from disability and fatality are just some of the many ways road traffic crashes can inflict costs on the broader society.

Figure 2.1. Visual Representation of the Far-Reaching Costs of Road Traffic Incidents

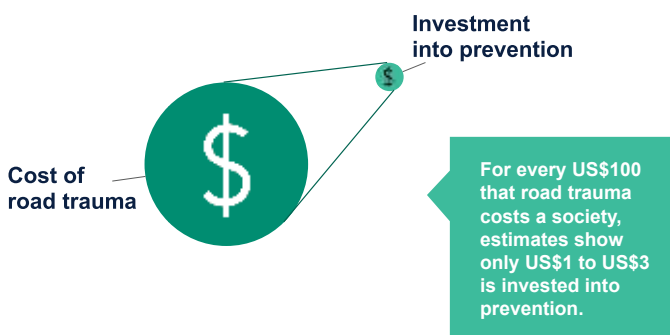


Source: Original figure produced for this publication.

These costs are significant, reaching as high as 6 percent of gross domestic product (GDP) in low- and middle-income countries (LMICs) when the fragmented picture is brought together.

It is estimated that the overall cost of RTIs to GDP in LMICs stands at US\$1.7 trillion. This figure outweighs the development assistance these countries receive, and equates to roughly 6 percent of their GDPs, compared to 1 percent to 3 percent in high-income countries (HICs) (McInerney and Smith 2020). A Global Road Safety Facility–Bloomberg Philanthropies Initiative for Global Road Safety (GRSF–BIGRS) analysis that looked at potential savings in the health sector alone found halving the number of traffic injuries could equate to an additional 15 percent to 22 percent GDP per capita income growth over 24 years in LMICs (World Bank 2017). In other words, inaction in the Decade of Action has cost LMICs a compounded 2 percent to 3 percent of potential GDP per capita growth. Yet, despite evidence of the size of the cost, very little is invested in prevention. As shown in figure 2.2, globally, current estimates indicate only US\$1 to US\$3 is invested in prevention for every US\$100 that road trauma costs a community (see “Road Safety Impact Investment: The [iRAP Global Business Case for Impact Investors](#),” published by the International Road Assessment Programme (iRAP).

Figure 2.2. Reactive vs. Preventative Spending



Source: McMahon and Dahdah 2008.

Figure 2.3. Road Fatality to Injury Ratio



Source: McInerney and Smith 2020

Ultimately, it is the victims of road crashes who pay the highest price. Economic costs are borne by the affected households and can result in families becoming trapped in poverty. An estimated 12 million to 70 million people are kept in poverty every year because of a road traffic injury or fatality (iRAP 2016). Losing a breadwinner, losing work due to disability or recovery time, or struggling to pay high medical costs and damages are just some of the ways in which the fallout from a road crash can trap a household in poverty. For example, a study conducted in Vietnam found that in 84 percent of households with a member undergoing treatment for a traumatic brain injury due to a motorcycle crash, treatment costs represented more than 40 percent of the family’s income (Hoang et al. 2008). Similarly, a study in Cambodia that looked

McMahon and Dahdah (2008) shows that for every road-crash fatality, victims suffer approximately 10 additional serious injuries (see figure 2.2). The World Health Organization (2018) shows that for 1.35 million fatalities, RTIs produce 50 million injuries.

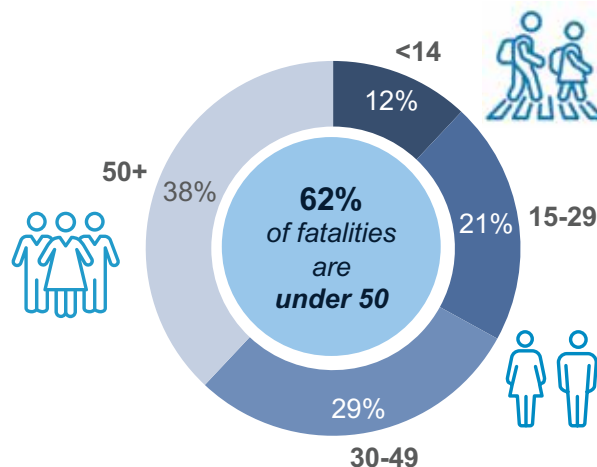
at a range of welfare indicators found household income fell an average of 21 percent after a member was involved in a traffic crash (Ericson and Kim 2011). Particularly in contexts where private insurance rates are low or insurance is insufficient, costs deplete the household's income and savings, and can become crippling for families. Beyond the initial costs of post-crash care, secondary effects can also be severe, such as children having to leave school and losing future earnings potential. These effects can reinforce cycles of poverty, further distancing individuals from paths out of poverty, such as the ability to undertake employment and education.

These costs also carry a gendered effect. Three times more men than women suffer road crash injuries. This is driven largely by the fact that males comprise a higher percentage of vehicle passengers as well as some evidence that men engage in riskier road behaviors than women (WHO 2002).¹ However, when women are involved in crashes, differences in height and stature actually mean women are 28 percent to 31 percent more likely to die than males under similar crash forces (WHO 2002). Furthermore, as shown in figure 2.3, an estimated 10 serious injuries occur for each death, resulting in the need for long-term care. Given male victims are more likely to be the lead source of income in LMIC households, care responsibilities are mainly borne by the women in the households, who face the burden of becoming full-time caregivers in the event a family member is injured in a crash (WHO 2002).

However, drivers are not the only ones affected. Vulnerable road users, such as pedestrians, are some of the most at risk, particularly in LMICs; many are children and young people. Vulnerable road users (pedestrians, cyclists, and motorcyclists)

make up more than half of global road traffic deaths (WHO 2018). Globally, 26 percent of road deaths are of pedestrians and cyclists, and passengers of two- and three-wheel vehicles comprise another 28 percent (see figure 2.4) These rates are even higher in lower-income country contexts, where there is greater foot traffic on roads without sidewalks, a higher number of motorized two-wheelers, and less infrastructure, such as bicycle paths, footbridges, or underpasses, to protect vulnerable users. Africa has the highest proportion of cyclist and pedestrian deaths, which represent a staggering 44 percent of total road deaths. In South-East Asia and the Western Pacific, 79 percent of road deaths are passengers of two- and three-wheel motorized vehicles (WHO 2018). Children and young people make up 33 percent of global road deaths, and more than 60 percent of those killed are under the age of 50 (see figure 2.5) (WHO 2018).

Figure 2.4. Road Fatalities by Age in LMICs, 2019



Source: WHO 2018.

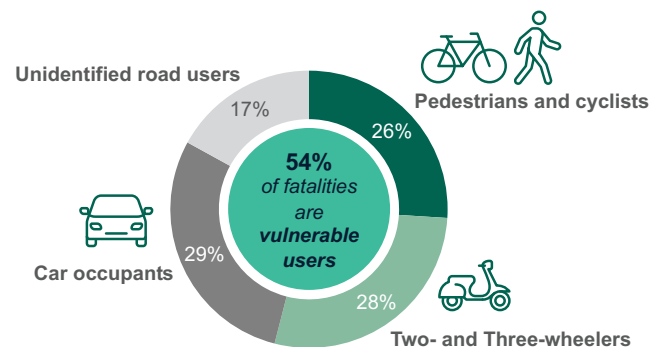
¹ The study was conducted in the United States for female occupants between the ages of 20 and 35. While three out of four RTI victims are male, women are more likely to take on care responsibilities, such as becoming full-time caregivers.

These trends are only projected to worsen, and without action LMICs will be approaching 1.5 million road fatalities a year by 2030.

As previously noted, 90 percent of global road deaths occur in LMICs, despite these countries having less than 60 percent of the vehicles (WHO 2021). Rapid urbanization and motorization within weak institutional frameworks has caused the number of road traffic incidents in LMICs to spike—a trend unlikely to slow down unless safety is made a priority. Furthermore, due to severe underreporting of traffic incidents in LMICs, these figures are likely much higher. Underreporting of road crash fatalities is estimated to be as high as 84 percent in low-income countries (LICs), and 51 percent in middle-income countries (MICs) (World Bank 2019). Whereas HICs have seen steady success in lowering their number of RTIs, injuries, and fatalities in recent decades, LMICs have not followed this trend (see figure 2.6). In fact, no LIC has seen a reduction in its number of road traffic deaths since 2013 (WHO 2018).

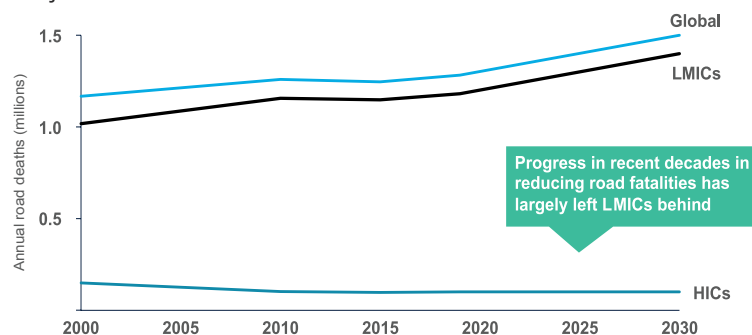
Crashes are also more fatal (figure 2.7): The risk of dying after a collision in a LIC is three times higher than in a HIC (WHO 2018). This is due in part to higher-risk roads and vehicles and weak emergency response and trauma care. Even if crash rates stayed the same in LMICs, but fatality rates from severe injuries dropped to the level of high-income countries (HICs), up to 500,000 road traffic fatalities could be avoided each year—a 40 percent reduction that would take current levels most of the way needed toward the 2030 Sustainable Development Goal (SDG) targets (WHO 2017). When the costs are so high, and trends are only projected to worsen, the question remains as to why road safety remains so low on the agendas of public policy and development assistance.

Figure 2.5. Global Road Fatalities by User, 2018



Source: WHO 2018.

Figure 2.6. Fatalities from Road Injury Over Time and Projected to 2030



Source: WHO 2020.

Figure 2.7. Road Fatalities per 100,000 for Ten Low- to Middle-Income Countries



Source: WHO 2020.

The Invisibility of the Crisis

Road traffic crashes are almost never “just an accident”—a strong evidence base has shown that traffic crashes are both predictable and preventable. For example, a 5 percent cut in average speed has been shown to result in a 30 percent reduction in fatal road crashes. Furthermore, studies have shown simple infrastructure improvements such as footpaths, safety barriers, bicycle lanes, and paved shoulders could save 3.6 million lives and prevent 40 million serious injuries if they were implemented on the 10 percent highest-risk roads in each country (WHO 2017). Yet, despite having the evidence to support acting on prevention, road safety remains low on the public agenda, with only 10 percent of LMICs having fully earmarked funding for road safety in their budgets.²

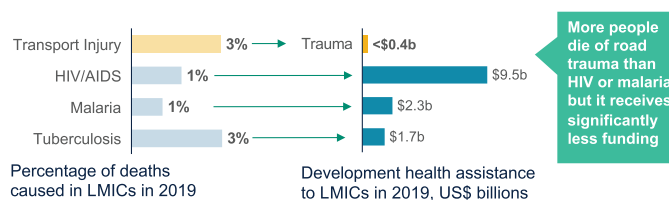
Framing road crashes as “one-off” moments of human error prevents the public from looking critically at system-level failures and calling for action. When governments, private road owners, and car manufacturers are not held accountable for failure to build, maintain, and enforce safer roads and vehicles, this leads to subpar levels of safety and perpetuates the fatalistic notion that road crashes are an unavoidable side effect of urban development. For decades, the development community has been calling road traffic injuries a major public health and development crisis, yet in the wake of a traffic crash conversations are still more likely to focus on the individual drivers rather than public responsibility.

The lack of accountability in the public domain is further exacerbated by the scattered responsibility of the road safety agenda. While transport ministries are responsible for developing and enforcing road and vehicle safety standards, the impact of poor road safety is felt by public health care systems. Though emergency response and medical treatment for trauma are sizable costs to the health sector, road safety does not fit within the remit of ministries of health, unlike other

preventative measures such as vaccines or nutrition. On the other hand, ministries of transport do not bear as much of the cost of RTIs and, working with limited budgets, are incentivized to allocate funds to other priorities. Only around 50 percent of LMICs have defined clear road safety targets, and only around 50 percent of LICs have a national road safety strategy (World Bank 2019). This disparity in mandates and incentives can lead to a lack of accountability for the road safety agenda, making effective change challenging.

This invisibility of the road safety crisis also leads to under-prioritization in development assistance, with trauma care receiving less than 1 percent of health development assistance and significant underinvestment in prevention (Stewart et al. 2019). As illustrated in figure 2.8, which compares the amount of development health assistance with the share of total deaths in LMICs, the funding for all types of trauma care is disproportionately small even in relation to the number of transport-related deaths, which is just a subset of all trauma deaths. For each US\$100 of trauma costs, only US\$1 to US\$3 is invested to prevent them (see “[Road Safety Impact Investment: The iRAP Global Business Case for Impact Investors](#)”). In comparison, tuberculosis, which is responsible for a comparable percentage of total deaths in LMICs, received 4.5 times more funding from development health assistance in 2019.

Figure 2.8. Global Health Development Financing vs. Percentage of Total Deaths in LMICs



Source: See “[Financing Global Health](#),” data available online from the Institute of Health Metrics and Evaluation (IHME). WHO 2020.

2 See more at World Health Organization Global Health Observatory Data Repository on Road Safety. Dataset last updated 2016. Accessed March 11, 2021. <https://apps.who.int/gho/data/node.main.A989?lang=en>.

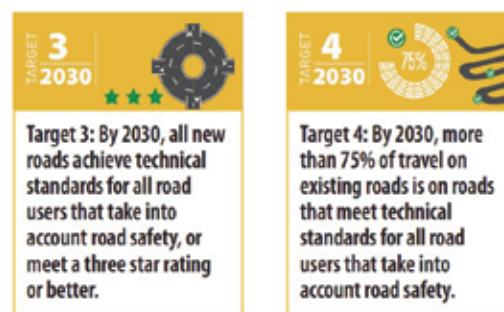
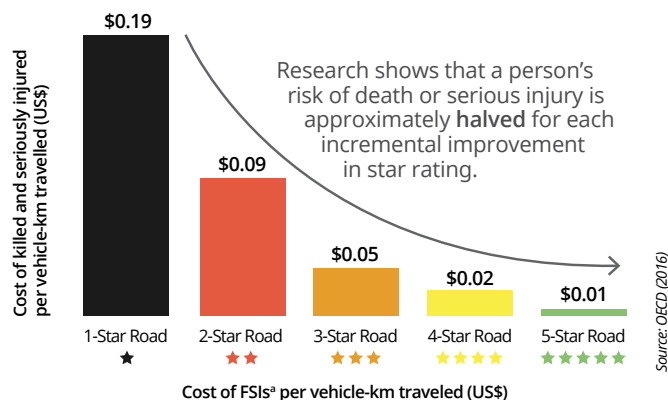
The Market Failure in Road Safety

Building safer roads and making existing roads safer has not been a priority. The lack of incentives for road owners to increase safety standards beyond the minimum requirements in cost-competitive environments makes them less likely to invest in road safety. Concessionaires and contractors typically compete on cost, and in environments with weak safety regulation and enforcement this can lead to a misalignment of priorities. Frequently, the upgrades in road quality in LMICs, which usually leads to increased speeds and traffic volumes, can lead to an adversely increased rate and severity of RTIs due to a lack of enforcement of appropriate safety standards and norms. This, in turn, stresses the need for adopting a holistic approach to road safety that includes well-targeted technical assistance adapted to the local contexts of considered interventions. The Liberian Monrovia–Gbarnga–Ganta–Guinea road network (discussed in box 2.1) is an example of this, where despite road infrastructure upgrades, the network remains a highly dangerous corridor. Even if roads are built to meet the required standards, local minimum standards in many LMICs are well below international best practice, with many countries still requiring support to build up technical capacity in this area.

Even where concessionaires do wish to invest in and make safety improvements, the lack of supportive regulatory environments acts as a significant constraint. The result is that across LMICs, 55 percent of roads are below an iRAP three-star rating for vehicle occupants (box 2.2 provides more details on iRAP and its star ratings) and 85 percent of roads are below an iRAP three-star rating for pedestrians—worryingly high figures generated using the iRAP “Big Data Tool.”³ Lack of attention to pedestrian safety

is common. Road owners and concessionaires see pedestrian safety—and the construction and maintenance of corresponding infrastructure (such as sidewalks, cycle paths, footbridges, and crossings)—as beyond their remit. This is especially concerning when pedestrian and cyclist casualties make up more than a quarter of road traffic fatalities (see figure 2.5, earlier in the chapter). As stated, RTIs can cost economies as much as 6 percent of their GDP. However, since the majority of these costs are not borne by the road owners, market failures arise when road owners do not account for the externalities of their dangerous roads.

Figure 2.9. iRAP Star Rating: Relationship between Safety Standards and Costs of Fatalities and Seriously Injured per Kilometer Traveled



3 The iRAP Big Data Tool is available online: <https://www.vaccinesforroads.org/irap-big-data-tool/>. iRAP star ratings are based on road inspection data and evidence-based research. Pedestrians, cyclists, motorcyclists, and vehicle occupants provide an objective measure of the likelihood of a crash occurring and its severity. A one-star rating is the least safe and a five-star rating is the safest.

Source: Vaccines for Roads, an iRAP program. <https://www.vaccinesforroads.org/how-safe-are-the-worlds-roads/>. Note: a. FSIs = fatalities and seriously injured.

Box 2.1. Persistent Road Danger Despite Road Upgrades in Liberia

The Monrovia–Gbarnga–Ganta–Guinea road in Liberia is a major transport corridor of economic importance because it provides a key link to the Guinea border. In 2011, the road had fallen into a state of disrepair and needed complete rehabilitation. The World Bank supported this restoration with a US\$230 million blended finance package to the government of Liberia, which included cofinancing from the International Development Association (IDA) and a grant from the Liberian Reconstruction Trust Fund. The Liberian Ministry of Public Works handled the project through a ten-year design-build-operate contract with an overseas contractor.

Although the contract agreements included reference to “international best practice” for safety, they did not include sufficient punitive measures, nor mechanisms to enhance or support local enforcement of adapted safety standards to the upgraded design of the corridor. At the time, the government of Liberia had yet to develop its technical capacity in road safety management as this was a new topic within the public agenda. The unintended result of the road rehabilitation project has been an increase in the rate of vehicle-to-vehicle and vehicle-to-object collisions—collisions now more severe due to the higher speed limits on the new road (see the crash illustrated in figure B2.1.1).

Figure B2.1.1. Photo of Crash on the Monrovia–Ganta Highway



Source: Lomax 2020.

In conversations with the press, traffic authorities have attributed the high crash rate in part to driver behavior, but also to the lack of appropriate safety standards on the corridor, including the absence of road markings and road signs (Lomax 2019). The road currently has a death toll much higher than is expected of a highway of this size. In 2019, there were more than 40 fatalities on the Monrovia–Ganta highway, and more than 300 injuries (Lomax 2019). In the first half of 2020, 27 lives were lost on the same stretch. In just one week in July, three severe collisions resulted in six of those deaths (Lomax 2020).

This example is not unique. It is common for new road constructions and upgrades, which often increase the number of vehicles and the speed at which vehicles drive, when combined with weak enforcement of safety standards to lead to an increase in the rate of road traffic accidents/fatalities and serious injuries. This underscores why it is vital that road safety becomes a priority.

This market failure is not confined to road infrastructure; it also extends to other pillars of road safety, including safer vehicles, as well. Similar to road owners, car manufacturers do not have financial incentives to invest in increasing the safety of their vehicles or disincentives to selling unsafe vehicles. This could be tackled with tighter regulation, increased transparency and reporting requirements, and greater inspection and certification of vehicles. Compulsory risk-adjusted motor insurance is another way to tackle this market failure, as, if enforced, risk-adjusted insurance will make unsafe vehicles more expensive to drive. This does not only apply to new vehicles, and a similar rigor needs to be applied to imports of used vehicles, many of which may no longer pass minimum safety standards. However, many LMICs currently lack sufficient regulation to correct this market failure. For example, a recent report by the Automobile Association of South Africa (AASA) funded by the Fédération Internationale de l'Automobile (FIA Foundation) found that 22 African countries currently have no restriction on the import of secondhand vehicles (FIA Foundation 2020). This makes it more likely that vehicles that are not roadworthy enter the market.

As regulation is introduced to drive more sustainable production and investment, an opportunity arises to include requirements for minimum standards that encompass both environmental performance and safety. Other developments, including mandating of sustainability reporting, could be utilized to introduce a safety element on the basis that assessment of the net impact of a vehicle

manufacturer or distributor includes harm to users potentially caused by unsafe vehicles. “Polluter pays” and similar approaches provide precedents for this in relation to environmental protections requiring disclosure. For example, the European Union Emissions Trading Scheme (EU ETS) imposes requirements on operators to submit annual emissions reports that must be verified by an accredited verifier (European Commission 2021a). Other examples of this approach include air passenger taxes to pay for or offset environmental harms; regulation or taxation of single-use plastic, which is estimated to generate €6 billion to €8 billion annually. In addition, sugar taxes, now in place in 42 countries, based on growing evidence of the negative health impacts of refined sugar content in food, are gaining the attention of investors as a risk to be managed (European Commission 2021b; Enache 2021; Marshall 2020).

Safer roads and vehicles generate benefits for many actors, including in the health sector, yet many of these potential beneficiaries are not involved in project design for RTI prevention.

Having demonstrated the far-reaching costs of dangerous roads across communities and economies, further significant financial savings that come with making roads safer. However, much of these savings are realized in sectors that are traditionally not involved in road investments. For example, the health care sector, insurance sector, and owners of commercial fleet all stand to gain financially from fewer RTIs, through fewer trauma patients, fewer claims, less damage to commercial vehicles, and better delivery times. Looking only at costs directly associated with

FSIs, figure 2.9 shows how by improving the safety standards of roads from a one-star to a five-star iRAP rating, significant cost savings could be generated per kilometer driven.

Many of the actors who benefit face barriers to participating or investing meaningfully in road safety. One barrier is the lack of structures allowing these beneficiaries to share in the traditional revenue streams associated with roads, such as of user fees (tolls) and availability payments from the road authority to repay road concessions. The second barrier is that road safety, which is typically framed as an infrastructure issue, lies outside of the area of expertise of many of these actors. For example, as shown earlier in figure 2.8, health development assistance currently under serves road trauma victims. Although post-crash care is an important part of the road safety puzzle, often the most cost-effective and long-term solutions lie in prevention. However, the needed infrastructure upgrades and changes in transport regulation lie beyond the area of expertise of health providers, making it harder for them to engage in addressing the root causes of road safety issues and limiting their ability to offer support. The following chapter will present a novel approach to solving these issues via a structured approach to road safety, whereby investable road safety projects with the potential to enable a wider range of actors to engage in road safety and mobilizing funding from a wide range of sources, are identified.

Box 2.2. iRAP Star Ratings

The International Road Assessment Programme (iRAP) is a registered charity in the United Kingdom with a vision for a world free of high-risk roads for all road users. The iRAP global standard has been applied in more than 100 countries worldwide, shaping more than US\$80 billion in safer roads investment. The star rating models form the basis of the United Nations member state agreed Global Road Safety Performance Targets in support of SDG Target 3.6, to halve road deaths and injuries by 2030.

Star Rating for Pedestrians, Cyclists, Motorcyclists, and Vehicle Occupants: Star ratings are based on road inspection and design data and provide a simple and objective measure of the level of safety which is “built in” to the road for vehicle occupants, motorcyclists, bicyclists, and pedestrians. Five-star roads are the safest, while one-star roads are the least safe.

The iRAP star ratings use evidence-based research and risk models that are governed by an independent Global Technical Committee, which is comprised of research experts from around the world. This data can then be used in estimations of fatalities and serious injuries (FSIs), and in investment plans, risk mapping, and performance tracking.

Source: iRAP (<https://irap.org>).

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3. Addressing the Market Failure in Road Safety



The movement toward socially responsible investing is forcing a realignment of incentives. Many economic activities have social and environmental consequences and externalities—positive and negative, intended and unintended. Pollution and environmental damage, for example, is perhaps the most well-known externality of economic development. Increasingly, companies are being required to measure, compensate for, and reduce their environmental and social footprint. For example, carbon taxes and carbon markets aim at pricing the externality of emissions, and a similar tactic can be applied to considering the social costs of road safety, where surcharges, levies, or corporate social responsibility (CSR) taxes could be used as a channel to internalize the social costs of road traffic incidents (RTIs) by funding road safety interventions. For example, in Colombia, the National Road Safety Agency (Agencia Nacional de Seguridad Vial) gains part of its funding by receiving 3 percent of the premiums on compulsory third-party motor insurance—therefore, directly channeling some of the cost of road crashes back into funding prevention.

This movement toward socially responsible investing is being supported by a rise in sustainability and economic, social and governance (ESG) strategies and reporting. The rise in ESG and sustainable investment is driven by public and investor demand. Expectations of greater transparency on business's wider impact is informing increased regulation, mandatory reporting requirements, and new standards. For example, European Union (EU) legislation that went into effect in 2021 as part of a broader sustainable finance package has made reporting on certain ESG and sustainability factors mandatory for

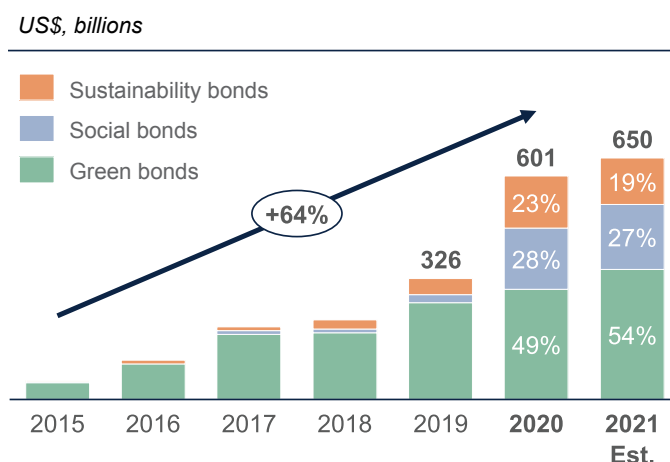
all EU financial market participants with more than 500 employees, as well as mandatory sustainability reporting requirements on a wide range of financial products.¹ The International Financial Reporting Standards Foundation (IFRS) is developing a proposal for an International Sustainability Standards Board, which could change the financial reporting landscape (IFRS 2021). By requiring investors to capture and account for their wider social costs and pay for them—either literally or through reputational risk—ESG reporting and socially responsible investing force a realignment of incentives between profitability and societal impact.

Investors are also moving beyond avoiding negative externalities to investing in pro-social opportunities, as marked by the rapid growth in the sustainable finance market. Increasingly, private and institutional investors are going beyond ESG ratings to seek out investments that contribute positively to the Sustainable Development Goals (SDGs). Markets are growing for socially responsible or impact investing, where investors expect both financial and social returns from their investments. This is significant as many of these investments recognize and factor in the social and environmental impacts previously considered externalities. In 2020, the sustainable debt market broke records with a US\$732 billion total issuance (see figure 3.1) having had a 61 percent compound growth rate over the past eight years and being projected to grow a further 25 percent in 2021 (Henze 2021; Bullard 2021; and Pratsch 2021). This market includes themed use-of-proceeds products such as social, green, and sustainability bonds or close space before—proceeds are earmarked for socially and environmentally beneficial

1 Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector. Accessed March 13, 2021. Available at: <https://eur-lex.europa.eu/eli/reg/2019/2088/oj?fbclid=IwAR0sngU-s67McR4blaaldV89Yozb7ivX-myZBRXZyb8XoCONIRDGy4v0hpNs>.

projects—and sustainability-linked debt, where investors' returns are conditional on the achievement of social and environmental outcomes. Several sectors have successfully leveraged this market to unlock large pools of new funding for development projects. For example, since the inception of green bonds in 2007, sustainable debt for climate projects has exceeded US\$1 trillion in total issuance and has even seen the emergence of a pricing premium for green bonds (or "greenium"), which adds another incentive for issuers and highlights the strong investor demand for this type of offering (Jones 2020; Löffler, Petreski, and Stephan 2021).

Figure 3.1. Global Sustainable Bond Market: 2015–2020 Historical and 2021 Estimated



Source: Environmental Finance 2020.

The increase in social bonds since 2020 has been marked, with a particular focus on health and COVID-19 relief. Other examples of areas currently successfully leveraging sustainable debt include financial inclusion and sustainable water management (Environmental Finance 2020). Sustainability-linked bonds and facilities have also entered the market. These debt products are structured around commitments to improve sustainability performance based

on agreed targets. This is linked to the pricing through the coupon paid to investors for bonds and review of the interest rate payable for other debt products. Despite being clearly targeted in and affecting a range of SDG targets, road safety is yet to be an investment area harnessing the sustainable finance market.

This is the perfect time for the road safety agenda to capitalize on sustainable debt products.

Infrastructure and other project finance are well suited to the sustainable debt products that have developed. A global survey of more than 300 infrastructure leaders (large asset owners and managers representing US\$10 trillion in assets) found that 97 percent believe ESG factors are important considerations in their investment decisions (GI Hub 2019). Furthermore, 36 percent of the infrastructure leaders said that ESG is a first-order question that they would consider even at the expense of performance. According to estimates data generated by the [Global Infrastructure Hub's "Infrastructure Outlook to 2040" database](#), more than US\$800 billion is invested globally in road infrastructure each year. This creates huge potential for road safety projects to capitalize on the shifting motivations of infrastructure investors.² So far, road safety has not been an explicit target of sustainable or impact investing, and ESG frameworks used at the portfolio level are often too high-level to consider individual road safety requirements or targets. As the ESG and sustainable investment market begins to mature, it is important that road safety is not left behind and can leverage this growing market.

Leveraging the sustainable finance market for road safety will require road safety to be woven into sustainability strategies and performance requirements. As visualized in figure 3.2, there are four main components to support this on a project basis: (1) monetizing the benefits of road safety to

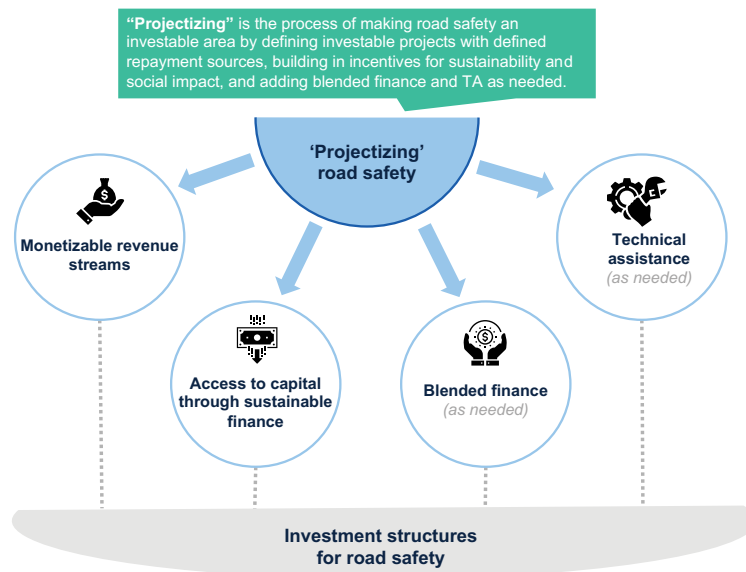
² Global estimate for total private and public investment, compiled by Oxford Economics in 2017.

create revenue streams to repay investments, (2) accessing capital through the sustainable finance market, (3) using blended finance to increase the viability where required, and (4) supporting technical assistance to ensure the delivery of impact. These are all then tied together via innovative investment structures designed to translate the economic case for road safety into a business case for investment in road safety. The remainder of this chapter details these four components and shows how each of them plays a role in addressing the market failure of dangerous roads, and how their combination can have a catalytic effect on the mobilization of private capital to road safety investments. Chapter 5 will then explore the nature of the investment structures that can tie these together in more detail, looking at how their structure and combination can vary based on the needs of the market and the road safety intervention.

New frameworks responding to and setting expectations for scaling up investments with positive social and environmental benefit can also be applied. Green and social bond principles and sustainability bond guidelines introduced by the International Capital Markets Association (ICMA)

provide frameworks for issuance of sustainability bonds (ICMA 2021a). Standards developed by the United Nations Development Programme (UNDP) and joint Organisation for Economic Co-operation and Development (OECD)-UNDP standards for private sector investment in development provide guidance for investment to be considered contributing positively to sustainable development, including requirements to consider stakeholder impacts, costs and benefits, and how they are distributed (SDG Impact 2020). These frameworks and standards could be a powerful tool in raising expectations of safety performance for road and related infrastructure and for vehicles. The frameworks can be applied by debt issuers from national and subnational, supranational, and multinational organizations, as well as companies, financial institutions, and special purpose entities backed by activities, assets, or projects. They can also be used to frame due diligence assessments and decision-making about the issuers' strategies, and governments, commissioners, and banks can support their adoption to promote sustainable development objectives, including safer roads and reduced road deaths and trauma and the related impacts.

Figure 3.2. Project-Based Approach for Sustainable Road Safety Investments



Source: Original figure produced for this publication.

Valuing Road Safety and Developing Sustainable Revenue Sources

Road safety does not have a “natural” revenue stream; however, a broader view of the system points to investable opportunities and potential revenue sources that would support investment.

Road investments are traditionally repaid either by the public (in the form of user fees) or by a government entity. Privately commissioned roads undergo a competitive tendering process that currently gives preference to lower-cost bids that meet the minimum design and operational standards. Road concessions are less likely to invest in safer roads unless the tendering process changes to give weight to other factors, the context shifts to crystalize and connect risk related to road safety factors, or investments can rely on new revenue streams.

Increasing private financing of road safety will require the generation of new and stable sources of revenue against which new projects can be financed. Revenue streams could be generated from users, such as through tolls, vehicle inspection fees or vignettes. Within existing road funds, clear ring-fencing of budget for road safety activities could be provided. However, since some of these revenues may already be allocated to finance other investments (for example, road maintenance), additional sources of revenue would be required to bridge the road safety investment gap. Governments need to consider creating additional sources to expand their road safety budget, such as through taxes and levies on key users. For instance, in Fiji, motor insurance companies voluntarily provide 10 percent of their insurance premiums to the National Road Safety Council, which amounts to 60 percent of its annual income (Zietlow 2006). In other instances, repayment can come directly from the users, such as using the revenue from newly established infringement fines to fund the installation and operation of a new speed management system, an increase in tolls to fund infrastructure

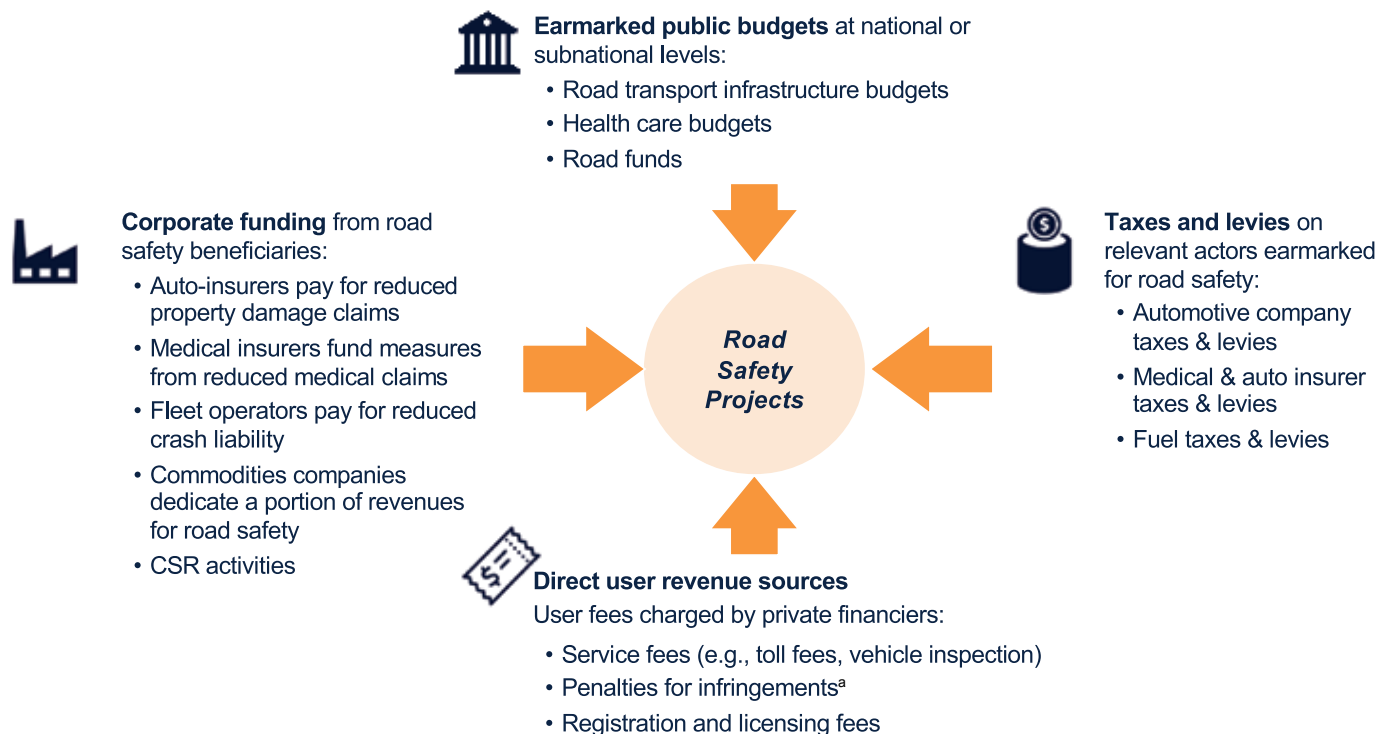
improvements, the requirement of a permit or “vignette” that gives road users access to specified parts of the network for an agreed period of time, or congestion charges levied by cities to address road usage at peak times (see the discussion of “[Mobility and Transport](#)” published online by the European Commission); also see Selmourne et al. 2020).

Recognizing the costs and benefits of road safety can unlock innovative mechanisms to create and align incentives for investment. By factoring in the cost to the wider economy and health care systems, public budgets can be mobilized to provide financial incentives for road safety. Innovative approaches can be adopted to enable corporates to better factor in costs and savings they stand to gain from lowered RTIs. For example, corporations with large fleets of commercial vehicles encounter significant costs from traffic collisions in terms of property damage, higher insurance premiums, and delays in addition to lost time and other impacts for personnel who are injured. A fleet owner (or consortium of fleet owners) could be willing to fund road safety improvements that help reduce these costs. An emerging interest in impact-weighted accounts, where a company’s financial statements transparently capture both positive and negative impacts of its performance, could also help attract investments. Fully costing the negative impacts of a corporate manufacturer or road user would affect its valuation and cost of capital, providing an incentive to invest in mitigating its negative impacts (see the “[Impact Weighted Accounts Project](#)” webpage published by Harvard Business School). This can also factor into the risk weighting of returns for investors over time. For example, as noted previously, the imposition of sugar taxes is bringing the harmful health effects of sugar to the notice of investors as an emerging risk factor that needs to be addressed (Marshall 2020).

When identifying a revenue stream, the distributional effect of the costs and benefits, as well as potential unintended consequences, should also be considered. The identification of repayment sources that can be tapped into or timing of outlays will vary between contexts and types of interventions. Even before considering donor capital, countries can explore several sustainable channels to generate funding for road safety, with the range of repayment sources summarized in figure 3.3. For interventions with wider societal benefits, such as pedestrian pathways across a city, a tax could be an appropriate revenue stream in terms of distribution as this spreads the costs over a wider group. In contrast, for interventions with a more contained benefit, such as

speed management on a single highway, user fees may be more appropriate. Where revenue streams are generated by market actors, the distributional effect of such actors passing on the cost will also need to be considered. Moreover, when applying user fees or similar costs, user behaviors and potential unintended consequences need to be considered, such as the risk of users diverting to higher-risk local roads in order to avoid paying tolls, which could potentially increase the crash rate in other areas. Therefore, when considering which revenue streams to use when funding intervention, user research and a willingness-to-pay analysis will be necessary. Box 3.1 looks at a successful investment case example in Australia.

Figure 3.3. Potential Revenue Streams for Road Safety Investments



Source: Original figure produced for this publication.

Note: a. If the legal and regulatory framework allows for collection of infringements by project financiers.

Box 3.1. Investment Case with Strong Internal Rates of Return from Lifetime Insurance Claims Reduction in Australia

Together with the International Road Assessment Programme (iRAP) and the Fédération Internationale de l'Automobile (FIA Foundation), the Transport Accident Commission (TAC) in Australia, which acts as a universal, no-fault insurer, has conducted an investment case for road safety, uncovering the potential returns that could be generated from a reduction in future claims by investing in a mix of preventative infrastructure treatments. The investment case examined the potential of two road networks with different levels of road safety maturity. The first network—the state network of Victoria—was relatively mature, with 4.33 fatalities per 100,000 in 2015, whereas the second network, Bruce Highway in Queensland, had much poorer baseline levels of safety, and (prior to recent government investment) had been listed as one of the 22 most dangerous highways in the world.

For each road, a mix of infrastructure treatments was proposed and costed that would target the highest-risk areas of the network and improve their overall iRAP star rating. Using the TAC dataset of more than 40,000 crashes and more than 50,000 claims together with iRAP models of how infrastructure upgrades would reduce the rate and severity of different crash types, it was possible to calculate the following investment cases for each stretch of network:

Victoria road network (a mature road network): Investing \$A28.4 million in up-front capital, followed by \$A33.4 million over 20 years to improve the iRAP star rating (from 40 percent to 78 percent four star or better for vehicle occupants, and from 54 percent to 87 percent three-star or better for motorcyclists) would save 40 lives and 240 serious injuries over 20 years. This equates to an estimated lifetime claims cost reduction of \$A52.2 million, shown in figure B4.1.1, with cost recovery by the 11th year. Figure B4.1.1 also shows a lifetime benefit-cost ratio (BCR) of approximately 1.6, and an internal rate of return (IRR) of 6 percent, before any broader economic cost savings are taken into account.

Figure B3.1.1. Victoria Road Network: Projected Costs Avoided



Source: World Bank analysis of TAC sample data and 2016 iRAP data.

Figure B3.1.2. Bruce Highway: Projected Costs Avoided



Source: World Bank analysis of 2016 iRAP data.

Bruce Highway, Queensland (a less mature road network): Investing \$A153 million in initial capital investment, followed by \$A204.4 million over 20 years to improve the iRAP star rating (from 54 per cent to 99 per cent three-star or better for vehicle occupants, and from 6 per cent to 41 per cent three star or better for motorcyclists) would save 340 lives and 2,660 serious injuries over 20 years. This results in an estimated lifetime claims cost reduction of \$A558.3 million, with approximate cost recovery in the middle of the fourth year, shown in figure B4.1.2. This equates to a BCR of approximately 2.7, and an IRR of roughly 20 percent—again before any broader economic savings are considered.

These positive BCRs and strong IRRs demonstrate the strong investment case for insurance companies that bear these costs to invest in RTI prevention, both for networks with higher and lower safety levels at the baseline. Although these investment cases assumed the simplest case of a direct investment from insurers into countermeasures (in effect bringing forward the capital that would otherwise be needed for future claims costs), other investment models that bring in a wider range of actors (as proposed in chapter 4 of this report) could also be considered to change the risk-return profile of the investment.

Source: Davies et al. 2016.

Directing Capital to Road Safety through the Sustainable Finance Market

Road safety provides a strong focus to direct capital from the sustainable finance market toward the Sustainable Development Goals (SDGs).

Opening new financing mechanisms could bring many benefits to borrowers in low- and middle-income countries (LMICs), particularly where access to capital is constrained. Road safety, which has a clear SDG mandate, is a good fit for sustainable investment. Beyond SDG Targets 3.6 and 11.2, road safety projects can also have linkages to a wider subset of the SDG targets.³ For example, increasing road access for rural communities (SDG Target 9.1.1), improving health and safety for road workers (SDG Target 8.8.1), increasing access to basic transport services for underserved communities (SDG Target 1.4.1), or increasing emergency preparedness in the health sector (SDG Targets 3.8.1 and 3.d.) are all SDG targets that could be met in tandem with road safety projects. Appendix A provides an illustrative mapping between 27 of the 169 SDG targets and potential road safety applications.

There is scope to enhance the sustainability proposition by bringing a climate lens alongside the road safety outcomes as road transport remains one of the largest sources of pollution. Various aspects of road safety, including safer roads and more efficient vehicles, also contribute to improved climate outcomes—for example, providing safe and efficient public transit facilities with associated safe facilities for pedestrians and cyclists; upgrading commercial fleets to newer models, including electric or hybrid vehicles; and inducing manufacturers (such as through impact-weighted accounts) to produce safer and cleaner vehicles.

Beyond the evident social impact derived from road safety investments, borrowers establishing

themselves as sustainable debt issuers also have access to other benefits. These benefits include access to more or lower-cost financing and contact with a wider pool of investors. This is particularly beneficial in LMICs where access to capital markets may be limited, as it could bring opportunities to engage with international capital markets. Over time, increased requirements for sustainability reporting may increase reputational risks or reduce availability of capital for businesses creating social and environmental harm.

Two types of sustainable debt with potential for road safety application are themed use-of-proceeds products and sustainability-linked products.

One option for raising sustainable debt is through a defined use-of-proceeds product—either in the form of a loan or a bond. Themed products, such as social, green, and sustainability bonds, are issued on the basis that proceeds will be directed toward investments aligned with the criteria laid out in the respective frameworks of the theme. In the case of social debt, use-of-proceeds are dedicated for projects with social benefit (typically related to the SDGs) as laid out in either the International Capital Markets Association's (ICMA's) Social Bond Principles, in the case of social bonds, or the Loan Market Association's (LMA's) Social Loan Principles, in the case of a loan (ICMA 2021b; LMA 2021). Given the SDG mandates for road safety under SDG Targets 3.6 and 11.2 and wider SDG linkages, raising social debt for road safety is a natural fit. Furthermore, if a road safety project also incorporates linkages to clean transport initiatives and climate impact, it could also be eligible for a sustainability-themed product where proceeds should be used for projects with both a social and climate impact (such as a sustainability bond under ICMA's Sustainability Bond Guidelines), as stated in ICMA (2021c).

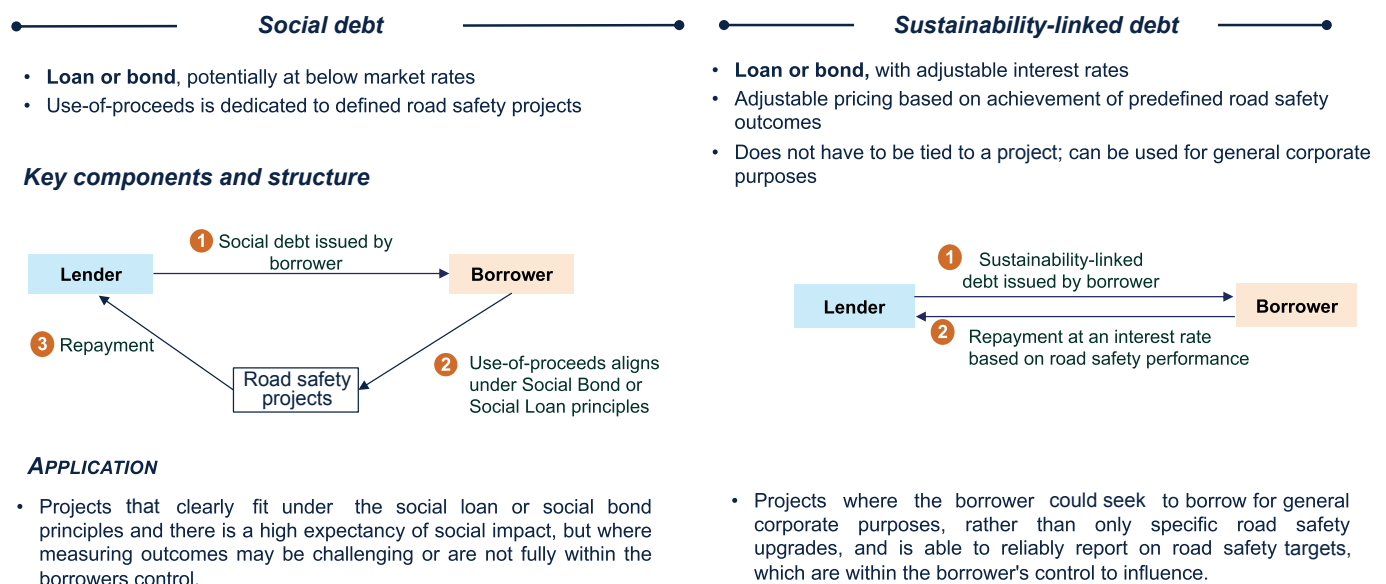
3 SDG Target 3.6: Halve the number of global deaths and injuries from road traffic accidents; SDG Target 11.2: Provide access to safe, affordable, accessible, and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities, and older persons.

Alternatively, if a borrower is not seeking financing for a specific road safety project, but rather for general corporate purposes while also wanting to improve road safety, sustainability-linked debt can serve as an alternative. In a sustainability-linked loan (SLL) or sustainability-linked bond (SLB) for road safety, debt would be raised for general purposes, but with variable pricing attached to predefined road safety key performance indicators (KPIs). SDG-linked debt is a common subset of sustainability-linked products, where pricing is conditional on targets related directly to the SDGs. As it is possible to measure the social benefits of road safety and set clear targets, either of these debt structures (as shown in figure 3.4) could be utilized.

The two options for sustainable debt can be chosen based on the needs of the borrower, the relative advantages that they provide, and the nature of the road safety investment. One of the

key differences between the two debt options shown in figure 3.4 is that only in sustainability-linked debt are financial returns tied to improvements on defined parameters. The other key difference is the use of financing: If the borrower prefers to raise financing for general purposes, and also has the ability to clearly influence and measure road safety impact, a sustainability-linked loan or bond could be the preferred choice as it offers the borrower the opportunity to unlock pricing advantages for seeking out road safety improvements in tandem with its wider projects. In addition, which debt products are most suitable and available will depend on the mix of lenders, borrowers, and implementers involved in the transaction, and the risks and returns associated with the road safety project in question. Multilateral development banks (MDBs) and development finance institutions (DFIs), acting as sustainability coordinators, have a particular role to play in assisting private sector clients to set up these structures and to access capital.

Figure 3.4. Two Options for Sustainable Debt Issuance



Source: Original figure produced for this publication.

Box 3.2. Infrastructure Group Leveraging Sustainability-Linked Loans in Chile

Acciona S.A., a multinational Spanish-owned infrastructure group with large asset holdings in Chile, has been leveraging the green finance market for many years to support its renewable energy projects, including photovoltaic and wind farm energy projects in Chile (Ali 2017). In 2020, Acciona S.A., whose Chilean assets include road concessions, went beyond the green loans markets to set up Chile's first ever ESG rating-linked loan (Santander 2020). This five-year sustainability-linked loan (SLL) of €675 million is one of the first to be governed by the recently released ICMA SLL Principles (Hussain and Rubinoff 2019). The SLL will be used for general corporate purposes with conditional pricing based on the company's overall ESG rating. Every year, RobecoSAM, which acts as the sustainability agency in the deal, will assess the ESG criteria of Acciona S.A. and assign a rating that will determine the pricing of the loan. Santander Corporate & Investment Banking, by financing the loan, is also positioning itself as a driver of sustainable financing in the region (Santander 2020). Compared to use-of-proceeds bonds and loans, SLLs offer greater flexibility to the borrower and potentially lower financing costs to companies committed to improving social outcomes. The strong potential for SLLs to be used in infrastructure investments in LMICs is beginning to emerge.

Source: World Bank analysis.

Catalyzing Investment with Blended Finance

Blended finance—a strategic use of grant investment to crowd in a larger pool of resources—is another way to catalyze private investment in road safety. Although an increasing number of investors are interested in responsible investment, not all are willing to pursue social impact in areas where there is a less established track record or in unfamiliar products or markets. Blended finance utilizes catalytic capital from public, donor, or other philanthropic sources to increase private sector investment in sustainable development. This includes making use of concessional donor funds to mitigate specific investment risks and help rebalance risk-reward profiles of innovative, high-impact investments so that they have the potential to become commercially viable over time (Convergence discusses this trend toward blended

financing on its [website](#); also see IFC 2021). This can increase the appeal of innovative projects or new market entrants to encourage private sector capital in projects that contribute to sustainable development, while providing financial returns to investors ([see the discussion on blended finance on the OECD website](#)).

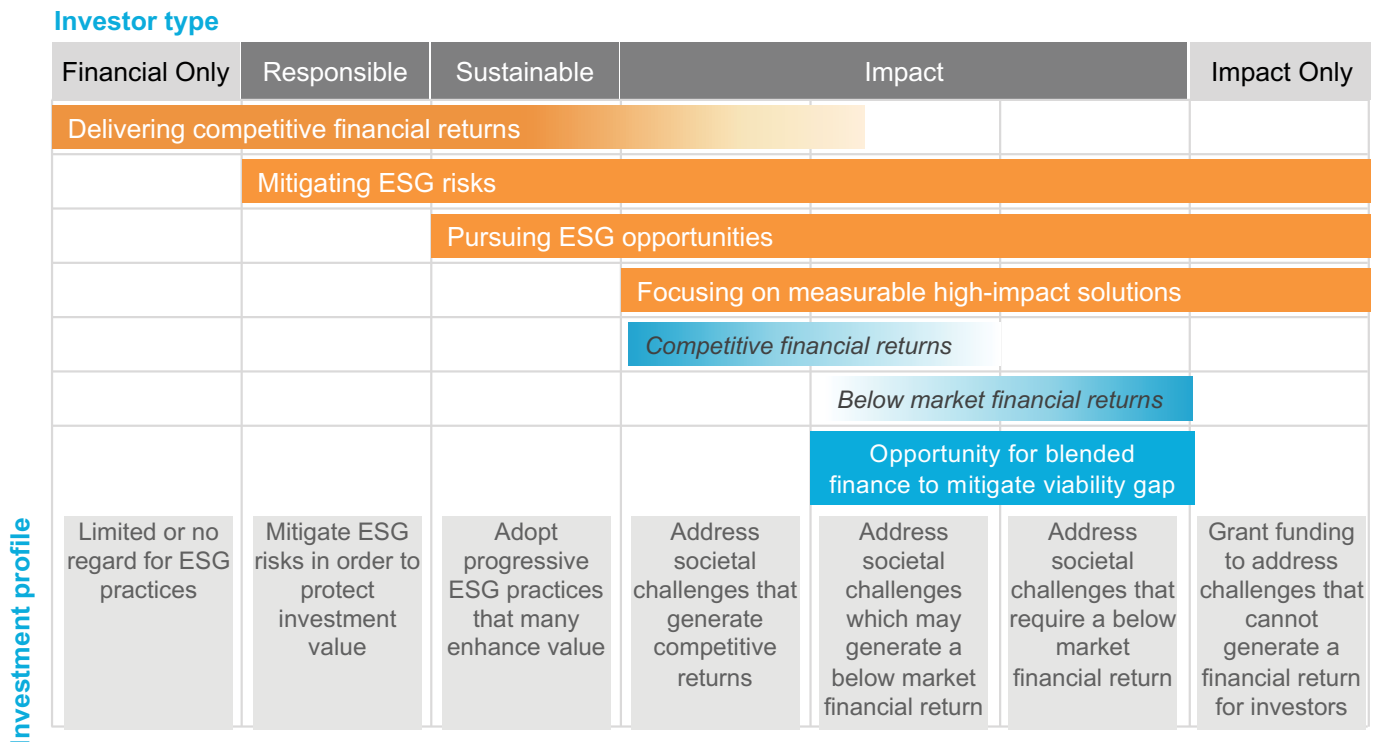
Blended finance is a strategic approach where development financing (such as grant funds from donors, governments, DFIs, or corporate social responsibility) is utilized to provide credit enhancement or other incentives to mobilize private capital. Well-designed and executed, targeted donor capital can mitigate specific investment risks and help rebalance risk-reward profiles of pioneering investments that are unable to proceed on accepted

commercial terms. This can provide a leverage effect for the donor or public funds to achieve more than would have been the case through grant funding alone, enable new models to be proven, and help establish a track record or benchmark risk to overcome barriers to broader market access. Targeted blended finance can break through barriers to new approaches and bridge market failures. Blending commercial investment with concessional capital results in a win-win scenario whereby investors are able to meet their risk-return criteria and funders are able to achieve significantly more impact from their contribution relative to financing a project entirely with available grant funding. A litmus test is that the grant or concessional funding is designed to enable

an outcome that would not happen otherwise and to crowd in private finance.

Globally, blended finance is gaining traction as a way of directing capital to achievement of the SDGs. To date, blended finance deals have raised US\$161 billion toward sustainable development in developing countries with 1,452 unique investors, of which 62 percent are private (see the [Convergence discussion](#)). Figure 3.5 illustrates where on the spectrum of capital blended finance is utilized to best effect, particularly in projects that are known to offer below-market financial returns and so will require additional incentives in order to mobilize capital (see the [OECD website](#)).

Figure 3.5. Spectrum of Investors and the Opportunity for Blended Finance



Source: Source: Adapted from Janiszewski and Taneja 2020.
 Note: ESG = economic, social, and governance.

Blended finance is most needed where business models are still in their nascency, or where they have a limited track record or successful use cases to inspire investor confidence. There are helpful examples emerging for road safety that could be replicated. The most successful examples of effective road safety investments are found in high-income countries (HICs), though the promising developments can now be seen in middle-income countries (MICs) as well.⁴ Without an established track record of investments that can be benchmarked across markets, first-mover investors could attribute a higher risk weighting to road safety investments. This is particularly so where those investments are in LMIC contexts where the lack of familiarity could be compounded by lack of readily accessible data to evaluate. Blended finance has a role to play in these contexts, incentivizing first-mover private investors and growing a catalog of successful projects. This approach could help demonstrate the business case for road safety and the ability to generate returns on investment. The thesis asserts the examples set by these projects will provide proof of concept for more private-capital-funded road safety projects which, over time, do not require the additional support.

Blended finance can also supplement private investment, for example, in road infrastructure, with technical assistance or capacity building that strengthens other safety dimensions, such as road user behavior. Blended finance could also provide the subsidy required to make investment economically viable in an LIC, for example, where it might not be possible to raise tolls to the level needed to start generating returns or where political risk might be a factor. In such cases, blended finance solutions serve

as an efficient use of grant resources and could still enable greater leverage or additional scale of outcomes to be achieved. The key question to ask when considering the need for, the form of, and amount of blended finance is which outcomes will be achieved (and among whom), or which barriers to achieving the outcomes will be removed, by the deployment of the blended finance, and could these be achieved without such a subsidy or by other means.

Three types of blended finance instruments have been considered for road safety: (1) viability gap funding (VGF), (2) guarantees, and (3) outcome funding. Table 3.1 presents the range of blending instruments that could be used and examples of their road safety application. The grant funds used in each mechanism could come from a number of sources, including CSR funds, donor funds, government budgets, or grant activities of DFIs. Which blending mechanism is needed primarily depends on why the project has not proven to be financially viable alone, and also on the funders' desired outcomes for the project. VGF is suited to where a high certainty of a project having a positive social impact exists, along with a known point in the future after which the project will become financially sustainable. In this case, a funder can offer up-front grants (or buydowns) to cover principal expenditures or the costs of a loan. For example, if the development of a network of vehicle inspection centers had clear revenue streams from user fees but would not generate enough to cover the initial cost of constructing the centers, the government could provide an up-front grant to cover some of the initial capital required, after which the project would be commercially viable to be run privately. Guarantees, on the other hand, are best suited when the primary

⁴ An example for high-income countries is the Transport Accident Commission in Victoria, Australia, that has a program of investment in safer roads. A middle-income country example is the Piracicaba-Panorama (PiPa) Lot Brownfield Project in Brazil, detailed in box 4.2, which has secured US\$3.4 billion in private investment.

barrier for investors is risk. For instance, if a commissioning entity did not have sufficient credit history to prove its creditworthiness, a funder could provide a guarantee instrument to provide a backstop in case of default, thereby making the investment viable to investors. Outcome funding, on the other hand, suits scenarios where a funder wishes to incentivize reaching certain safety performance targets by offering investors financial rewards for meeting targets or

to align project partners' incentives toward meeting those targets. A key advantage of outcome funding is that the funders do not have to pay until the results are achieved, thereby ensuring an efficient allocation of donor funds, while allowing funders to safely engage in more innovative or experimental projects that would not normally have been explorable with constrained public or donor funds.

Table 3.1. Blended Finance Instruments

Instrument	Description	Road safety examples
Viability gap funding (VGF)	Viability gap funding (VGF): Up-front grant funding to support interventions that are known to have high impact but are not financially viable	<i>A concessionaire tasked with deploying automated speed enforcement on the highways it operates receives an up-front capital grant to cover the gap between expected returns and required investment.</i> <i>A subnational government taps into the market to borrow funds for the development of safe pedestrian and bike paths and an interested donor provides funding that allows the scope of the intervention to be larger than would have otherwise been the case.</i>
	Buydowns: Debt combined with grants to subsidize the cost of a loan	<i>Interest rate buydowns lower the cost of debt for the implementation of private vehicle inspection centers, an untested business model in a country that is just improving enforcement and with initial returns that might be too low to attract investors.</i>
Credit guarantee	Guarantee to cover losses (partially or completely) in the event of a borrower's inability to repay the debt	<i>A multilateral development bank (MDB) provides a credit guarantee for a subnational government entity's ability to repay the loan to contract the upgrade of a city for safe pedestrian and bike paths to a lender.</i>
Project guarantee	Guarantee to cover losses in the event of breach of contract obligations by project counterpart	<i>An MDB provides a guarantee backstopping the government's obligations to make payments to a private partner under a road safety public-private partnership (PPP).</i>
Outcome funding	Outcome funding: Conditional grant funding paid out to the implementer if and when impact-related outcomes are achieved	<i>A road concessionaire receives bonus payments from donors by building and delivering a road project with road safety standards that exceed the targets for reduction in crashes. Payments help offset financing costs for private investors and align incentives of all parties toward target outcomes.</i>
	Performance-based contracts: Milestone- or results-based remuneration for providing goods or services over the time horizon of a contract	<i>A transport authority incorporates road safety key performance indicators (KPIs) in a road concession contract and agrees to disburse payment or unlock contractual benefits subject to the project's performance against the KPIs.</i>

Source: Original table produced for this publication.

Blended finance can be mobilized directly by DFIs financing projects using donor funds and structured using equity, subordinated debt, or risk-sharing instruments. When DFIs offer blended finance solutions, these can be used to enhance their traditional investments, and can come together in a package offering. By offering concessional finance, DFIs can address some of the participation constraints within transport investments by de-risking returns through guarantees, first-loss structures, or the subordination of loans or equity. They can also address misaligned incentives by using concessional loan pricing or performance incentives to align objectives toward the development mandate. Using these innovative methods can also provide the benefit of

allowing for the funding of larger projects than would otherwise have been possible by targeting those that are only viable at scale and crowding in investment from other private sources. For example, for the past decade, the International Finance Corporation (IFC) has been successfully leveraging concessional donor funds, deploying US\$1.6 billion of concessional donor funds to support 266 high-impact projects in more than 50 countries. These concessional funds have leveraged US\$5.8 billion in IFC financing and more than US\$6.8 billion from other private sources ([IFC discusses this in detail online](#)). The IDA Private Sector Window (IDA PSW), detailed in box 3.3, is another example of the World Bank Group (WBG) using innovative methods to catalyze private sector investments.

Box 3.3. IDA Private Sector Window

In its efforts to catalyze private sector investment in some of the most in-need economies, the World Bank Group (WBG), through the International Development Association (IDA), the International Finance Corporation, and the Multinational Investment Guarantee Agency (MIGA), set up a US\$2.5 billion PSW in 2018, which has been replenished at the same funding level for subsequent years (World Bank 2018).^a The aim of the window is to facilitate greater private sector investment in IDA-only countries—these countries are defined by having a gross national income (GNI) per capita below an established threshold, which for 2021 is below US\$1,185 per capita.

The IDA PSW was founded under the recognition that achieving the SDGs is not possible without greater involvement from the private sector, and that uncertainties and risks—be they real or perceived—are an impediment to high-impact private sector investment in low-income countries (LICs). The IDA PSW aims to address this challenge. The window does not fund private investment on its own, but through four different facilities either backstops or blends IFC investments or MIGA guarantees to support private sector investments (see the [IDA discussion of its PSW online](#)). The four facilities are:

1. **Local currency facility** to provide long-term local currency IFC investments in IDA countries where capital markets are not developed and market solutions are not sufficiently available.
2. **Blended finance facility** to blend PSW support with pioneering IFC investments across sectors with high development impact, including small and medium enterprises (SMEs), agribusiness, health, education, affordable housing, infrastructure, climate change mitigation and adaptation, among others.

3. **Risk mitigation facility** to provide project-based guarantees without sovereign indemnity to crowd in private investment in large infrastructure projects.
4. **MIGA guarantee facility** to expand coverage through shared first loss and risk participation via MIGA reinsurance.

The IDA PSW is intended to be used when there is no alternative commercial solution and the WBG's other tools and approaches are insufficient, thereby only using concessional funds when they are most needed. The IDA PSW allows the WBG to expand efforts in countries where it has already engaged in policy work and provided robust support for private sector investment—this support has exceeded US\$100 billion for IDA countries in the past decade.

Source: World Bank analysis.

Note: a. The International Finance Corporation (IFC) is the largest global development institution focused on the private sector in developing countries, providing and mobilizing scarce capital, knowledge, and partnerships that can help address critical constraints to private sector development. The Multilateral Investment Guarantee Agency (MIGA) promotes foreign direct investment (FDI) in developing countries to help support economic growth, reduce poverty, and improve people's lives.

Health donors are well positioned to support blended finance initiatives, and the global health sector is growing its experience in engaging in blended finance. To date, the health sector has accounted for approximately 6 percent of global blended finance transactions, but, as health deals are often significant in size, this represents 19 percent of total funds raised ([Convergence discusses these market trends on their website](#)). In the wake of the COVID-19 pandemic, more health care actors are seeking transactions and will gain experience in how to leverage blended finance to expand their health impact.⁵ Development actors and governments have also been able to use this growing blended finance market for health to channel funds toward certain priority areas. For example, the Global Fund, a partnership platform with the goal of mobilizing funds to fight HIV/AIDS, tuberculosis, and malaria, has leveraged large pools of private capital for health

investments in LMICs by offering private partners debt swaps, outcome funding, and results-based financing opportunities (see the [Global Fund's discussion of innovative finance](#)). The reproductive, maternal, and child health space is also a health area where private capital mobilization through blended finance is gaining traction, with eight large deals alone mobilizing approximately US\$560 million in investment for women and children's health (Bery 2019).

As road safety is a global health crisis, it, too, should be able to leverage the opportunity of health donors as blended finance funders. Health is one of the sectors that carries a major cost burden from the effects of road trauma and yet an estimated less than 1 percent of health official development assistance (ODA) is directed toward trauma care (Stewart et al. 2019). Annually, almost twice as much aid is directed toward health than transport

5 Future growth in the blended finance market is also predicted, with Convergence stating that in 2021, 19 percent of transactions currently seeking blended capital are in health care. See the online discussion of market trends on the Convergence website: <https://www.convergence.finance/blended-finance/2020#market-trends>.

(US\$22.4 billion and US\$11.9 billion respectively in 2019).⁶ Significant health benefits could be achieved if even just a very small proportion of the health funding were redirected to sit alongside transport investment to fund behavioral interventions for safer road use, or to fund additional interventions such as trauma care where RTIs do occur. Blended finance structures can also support outcomes-based models such as development impact bonds where precedent has been set for health funders to act as outcome funders (Convergence 2020). For road safety,

outcome funding can be thought of conceptually as the health sector sharing the financial savings it makes from reduced road traumas with other actors, including private investors, who are investing in RTI prevention. For example, the case study in box 3.4 presents how a helmet-wearing campaign by the Asia Injury Prevention Foundation (AIPF), if structured as an impact bond, could generate a positive benefit-cost ratio (BCR) for outcome funders based on the reduction in costs associated with head traumas, and could thereby support a case for investment.

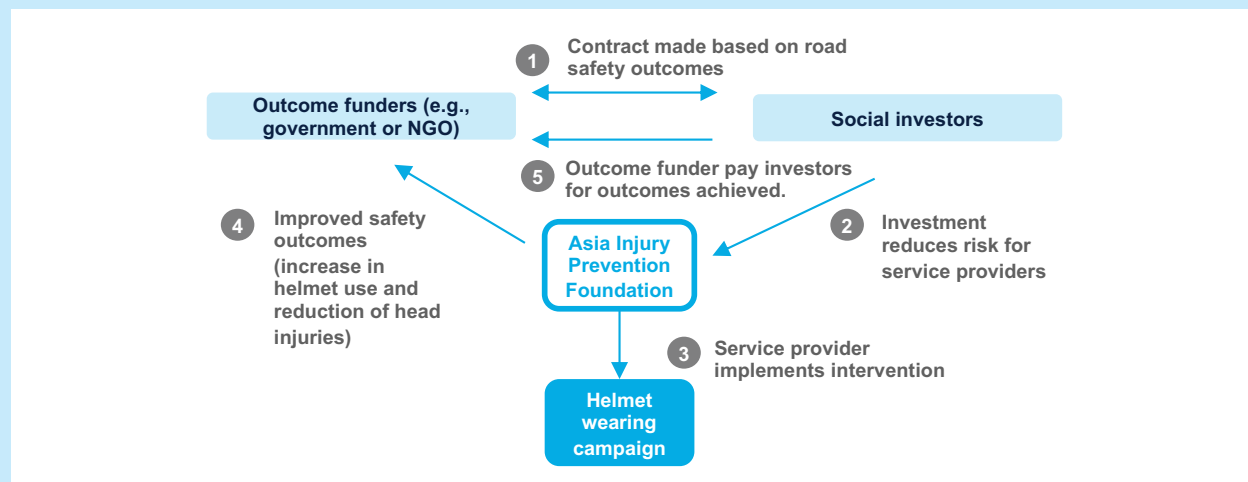
Box 3.4. Mobilizing Health Funding Toward Prevention—an Investment Case from Cambodia

An investment case study prepared by the International Road Assessment Programme (iRAP), the Fédération Internationale de l'Automobile (FIA Foundation), and the Asia Injury Prevention Foundation (AIPF) in Cambodia investigated the savings and impact that could be generated for an impact bond toward increased helmet wearing in Cambodia (Davies et al. 2016). Motorcyclists account for 73 percent of road deaths in Cambodia, with low levels of helmet wearing playing a major role in this figure (Open Development Cambodia 2014). For example, in 2014, when AIPF started its campaign work, 80 percent of motorcycle drivers were not wearing a helmet at the time of a crash, and 69 percent of those involved in a crash suffered head injuries. Children are also one of the main victims, with 99 percent of children killed in motorcycle crashes not wearing a helmet (ITF 2018).

Between 2014 and 2016, AIPF ran an innovative, multi-stakeholder behavior change campaign called “Head Safe. Helmet On” that held the ambitious aim of increasing helmet wearing from 10 percent to 60 percent across six target districts. Using the data gathered from this campaign, the FIA Foundation and iRAP modeled an alternative impact bond structure for the intervention. In this scenario, AIPF would implement the program with the support of social investors who would take on the risk of the project, and outcome funders (such as the government) who would pay investors based on the achievement of outcomes. This structure is shown in figure B3.4.1.

6 Global Health (database), Donor Tracker (accessed September 23, 2021), <https://donortracker.org/sector/global-health>; Detailed Aid Statistics: Official Bilateral Commitments by Sector (database), OECD, (accessed September 28, 2021), <https://doi.org/10.1787/data-00073-en>.

Figure B3.4.1. Impact Bond Structure for a Helmet-Wearing Campaign



Source: [FIA Foundation](#) and [iRAP](#).

The two-year campaign cost US\$1.1 million to implement. AIPF calculated that if the 60 percent helmet-wearing target was met, US\$1.4 million lifetime costs could be avoided in administration, damages, loss of output, and medical costs associated with head traumas from motorcycle crashes. Therefore, the government—or another outcome funder invested in these social savings—by paying only on the condition that certain outcome thresholds were achieved could receive a net benefit by paying for outcomes. This investment case revealed a 4 percent internal rate of return (IRR) before any broader social and economic costs were considered and is projected to save 14 casualties and 260 serious head injuries over three years. Read more on the potential of impact bonds for road safety in chapter 4.

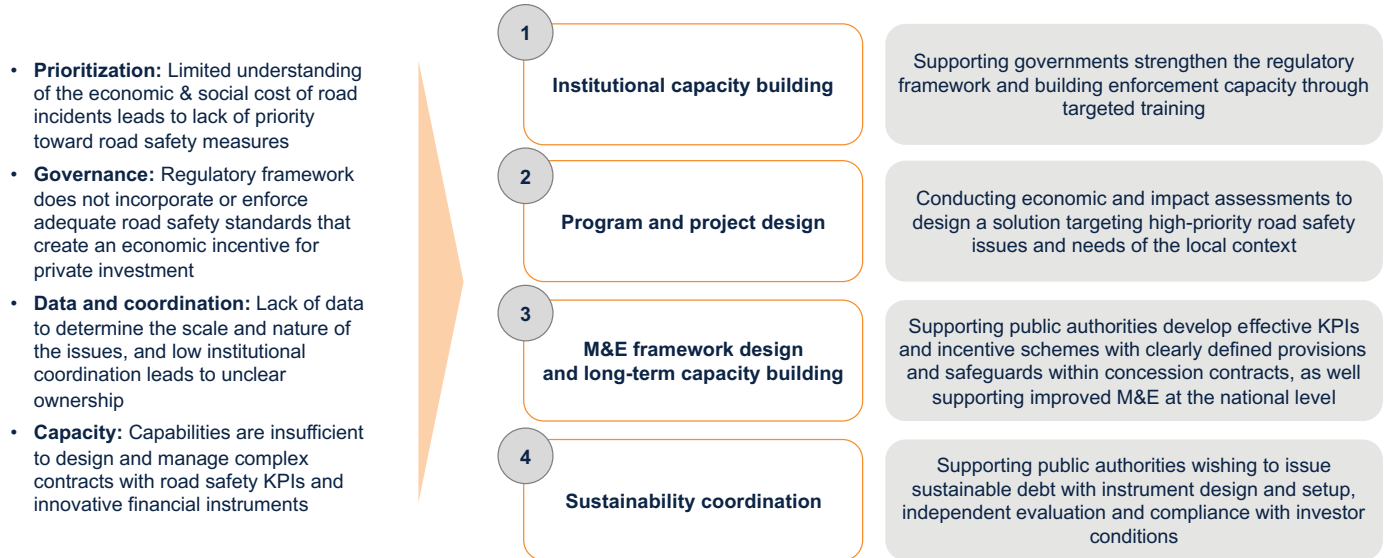
Source: World Bank analysis.

Facilitating Sustainable Impact through Technical Assistance

Technical assistance is vital to setting up and maintaining private capital mobilization in a way that can be sustainable and impactful in the long run. Beyond the activities for raising funds, it is essential that financiers also ensure their investments are supported by the necessary technical assistance. This is particularly important in LMIC contexts, where there likely remains work to be done in creating the foundational enabling environment for private investment in road safety. Technical assistance can come at many levels to address some of the key barriers faced in LMICs (as shown in figure 3.6) and can include

activities such as strengthening road safety regulation, building public and private capacity for monitoring and evaluation (M&E), supporting the design of effective road safety interventions, and facilitating innovative investment structures. Overall, it is only with the adequate technical assistance to secure the social impact and sustainability of road safety investments that it will become possible to demonstrate feasibility and grow the pool of interested investors and potential use cases, thereby transforming road safety into a sustainable investment area that lasts into the longer term.

Figure 3.6. Technical Assistance to Support Low- and Middle-Income Countries



Source: Original figure produced for this publication.

Note: KPIs = key performance indicators; M&E = monitoring and evaluation.

At the highest level is the need for institutional capacity building, which aims to create an enabling environment through advocating for and supporting the necessary regulatory and market shifts to facilitate road safety investment. Weak regulation and lack of enforcement are major barriers for road safety in several LMICs. Not only does this disincentivize safety-conscious practices, but it can even prevent private actors from being able to make some of the safety improvements they would like to make. For example, with weak enforcement, a speed management system cannot be guaranteed to generate a steady revenue from fines. Lack of national-level data and oversight are also significant barriers, as without road safety audits for major road networks or crash data management systems the task of scoping out key areas to target with investment becomes more challenging—as does the task of measuring outcomes. As championed by the Global Road Safety Facility (GRSF), a facility hosted at the WBG focused on building public road safety capacity in LMICs, working closely with governments and local authorities to build the institutional capacity needed to address the challenges in the policy environment, regulatory frameworks, and enforcement capacity is a vital step to ensuring safety can be improved and sustained over the longer term (see the discussion in the section titled, “Public Authorities to Create the Necessary Enabling Environment” in chapter 5).

At the program and project design stage, technical assistance can ensure that road safety interventions are designed with strongest chances for success. This begins with a prefeasibility analysis, setting out the preliminary work of prioritizing investments and ensuring the necessary legal, regulatory, and institutional environment is in place. Depending on the project, this can include a technical and

economic analysis, site investigation and road audits, social and environmental assessments, human-centered design to address aspects of safe design and user interaction, and requisite legal and regulatory analysis. Next is the project preparation phase, where project design, which can include public-private partnership (PPP) structuring in case of PPP, and the accompanying investment plans and appraisals are developed. Road safety experts, who are trained in international best practices and have an expert understanding of the local context and challenges, should be engaged throughout these stages to ensure baseline safety assessments are conducted and the developed intervention and contract design will work in the local context. As the catalog of successful, privately funded road safety projects in LMICs grows, it is hoped that these designs will become replicable and easy to follow for other implementers in new locations.

M&E and learning are cornerstones of effective social investment, and an area likely to require technical assistance. When financing becomes tied to social outcomes, M&E capacity immediately becomes a prerequisite to investment. M&E frameworks at the project level are considered further in chapter 4. However, at the base level, many LMIC stakeholders do not currently have the capacity to accurately and transparently monitor and report on road safety outcomes. A lack of detailed data on RTIs in many LMICs is a serious barrier in the road safety space. If there is no crash management database in place, RTI data is likely to be fragmented across private concessionaires’ records, police systems, insurance data, and health records, and in some LMICs might not be digitally recorded or systematically aggregated. In addition, severe underreporting of RTIs means data collected is unlikely to be complete—underreporting of road crash fatalities

is estimated to be as high as 84 percent in LICs and 51 percent in MICs (World Bank 2019). Lack of transparency and trust in the reporting system can be a serious barrier to implementing investment structures where stakeholders' financial returns are tied to KPIs. For example, without a crash investigation unit that is trusted to categorize the cause and consequences of an RTI, stakeholders are unlikely to agree to their returns being tied to outcomes that could potentially be disputed later. Technical assistance and the support of independent evaluators is, therefore, critical for addressing these issues. Although the M&E capacity could be low to start with, long-term technical assistance can grow capacity over time and thereby build greater confidence in the data generated. To this end, M&E activities should go beyond project-level engagement and contribute to building robust national and global evidence bases, including support to national and global efforts for improving data quality and availability on road safety. Alongside M&E, technical assistance also has an important role to play in helping learning programs that support curation, codification, and dissemination of knowledge and learning for road safety projects. Effective, accessible learning resources will lower knowledge barriers and can facilitate a knowledge community between established road safety actors and critical new entrants who will need to be engaged.

Technical assistance can support financing through sustainability coordination and transaction design. Private capital mobilization for road safety is likely to engage several public and private actors unfamiliar with sustainable debt instrument design and setup, and so will need support in coordinating the transactions and enabling cooperation between actors. This can be facilitated by MDBs, DFIs, or other financial institutions with experience in sustainability coordination. Sustainability coordination involves the development of a sustainability framework and of associated KPIs, as well as the engagement of independent evaluators who play a key role in ensuring compliance, quality, and transparency across stakeholders. In the transaction design phase, projects may also need support to identify and engage prospective investors and raise financing. Where blended finance is to be included, additional tailored assistance will also be needed to support this transaction. As the approaches to investment that improve road safety develop, the experiences of the first few road safety transactions will pave the way for future projects. The following chapter will take a deeper look at how to operationalize the investment in road safety, putting forward eight high-impact and investable road safety project archetypes as well as investment structures that suit a wide range of private to public borrowing entities and investors.

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4. Structuring Investable Road Safety Projects



Building on the insights of the previous chapter, chapter 4 looks at how to bring together the four parts involved in structuring road safety projects (see figure 3.2, in chapter 3): monetizable revenue streams (figure 3.3 in chapter 3 presents a range of potential revenue streams for road safety), access to capital from the sustainable finance market, blended finance opportunities, and technical assistance. First, the chapter presents eight high-impact road safety intervention project archetypes that have been identified as having both the strong potential for private investment, as well as strong evidence of their impact

to save lives. Next, the chapter addresses some of the key country and local context considerations with regard to public and private sector readiness. Possible investment structures are then presented in five categories, which can be chosen and adapted to suit the project archetype, the mix of borrowers, lenders and implementers, the available funding sources, and the constraints of the country context. The chapter concludes with the consideration of the key elements of a robust results framework, as well as potential ethical, financial, and execution risks and appropriate mitigation strategies.

High-Potential Road Safety Project Archetypes

Attracting private investment in road safety requires a clear investment case. Only certain types of road safety interventions will be suitable for private sector investment, and it is important that the investment product and structure is fit for purpose. In general, it must be possible to create links to revenue streams or forward commitments through which investments can be repaid, build value in an equity model, or attract funding in an outcomes-based financing model.¹ For example, helmet wearing is critical to reducing fatalities and serious injuries but is not an intervention that can develop revenue streams, although local manufacture and distribution of affordable quality helmets may be a commercially viable business model and behavior change and enforcement may support an outcomes-based model.

Research by the World Bank Group (WBG) has identified eight examples of high-impact road safety projects with strong potential for private









sector participation. From a detailed review of more than 100 road safety interventions, eight project archetypes emerged as best suited for private sector engagement and also offer measurable and cost-effective potential to reduce RTIs. The eight areas, and their potential for impact, are presented in figure 4.1. Road safety is a complex ecosystem—driver behavior, road conditions, vulnerable users, commercial vehicles, enforcement, and emergency response all play a part in the risk of road traffic incidents (RTIs), and there is growing evidence of which countermeasures are the most effective. For example, the recent World Bank report, *Guide for Road Safety Interventions: Evidence of What Works and What Does Not*, has made important progress in bringing together the growing evidence base of which interventions offer the highest impact, and notes that interventions are best chosen from across the different pillars of road safety (Turner, Job, and Mitra 2020). The eight identified project archetypes covered in this report span many

¹ A range of potential revenue streams for road safety are presented in Figure 3.3 in the previous chapter.

different parts of this ecosystem. They include post-crash care (emergency medical services, regional network of trauma centers), traffic violation enforcement (speed management and enforcement), vehicle quality (vehicle inspection and certification), road safety infrastructure (upgrades of road safety infrastructure and standards for new and existing concessions, infrastructure to protect vulnerable users), and commercial vehicles (commercial fleet upgrades).

The first six interventions focus on prevention of RTIs and span the safe systems pillars of “safer vehicles” and “safer roads,” whereas the final two focus on mitigation, aiming to reduce fatal and serious injuries (FSIs) after the incident through the road safety pillar of “post-crash response.” A review of the methodology used to select these eight project archetypes is included in appendix B.

Figure 4.1. Eight Project Archetypes with Strong Potential for Private Sector Involvement

Intervention	Potential for road safety impact	Potential revenue streams
 P1. Vehicle inspection and certification Developing or upgrading a vehicle inspection center network	Unsafe vehicles which are not road worthy are a major cause of RTIs in LMICs. Modern vehicle inspection systems reduce vehicle failure rates, which can reduce road deaths up to 40%.	<ul style="list-style-type: none"> User fees and infringement fines Auto-companies (% of incremental sales) Insurance companies (% of their premiums) Infrastructure companies (toll revenue)
 P2. Commercial vehicle fleet upgrade Upgrading commercial fleet to vehicles that adhere with international roadworthy standards	Research in LMICs shows vehicle defects cause up to 5% of crashes. This is most concerning with regards to commercial vehicles, which often being heavier and traveling longer distances, can result in more serious and fatal collisions.	<ul style="list-style-type: none"> Lease payments from fleet operators and end customer fees Auto-companies (% of incremental sales) Infrastructure companies (toll revenue contributions)
 P3. New road concessions with road safety requirements Designing new road projects adhering to iRAP 3-star or better rating	In LMICs 55% of roads are below an iRAP 3-star rating for vehicle occupants. Each incremental improvement in star rating can reduce the rate of car crash fatalities and serious injuries by between 43% and 75%.	<ul style="list-style-type: none"> Direct or shadow tolls or availability payments Infringement fines (if legally permitted) Public healthcare budgets Insurance companies (% of their premiums)
 P4. Upgrade of highway protective infrastructure Upgrading highway infrastructure for protective infrastructure , such as guard rails, crash cushions, and dividers	Well-designed infrastructure treatments can lead to a reduction of road crash fatalities by up to 90%, and investment into such treatments have an average benefit-cost ratio of more than 15:1 in LMICs countries .	<ul style="list-style-type: none"> Increase in direct or shadow tolls, or availability payments Infringement fines (if legally permitted) Public healthcare budgets Insurance companies (% of their premiums)
 P5. Speed management & automated enforcement Upgrading roads with speed reducing infrastructure and installing automated speed enforcement devices on high-speeding networks	Reducing road users' average speed by as little as 5% can reduce the number of fatal road traffic crashes by 30%.	<ul style="list-style-type: none"> Infringement fines Insurance companies (% of their premiums)
 P6. Road safety upgrades for protection of vulnerable road users Upgrading roads for vulnerable users to an iRAP 3-star or better rating	65% of traffic deaths are vulnerable road users, and in LMICs 84.8% of roads are below 3-star rating for pedestrians. Improving protective infrastructure on the 10% highest risk road could save 3.6 million deaths and 40 million serious injuries over 20 years.	<ul style="list-style-type: none"> Public healthcare budgets Insurance companies (% of their premiums) Toll revenue contributions from concessionaires
 P7. Emergency medical services Develop or upgrade emergency medical services for road crash victims	Implementing well-designed pre-hospital care can reduce the risk of death in injured patients by 25%.	<ul style="list-style-type: none"> Public healthcare budgets Insurance companies (% of their premiums) Toll revenue contributions (infrastructure companies/concessionaires) Healthcare funders
 P8. Regionalization of specialist trauma centers Building a network of trauma centers for post-crash care	Even if crash rates stayed the same in LMICs, but fatality rates from severe injury were dropped to the level of high-income countries, up to 500,000 road traffic fatalities could be avoided each year.	<ul style="list-style-type: none"> Public healthcare budgets Toll revenue contributions (infrastructure companies/concessionaires Insurance companies (% of their premiums) Healthcare funders

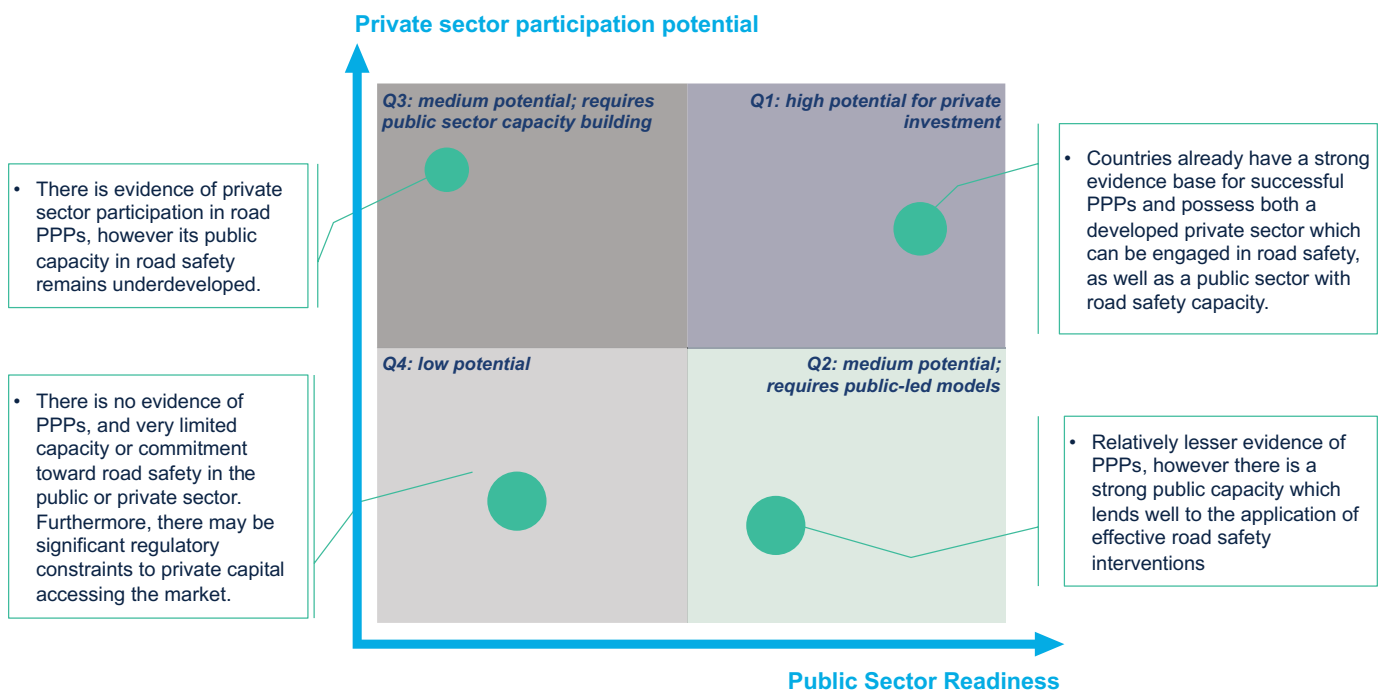
Sources: Revenue streams: World Bank Group and Dalberg Advisors analysis; Schulz and Scheier 2020; Peden et al. 2004; Vaccines for Roads (<https://www.vaccinesforroads.org/irap-big-data-tool/>); Turner, Job, and Mitra 2020; WHO 2017; WHO 2019; Mehmood et al. 2018; World Bank 2017.

Country and Local Context Considerations

When considering the local context in which to implement these projects, there are two key dimensions to assess: public sector maturity and ease of private sector participation. These dimensions effectively speak to the ease or difficulty of transacting in the local context. As transport infrastructure is typically within the public sector’s mandate, road safety investments are more likely to be feasible and successful in the long term when supported by an enabling public sector environment, even where the investment itself is private sector led. Furthermore, without certain baseline private sector capabilities being present in the ecosystem, this type of approach is less likely to be successful unless led by a major donor or multilateral agency.

As low- and middle-income countries (LMICs) can differ significantly from one another in both private and public sector readiness, assessment of these factors is an important step in determining which solutions and investment structures will suit the given country context. Figure 4.2 provides an illustration of a matrix format that can be used to analyze this issue. In Quadrant IV, both private sector and public sector capacity are too weak to accommodate road safety investments. In Quadrants II and III, technical assistance to create maturity in the private and public sectors, respectively, could be used to move the readiness of the local context toward Quadrant I—where the necessary enabling public and private sector environments exist. Appendix E includes a mapping of 10 LMICs from across the income spectrum using this method, illustrating the insights that can be gained from this high-level analysis.

Figure 4.2. High-Level Analysis of Context Potential for Private Investments for Road Safety



Source: Original figure produced for this publication.

Public sector maturity can be assessed by four key indicators: the presence of a road safety agency, dedicated road safety funding, regulations in line with global standards, and enforcement capacity. The lack of a public agency with a specific road safety mandate and strategy or without dedicated road safety funds may indicate road safety is a lower priority for the government. Additionally, if adopted road safety standards are low, which can be determined by looking at national legislation versus the globally accepted best practices on road safety, road safety may be deemed too low a priority within the public agenda to receive support. Enforcement is also a key issue, and the World Health Organization (WHO) collects self-reported ratings of the quality of road safety enforcement across countries, which can act as a useful indicator (WHO 2018). For certain investments, low public prioritization and weak enforcement might also mean that private actors will be unable to secure revenue streams for their road safety investments. Analyzing this environment will either reveal that private capital mobilization for road safety is not yet viable or will highlight which areas can be supported by public sector capacity building to create the necessary enabling environment. More on the work that should be conducted by and with public authorities is laid out in chapter 5.

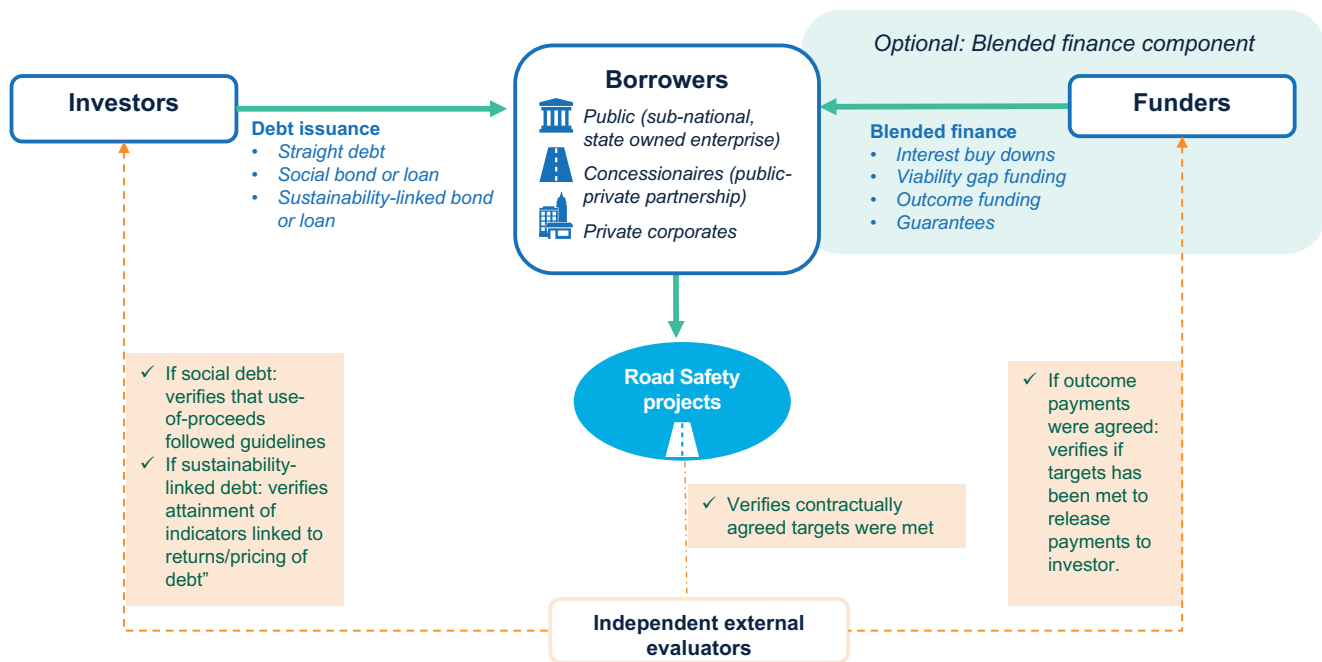
The potential for private sector participation can be assessed by examining a country's track record on public-private partnerships (PPPs) in road infrastructure and other sectors, as well as other key indicators on the ease of doing business. At a high level, a number of tools can be used to explore the ease of private sector participation within a country, such as the Country PPP Readiness Diagnostic Tool provided by the World Bank, as well as research into the country's past experience with PPPs in infrastructure, health, or transport (World Bank 2016). Other indicators to understand the appeal for private investment in a country can also include corruption perception indices and ease of doing business rankings that assess a country's regulatory performance (Transparency International 2020; World Bank 2019a). These factors will affect how interested private investors will be in engaging with investment opportunities in the country, and where private investors perceive the risk of engaging in the context as too high, mitigation strategies that target the root causes of the risk need to be applied. Types of risk and possible mitigation strategies are explored further at the end of this chapter.

Investment Structures for Road Safety

Specific investment structures can be designed to bring in a mix of investors, borrowers, and funders appropriate to the context and project. Figure 4.3 provides an overarching illustration of the primary actors involved in investment structures for road safety. There are three primary actors—investors, borrowers, and funders—who are supported by independent evaluators. In addition to this core mix, additional technical assistance and monitoring and evaluation (M&E) partners may be brought on board. These actors will come together in different permutations—that is, investment structures, or models—in order to serve the context-specific needs of the road safety market in question. The possible investment structures vary according to private or public borrower, the type of debt used, the type of

revenue streams that can be engaged, and the road safety projects that are most suitable. Furthermore, all models can, where necessary, be supported by the optional addition of blended finance, where funders can support the financial viability of the project to help align incentives around road safety outcomes. Throughout all possible arrangements, independent evaluators will be crucial to supporting coordination and compliance by assessing baselines and verifying if targets have been met and whether the terms of social or sustainability-linked debt have been fulfilled. This section presents five variations of possible investment structures that have been designed to showcase the range of possibilities across the private-public spectrum and meet the needs of the eight project archetypes across a range of contexts.

Figure 4.3. Primary Actors in Investment for Road Safety



Source: Original figure produced for this publication.

An advantage of the operating environment for road safety investments is the range of public and private actors that can be involved, depending on the opportunity. On one end of the public-private spectrum is a public-led investment, whereby an aid agency—a national government, subnational entity, or state-owned enterprise—seeks to raise capital from private investors for road safety-related investments. Public-led investments are most appropriate when road safety is a high priority for a public entity and the road safety projects are in some way operating as a public good and are, therefore, not directly monetizable through a private entity. On the other end of the spectrum are road safety investments that can be entirely private sector led. This suits private entities with an interest in road safety inputs, outputs, or outcomes, such as motor insurance companies, vehicle manufacturers, or corporates with fleets of commercial vehicles, who could raise debt for road safety investments across their portfolio of activities. Between these two options are PPP arrangements, which are highly typical arrangements in the transport sector where large up-front capital is involved. PPPs typically generate project-specific revenue streams through user fees (such as toll revenue) and can also be funded by payments made by the relevant public authority. PPPs are, therefore, suited for road safety projects that can host privately run






development and operations—such as development or upgrade of highways or vehicle inspection centers—and are in a domain where they will also need buy-in from the public authorities.

As shown in figure 4.4, this public-private spectrum is the main axis across which the first four investment structures (A, B, C, and D) have been mapped: Model A (which has two forms) being public led, Models B and C being variations to serve new and existing PPP agreements, respectively, and Model D being private sector led.

Model E takes a different approach, which aligns incentives around the road safety outcomes. This may take three forms: an impact bond, an outcomes fund or an outcome-based incentive scheme as an additive to other projects to bridge the gap between road infrastructure and safe roads and safe user behaviors on and around roads.

The remainder of this section will lay out the benefits of each of these models, and where they are best suited. A more detailed explanation of the models, including more detailed notes on the transactions, model-specific applications, and prerequisites, can be found in appendix C.

Figure 4.4. Overview of the Five Investment Structures

Borrower type	Business Models	Description & Instruments	Financing	Blended finance instruments (optional)
Public borrower	A  Financing a subnational entity	A subnational entity issues debt (straight debt, Social or Sustainability-linked), with all or some proceeds used for road safety projects.	<i>Sub-national financing</i>	<ul style="list-style-type: none"> • Viability gap funding • Outcome funding • Guarantee
	Private borrower	B  Financing new PPPs	New PPPs (either road concessions or non-road, such as vehicle inspection centers) with road safety components receive financing to incorporate road safety upgrades (straight debt, Social or Sustainability-linked)	<i>Upfront project financing</i>
C  Additional debt to existing PPPs		Existing PPPs (either road or non-road) issue additional or subordinated debt to fund road safety improvements against additional remuneration / extended concession terms by government	<i>Additional project financing</i>	<ul style="list-style-type: none"> • Outcome funding • Guarantee
D  Corporate financing		Private entity with relevant transport investments (roads, equipment) issues debt to finance road safety actions at the corporate level associated with its sustainability strategy and with outcomes measured via KPIs	<i>Corporate financing</i>	<ul style="list-style-type: none"> • Outcome funding • Guarantee
Public or Private	E  Outcome funding	Donors provide results-based funding for road safety projects that have high impact health outcomes but lack financial return	<i>Impact bond or none</i>	<ul style="list-style-type: none"> • Outcome funding (required)

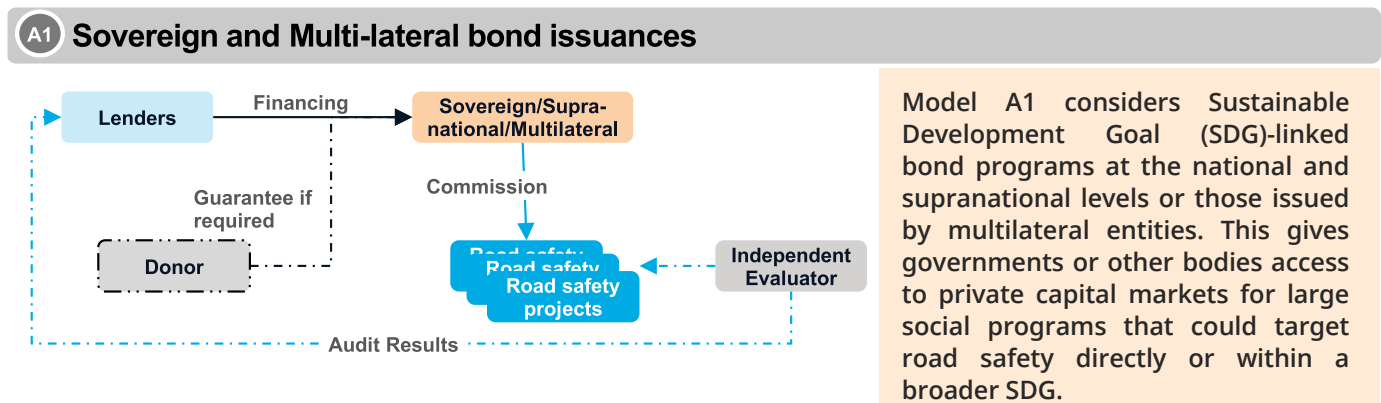
Source: Original figure produced for this publication.

MODEL A: SOCIAL AND SUSTAINABILITY-LINKED FINANCINGS AND OTHER DEBT INSTRUMENTS

Debt markets have been very active in recent years, not least to respond to the financing needs related to COVID-19. The availability and cost of capital have remained relatively favorable. There are clear opportunities for multilateral agencies, national governments (treasuries), as well as supranational and subnational bodies to capitalize on the appetite for more socially responsible and sustainable debt to access these markets to fund road safety initiatives.

The capacity of these actors to raise capital at scale, which could then be directed to road safety initiatives, is worthy of exploration. Model A1 (figure 4.5) explores the potential for national and multilateral bond programs; Model A2 considers application of a bond model at a subnational level, where prime responsibility for the road or safety-related investment sits in some jurisdictions.

Figure 4.5. Model A1: Sovereign and Multilateral Bond issuances



Source: Original figure produced for this publication.

Private markets have responded positively to bond issues by national governments (treasuries) and supranationals that have tackled social issues, with the few examples of issuances being oversubscribed. For example, the initial European Commission social bond issuance under its program for temporary support to mitigate unemployment risks in an emergency (SURE) (€10 billion 10-year and €7 billion 20-year at seven-year bond priced at a negative yield of -0.497 percent) issued in late 2020 was more than 13 times oversubscribed (European Commission 2020). The program can raise up to €100 billion that will be made available to member states to address negative economic and social consequences of the COVID-19 pandemic in their countries ([the European Commission discusses the SURE program on its website](#)).

The year 2020 was notable not only for growth in socially focused bond issuances, but also for middle-income countries (MICs) accessing these markets. The example of Mexico's SDG bond framework set out in box 4.1 provides a clear example for where road safety projects could be incorporated within a national spending program or where bonds could be issued for purposes including road safety as a contribution to meeting national commitments to measures that help meet SDG targets.

Box 4.1. Issuance of a Sovereign SDG Bond to Global Capital Markets

In September 2020, Mexico issued a sovereign level €750 million seven-year use-of-proceeds SDG Bond in partnership with the United Nations Development Program (UNDP), BNP Paribas, Credit Agricole CIB, and Natixis. A second issuance of a €1.25 billion 15-year use-of-proceeds bond followed in July 2021. This bond program is the first of its kind to link government policy and a sovereign bond framework to SDGs, specifically directing the capital to projects and programs for vulnerable populations.

The initial bond issuance was more than six times oversubscribed; 154 global investors participated enabling Mexico to tap investors committed to financing sustainable development—46 percent of the issuance was allocated to environmental, social, and governance (ESG)-focused investment portfolios (UNDP in Latin America and the Caribbean 2021; Reuters 2020; White 2020).

The bond issuance leveraged the Mexican government's work to link its 2021 federal budget to the SDGs. The bond's framework maps to social and environmental targets for 11 of the SDGs.^a

The areas targeted are broad enough to make road safety programs eligible for funds particularly under SDGs 3, 7, 9, and 11, indicating an opportunity for collaboration between the road safety community and sovereign bond issuers to direct funding to road safety projects.

Source: World Bank analysis.

Note: a. Abiding by the Social Bond Principles and Green Bond Principles developed by the International Capital Markets Association (ICMA).

This approach by Mexico illustrates the opportunity and appetite for sustainability and SDG-linked debt products and signal to an opportunity to fund road safety, an objective directly linked to SDGs, using similar instruments.

Multilateral actors can also utilize their role in private debt markets for broader goals linked to sustainability objectives. The World Bank Treasury has a long

track record of partnership with the private sector driving growth in green and sustainable markets and innovation to mobilize capital for sustainable development, including taking an active leadership role in catalyzing the green bond market and spearheading disclosure and impact reporting standards for green and other sustainable assets to demonstrate the potential for SDG-aligned finance. Figure 4.6 highlights some examples.

Figure 4.6. Examples of World Bank Engaging with Investors on the Sustainable Development Goals

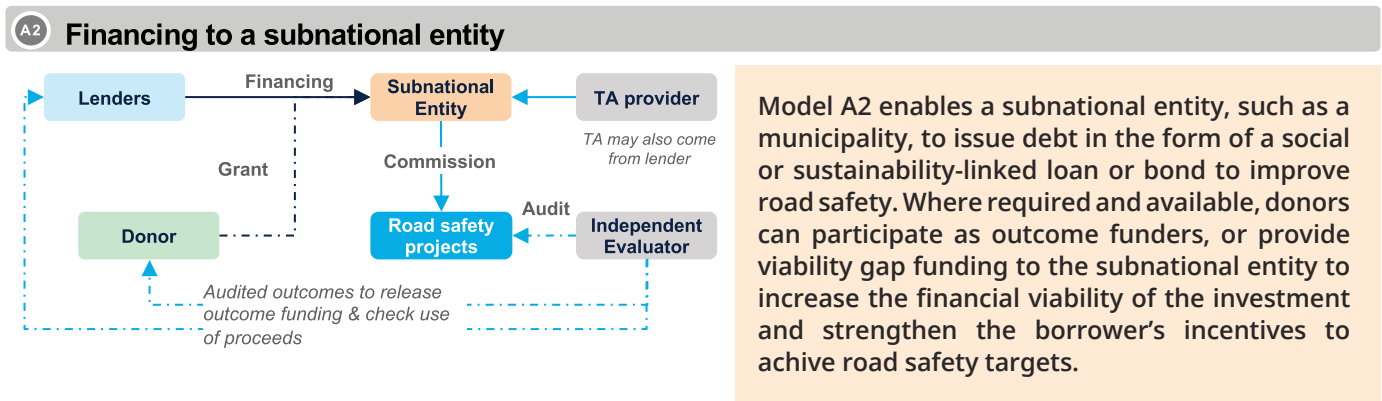


Source: World Bank analysis.

The International Finance Corporation (IFC) and other multilateral agencies have also played a role in demonstrating the efficacy of social and sustainability-linked instruments. For example, in response to COVID-19, the IFC issued social bonds to support health supply chains in LMICs and rebuilding jobs and local business. Its benchmark US\$1 billion social bond when the pandemic was declared attracted more than US\$3.4 billion in private investor interest, despite market uncertainty.

The capacity of these sovereign and multilateral actors to raise capital at scale that could then be directed to road safety initiatives nationally, regionally, or across a global program, for example, to upgrade roads across different country settings taking a portfolio approach, is worthy of further exploration.

Figure 4.7. Model A2: Financing to a Subnational Entity



Source: Original figure produced for this publication.

In Model A2 (see figure 4.7), subnational entities can raise private financing for road safety in areas where direct investment is necessary, but which goes beyond what they could access through national government funding or a sovereign-backed loan from a multilateral, and, therefore, is likely to require the raising of additional revenues to make the issuance creditworthy. In this sense, subnational entities can expand their total resources by unlocking private sector investment.

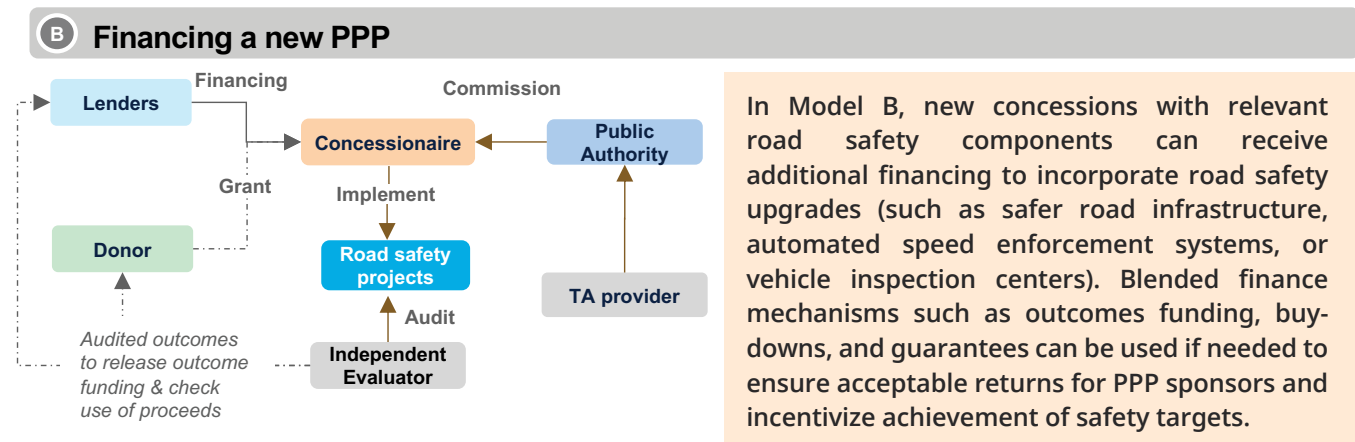
While subnational borrowings represented nearly half of public debt markets for high-income countries (HICs) (49.1 percent), they only represent 7.3 percent for low-income countries (LICs) as of 2019 (Smoke 2019). This model is better suited to middle-income countries, where there are subnational entities with the sufficient capacity to borrow and to implement projects. This model is also well suited to road safety interventions where private sector management may be challenging or inappropriate (for example, if the road safety element is acting as a public good). It is also well suited for projects that are challenging to monetize directly through the intervention, yet have high potential for impact, as the subnational entity can repay the financing through revenues that are generated more widely, such as through a fuel tax ring-fenced for safety interventions within a road fund. Projects well suited for Model A2 include speed management and enforcement (such as,

automated traffic management systems), infrastructure upgrades to protect vulnerable uses (footpaths and bike lanes, for example), and trauma care. These projects also lend themselves to being scaled up at the regional level if they are proven to be effective.

There are many benefits to structuring investments through subnational entities. Firstly, several subnational entities—such as a local municipality or a road traffic agency—may have already conducted assessments of road safety in their districts and have clear projects to undertake but suffer from a lack of funding. By leveraging the sustainable debt market, subnational entities can take on loans to fund these projects—which may even be at a lower price, such as in the case of a sustainability-linked debt that offers pricing incentives in exchange for achieving road safety commitments, or, if blended finance mechanisms are used, to support the investment. Model A2 will work best where the subnational entity (whether a state or municipal government) has fiscal authority to raise debt, when there has already been a prioritization of road safety within the public agenda, and sustainability-targeted financing can further align incentives to ensure efficient and effective delivery. However, to avoid risk of over leveraging public entities, the creditworthiness of the subnational entity and whether there is sufficient fiscal space to take on further borrowing need to be considered.

MODEL B: FINANCING A NEW PPP

Figure 4.8. Model B: Financing a New Public-Private Partnership



Source: Original figure produced for this publication.

As shown in Model B (figure 4.8), for new PPPs can provide an excellent opportunity to increase road safety investment through a range of projects, including vehicle inspection, infrastructure treatments for roads, speed management enforcement, and emergency service provision. The PPP arrangement provides an opportunity to specify requirements and set performance indicators and design parameters. The approach serves for projects that have medium to high capital expenditure requirements, and that are carried out in environments where there is a strong private ecosystem and private sector management is provided for and encouraged in the regulatory environment. Box 4.2 provides an example of the approach being taken for a new vehicle inspection network in Turkey where a privatization of the vehicle inspection system allowed for greater vehicle safety outcomes.

By taking advantage of a new tendering for a concession agreement, Model B enables competitive tendering where road safety requirements are provided for in the new concession contracts, as well as additional financing to conduct the required safety upgrades. This model is suited to contexts where there has been a previous lack of prioritization of

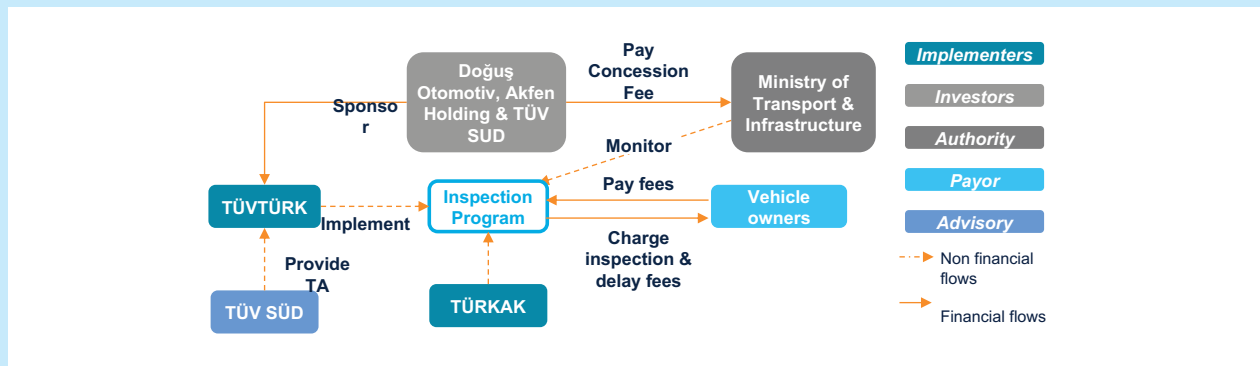
road safety, and the current minimum requirements as provided for in existing regulations and concession contracts are either insufficient or have been insufficiently enforced. By incorporating strong M&E and contractually defined safety performance indicators with financial repercussions (either through penalty or incentive schemes, through terms attached to sustainability-linked debt, or via terms of blended finance agreements) concessionaires can be brought to higher levels of road safety that go beyond the minimum standard. Contract terms can also specify data collection and reporting requirements and set expectations for the road safety impacts to be managed through the PPP life cycle. The Piracicaba-Panorama (PiPa) Lot case study from Brazil, as presented in Box 4.3, shows how safety performance targets attached to financial incentives can be successfully incorporated into new concession contracts in an LMIC context. In the long run, uptake of these concessions will promote a shift toward higher standards more widely. To facilitate this structure, there needs to be a degree of PPP readiness within the regulatory framework and a capable set of private sector players. Furthermore, low corruption perception—where the public authority can be trusted to manage M&E appropriately—is important.

Box 4.2. Vehicle Inspection Fees Funding Road Safety in Turkey

In 2008, the existing vehicle control system in Turkey had proven ineffective, with an insufficient number of stations, a lack of suitable test equipment, and inadequately trained personnel for audits. To counter this, the government decided to privatize the system by tendering the country’s vehicle inspection operations. A twenty-year concession was signed with TÜVTÜRK to provide a modern vehicle inspection system, modeled after the well-proven system in place in Germany and customized to the local market.

The contract for the inspection centers held key performance targets, including the withdrawal of 50,000 of the old vehicles that threaten safety on roads by the end of 2013 and making available 150 additional vehicle inspection stations by 2013 for an effective inspection system. TÜVTÜRK was backed by institutional investors who invested US\$270 million for capital expenditure. Revenues were then generated through users’ inspection fees, a portion of which was earmarked for the government (30 percent for the first three years, 40 percent for the next seven years and 50 percent for the final 10 years), as well as a 5 percent monthly delay fee. This structure for revenue sharing allowed for the public authorities and private investors’ incentives to be aligned, creating necessary conditions for key stakeholders to work toward efficiency and increased safety standards together.

Figure B4.2.1. Turkey Vehicle Inspection Centers Investment Structure



Source: Original figure produced for this publication

The results of the program have been impressive, with several targets having been exceeded. There are currently 189 fixed stations and 81 mobile stations equipped with advanced facilities and technologies supported by an integrated IT system, real-time data processing, and data storage. To operate the vehicle inspection network, TÜVTÜRK has trained and managed a network of 47 business partners in 81 provinces. Overall, this has also had a strong positive contribution to FSI reduction, with deaths in traffic crashes having decreased by 40 percent since the program launch (Schulz and Scheler 2020).

The case study demonstrates how adapting a well-proven model to a new country context can reduce implementation risks and support local capacity building to maximize program effectiveness—an area that was facilitated by a combination of international expertise and local entities engaged in the project. Furthermore, the innovative financing structure allowed incentives of public entities and commercial enterprises to be aligned within the PPP arrangement to maximize efficiency and outcomes of the new system.

Source: World Bank analysis.

Box 4.3. A Public-Private Partnership in a Middle-Income Country with Financial Incentives for Road Safety

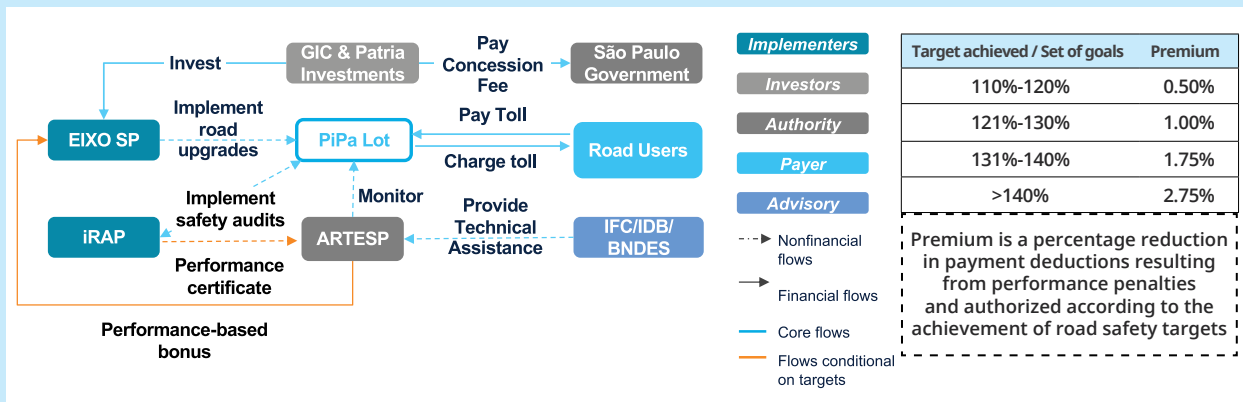
Piracicaba-Panorama (PiPa) Lot Case Study

With the aim of improving national road safety, the Piracicaba-Panorama (PiPa) lot was one of the first lots recommissioned to new concessionaires that included a performance-based penalty scheme and clear targets for road safety.

Under a wider initiative set out by the International Finance Corporation (IFC), Brazil’s National Bank for Economic and Social Development (BNDES), and the Inter-American Development Bank (IDB), a competitive tender for the PiPa toll road was commissioned by the São Paulo State Government and won by a consortium of institutional investors - Patria Investments- and the Government of Singapore Investment Corp. (GIC).

The 30-year concession contract incorporated a clear road safety investment plan estimated to save approximately 34,000 fatalities and serious injuries through a US\$3.4 billion investment in road upgrades that would bring routes up to the standard of the International Road Assessment Programme’s (iRAP’s) three-star rating or higher. The concession contract also stipulated financial penalties based on whether planned targets were met. From these penalties, the IFC supported the public traffic authority Agência de Transporte do Estado de São Paulo (ARTESP) to design an innovative bonus scheme whereby the concessionaire could receive a road safety performance bonus paid out in the form of a deduction from the performance penalties it owed to the granting authority if it met certain road safety targets developed by ARTESP.

Figure B4.3.1. PiPa Lot Investment Structure

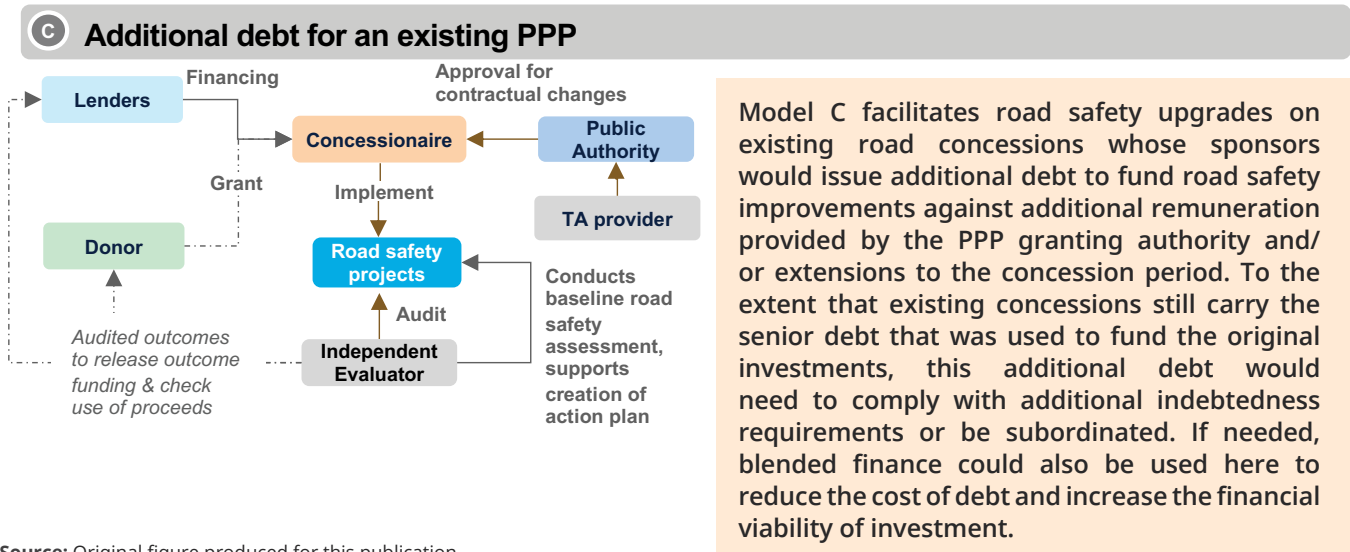


The success of commissioning the PiPa contract demonstrates the ability for road safety to be efficiently negotiated into new concession contracts in LMIC contexts—as per Model B proposed in this paper. The contract effectively realigns the concessionaire’s commercial incentives with investing in road safety. The case study also showcases how effective technical assistance (such as that provided by iRAP and IFC) can enhance the business models that are designed and implemented.

Source: International Finance Corporation (<https://www.ifc.org>).

MODEL C: ADDITIONAL DEBT FOR AN EXISTING PPP

Figure 4.9. Model C: Additional Debt for an Existing Public-Private Partnership



Source: Original figure produced for this publication.

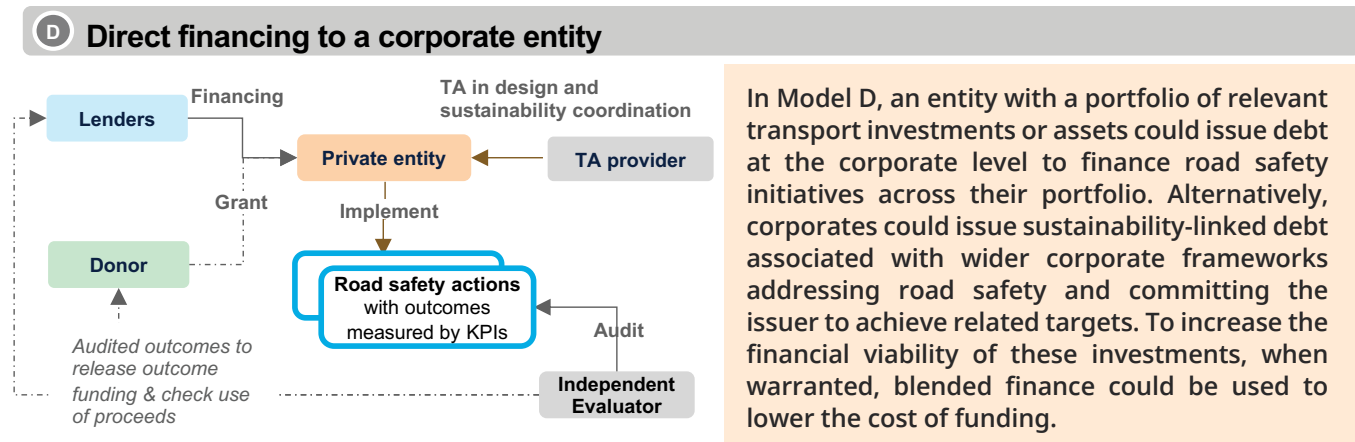
Instead of tendering a new PPP, investment Model C (figure 4.9) seeks amendments to an existing concession contract that would take on additional debt (potentially subordinated) to fund new road safety investments. Similarly, by using a PPP arrangement, this structure suits a range of interventions with medium to high capital expenditure requirements, including vehicle inspection, infrastructure treatments for roads, protective infrastructure for users, speed management enforcement, and emergency service provision.

Model C is particularly useful when there are existing road concessions with known safety concerns that also have the available crash data or recent star rating or safety inspections. Having crash or inspection data would allow PPP granting authorities to identify causes of RTIs and blackspot areas that can be treated with appropriate countermeasures to be included in a PPP contract amendment. As in Model

B, this investment structure can serve contexts where there has been an inadequate prioritization of road safety in contractual requirements and enforcement. Furthermore, by engaging funders through blended finance, this model could also serve contexts where there is revenue risk (such as road users being unable to pay higher toll fees, potentially due to a government cap to maintain affordable access) or limited remuneration (governments are not willing to provide the necessary funding for road safety measures). A potential complication to implementing Model C will be the need to renegotiate the additional investments and new safety provisions into the existing PPP or concession agreement, which may prove challenging in contexts where commissioning authorities are not flexible toward contract amendments. Improved and more reliable traffic flow and travel times through reduced road crashes provide one common area of interest to support negotiations.

MODEL D: DIRECT FINANCING TO A CORPORATE ENTITY

Figure 4.10. Model D: Direct Financing to a Corporate Entity



Source: Original figure produced for this publication.

Model D (figure 4.10) is a structure that is private sector led. It is best suited to corporate entities that stand to gain financially from a reduction in RTIs or can utilize sustainability focused capital to improve their road safety performance and/or their contributions to the safe system. Reduced RTI-related costs could entail lowering costs of fleet damage or delays, lowering insurance premiums, or reducing health care expenditures due to road trauma. Improved road safety focus could also include improved vehicle design for road safety and retooling production lines, for example, for vehicle manufacturers to make environmentally cleaner—and safer—vehicles. As the interventions will be private led, the safety interventions must also occur in areas that are managed by the private sector, allowing corporations to influence and monitor outcomes. Another application is major property development where financing for net zero carbon communities can incorporate safe and renewable transport. An example is the €3 billion Milan Innovation District (MIND) mixed use development by global property company Lendlease that will be powered by renewable energy and all transport will be public and electric ([learn more about MIND online, via Lendlease](#)).

In Model D corporates can directly use the capital to support their commitments to improved safety performance (social financings) or use it for general purposes while still reinforcing their sustainability goals by committing to the attainment of relevant targets (sustainability-linked financings). Sustainable debt options can potentially provide access to capital at a lower cost by providing corporates access to different sources of finance. More importantly, in addition to providing reputational benefits and increasing interest from international investors, committing to improved road safety goals can also reduce costs and improve profitability.

As an example, sustainability metrics for a manufacturer that benchmark performance against the recognized international standards for safe vehicles could be linked to cost of capital to provide a strong incentive to focus on improved safety features of vehicles. Ideally, the reference benchmarks would reflect the most ambitious standards, such as the Global New Car Assessment Program (Global NCAP), which applies a safety rating to new cars in production to provide a stretch target and could set a floor based on accepted minimums reflected in Target 5

of the Global Road Safety Performance Standards.² Alternatively, these safety standards could inform a use-of-proceeds bond where proceeds are used, for example, to retool production lines or add features and functionality for safer vehicles.

Where vehicle manufacturers, fleet owners, and managers are also facing requirements to improve environmental performance of vehicles and fleets, including transition to electric vehicles, the goals could be combined and structured into a transition bond or sustainability-linked facility.³ In appropriate cases, progressive investors or lenders can choose to place any additional investment payments that accrue from borrowers succeeding or missing their targets into a fund which is used to make investments advancing the same social objectives against which the sustainability-linked financing was structured. This could help fund education programs or other technical assistance or develop data related to the cost of not incorporating greater focus on safety to inform pricing of debt into the future as sustainability requirements become more common.

There are precedents in the market, such as Toyota's 2021 US\$2.57 billion three-to-ten-year Woven Planet Bond issuance 2021, that will finance safety technologies alongside several mobility and green initiatives mapped to SDGs 3, 7, 9, 11, and 13 (Toyota Motor Corporation 2021).

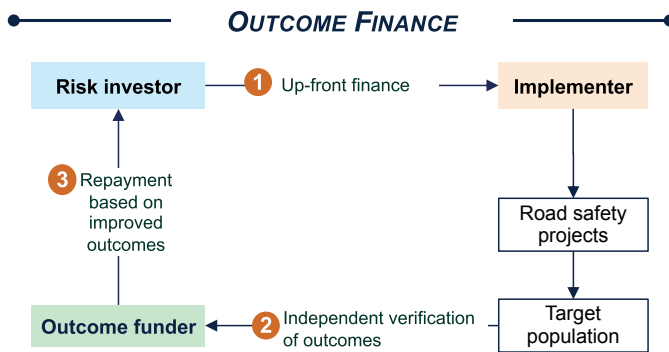
MODEL E: OUTCOMES-BASED FUNDING AND FINANCING

Model E takes a different approach to funding and financing road safety outcomes. This approach places outcome funding as the central component in the design and aligns the incentives of each of the parties with the outcomes to be achieved. It is a low-cost, high-impact means of achieving road safety outcomes where there is a complexity to achieving outcomes that system-level targets of the type envisaged for other models would not be able to overcome. This model has three forms—E1: single-project outcome funding to a public or private entity (impact bond); E2: an outcomes fund, to support multiple projects at a national or regional scale; and E3: a “last-mile” model that combines an outcomes-based approach with the system-level targets in investment Models A to D.

Outcomes-based funding of the type illustrated in the forms E1 to E3 is suitable for where there are multiple components or stakeholders that need to come together to achieve road safety outcomes. Model E entails a collaborative partnership between **risk investors, outcome funders, and implementers**. As illustrated in figure 4.11, up-front capital is provided by the risk investors to enable the implementer to deliver services that will improve outcomes among a targeted group of people. If the outcome targets are met, as verified by a verification agent, the outcome funder repays the investors their initial investment, plus a return.

2 For example, UN Regulations Nos. 94 and 95 on front and side impact protection; UN Regulation No. 140 or U.N. GTR No. 8 on electronic stability control; UN Regulation No. 16 on safety-belts; UN Regulation No. 14 on safety-belts anchorages; UN Regulations Nos. 44 or 129 on child restraint systems; UN Regulation No. 145 on ISOFIX anchorage systems, ISOFIX top tether anchorages, and i-Size seating positions; for more information see Global NCAP's website at <https://www.globalncap.org/about>.

3 In sustainability-linked bonds (as opposed to loans), it is more common to have the pricing step up in the case of targets being missed without any pricing step down.

Figure 4.11. Money Flows in Outcomes-Based Financing

Source: Original figure produced for this publication.

An outcomes-based approach enables funding to be spent efficiently as it is only disbursed if verified outcomes are achieved. In a typical impact bond structure, finance is provided by investors as risk and working capital, and those investors receive a return on their investment if and as outcomes are achieved. This helps align the incentives of the parties around the achievement of the outcome goals. It also creates an accountability mechanism where investors monitor performance, and the parties can adapt and improve the interventions as they learn how to most effectively achieve the targeted outcomes. Implementation of an outcomes-based intervention often requires some nonfinancial support provided through technical assistance.

Model E requires balancing the risk and return so that it is acceptable from each perspective. Investor risk can be mitigated in different ways. A key risk mitigation lever for investors is performance oversight, described above, and the flexibility to adapt and improve the service provider's performance. Risk could also be mitigated by the inclusion of guarantees, risk-sharing mechanisms, or subordinated debt, when blended finance has a role to play.⁴

Outcome funders are typically donors, aid agencies, philanthropic funders, or the public sector (national or subnational government) and may be a combination of these actors. Outcome funders are typically those that have responsibility, or a mandate, relating to the target group for the intervention or will benefit from future savings that result from improved outcomes. Effective design of outcomes-based interventions will seek to integrate road safety within the system and engage local governments to take a wider view of road safety benefits that can be built. One approach involves combining funding from donors and national governments in a way that encourages local ownership and embedding change by utilizing concessional finance from multilateral development banks (MDBs) or development finance institutions (DFIs) to “back fund” a national government's outcome funding contribution. For example, Cameroon's Ministry of Public Health was the outcomes payer in an impact bond to scale a health intervention, where the multidonor [Global Financing Facility](#) provided back funding (Social Finance 2021). Routing concessional funding through the government ensured stronger government engagement. In that case, evidence from the project was integrated into the ministry's regulatory frameworks and health safety standards, creating more lasting impact.

Investors range from those specifically targeting the social impact to a broader group who see the benefit to their portfolio based on risk or return criteria; or who see a benefit from diversification because these models are often not correlated to other drivers of market performance. An example of the former is family offices or foundations who identify alignment with their mission. An example of the latter is institutional investors such as NewRe (part of Munich Re Group) who participated in the humanitarian impact bond (HIB) issued by the International Committee of the Red Cross (ICRC) (box 4.4).

⁴ The Cameroon Cataract Bond provides an example of blended finance in action. More information can be found here: <https://golab.bsg.ox.ac.uk/knowledge-bank/case-studies/cameroon-cataract-bond/>.

Investors attracted to outcomes-based models have a varied range of risk and reward expectations. Investor risk in this model includes: (1) outcome risk, including how outcomes have been defined and set, and the availability of evidence that the proposed implementation plan will achieve the outcome targets; (2) performance risk, in particular risk of underperformance by the implementer; and (3) outcome payor risk, including both the outcome payor's credit record and the risk of disputes over, for example, verification of results. Investor risk can be mitigated by their involvement in the structuring so that targets, outcome definition, and measurement methodology are not developed independently of an investor perspective as well as through application of structural mechanisms. For example, project governance and performance oversight play a key role in mitigating performance risk. In some cases, implementers may also share in risk (though this also makes it more difficult for an investor to replace an implementation partner). The structural mechanism to mitigate investor risk, such as through a tiered structure with first-loss investors (for example, higher risk, higher return) or through a loss guarantee, may also be options for consideration where philanthropic capital or blended finance could have a role to play by extending such guarantee.

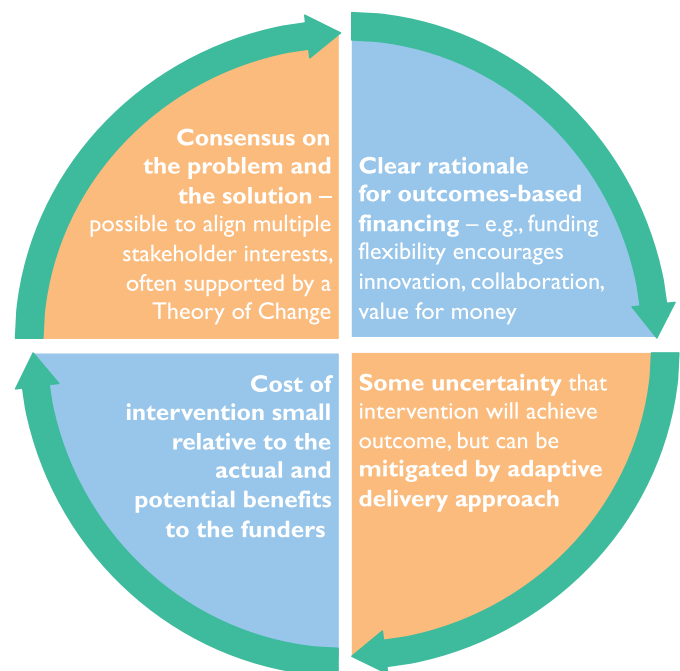
Another important consideration when setting up an outcomes-based structure is to ensure that there is alignment between all the parties' incentives so that they are all focused on the same end goal, and that the implementation plan and funding flexibility gives the implementer sufficient control to work effectively toward the target outcome goals.

Outcomes-based structures offer versatility by supporting an adaptive approach with flexible, outcomes-focused funding and finance. They work best when focused on a clearly defined problem and user

group, with some evidence for an appropriate intervention. However, there is complexity or uncertainty in the approach that could be mitigated by an adaptive, data-informed approach to implementation. Globally, more than 200 impact bonds and similar outcomes-based instruments have been launched to date across a wide range of issue areas (Government Outcomes Lab 2021). While many of these are pilots are small in scale, work is ongoing among key actors, including donors, DFIs, and foundations to explore strategies for scaling up and mainstreaming.⁵

The core characteristics and rationale underlying each of the outcomes-based approaches included in Model E (E1, E2, and E3) illustrated in figure 4.12.

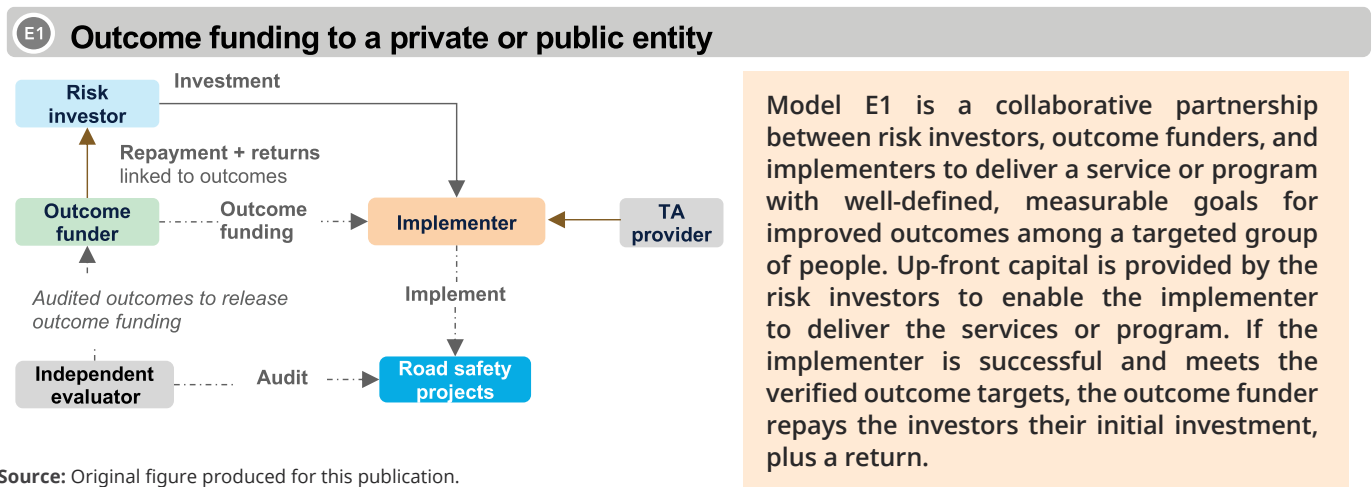
Figure 4.12. Outcomes-Based Funding and Financing



Source: Original figure produced for this publication.

5 See Impact Bonds Working Group at <http://www.ib-wg.com/>, accessed October 5, 2021.

Figure 4.13. Model E1: Single Project Outcome Funding to a Private or Public Entity or Impact Bond



Source: Original figure produced for this publication.

Model E1 (figure 4.13) reflects the core components of an outcomes-based approach, applied to an individual road safety project where funding is linked to and disbursed against specific road safety targets. Pedestrian road safety interventions, emergency medical services, protective infrastructure for vulnerable users, some road infrastructure upgrades, enforcement, and trauma care could all be suitable for funding through Model E1. The selected funding mechanism should be led by the problem and context.

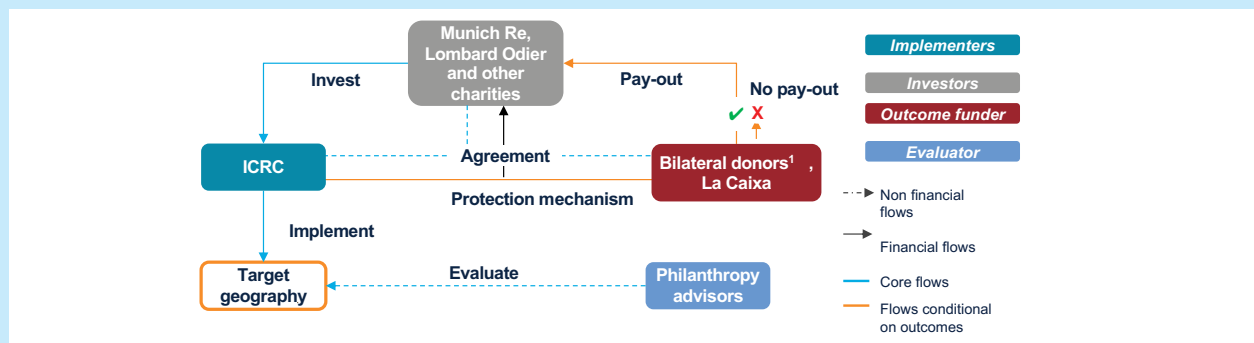
Box 4.4 highlights an example of an impact bond issued by the ICRC in Mali, Nigeria, and the Democratic Republic of Congo for building physical rehabilitation centers. This example also showcases the use of capital protection to reduce the risk for the investors. This example could be adapted for the provision of post-crash trauma care. Box 3.4 in the previous chapter provides another example of the application of Model E to increase helmet wearing among motorcycle passengers in Cambodia.

Box 4.4. Physical Rehabilitation Centers through a Human Impact Bond in Mali, Nigeria, and the Democratic Republic of Congo

In countries that have experienced or continue to experience conflict, many traditional funders and investors are deterred from providing health funding and development assistance due to the challenges in guaranteeing outcomes. One consequence of this lack of funding is a low provision of physical rehabilitation—an area of treatment that supports those living with disabilities that affect their mobility.

To tackle this issue the International Committee of the Red Cross (ICRC) raised a US\$28 million Humanitarian Impact Bond (HIB)—the first of its kind—to fund three new physical rehabilitation centers in Mali, Nigeria, and the Democratic Republic of Congo to meet the needs of key underserved populations (ICRC 2017). By structuring the funding through an HIB, the ICRC was able to crowd in institutional investors and funders and manage the funding risk more efficiently. The investors would only receive a return if the new centers met the predetermined staff efficiency ratio (SER) that captured the number of beneficiaries (re)gaining mobility per local rehabilitation professional. If the new centers did not meet the SER, the investors would make a loss, activating a capital protection mechanism protecting 60 percent of the investors’ initial investment. In this case, the ICRC would make the first-loss payment at 10 percent of commitments. If the SER was instead better than the baseline, the investors would earn a premium. Overall, investors’ potential returns range from negative 11.3 percent per year to a positive 7.0 percent per year.

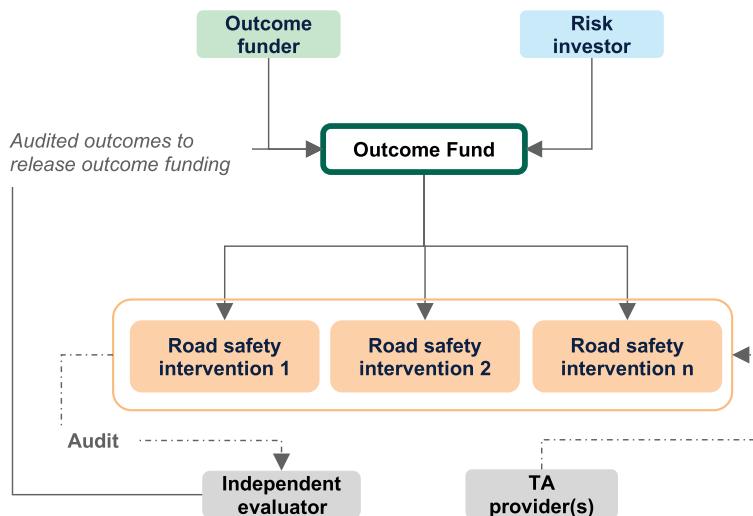
Figure B4.4.1. The ICRC Humanitarian Impact Bond Structure



Source: Original figure produced for this publication, based on ICRC 2017.

The HIB case study illustrated in figure B4.4.1 highlights the potential for bringing in diverse investors, including insurance companies and other institutional actors, into funding an impact bond. NewRe (part of Munich Re Group) was the first reinsurance counterparty to participate in such an impact bond mechanism. Similarly, an impact bond for road safety could attract insurance companies who see road safety as being in line with their sustainability mandate and see an opportunity to generate returns at a reasonable level of risk.

Source: ICRC 2017; World Bank analysis.

Figure 4.14. Model E2: Outcome Funds for Scaling at a National or Regional Level**E2 Outcome Fund**

An outcome fund model benefits from scale by bringing together multiple outcomes-based contracts that operate under a common outcome payment framework. The pooled capital in the outcome fund is disbursed by the outcome fund manager if the pre-agreed outcomes are met by the interventions. Where implementers require it, risk investors pre-fund the intervention and are repaid out of outcome payments.

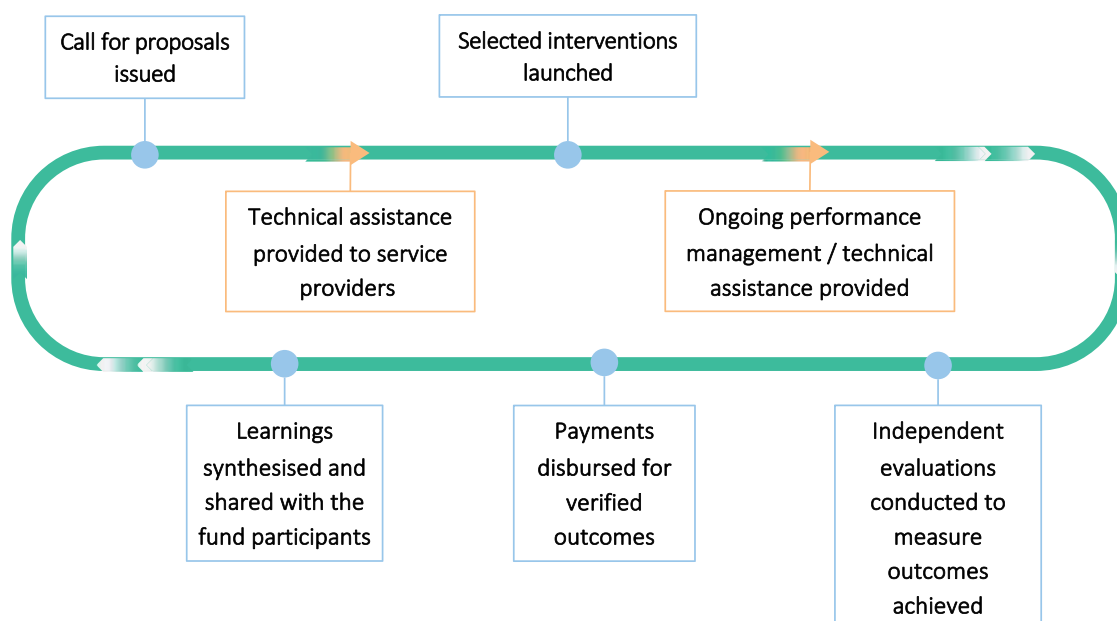
Source: Original figure produced for this publication.

While Model E1 is well suited as a demonstration case to build the evidence base for what works, Model E2 provides a pathway for a more programmatic, scalable use of this approach. It enables deepening the evidence base for a particular road safety intervention type, or group of interventions, as well as more systemic collaboration. It is suitable for multiple interventions in a single country or for rolling out an intervention in several countries, as a regional approach. In this form of the model, outcome funders take a structured approach to allocation of funding across multiple projects against specified road safety metrics. The model also provides a scale opportunity for risk investors as it offers a pipeline, or portfolio, of investments (Bartz-Zuccala, Bellesi, and Moller 2021). If there is sufficient scale, it could support a linked investment fund. Box 4.5 outlines the Education Outcomes Fund as an example of this approach.

A core feature of an outcome fund is how the concentration of projects enables a cycle of continuous learning and adaptive delivery. This generates data and evidence that can influence future project design and policy change. An outcome fund can be linked to a blended finance facility to enable this cycle of learning and provide rich data and evidence for the sector.

For road safety, an outcomes fund (see figure 4.15) could support interventions of similar type, for example, a Footpaths for Africa outcomes fund focused on pedestrian safety, adapted and rolled out in several contexts and geographies (iRAP 2021). Such a fund would enable faster replication and scaling of lives saved. The approach would also enable significant cost and delivery efficiencies and promote innovation in delivery technologies and approaches. An alternative approach might be to focus on innovation, with an outcome funding window that tests different types of road safety interventions that are suitable for an outcomes-based approach

Figure 4.15. Outcome Funds Support Continuous Learning and Adaptive Delivery



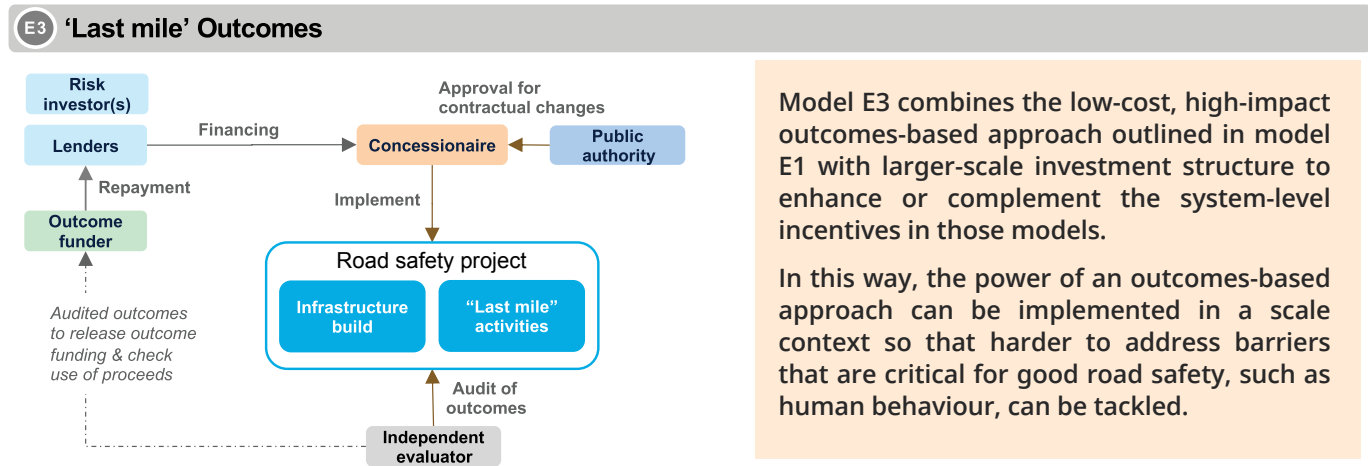
Source: Original figure produced for this publication.

Box 4.5. The Education Outcomes Fund

The Education Outcomes Fund (EOF), hosted by the United Nations Children’s Fund (UNICEF), is an example of an outcome fund.^a The fund has a long-term goal of pooling US\$1 billion and focuses on strengthening the ecosystem, improving public policy and practice, and generating sustainable funding for education. Initial implementation countries are Ghana (US\$30 million program) and Sierra Leone (US\$26.5 million program). In parallel, recognizing the risk capital requirement that the fund will create, action is underway among private wealth managers and impact investment funds to establish a separate fund that can provide, or cornerstone, the risk capital requirements that EOF and other such funds will create.

Source: World Bank analysis, based on information available from the Education Outcomes Fund.
Note: a. For more information about the Education Outcomes Fund see <https://www.educationoutcomesfund.org/>.

Figure 4.16. Model E3: “Last-Mile Model—Using an Outcomes-Based Approach in Combination with the System-Level Targets in Models A to D



Source: Original figure produced for this publication.

Model E3 combines the low-cost, high-impact outcomes-based approach outlined in model E1 with larger-scale investment structure to enhance or complement the system-level incentives in those models.

In this way, the power of an outcomes-based approach can be implemented in a scale context so that harder to address barriers that are critical for good road safety, such as human behaviour, can be tackled.

Model E3 (see figure 4.16) takes the low cost, high impact of an outcomes-based approach and combines it with another, much larger scale, transaction model. This combination is designed to deliver maximum, “last-mile” impact that would not be possible with either model operating on its own.

Models A to D envisage blended finance in the form of outcome funding as an option that could be deployed alongside the given financing structure to create additional incentives to deliver road safety outcomes. However, the scale of those investments will likely mean that outcome funding is linked to system-level targets. To realize the full benefit of investment in road safety terms, it may be necessary to include an additional layer of funding that addresses the “last-mile” steps that are necessary to respond to the needs and behaviors among end users that only become better understood through implementation and adaptation. For example, ensuring road safety responses address needs of vulnerable users, which go beyond what can be achieved with a mainstream response.

This “last-mile” component is suitable for funding using an outcomes-based approach described above. For example, Model A could successfully support the building of a new, safe road that meets required safety standards. Deployed together with Model E3,

measures could then be designed to focus on specific users and help ensure that the road is not only safer, but also used safely. An alternative application of Model E3 might be alongside Model B, in a case where existing finance to build a road corridor that passes through several villages is supplemented with a more flexible, outcomes-based funding envelope that can support a range of additional, low-cost safety measures (including both infrastructure measures, such as wide centerlines, safer roadsides, better signage, traffic calming, sidewalks, and crossing facilities, as well as community engagement measures) that are able to respond to the specific local needs and users.

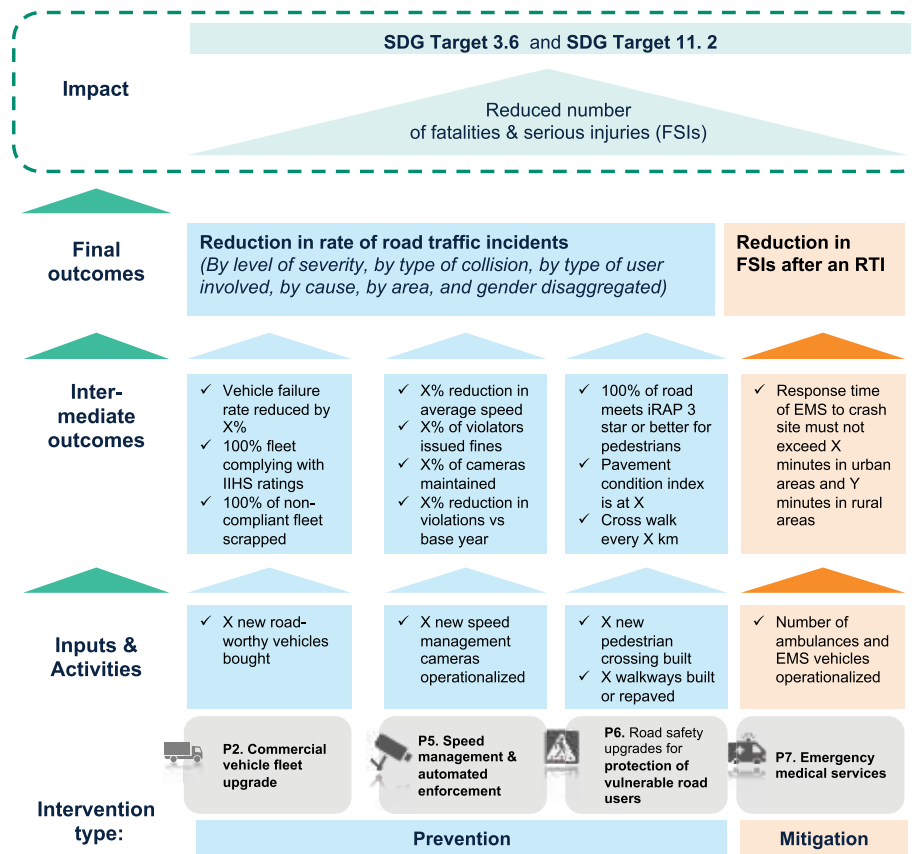
Model E3 can be used in combination with any of Models A to D in circumstances where to fully realize the benefits of investment there is a small, but complex, “last-mile” issue to be overcome with an adaptive learning component, or which may require parties to be involved—such as local groups or NGOs—who are not typically part of the investment structure but expert in the needs of the target users. The outcomes-based component would be linked to the main structure and may also engage a broader group of outcome funders and risk investors whose interests are more aligned to the “last-mile” impact and related activities.

Results Frameworks and Monitoring and Evaluation

Within project design, a robust results framework needs to be built to track progress toward appropriate targets that contribute to the ultimate goal of reducing FSIs. For projects to be designed for success, having clear safety targets and appropriate indicators of progress is essential. Preferably, targets will also be stipulated within the contracts—either on an incentive or a penalty basis—so that implementers or investors (or both) are tied to their safety commitments as a performance measure, including financially. Designing appropriate results frameworks and targets requires consideration of the link between interventions, outputs, outcomes, and impact. It should also leave space for adaptation as data and evidence from project implementation

emerges. Initial frameworks can draw upon existing practice and targets for road safety, including in the SDGs, for the recently launched Global Plan for the Second Decade of Action for Road Safety 2021-2030 and available work on safe systems. As for other aspects of design and structuring, these will need to be adapted for local and project context and other design elements, such as behavioral elements for how people use or interact with the roads or safe system. Development of a results framework is visualized in figure 4.17, which gives illustrative examples of outcomes and outputs for a range of road safety interventions. A version of this visual for all eight project archetypes is included in appendix F.

Figure 4.17. An Illustration of a Results Framework That Maps Activities to Final Outcomes



Source: Original figure produced for this publication.

Note: The included safety performance indicators for each project are purely for the purpose of illustration.

While the ultimate objective of any road safety intervention is a reduction in the number and severity of RTIs and FSIs, intermediate outcomes and inputs need to be tracked to ensure attribution and progress. The reduction in RTIs and FSIs (per figure 4.17) makes the link to the SDG target of halving road traffic fatalities by 2030.⁶ While RTI and FSI reduction will be the primary outcome across projects, attention to design is required for the causal chain between activity, outcomes and impact. In order to be able to aggregate and compare data across projects, contexts, and investment structures, a level of consistency is required on agreed metrics. It is also important that indicators are calibrated to support learning and adaptation as the effectiveness of interventions becomes better understood.

Linked to the SDG targets, the Global Road Safety Performance Targets (see box 1.1 in chapter 1) provide an initial framework for results-based monitoring and evaluation (GRSP 2020). The performance targets also provide the basis for the United Nations' Global Plan for the Second Decade of Action for Road Safety 2021–2030. More detailed key performance indicators (KPIs) have been recommended as part of the Sum4All initiative hosted by the World Bank, and the Decade of Action recommended KPIs for infrastructure safety that were recommended by iRAP (Sustainable Mobility for All 2021; also see iRAP's "[Road Infrastructure Key Performance Indicators Using the iRAP Global Standard](#)," available online).

Intermediate outcomes are important factors to monitor over time and can also be included as KPIs stipulated within project contracts. Intermediate outcomes represent the link between the intervention and final outcome. For example, for an automated speed management system the intermediate outcome is the reduction in speeding, and the final outcome is a reduction of speeding-related RTIs. Results from road safety infrastructure inspections and audits, number of trauma centers built, or volume

of vehicles inspected could all be examples of other KPIs at the intermediate level, which would be hoped to have a positive causal impact on the final outcome of lowering RTIs and FSIs. Resources are available to inform KPIs that are attributable and measurable. For example, the Permanent International Association of Road Congresses' (PIARC's) *Road Safety Manual* and the Global Road Safety Facility's (GRSF's) Good Practice Note provide guidance on how to choose KPIs. Inputs can also be monitored as KPIs, such as number of ambulances purchased, or number of crash barriers built and installed (PIARC 2019; World Bank 2019b). Once the KPIs are chosen, a suitable baseline needs to be selected, either from previous years' performances or from data from comparable roads. As the aim should be sustained and continuous improvement over time, year-on-year reductions could be an effective way to structure targets. Gender-disaggregated data is another element which is severely lacking both in LMICs and globally. Such data are critical to being able to apply a gender lens to understanding the costs that road crashes inflict on society.

Results frameworks need to be selected with a critical eye to the management, M&E capacity, availability, and collection of data possible in the local context. Operating road safety projects in contexts where available data is limited, including in some LMICs, will require focusing on the key measures that link to the outcomes, capacity building to enable better quality of data collection, and steps that may be necessary to assure or verify that metrics can be and are collected reliably and verified appropriately. In the five models presented in the previous section, independent evaluators are proposed for each structure. Engaging evaluators and bringing focus to the results frameworks and data collection and verification early on in the program design can assist in building the appropriate results framework and M&E strategy and linking that to the investment structure and broader development of the field.

⁶ Halving global traffic deaths by 2030 is the SDG Target 3.6.

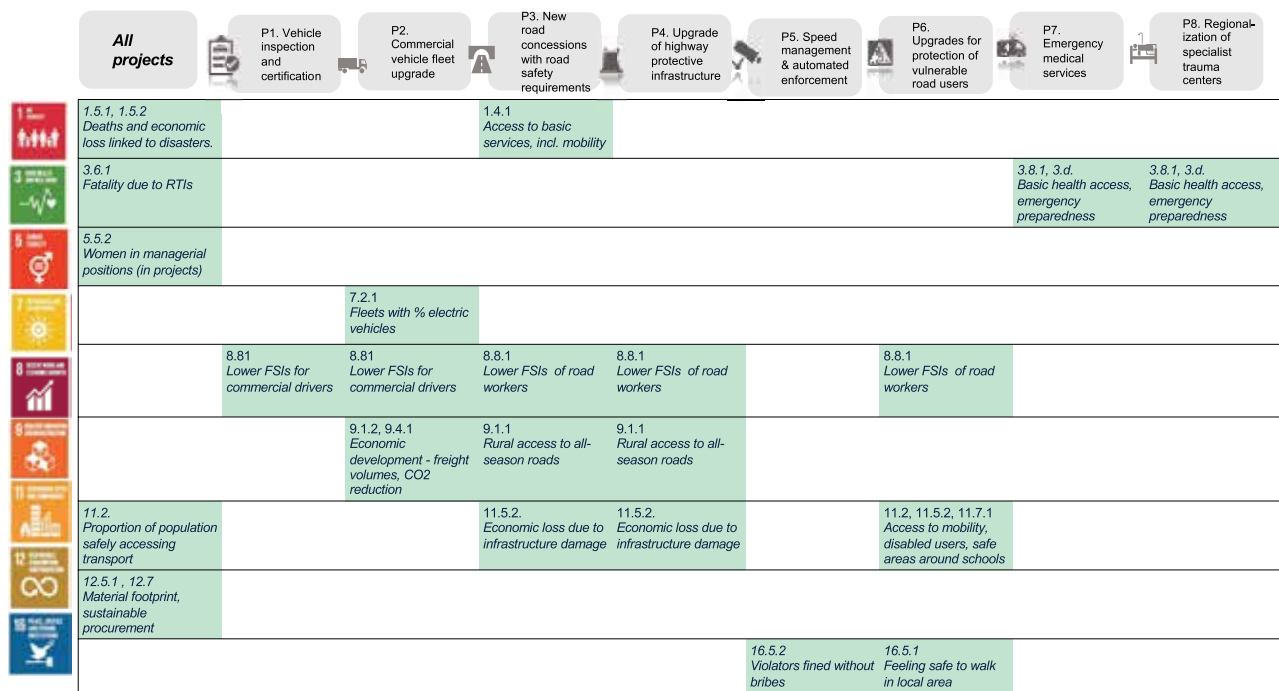
Global-level coordination and review of evaluations can also support continuous improvement in the underlying models that support the investments. Beyond framework design, management for the impact sought is a critical element for achieving impact and building the evidence base. Like other aspects of project management, impact targets and goals need to be monitored and managed, and adjustments and improvements made to course correct through the life cycle of a project or investment. This process provides valuable and transferable lessons within a project and to inform a broader set of projects and transactions as well as informing measurement and reporting.

This is an area where technical assistance may be useful to build capability and a better understanding of what works over time. Although the scope of M&E may be limited to start with, seeking out longer-term technical assistance to build up M&E capacity can mean that over time the available data will grow, providing room for a more nuanced and contextualized analysis of outcomes. For example, as the data availability grows at the regional and national

levels, outcomes can become further contextualized with data on institutional delivery (such as policy and enforcement), exposure measures (such as affected populations), socioeconomic costs of road trauma, and economic data (such as vehicle sales) (OECD 2008). The greater the capacity for monitoring and reporting, the easier it is for investors to engage in the space and fund improvements, making financing conditional on meaningful measurable improvement.

Road safety frameworks and indicators can link to a wider range of SDGs. This is likely to make possible a broader range of investment options, including more sustainability-linked debt, and may attract broader donor and investor interest. Figure 4.18 illustrates some examples of the ways in which the eight project archetypes might link to other SDGs. A more detailed mapping is provided in appendix A. Performance indicators that are selected for other SDG linkages should also be measurable and attributable. The United Nations Development Program’s (UNDP’s) SDG Impact Standards can inform design for impact goals and management of impact through the project (SDG Impact and UNDP 2021).

Figure 4.18. Illustrative Mapping of the Potential Wider SDG Linkages of Road Safety Interventions



Source: Original figure produced for this publication.

Risk and Mitigation Strategies

As with any investment or programmatic response, road safety investments require assessment and effective management of the risks.

Bringing together investment with road safety initiatives means there may be both investment and impact risks to consider. Where donor or public funds are involved, there may also be ethical risks to consider and the need to ensure integrity and value for money. Each of these dimensions can be designed for and managed with clear mitigation strategies. Where the approach is novel, investors may not yet fully understand the risk relative to their usual assessments of risk-adjusted return, which is where the evidence base for interventions and, where appropriate, credit enhancement through blended finance may play a role until the models are proven.

Markets are becoming more sensitized to reputational risk and the risk that there is insufficient management and accountability of impact.

Growth of social and green investment has informed caution of “impact washing” and “greenwashing”—where actors are able to co-opt sustainability narratives and benefit from creating a more sustainable image of their product or investment without taking sufficiently responsible action. This risk is also

possible for road safety investments. However, it can be managed with sufficient due diligence by setting a requirement for the transport investments to meet more than basic required safety standards, appropriate governance, and expectations of transparency. It is important these risks are managed, or they could undermine the credibility of private capital mobilization for road safety and delay progress.

Other ethical risks also need to be considered.

These include distorting the road safety market, subsidizing market-based activity without sufficient additionality to road safety, undermining local ownership, increasing the debt burden in LMICs, or not investing in long-term sustainability. Particularly when operating in LMICs, where regulatory and legal frameworks may not be sufficiently robust to safeguard local markets and economies, it is important to take a critical look at the ethical risks of private capital and overseas investment in a new investment area, examining the potential for any unintended consequences. Following this, the project design and execution strategy can be adjusted to safeguard against these risks. Table 4.1 presents a range of potential ethical risks and ways in which they could be mitigated within the investment structure and program design.

Table 4.1. Ethical Risks and Mitigation

Ethical risks		
Risk	Example	Mitigation
“Impact washing” of investments	Transport investors are able to benefit financially or reputationally by co-opting the road safety narrative without taking the necessary commitments beyond minimum standards	Conduct proper due diligence of individual investments and consider creating standards for debt-financed road safety projects that set out minimum standards to be considered valid investments

Ethical risks		
Risk	Example	Mitigation
Mission dilution	Focus on commercial road safety interventions without considering other effective road safety interventions (such as, driver education, awareness campaigns, appropriate speed limit setting)	Design program based on the road safety needs, not just capital requirements. Engage mission-focused donors to ensure solution is victim-centric. Scope and integrate local CSR-driven and government initiatives to strengthen program
Increasing public debt burden	Borrowing entity increases its debt obligations to an unsustainable level	Assess fiscal space of the borrowing entity and use covenants where necessary to ensure sustainable financing practices
Distorting public priorities	High degree of subsidies offered for road safety deters investment in other high-priority areas for the sub-national region	Conduct a needs assessment in the sub-national region to determine priority of road safety and issue debt in proportion to the relative need
Lack of public ownership	Private sector engagement undermines local ownership or overlooks country financing priorities	Engage with the government entity to determine its road safety priority and identify dedicated resources to design and execute on the programs
Market distortion	Concessionaires or implementers receive grant funding or subsidy for an investment that could be economically viable with the right pricing and cost structures in place	Engage an experienced technical evaluator to develop a rigorous road safety investment plan and test the market dynamics to determine the need for viability gap funding (VGF)
Lack of regulatory support	Regulatory and institutional enablers do not sustainably support road safety concessions without technical assistance support in the long run	Target public capacity-building support such that PPP frameworks evolve to support the commercial viability of road safety interventions by allowing concessionaires to budget in road safety and by publicizing safe concessions
Short-term commitments	Concessionaires fail to sustain the same level of prioritization and standards of road safety measures without the subsidy	Outline clearly the impact on financial risk and tailor technical assistance to the concessionaires to support capability building by prioritizing safety action plans and achieving minimum international standards in road safety

Source: Original table produced for this publication.

Execution risks also need to be considered, including risks of projects not reaching their desired goals of improving safety outcomes and saving lives.

These risks can be mitigated through robust project design and effective monitoring and management to enable course correction over the course of implementation. Responsibility and resources for this function are an important design component. Table 4.2 outlines some of the execution risks that should be considered and provided for in the project design and contracting in order to maximize the project's chances of success. As many of the models suggested in this report recommend results-based approaches, including where returns are tied to outcomes, particular attention to the attribution of outcomes, the potential gaming of outcomes, and measurement of KPIs is important. The gaming of outcomes is where parties receiving outcome payments

are able to either lower benchmarks or misreport outcomes in order to maximize their income without delivering improved safety outcomes.

Furthermore, if outcomes cannot be reliably attributed to the implementer, or cannot be reliably measured, this undermines many of the models presented in this report. There are also sustainability risks related to some of the models and their revenue streams over time, which can also create perverse incentives. For example, it should be hoped that the number of fines from speed enforcement will go down over time, which—if the PPP is reliant on these revenue streams—could undermine the long-term sustainability of the project and could also create perverse incentives or corrupt behaviors in the implementers

Table 4.2. Execution Risks and Mitigation

Execution risks		
Risk	Example	Mitigation
Gaming of outcomes	Outcome payments could create perverse incentives for lowering benchmarks of outcomes or overrepresenting outcomes	Set robust measuring mechanisms and appropriate limits on outcome funding
Sustainability risk	Identified revenue streams (such as revenue from infringement fines) are not sustainable in the long term	Conduct a sustainability analysis of the revenue streams and pursue multiple revenue streams if necessary
Misuse of funds	Borrower or implementer does not use funds as expected toward road safety	Set out clear monitoring and recourse mechanisms for any potential misuse
Insufficient funder/ investor interest	Limited interest from donors to fund road safety and/or commercial investors to finance the public entity	Conduct a needs assessment in the subnational region to determine priority of road safety and issue debt in proportion to the relative need

Execution risks		
Risk	Example	Mitigation
Design risks	This could result from complexity and transaction costs involved in setting up the structure, or limited interest due to hard-to-achieve outcomes	Engage potential investors in order to (1) determine the level of inputs and design a straightforward structure to enable participation, (2) design a risk-return mechanism that will be sufficiently attractive, and (3) outline transparent impact data that can be easily reported on
Legal risks	Borrower or implementer faces legal repercussions for contract breach	Provide technical assistance to support attaining necessary public approvals to allow for additional road safety investments and evaluating regulatory framework to ensure compliance
Ineffective interventions	Intervention is implemented and meets targets, but does not achieve desired impact on road safety due to: (1) metrics that are ineffective, (2) international targets that are not tailored to local context, or (3) policies that are inadequate in addressing behavioral changes	Enlist support of road safety experts and conduct local safety assessment pilots to ensure adequate evidence-based attribution data is available to design effective interventions and KPIs Ensure capacity-building technical assistance targets improved enforcement capabilities. Promote complementary efforts in education and awareness raising
Ineffective M&E design	Intervention is implemented and meets targets, but does not achieve desired impact on road safety due to: (1) metrics that are ineffective, or (2) targets that are not tailored to local context	Provide technical assistance to support availability of adequate evidence-based attribution data tailored for the local context and design of effective interventions, KPIs, and targets

Source: Original table produced for this publication.

A range of financial risks can also occur depending on the investment structure and entities involved, including credit, currency, and counterparty risks.

To counter the credit, currency, and counterparty risks that might be involved in financing a subnational entity or corporate in an LMIC, a number of guarantees and hedging mechanisms can be engaged for mitigation, as summarized in table 4.3. Financial sustainability relative to the project or investment

also needs to be tested. Some risks may be mitigated through available mechanisms such as political risk insurance, resource mobilization initiatives or currency exchange funds.⁷ In the short term, those models with lower financial risk are likely to pose fewer barriers to getting an investment to market than models that may take longer to design and develop.

7 For example, the Inter-American Development Bank's resource mobilization initiatives: <https://www.iadb.org/en/about-us/financing-and-mobilization-of-resources%2C6243.html>, and the Currency Exchange Fund, designed to facilitate local currency funding in LMICs, offering hedging for currency ad tenor not served by commercial banks. For more information, go to: <https://www.tcxfund.com/>.

Table 4.3. Financial Risks and Mitigation

Financial risks		
Risk	Example	Mitigation
Credit risk	Credit assessment of the offtaker of road safety services (government counterpart in a PPP or state government in a sub-national financing) is a challenge, limiting private investment	Provide credit enhancement in the form of a guarantee to private investors. A counter-guarantee may also be sought from a national entity
Currency risk	Sharp shifts in exchange rates can result in the borrower's inability to make payments in hard currency	Issue debt in local currencies where possible and employ relevant hedging mechanisms
Project risk	Unforeseen shifts in priorities for expenditure or in projected revenues or changes in government can result in payment defaults	Use guarantee mechanisms to hedge against political risk or credit risk as appropriate

Source: Original table produced for this publication.

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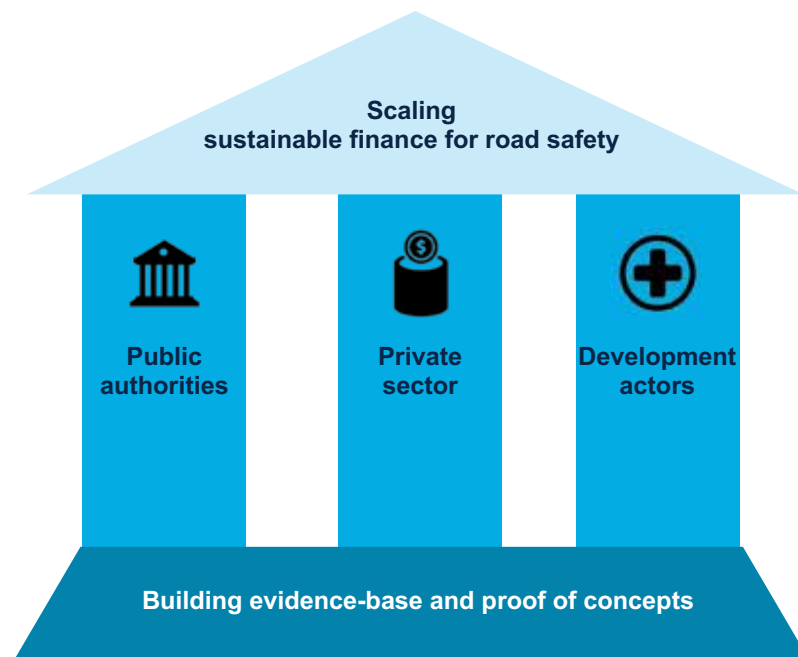
5. Forward Together



The first steps to mobilize private capital to road safety will require a joint effort by public and private stakeholders facilitated through a mobilization platform, with the end goal being a scaling up of investment in road safety. As shown in chapter 2, the costs and market failures of road safety are felt across a wide ecosystem of actors. To create the opportunity for private capital to flow into road safety, existing actors in road safety will need to crowd in other stakeholders to create new approaches and develop a conducive environment for investment, structure projects, and share best practices by utilizing the models gaining traction in sustainable debt markets as part of a broader platform.

Initial catalytic financing provided through a platform will kick-start a virtuous cycle that will lead to more high-quality transactions in road safety. This will attract new actors, enable clearer positioning of road safety investments in the environmental, social, and governance (ESG) sustainability landscape, and mobilize private capital in road safety at scale. Figure 5.1 shows how coordinated efforts by public authorities, private sector, and development actors are necessary to build this evidence base, and from this base move toward creating scalable opportunities. This chapter aims to serve as a road map for the collaboration necessary to achieve this goal, outlining the roles of development actors, public authorities, and the private sector. Chapter 6 then brings it all together by setting out a vision and overview of the platform as the catalyst and convener of this collaboration.

Figure 5.1. Forward Together to Scale the Mobilization of Private Capital for Road Safety



Source: Original figure produced for this publication.

Coordinated Efforts to Build Evidence and Proofs of Concept

National and global efforts that focus on creating evidence to clearly define the investment case of road safety will accelerate progress. This will help to connect the available evidence on the social and economic effects of road traffic incidents (RTIs) with transport policy, how road infrastructure is commissioned and delivered, and increasingly shed light on the externalized costs of current infrastructure and unsafe vehicles in many countries. A current barrier to investment in road safety is the lack of proofs of concept in low- and middle-income countries (LMICs). In high-income countries (HICs), investment cases are beginning to be developed for road safety—see, for example, the investment case developed by the International Road Assessment Programme (iRAP) and the FIA Foundation for road safety infrastructure investments in Australia described in box 3.1 in chapter 3 (Davies et al. 2016). Such detailed investment cases are only starting to be conducted in LMIC contexts and need to be developed further to show that investment opportunities are not confined solely to HICs but can be adapted successfully to contexts with less-developed road safety management and still generate both return on investment and lifesaving impact. The more projects that are conducted in diverse contexts, the higher the external validity of their results will be, inspiring more countries to follow suit and add to a growing evidence base of private capital-funded interventions and impact. Once the concepts have been demonstrated to deliver both impact and returns in LMICs, there will be the ability to scale up investments and projects.

Adaptive learning is needed to find the most cost-efficient, high-impact projects, and those which present the strongest investment cases for the private sector. According to the Global Road Safety Facility (GRSF), which works with transport authorities in LMICs, many road safety interventions

are selected based on “common sense” ideas of which interventions may be more effective, rather than on evidence (World Bank 2019a). Particularly in budget-constrained environments, this status quo needs to change; interventions instead must be selected through a data-driven approach with thoughtful design and rigorous assessment of these interventions’ impact on reducing fatal and serious injuries (FSIs), including the economic and societal benefits this will bring. The effectiveness of interventions is often highly contingent on the context in which they are applied, and compared to the evidence base from HICs, more data still need to be generated in LMIC contexts on what are the most effective solutions. Furthermore, these learnings need to go beyond simple macroeconomic estimations toward calculating the direct cost savings for specific sectors and actors. This includes breaking down the costs saved by enforcement authorities or public health systems, the reduction in claims for insurers, the savings and increased productivity for commercial fleet owners and operators, and, finally, savings in health care, property damage, and loss of income for the road users themselves—for example, through localized validation of the true impact of road injury in respective countries, building on iRAP’s Global Impact of Road Injuries (Vaccines for Roads 2020). With these breakdowns, investment cases can be generated from these studies that can be used to build new funding models and attract investors to road safety. To this end, the collection of gender disaggregated data is also needed, as it is critical to be able to apply a gender lens when unpacking the complex implications of road safety on households. This data can then inform the gendered dimensions of possible countermeasures. As pilot opportunities are developed and tested, some interventions will be found to be more successful than others in generating a return and in creating impact. From these

learnings it will become clear which high-impact, low-return interventions should stay public or donor led, and which can be taken over by private sector investment, leading to a more efficient allocation of public and private resources.

The end goal is to scale up pilot investments and mainstream private investment in road safety.

The larger and more robust the evidence base demonstrating the potential for investment and the applicability across various LMICs, the greater is the potential for private participation in road safety projects to become common place. The demand for road safety funding in LMICs is evident. For example, the United Nations Road Safety Fund set up in 2018

received 73 project proposals in its call for projects—totaling approximately US\$62.5 million in funding requests against its total budget of just US\$4 million—and these were only non-infrastructure project proposals, which are typically lower cost (UNECE 2020). With such high demand for road safety projects, once the investment case is proven the potential investment opportunities will be vast. While initial stages may rely on donor- and public-led initiatives, development actors can work with public authorities to design pilots and demonstrate the potential to investors on a case-by-case basis. However, once the proof of concept is established, the initiative can become private sector led.

Development Actors to Lead the Way for Road Safety Investments

Donors, aid agencies, and development financiers can lead the way in supporting road safety investments and play a catalytic role in crowding in other private investors. While road safety remains an untapped market for private investment, development actors have a unique role to play as first movers creating proven investment cases and catalyzing other private capital to follow. By offering blended finance, technical assistance, and capacity building and taking on junior creditor positions when perceived risks are higher, development actors can make road safety investments more attractive for private investors. The aim is for donor or grant funding to be used in targeted ways to demonstrate feasibility and leverage the sustainable debt and impact investment

markets to expand the available resources for road safety. This will be more necessary at the start, where investors have few examples to follow and will need additional incentives or security to become first movers in the space.

Donors, aid agencies, and development financiers can also help break through the government budget silos that disincentivize making road safety a priority. While spending decisions to fund new road and road-related projects are often the domain of a transport ministry or agency, the costs of not adequately addressing the road safety element of those projects are typically felt elsewhere in the system, including burdens on the health system, and loss to

national treasuries from reduced economic production and tax income. Tackling budget silos is difficult from within governments. Donors, aid agencies, and development financiers can engage with national treasuries and help break through these budget silos. They can do so by requiring a more holistic cost and benefit assessment that takes account of the negative impacts of poor road safety, which can be included by national treasuries or other agencies in their funding proposals, such as the “[iRAP Global Business Case for Impact Investors](#)”. The role of international organizations, such as the OECD’s Development Co-operation Directorate, in promoting coordinated, innovative international action to accelerate the achievement of the SDGs will be instrumental in ensuring the road safety, sustainable transport, climate change, and health-related goals are met by 2030.

Multilateral development banks (MDBs) and development finance institutions (DFIs)

By serving as a bridge between the development and investment spaces, multilateral development banks (MDBs) and development finance institutions (DFIs) have an important role to play in leading private capital mobilization for road safety. MDBs and DFIs can take on numerous roles in promoting private capital mobilization for road safety. An initial step that MDBs and DFIs can take is to take a critical look inward at their current portfolios of transport and health investments and consider the extent to which road safety is provided for and monitored. They can also leverage their relationships with treasury and finance functions across developed and developing contexts to bring increased focus to the overall impact of road safety on budgets. The

Multilateral Development Banks Working Group on Sustainable Transport (MDB WGST) has acknowledged the need to review priorities and procedures in the road-related projects it supports in order to encourage a “more ambitious, integrated, accountable and results-oriented approach” to safety.¹ The World Bank, by hosting the GRSF-Bloomberg Philanthropies Initiative for Global Road Safety (BIGRS) partnership, is also conducting assessments of its road-related investments in LMICs and leveraging the technical expertise and capacity-building work of GRSF to ensure investments are promoting improved road safety to the largest extent possible. Furthermore, through their relationships with governments and large investors in LMICs, MDBs and DFIs can encourage regulatory reforms and push for the uptake of higher road safety standards, offering any technical assistance needed to build public and private sector capacity in this area.

MDBs and DFIs can support private capital mobilization by signaling its priority, including coming in as early investors or as providers of technical assistance and blended finance. In the investment structures presented in chapter 3, MDBs and DFIs can play various roles in the equation depending on where their input will be most valuable. While the private capital market for road safety is in its nascency, MDBs and DFIs are well suited to take on roles that reduce the risk for other private sector capital, such as offering blended financing options or taking on junior debt positions. MDBs and DFIs also have the option of issuing social debt or sustainability-linked debt, which is earmarked for road safety, continuing to lead the growing trend of financial institutions

1 A group of ten multilateral development banks, including the following: African Development Bank, Asian Development Bank, Asian Infrastructure Investment Bank, CAF-Development Bank of Latin America, European Investment Bank, European Bank for Reconstruction and Development, Inter-American Development Bank, Islamic Development Bank, New Development Bank, and the World Bank; Multilateral Development Banks High-Level Joint Statement on Road Safety, November 16, 2020. Accessed on 11 March 2020. <https://www.eib.org/attachments/press/mdb-high-level-joint-statement-on-road-safety-en.pdf>.

issuing such sustainable debt products. Having a strong presence in LMICs, they are well placed to gauge the market demand for various themed debt products and hold a strong position to leverage the growing interest from international and local investors in buying sustainable debt.

To enable transactions even without investing, DFIs can act as sustainability coordinators helping stakeholders to set up investment structures and organize compliance across actors. Having experience in sustainable debt products and impact investment structures, DFIs are well suited to design and coordinate investment structures for road safety projects, setting up the necessary financial transactions and facilitating negotiation and compliance across actors. For example, in the Piracicaba-Panorama (PiPa) Lot case study (see box 4.3 in chapter 4) the International Finance Corporation (IFC) took an advisory role. The need for DFIs to take on this role is likely to be highest for initial pilot projects, where there are still few LMIC investment cases to follow. However, although the investment structures presented in this report may be novel to the transport sector, in many other development sectors they are being implemented successfully. MDBs and DFIs can transfer their experiences from working with impact bonds, blended finance, social debt, and sustainability-linked debt to the new application of road safety. By publishing and promoting the cases in which they coordinate and invest, MDBs and DFIs can also contribute to the global evidence base, creating investment case blueprints to inspire private sector actors to take on similar projects.

Health and development donors and aid agencies

Health and development donors and aid agencies can make their grants go further by using them to catalyze private investment. By supporting blended finance transactions, a smaller amount of grant funding can be used to attract a much larger pool of private capital, creating a multiplier effect for the total resources available for road safety. Due to the large ticket sizes associated with infrastructure improvements, donor funds and grants may not meet the scale of investment required on their own—even if there is demonstrated ability to save lives through an intervention. However, there may be cases where a smaller amount of grant funding can attract private investment by lowering the risk or increasing the return up to market rates. Especially by subsidizing early pilots, donors and aid agencies can attract early investors and support building the investment case to grow the market to a point where it can become private sector led. As the evidence for business models with attractive returns becomes clear, investors will crowd in and require fewer incentives to engage in the space. However, where genuine viability gaps persist for high-impact interventions, such as in low-income settings where challenging economic and political conditions will make it riskier for investors to come to market, donors and aid agencies should consider providing blended finance options on an ongoing basis, and act as a catalyst for increasing sustainable investment in some of the more challenging contexts that would otherwise go unfunded.

For high-impact interventions that are not monetizable, donors and aid agencies can continue to champion them through impact bonds—maintaining a results-based approach to their grant making. Several road safety programs may also emerge as high impact despite not being easily monetizable. In such projects with low financial returns but high impact for reducing FSIs, donors may choose to continue supporting these interventions through an impact bond. Conducting a cost-benefit analysis, donors and aid agencies can calculate the potential benefit of a road safety intervention—such as in terms of costs avoided to the health sector or to affected households—and engage an implementer on a pay-for-outcomes basis up to that amount. The end result should be that the funder has efficiently allocated its resources by only paying for guaranteed results. Model E and box 4.4 in chapter 4 provide more detail and real-world examples of how this structure can drive results in certain contexts. Furthermore, by first supporting the involvement of private sector capital and then identifying which high-impact interventions are not monetizable, funders can allocate their resources more efficiently by prioritizing their limited pools of grant funding to the areas where private investment cannot be used instead. Overall, as the evidence from use cases grows, this should lead to a more efficient allocation of private, public, and donor funds in the road safety market.

Local and international development actors also have an important role in raising the profile of road safety globally through their advocacy work. Despite being a global health crisis, road safety remains an invisible issue which is low on both public and development assistance agendas. Through advocacy and campaigns, development actors and NGOs have the ability to move the needle of public opinion on road safety by sensitizing communities to the public responsibility of making roads safer and calling for action. Organizations with strong local presence can also facilitate community stakeholder engagement, bringing an inclusive and participatory approach to the prioritization, selection, and implementation of road safety interventions, and can also support public capacity building through their work with local authorities. International development actors and NGOs like the Global Alliance of NGOs for Road Safety and Youth for Road Safety (YOURS) can also disseminate wider insights from developments in road safety investments, sharing best practices and fostering cross-country learning.

Public Authorities to Create the Necessary Enabling Environment

Public authorities in LMICs should set high standards for road safety in concession contracts and, where possible, create financial incentives via bonuses or penalties to encourage more investment in road safety. There are many ways in which public authorities can facilitate greater private investment in road safety, of which perhaps the most accessible first step is to reform their approach to concession contracts. Concession contracts should clearly outline safety requirements that are in line with international best practice, such as those set out in the Permanent International Association of Road Congresses' (PIARC's) *Road Safety Manual* for safe systems or to meet iRAP three-star or better standards for infrastructure. When minimum safety standards are stipulated in concession contracts, all private concessions are obliged to invest in safety regardless of competing on cost. In addition, financial penalties and incentives can be stipulated within contracts. Concession contracts for building and operating roads often outline financial penalties for delays in construction or for congestion, and this same system can be applied to meeting safety performance indicators (SPIs) that if not met will result in financial penalties. This is an effective way for governments to prevent private road investors from cutting corners when it comes to safety. The case study shared in box 4.3 in chapter 4 provides an example of this approach being successfully applied on toll roads in Brazil. Authorities should ensure that the financial consequences of noncompliance are large enough to disincentivize cost cutting on safety, and ensure that active M&E and enforcement is in place. If governments seek to encourage concessions to go beyond the minimum safety requirements and seek out continuous year-on-year improvement, they can also consider offering financial bonuses to concessions based on SPIs.

Public authorities, as the overseers of transport policy and strategy, must carve out the fiscal space to fund investment in road safety. A major constraint for road safety is that it often remains a low priority on the public agenda. Less than 75 percent of LMICs have a funded lead agency for road safety or a national road safety strategy (only around 50 percent for LICs), and only 50 percent of LMICs have defined clear road safety targets (World Bank 2019b). Raising dedicated public funds for road safety is an essential step in moving toward sustained improvement. To do so, public authorities could consider imposing additional taxes and levies on key stakeholders (such as requiring motor insurance companies to contribute a percentage of their premiums or applying a new fuel tax) that are earmarked for a road safety fund. These ring-fenced funds can then be used as revenue streams against which financing can be raised directly by the public entity; or used to fund availability payments to PPP partners, against which private debt can be issued.

Public institutions that are fiscally constrained can also find creative measures to expand resources. This could include working closely with private sector beneficiaries of road safety (such as insurance companies, fleet managers, or the private health sector) to find synergies in road safety investments, identifying cost-effective areas where health development assistance could be directed to prevent or mitigate road trauma, or considering concessional capital opportunities. There is also the option of seeking out donor funds for road safety, which could act as a catalyst for private investment by making public-private partnerships (PPPs) for road safety financially viable. Furthermore, in carving out fiscal space to fund prevention, wider government bodies should

eventually be able to recognize the broader public savings that are generated through lowered RTIs, such as in the health and social welfare budgets, and in tax revenues.

Public authorities also have important work to do in creating an enabling environment for investment by improving data on road safety and bolstering enforcement. Lack of trust in the capacity for reliable reporting and enforcement are both disincentives for private investment, particularly when pay-for-outcome investment structures are being considered. The Regional Road Safety Observatories can play important roles in building capacity, confidence, and consistency in road safety data and reporting ([GRSF provides more information on road safety observatories on its website](#)). The World Bank's Road Safety Country Profiles also provide a consistent and consolidated picture of road safety performance and potential to reduce road trauma (World Bank 2020). Public authorities can seek out technical assistance to improve in these areas, such as from the GRSF-BIGRS collaboration, from those who specialize in addressing road safety challenges in LMICs and can provide innovative solutions even in some

of the most fiscally constrained governments (see box 5.1). With better data, public authorities can build an accurate picture of the road safety environment by conducting road safety audits, building a national crash management system, and conducting cost analyses of RTIs. This data can be used to identify the blackspots that need to be addressed and monetizable project opportunities. Toward this end, the GRSF, with funding from UK Aid, is also currently working on a Road Safety Calculator tool, which will be launched in 2021, and which governments able to use to assess the potential for implementing certain road safety treatments (see box 5.2). Enforcement can also be improved by seeking technical assistance for road safety management, such as in support of adopting an automated traffic enforcement system which automatically issues fines to registered vehicles. These efforts will make it easier for revenue streams to be predictable and guaranteed, and thus easier for private capital to move in. Once there is a good level of enforcement and the public authorities have a clear picture of their country's safety status and priorities, it will be easier for them to identify and create public-led or PPP road safety projects.

Box 5.1. Cost-Effective Tools to Build an Enabling Environment for Road Safety in LMICs

With 15 years of experience supporting low- and middle-income countries (LMICs) to improve their road safety environment, the Global Road Safety Facility (GRSF), a multidonor fund hosted by the World Bank, has designed many innovative ways to work with the challenges faced in LMICs.

Public budgets in low-income countries (LICs) often lack sufficient funding to conduct essential road safety audits. In 2020, GRSF collaborated with the governments of Mozambique and Liberia to develop an innovative road safety assessment methodology that uses automated image analysis technology. Compared to traditional road audit methods, this methodology is substantially cheaper, and, therefore, accessible to LICs without compromising on quality of measurement (GRSF 2020).

To address the severe lack of crash data in LMICs, which are plagued by underreporting, corruption, and fragmented data collection points, GRSF has supported the creation of the Data for Road Incident Visualization Evaluation and Reporting (DRIVER)—a web-based, open-source platform for geospatially recording, analyzing, and reporting road crashes ([see the GRSF website for more information on the DRIVER program](#)). DRIVER is currently being piloted in 11 LMIC locations (Bangladesh, Belarus, Brazil, Côte d'Ivoire, India, Laos, Malawi, Philippines, Thailand, Ukraine, and Vietnam). It also provides key analytical tools for hotspot prediction, estimating the economic costs of crashes, and tracking the efficacy of road safety interventions—making it the perfect enabler for private capital-funded road safety projects. Furthermore, being an open-source system, it is easy to deploy at limited cost, is integrated with iRAP data, and is highly scalable, allowing for aggregation across countries to facilitate deeper analysis and cross-country learning (iRAP 2020).

Source: World Bank analysis.

Box 5.2. World Bank-Supported Road Safety Calculator for High-Level Decision-Making

To support the renewed commitment to road safety under the Second Decade of Action, Global Road Safety Facility (GRSF) identified the need for a tool to assist low- and middle-income country (LMIC) stakeholders in selecting road safety interventions that are appropriate to their local context and efficient both in terms of resource use and impact on reducing road traffic incidents (RTIs). The tool aims to guide high-level decision-making and priority-setting, such as in policy-making settings or in outreach and advocacy work, rather than the more detailed analysis needed at the project implementation level.

Building from a prototype developed by the University of Chicago, and utilizing funding from UK Aid, the new tool is being developed by GRSF, Iowa State University, and Monash University. The tool aims to cover behavioral, infrastructure, vehicle safety, and emergency medical services interventions. The Road Safety Calculator connects users with the most up-to-date evidence on the impact of different countermeasures, and the available evidence will be adjusted to take into consideration differences of LMIC contexts and will facilitate a side-by-side comparison of crash modification factors for a range of countermeasures, enhancing decision-making in resource-constrained environments.

Source: World Bank analysis.

Private Sector to Participate in Making Road Safety Investable

As a first step, investors should begin to monitor and report on road safety indicators to increase their transparency and accountability, which will lead to increased demand for safety-conscious investments. The market failure of road safety is perpetuated by infrastructure investors failing to record and account for the wider costs of dangerous roads. Although there is a movement toward wider use of environmental, social, and governance (ESG) reporting, the majority of widely used frameworks do not have a focus on road safety. Similarly, the Joint Impact Indicators for impact investing do not yet have indicators on road safety, despite it being an SDG target.² Investors with road-related projects in their portfolios should advocate for this to change, considering how road safety indicators can be added to their measurement frameworks, and, therefore, be emphasized and accounted for in their reporting. The Fédération Internationale de l'Automobile (FIA Foundation) is currently developing a Road Safety Benchmarking Index to be used at the corporate level that will measure factors such as the provision for road safety in their supply chain, their commercial fleets, and products they sell (if a vehicle manufacturer) (FIA Foundation 2020). Once the index is released it could significantly help private corporations and consumers assess the road safety footprint of companies. Beyond their internal reporting, private companies should also promote a wider adoption of road safety performance indicators among the investment community, including advocating for these to be encompassed into some of the more widely used standards. Overall, this should be in support of all road-related investments having high-quality monitoring and reporting and adherence to international road safety standards. Investors should also consider

becoming first movers to invest in this space, as funding early stage road safety pilots will be crucial to building the evidence base and paving the way for private capital mobilization in road safety.

Private corporations with a stake in safer roads should shift away from reactive spending toward preventative spending by investing in road safety.

To make this transition, private corporations that are negatively impacted by RTIs and road-related FSIs should proactively conduct cost-benefit analyses to see the degree to which they could invest in RTI reduction based on how much they could stand to gain. These in-depth analyses are vital to creating an investment case and, if published and disseminated, can complement the evidence base of effective road safety projects with demonstrations of the associated revenue streams needed for investment. Partnering with public authorities, private concessionaires, and the development community, private corporations can then begin to operationalize preventative investments in road safety. In addition, corporations may want to consider whether their CSR strategies can be further leveraged to promote road safety, such as through taking on the role of funding viability gaps in road safety projects.

Private actors should also consider the possibility of coming together as consortiums, creating a larger pool of resources that can be invested in mutually beneficial road safety improvements. As shown throughout this report, the cost savings from reducing RTIs are widely spread and fragmented. However, by grouping some of these beneficiaries together the pool of potential savings can become large enough to facilitate investment. In coming

² The Joint Impact Indicators (JII), a set of high-level indicators that impact investors, can be used to measure and report on their investment activities. The indicators can be found online: <https://iris.thegiin.org/metrics?search=&joint-impact-indicators%5B%5D=all-joint-impact-indicators&sortBy=alphabetical>.

together, the barrier to entry in investing in prevention is lowered, making participation possible even for smaller corporations. These corporations can then invest together in mutually beneficial interventions. For example, several motor insurers or fleet operators may suffer the majority of their RTI-related costs as a result of a few key blackspots on a major highway. Recognizing the mutual benefit of removing these blackspots, corporations could come together to fund the needed investments. Bringing interested parties together as a consortium of investors

leverages their range of experience and expertise, and also ensures that road safety efforts will be coordinated, thereby maximizing synergy and potential for impact. On the flipside, without coordinated efforts across corporates some players may not want to undertake investments that would give their rivals competitive advantage free of charge. Therefore, creating consortiums also mitigates this barrier to action. Where free riding is a significant concern whole industry efforts can be considered.

Box 5.3. Coordinated CSR and Donor Initiatives in India with the Aim of Reaching Zero Road Fatalities

India is one of the largest contributors to global road deaths, contributing around 11 percent of global road crash-related deaths (WHO 2018). Every hour, 17 lives are lost on India's roads. Motivated to tackle this problem and building on India's corporate social responsibility (CSR) culture established through its 2 percent CSR law, SaveLIFE Foundation together with the Government of Maharashtra and CSR support from Mahindra & Mahindra (M&M) and ŠKODA AUTO Volkswagen India have set up the Zero Fatality Corridor (ZFC) initiative.

Initiated in 2016, the ZFC focuses on the Mumbai-Pune corridor, a high-speed road that experiences a large number of traffic crashes, fatalities, and serious injuries, and pre-2016 was averaging a staggering 140 road fatalities a year.^a The ZFC initiative executes a 360-degree approach to road safety, looking at engineering, enforcement, emergency care, and public engagement.^b

The Mumbai-Pune Expressway (MPEW) stretch (supported by M&M) has seen a 43 percent reduction in deaths in four years, from 151 road fatalities in 2016 down to 86 in 2019, and the NH-48 stretch (supported by ŠKODA AUTO Volkswagen since 2017) has seen a 30 percent reduction in deaths in two years, from 298 deaths in 2017 down to 206 in 2019 (*CSR Journal* 2021).

These impressive fatality reductions show how through a coordination of stakeholders there can be lifesaving potential from pooling and coordinating CSR funding toward road safety.

Source: World Bank analysis.

Note: a. Learn more about Save LIFE Foundation online: <https://savelifefoundation.org/zero-fatality-corridor/>.

b. For more information on the Zero Fatality Corridor, go online: <https://www.zerofatalitycorridor.in/about-zfc/>.

Private capital mobilization is the logical next step in global efforts to make the world's roads safer, and private sector players must be open to working with public institutions and development actors to support the realization of this goal. Investing in road safety is a win-win scenario, where investors can contribute to saving lives while also receiving a return on investment. Currently, dangerous roads are taking an enormous financial toll on the households and economies of LMICs. At the same time, this means there is

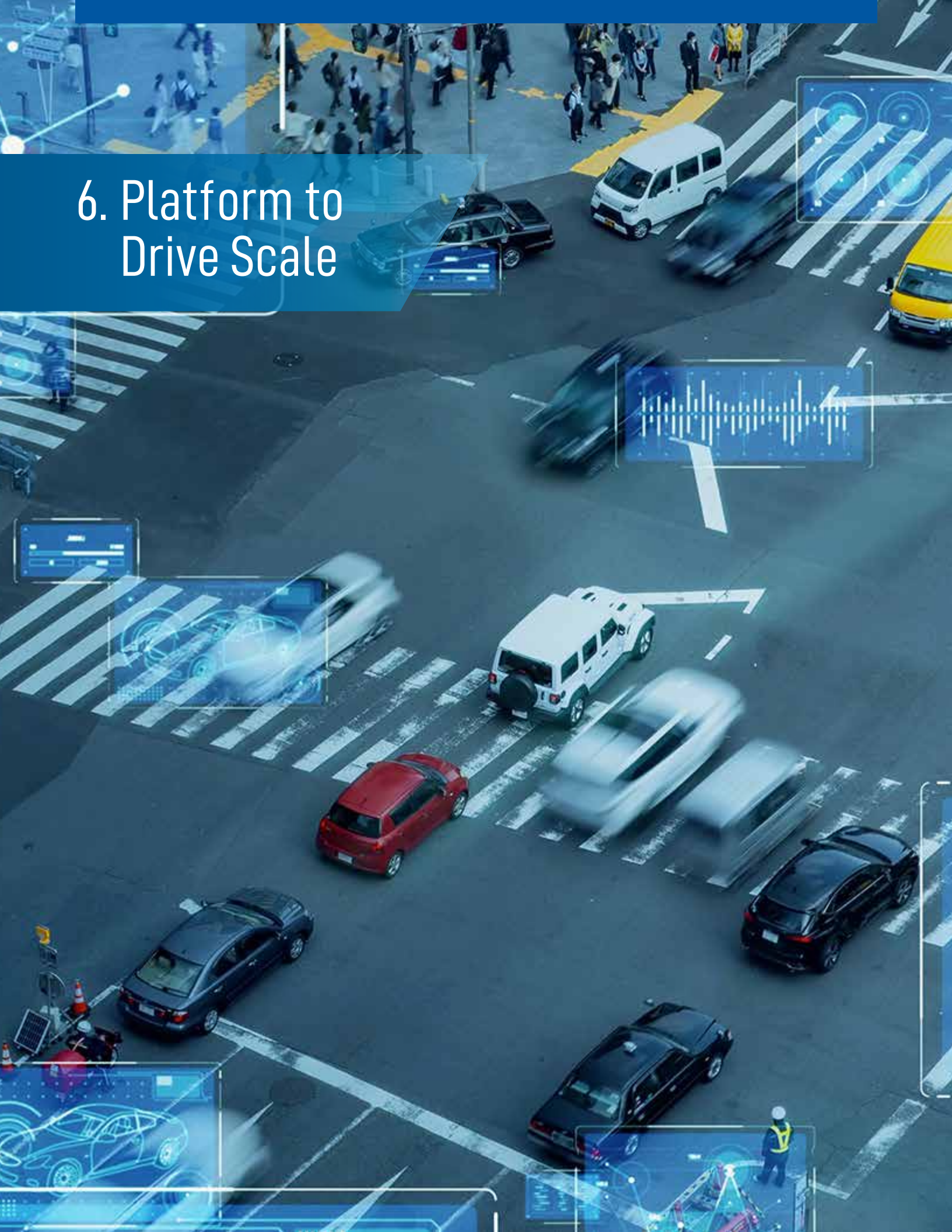
an enormous savings potential that can be unlocked by investment structures that realign investors' incentives to prioritize safety. To correct the market failures of dangerous roads presented in this report, public, private, and development actors must move forward together to build a new market for road safety investment, taking action while there is still time to deliver on the SDG commitment of halving road traffic fatalities within the next decade.

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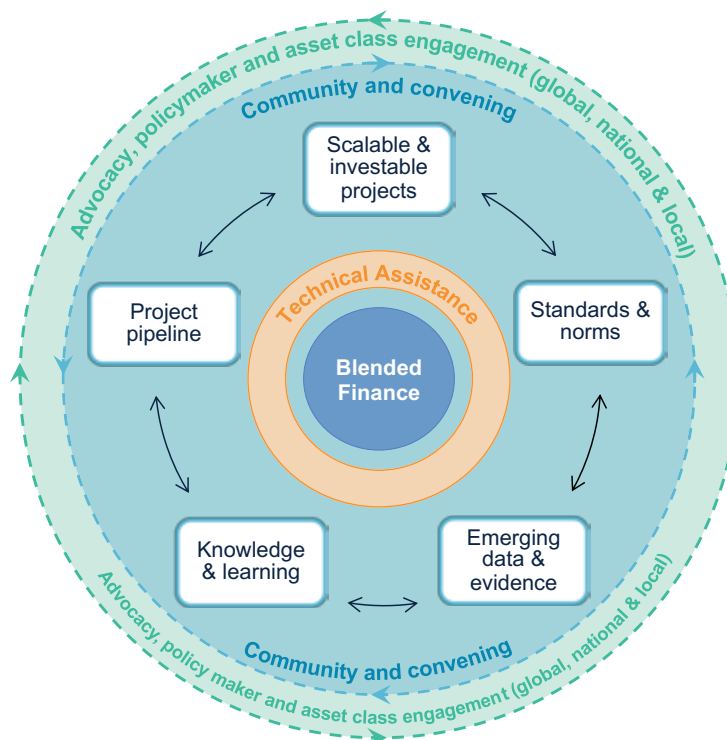
6. Platform to Drive Scale



Successful mobilization of private sector capital at scale will require coordination and collaboration across sectors and enabling mechanisms. A well-designed platform can facilitate engagement, data collection, and deal flow. It can also provide means for connecting across the broad range of actors that need to come together to achieve a step change in road safety investment, including development capital, private sector investors, and public sector commissioners. There is already participation from different actors, including substantial philanthropic support, and a rich body of resources to leverage.

A new platform can build on these efforts and bring together additional actors and resources to address barriers and unlock private capital at scale. Figure 6.1 provides an overview of the components of such a platform and how they interrelate. The aim is to accelerate progress by providing structured opportunities for engaging actors in the way forward and making it easier for individual projects to be generated, facilitate scaling and replication of what works, embed a systemic approach to sharing learning, and capture data and standards that inform more effective and widespread practice. If that platform also gives access to finance, it will shorten the route to more mature investment offerings and have enormous potential to increase the global capital pool for road safety.

Figure 6.1. A Platform to Facilitate Multi-Actor Partnerships to Scale Road Safety



Source: Original figure produced for this publication.

The World Bank intends to launch such a mobilization platform, designed to crowd in actors from public, private, and nongovernmental (NGO) sectors; demonstrate impact for investors, road users, and other beneficiaries; and build the evidence base, tools, and know-how. As development finance institutions (DFIs) and multilateral development banks (MDBs) have the ability to crowd in other actors to invest in road safety by providing catalytic financing for projects, they are key participants in this strategy. Their participation will also ensure the effectiveness of the platform to set standards for and support road safety projects at the regional, national, or subnational levels. Involvement of multilaterals will connect projects to the platform and provide the leverage to ensure data and evidence is collected that informs knowledge sharing, drives decision-making and commissioning, and attracts further investment. To set this in motion, DFIs and multilaterals, in collaboration with the World Bank, should come together to establish consensus on the platform and seek user input on the design.

Access to blended finance through the platform will drive participation and create incentives to adopt standards for good road safety investment. By providing access to blended finance and technical support, the platform will be able to crowd in new projects delivering road safety interventions, new actors that are seeking access to finance for road safety projects, and new investors for whom the blending of private finance with concessional capital, where needed, will provide them with the returns they are expecting. Blended finance can be structured with the specific objective of attracting new entrants and early adopters, by providing de-risking mechanisms or supporting advantageous financial

returns that are then phased out as track records and market terms are established and subsidy is no longer needed to attract investment. In this way, it can facilitate the virtuous cycle outlined in figure 6.1.

Providing for a structured blended finance capacity will leverage the unique position of DFIs and MDBs to provide concessional funding and donors and aid agencies to provide grants more effectively toward changing road safety norms and outcomes. Concessional funding and grants will also help de-risk private investments, especially where the investment cases are still being generated through proof of concept. The blended finance facility, and the role the platform can play in navigating access to concessional funding and grants, will act as core levers for the platform, enabling the provision of finance and technical support to be linked to good safe system standards and to the creation of data and evidence that will support future investments. To build momentum, DFIs and MDBs should come together to design and launch an early blended finance window to stimulate demand.

Mechanisms adopted by the platform to encourage standardization in data collection and reporting will help develop a richer evidence base to build investment cases. To be actionable, data must be robust, accessible, and from trusted sources. To be most effective, this effort will build on the available data to inform work with existing and prospective road safety actors on data convergence and a more standardized data framework designed to support investment, and be accessible to priority users of the platform. In the early stages, the platform will consolidate the already extensive data on road safety, for example the International Road

Assessment Programme's (iRAP's) Vaccine for Roads "Big Data Tool". In addition to this and other existing data initiatives that focus on road safety, the platform's data architecture could also benefit from the work undertaken by the Impact Management Project that identifies key dimensions of impact and data categories.¹ A robust approach to standardization of data frameworks will help national and subnational authorities commission road safety projects and set appropriate standards and key performance indicators (KPIs), will aid investors in carrying out due diligence on prospective investments, and support the design of outcomes-based transactions. Work should commence to bring together market actors to develop an actionable plan for data and reporting, recognizing the differing requirements of established and new entrants, as well as the need to assure that data is trusted, validated, and accessible.

To drive additional investment to road safety, the platform will need to support learning and convening functions. This will require attention to channels of engagement and how the platform is positioned to work alongside existing initiatives that support learning and knowledge-sharing, for example, the Global Road Safety Partnership, global Transport Knowledge Practice (gTKP), Regional Road Safety Observatories (RRSOs), and the Global Alliance of NGOs for Road Safety. There is also an important convening role where the community of road safety actors share their knowledge and experience, and in turn start to reorient road safety investments from those based on common sense to those based on evidence, learning, and best practice.

A focus on trusted, robust, open-access, and actionable information, case studies, and tool-kits will enable and encourage market actors to leverage the platform for their own transactions.

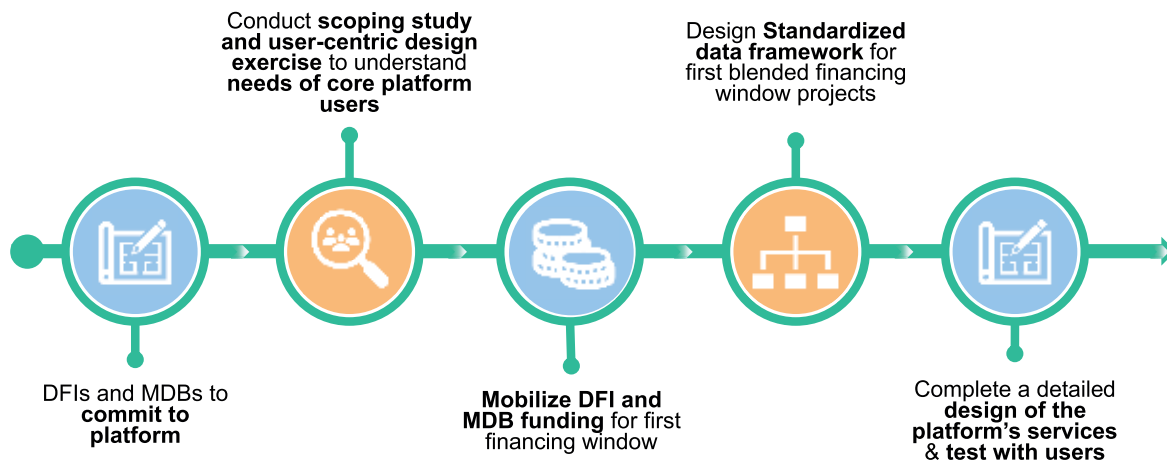
Over time, resources can be tailored to the needs of different user groups and will provide both high-level navigation guides that can aid new entrants, as well as detailed, accessible technical materials that support project design and embed high-quality road safety standards and incentives into projects as well as the design of investment structures and tendering processes. Outreach to market actors to facilitate development of the learning and convening role of the platform to ensure it is trusted, valued, and used will be critical.

Early transactions that embed these principles and demonstrate efficacy are a critical first step.

From there, design and functionality of the platform can evolve over time. Extensive consultation and testing with funders and market actors will be necessary to ensure that the purpose, goals, and core functions are clear, aligned with existing sectoral initiatives, and meet the needs of its target users. Figure 6.2 outlines initial steps following a user research approach to achieving a fit-for-purpose platform that addresses these principles and the market gaps. The phased approach places initial focus on design and incorporation of an early blended finance window to support projects that incorporate the required road safety standards and data principles. These early transactions are imperative to catalyze the market. Data and learning from the projects will enrich the platform as it moves to a build out phase and, eventually, to become a sustained part of market architecture.

1 See more at Impact Management Project's website: <https://impactmanagementproject.com/>.

Figure 6.2. Initial Steps to Mobilizing the Platform



Source: Original figure produced for this publication.

A platform anchored in the wider ecosystem can play a vital role in attracting more and different actors and driving scale. This includes collaborating with sectoral platforms and initiatives, such as the Global Infrastructure Hub and Global Infrastructure Facility, infrastructure and public-private partnership (PPP) sectors, the Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC) and Convergence for blended finance transactions, SDG Impact and its

investor platform for Sustainable Development Goal (SDG)-related investment, as well as investor-led initiatives, including the International Capital Markets Association (ICMA) and the growing number of forums for investors seeking to drive more sustainable outcomes. This will help position road safety investment in the sustainable finance markets and support actionable progress toward meeting SDG targets and the goals set by the international community to at least halve global road deaths by 2030.



7. Appendices



Appendix A. Mapping Road Safety to the SDGs

Figure A.1. Mapping Across the Eight High-Impact Project Archetypes

	All projects	P1. Vehicle inspection and certification	P2. Commercial vehicle fleet upgrade	P3. New road concessions with road safety requirements	P4. Upgrade of highway protective infrastructure	P5. Speed management & automated enforcement	P6. Upgrades for protection of vulnerable road users	P7. Emergency medical services	P8. Regionalization of specialist trauma centers
1. No poverty	1.5.1, 1.5.2 Deaths and economic loss linked to disasters.			1.4.1 Access to basic services, incl. mobility					
3. Good health and well-being	3.6.1 Fatality due to RTIs						3.8.1, 3.d. Basic health access, emergency preparedness	3.8.1, 3.d. Basic health access, emergency preparedness	
5. Gender equality	5.5.2 Women in managerial positions (in projects)								
7. Affordable and clean energy			7.2.1 Fleets with % electric vehicles						
8. Decent work and economic growth		8.8.1 Lower FSIs for commercial drivers	8.8.1 Lower FSIs for commercial drivers	8.8.1 Lower FSIs of road workers	8.8.1 Lower FSIs of road workers		8.8.1 Lower FSIs of road workers		
9. Industry, innovation and infrastructure			9.1.2, 9.4.1 Economic development - freight volumes, CO2 reduction	9.1.1 Rural access to all-season roads	9.1.1 Rural access to all-season roads				
11. Sustainable cities and communities	11.2. Proportion of population safely accessing transport			11.5.2. Economic loss due to infrastructure damage	11.5.2. Economic loss due to infrastructure damage		11.2, 11.5.2, 11.7.1 Access to mobility, disabled users, safe areas around schools		
12. Responsible consumption and production	12.5.1, 12.7 Material footprint, sustainable procurement								
16. Peace, justice and strong institutions						16.5.2 Violators fined without bribes	16.5.1 Feeling safe to walk in local area		

Source: Original figure produced for this publication.

Note: This table is not exhaustive and the suggested SDG target links are not applicable to all projects under each archetype.

Illustrative mapping of road safety to 27 of the 169 SDG targets

The mapping shown in figure A.1 and table A.1 is not exhaustive and is only for illustrative purposes. It is suggested that for any road safety project, a consideration of all 169 indicators should be taken into account to see all the areas where SDGs can be targeted. This selection of 27 of the SDG targets aims to illustrate to the reader some of the more likely areas for SDG linkages to occur in road safety projects.

Part of this mapping taken from the following publication: Monclús, Jesús. 2020. *Road Safety and the SDGs: A Guide for Private Sector Organizations*. Madrid, Spain: Fundación MAPFRE. <https://noticias.mapfre.com/media/2020/01/Road-Safety-and-the-SDGs.pdf>.

Table A.1. Mapping of Road Safety to SDG Targets

SDG Target	SDG Indicator	Road Safety Relation
1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership, and control over land and other forms of property, inheritance, natural resources, appropriate new technology, and financial services, including microfinance	1.4.1 Proportion of population living in households with access to basic services	Transport and mobility are considered “basic services” by the United Nations, meaning road-related projects that also expand access to transport contribute to 1.4.1
1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social, and environmental shocks and disasters	1.5.1 Number of deaths, missing persons, and directly affected persons attributed to disasters per 100,000 population	Road safety is often defined as a preventable global disaster. Road traffic injuries disproportionately affect vulnerable groups of road users, including the poor who represent more frequently vulnerable road users. Those affected by road crashes often bring the only income to the families who are often thrown into poverty as a consequence.
	1.5.2 Direct economic loss attributed to disasters in relation to global gross domestic product (GDP)	Road safety is a global disaster that has significant economic costs, which can be as high as 6% of GDP in LMICs.
3.2 By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under 5 mortality to at least as low as 25 per 1,000 live births	3.2.1 Under 5 mortality rate	Road fatalities still represent the main cause of death from childhood and youth age groups between 5 and 29 years. Every four minutes a child is prematurely lost on the roads of this world: more than 500 children every day.
3.6 By 2020, halve the number of global deaths and injuries from road traffic accidents	3.6.1 Death rate due to road traffic injuries	Road safety directly targets this SDG target by lowering traffic injuries and fatalities.
3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health care services, and access to safe, effective, quality, and affordable essential medicines and vaccines for all	3.8.1 Coverage of essential health services	Emergency medical care is an essential health service. Road safety interventions that expand emergency service provision or trauma care also expand essential health provision.
3.9.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction, and management of national and global health risks	3.d.1 International Health Regulations (IHR) capacity and health emergency preparedness	Improvements in post-crash response to road victims can increase survival rates and reduce long-term consequences.
5.5 Ensure women’s full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic, and public life	5.5.2 Proportion of women in managerial positions	Programs can be designed to ensure that women are included in managerial positions for road safety projects.

SDG Target	SDG Indicator	Road Safety Relation
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1 Renewable energy share in the total final energy consumption	In upgrading fleets to be safer, there could also be an increase in the percentage of vehicles that are electric.
8.8 Protect labor rights and promote safe and secure work environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment	8.8.1 Fatal and non-fatal occupational injuries per 100,000 workers, by sex and migrant status	Safe labor conditions for road workers, including professional drivers in developing countries, are a part of road safety. This could include the upgrade of commercial fleets, construction of rest stops, tighter laws for commercial drivers, and protective infrastructure and vehicles to safeguard road workers.
9.1 Develop quality, reliable, sustainable, and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being with a focus on affordable and equitable access for all	9.1.1 Proportion of the rural population who live within 2 km of an all-season road	Road improvements may also expand access to rural populations. For example, this could be the case for a new road concession.
	9.1.2 Passenger and freight volumes, by mode of transport	Road improvements may also impact passenger and freight volumes in LMICs.
9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities	9.4.1 CO ₂ emissions per unit of value added	Safety improvements for vehicle fleets can also make a move toward a higher percentage of fuel-efficient vehicles.
9.a Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological, and technical support to African countries, least-developed countries, landlocked developing countries, and small island developing states	9.a.1 Total official international support (official development assistance plus other official flows) to infrastructure	Safer roads can also be built to be more resilient (such as to natural disasters and climate change). Furthermore, if development assistance is used, the project can contribute to targets on expanding international support for resilient infrastructure in LMICs.
10.6 Ensure enhanced representation and voice for developing countries in decision-making in global international economic and financial institutions in order to deliver more effective, credible, accountable, and legitimate institutions	10.6.1 Proportion of members and voting rights of developing countries in international organizations	Engaging LMIC stakeholders in legislation, projects, and private capital mobilization for road safety will help to deliver more long-term and sustainable solutions.
11.2 By 2030, provide access to safe, affordable, accessible, and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities, and older persons	11.2.1 Proportion of population that has convenient access to public transport, by sex, age, and persons with disabilities	Safer roads can make public transport more accessible, and public transport itself can be a target of road safety interventions.

SDG Target	SDG Indicator	Road Safety Relation
11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global GDP caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations	11.5.1 Number of deaths, missing persons, and directly affected persons attributed to disasters per 100,000 population	Road safety is often defined as a preventable global disaster and also disproportionately affects the most vulnerable communities. Road death reduction can, therefore, be seen as contributing to reducing deaths from disasters in countries where road deaths are very high.
	11.5.2 Direct economic loss in relation to global GDP, damage to critical infrastructure, and number of disruptions to basic services attributed to disasters	As shown in this report, road traffic injuries (RTIs) cause significant economic costs, resulting in part from damage to infrastructure and disruption to basic services. Therefore, reducing the disasters caused by road crashes can curtail economic losses.
11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	11.6.2 Annual mean levels of fine particulate matter (e.g., PM2.5 and PM10) in cities (population weighted)	Fleet upgrades that move toward greener vehicles can also reduce city-level pollution, as can road safety upgrades that encourage activities such as cycling or using public transport.
11.7 By 2030, provide universal access to safe, inclusive, and accessible, green, and public spaces, in particular for women and children, older persons, and persons with disabilities	11.7.1 Average share of the built up area of cities that is open space for public use for all, by sex, age, and persons with disabilities	Road safety can contribute to the accessibility, inclusivity, and safety of key areas, with safety around school zones being a particular example. In particular, vulnerable road users can be made safer within cities.
11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans toward inclusion, resource efficiency, mitigation and adaptation to climate change, and resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels	11.b.1 Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030	Road casualties are commonly defined by the road safety community as a global disaster. Therefore, the number of cities adopting safe and sustainable (road) transport policies and plans and the number of countries with safe and sustainable (road) transport policies and plans contributes to holistic disaster risk management targets.
	11.b.2 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies	
12.2 By 2030, achieve the sustainable management and efficient use of natural resources	12.2.1 Material footprint, material footprint per capita, and material footprint per GDP	Moving toward more fuel-efficient fleets and planning to minimize footprint in road safety infrastructure projects can contribute to lower material footprints.
12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling, and reuse	12.5.1 National recycling rate, tons of material recycled	Projects can consider how to minimize their waste production, particularly in large-scale infrastructure projects.
12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle	12.6.1 Number of companies publishing sustainability reports	As part of the road safety investments, monitoring and evaluation (M&E) is key, and the impact on wider society should be published.

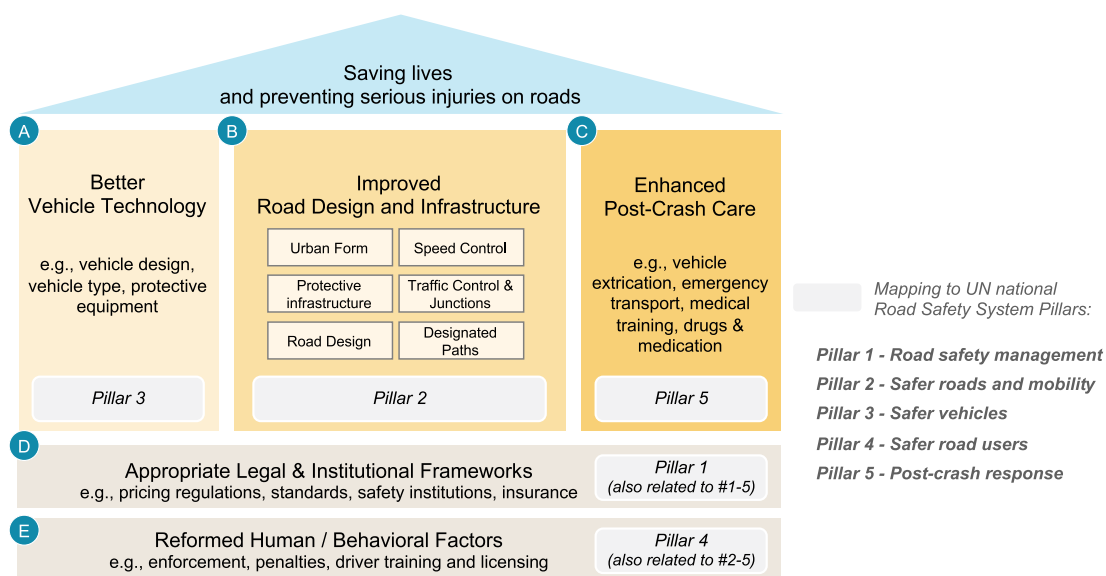
SDG Target	SDG Indicator	Road Safety Relation
12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities	12.7.1 Degree of sustainable public procurement policies and action plan implementation	<p>The role of the public sector is crucial to show the way ahead. Public contracting authorities can award contracts to organizations showing commitment and good practices in road safety.</p> <p>Include additional safety provisions in road transport infrastructures projects, including public transport tenders, and public (and private) procurement of only safe vehicles.</p>
16.1 Significantly reduce all forms of violence and related death rates everywhere	16.1.4 Proportion of population that feels safe walking alone around the area they live	Roads can also be dangerous in terms of violence, and road safety projects may also take this into account. For example, street lighting could increase safety by making communities feel safer walking the roads at night.
16.5 Substantially reduce corruption and bribery in all their forms	<p>16.5.1 Proportion of persons who had at least one contact with a public official and who paid a bribe to a public official, or were asked for a bribe by those public officials, during the previous 12 months</p> <p>16.5.2 Proportion of businesses that had at least one contact with a public official and that paid a bribe to a public official, or were asked for a bribe by those public officials during the previous 12 months</p>	Road safety interventions will always require strategies for improved enforcement. For example, an automated speed enforcement system will make it easier for authorities to reliably capture and enforce speeding violations, limiting the room for corruption. Projects can also entail working closely with the police and other enforcing bodies to improve standards.
16.6 Develop effective, accountable, and transparent institutions at all levels	16.6.1 Primary government expenditures as a proportion of original approved budget, by sector (or by budget codes or similar)	Transparent and efficient use of transport public budgets can be encouraged.
16.8 Broaden and strengthen the participation of developing countries in the institutions of global governance	16.8.1 Proportion of members and voting rights of developing countries in international organizations	Participation of developing countries in international road safety fora and decision-making bodies with impact on the condition of the road safety system
17.1 Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection	17.1.1 Total government revenue as a proportion of GDP, by source	As road safety has a significant impact on GDP in LMICs, plans to reduce these costs can have a positive impact on government revenue, as can business models that generate new revenue streams for public road safety budgets.

Source: Monclús, Jesús. 2020. Road Safety and the SDGs: A Guide for Private Sector Organizations. Madrid, Spain: Fundación MAPFRE <https://noticias.mapfre.com/media/2020/01/Road-Safety-and-the-SDGs.pdf>.

Appendix B. Methodology for Selecting the Eight Road Safety Project Archetypes

The investigation into the project archetypes was based on a comprehensive framework for road safety mapped across the United Nations' National Road Safety System Pillars, as presented below, from which an analysis and prioritization of the different countermeasures was conducted.

Figure B.1. National Road Safety System Pillars



Source: Original figure produced for this publication, based on the United Nations' National Road Safety System Pillars.

Analyzing available evidence on the impact of different interventions on road traffic incident (RTI) reduction and fatal and serious injury (FSI) prevention from:

- The iRAP Road Safety Toolkit: <http://www.toolkit.irap.org/>
- European Union's (EU's) SafetyCube: <https://www.safetycube-project.eu>
- World Health Organization (WHO) reports on road safety: <https://www.who.int/westernpacific/health-topics/road-safety>
- Centers for Disease Control and Prevention (CDC) Road Safety Calculator: <https://www.cdc.gov/transportationsafety/calculator/index.html>
- PIARC Road Safety Manuals: <https://roadsafety.piarc.org/en>
- Global Road Safety Facility (GRSF)-Bloomberg Initiative for Global Road Safety (BIGRS) and World Bank reports: <https://www.roadsafetyfacility.org/publications/high-toll-traffic-injuries-unacceptable-and-preventable>

Synthesizing from a list of more than 100 road safety countermeasures across the road safety framework, these were grouped into 19 implementable project archetypes, as per the table below.

Table B.1. Synthesis of Implementable Project Archetypes

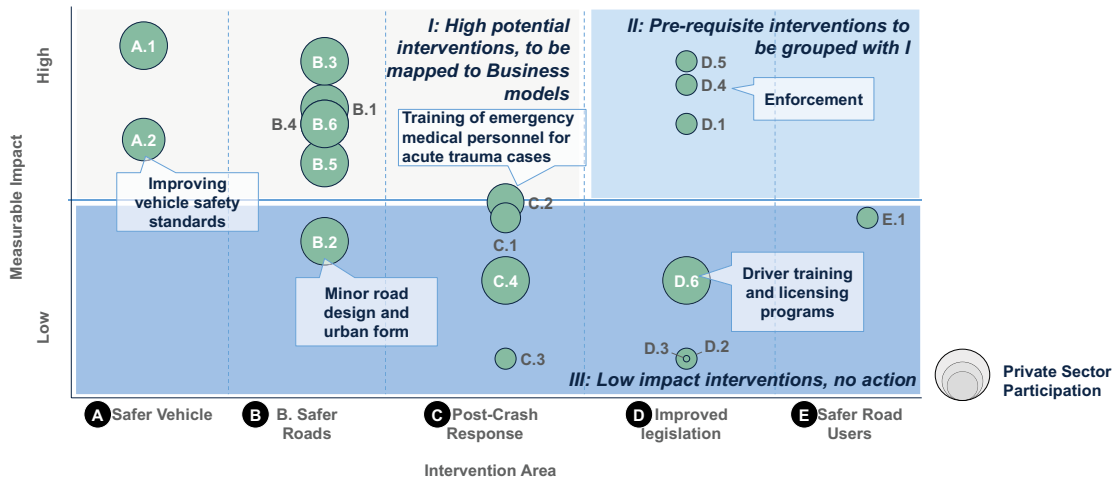
Intervention Designations	Pre-requisites	Program
A.1 Vehicle safety regulations and certification against standards	D.1, D.3, D.4, E.1	P1
A.2 Vehicle minimum safety requirements (e.g., new car assessment programs)	D.1, D.3, D.4	P2
B.1 Road design and urban form (major)	<i>None</i>	P3
B.2 Road design and urban form (minor)	<i>None</i>	P7
B.3 Protective infrastructure	<i>None</i>	P4
B.4 Speed control infrastructure (speed limits, traffic calming, traffic obstructions)	D.3, D.4, B.6	P5
B.5 Bicycle, PTW and pedestrian paths to separate them from other motorized traffic	D.3, D.4, B.6	P6
B.6 Traffic control and junctions (signs, signals, markings, devices used to regulate, warn or guide traffic)	D.3, D.4	P5, P6
C.1 Implementation of pre-hospital care (on-site to transport)	B.2, C.2, C.4	P7
C.2 Improving the level of training of medical personnel to manage for acute trauma case	C.4	P7, P8
C.3 First aid training of bystanders, drivers and policeman to diminish mortality and damage seriousness	D.3	<i>None</i>
C.4 Development and regionalization of emergency treatment and trauma centers	D.3, D.4, C.2	P8, P7
D.1 Safety institutions - central agencies & research	<i>None</i>	P1, P2
D.2 Motor vehicle insurance schemes	D.3	<i>None</i>
D.3 Laws regulating road user behavior such as use of helmets, seat belts, cell phone, etc.	<i>None</i>	P1, P2, P5, P6, P7, P8
D.4 Enforcement: Actions taken to ensure compliance with legislation	D.3	P1, P2, P5, P6, P7, P8
D.5 Sanctions and penalties: As a means of enforcement for obedience of road safety laws and regulations	D.3	<i>None</i>
D.6 Driver training and licensing	D.3, D.4	<i>None</i>
E.1 Road user education, awareness building and public campaigns that aims to teach appropriate skills of RS	<i>none</i>	P1

Source: Original table produced for this publication.

Based on the available evidence of each intervention on RTI and FSI reduction from the sources listed above, the impact of each project archetype was evaluated from one to five, one being low and five being high. Each project was also analyzed for the potential degree of private sector involvement, considering whether private actors could take on the role of investor, borrower, or implementer for each of the interventions, and whether there were significant barriers to private sector participation. The resulting evaluation was mapped against the road safety

framework as displayed in figure B.2. Quadrant I (top left, in light gray) identifies high-impact interventions with potential for private sector participation to be mapped to potential business models, while Quadrant II (top right, in light blue) identifies interventions related to legislation and human behavior as prerequisite interventions, such as enforcement, to be mapped to the relevant interventions in Quadrant I. Quadrant III (bottom right, in blue) identifies interventions with impact potential considered too low to be taken further.

Figure B.2. Review of Road Safety Interventions Analysed According to Their Measured Impact and Potential for Private Sector Participation



Source: Own elaboration.

The high potential interventions in Quadrant I were grouped with the relevant prerequisite interventions into eight intervention programs (P1 to P8), as shown in table B.2:

Table B.2. Potential Private Sector Role in Road Safety

Intervention Program	# of interventions ⁵	Potential private sector role				Potential non-govt revenue sources	In-country pre-requisites	
		Road PPP ¹	Non-road PPP	Existing RT PPP	Private operator			
PREVENTATIVE	P1. Vehicle standards regulation and enforcement	5		✓		✓	Certification fees Penalty fees	Vehicle regulations in place Vehicle manufacturers/ distributors on board
	P2. Vehicle fleet upgrade	3		✓	✓	✓	Transportation Network Company fees	Availability of aggregated private vehicle fleet owners Low vehicle import tax rates
	P3. Major road and urban form development	1	✓			✓	Toll fees Infringement fees	Mature sector of private concessionaires Credit-worthy government entity
	P4. Road upgrade for protective infrastructure	1	✓			✓	Toll fees	
	P5. Road upgrade for speed management	4	✓			✓	Penalties Infringement fees	
POST-CRASH	P6. Urban road upgrade for protection of vulnerable road users	4	✓		✓	✓		Mature sector of private concessionaires, urban and densely populated settings
	P7. Implementation of pre-hospital care	6	✓			✓		Relatively advanced on Road Safety agenda, i.e., RS agency, preventative measures in place
	P8. Regionalization of care to specialist trauma centers	4				✓		

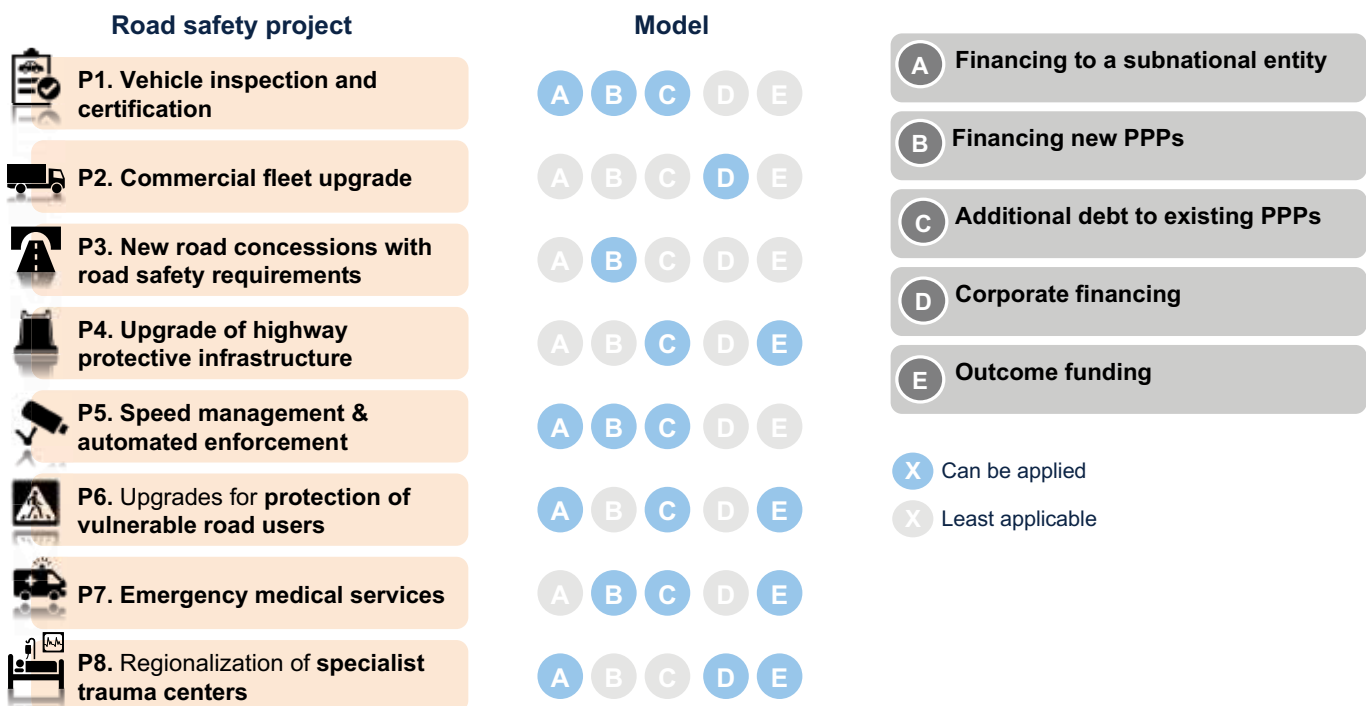
Source: Original figure produced for this publication.

Appendix C. Investment Structures

Illustrative mapping of road safety project archetypes to the business models

As explored in each of these investment structures, some models are better suited to certain project archetypes than others. For example, Model D suits interventions that can be private sector led, whereas Model A suits interventions traditionally in the public domain, and that may be acting as a public good. The above illustrates some examples of project archetypes where these models could be suitable. The remainder of this chapter will go on to lay out other primary concerns in applying countermeasures and investment structures, namely monitoring and evaluation (M&E) frameworks, and risk and mitigation strategies.

Figure C.1. Illustrative Mapping of Road Safety Project Archetypes to Selected Business Models

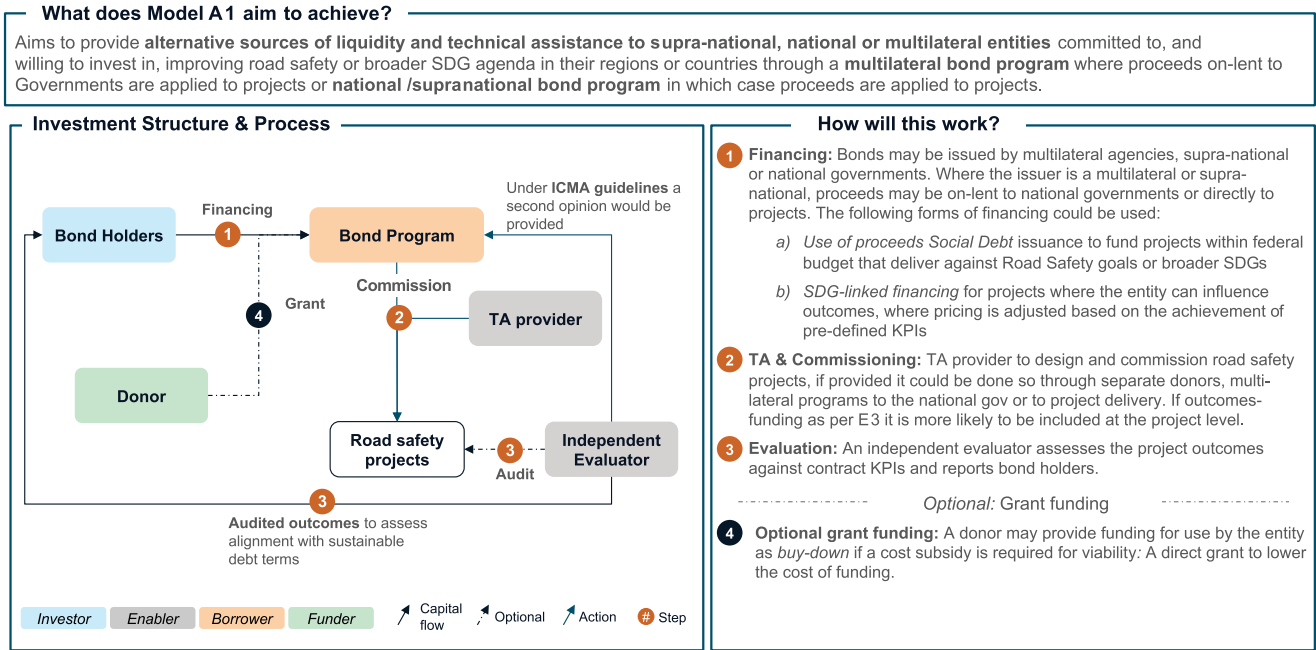


Source: Original figure produced for this publication.

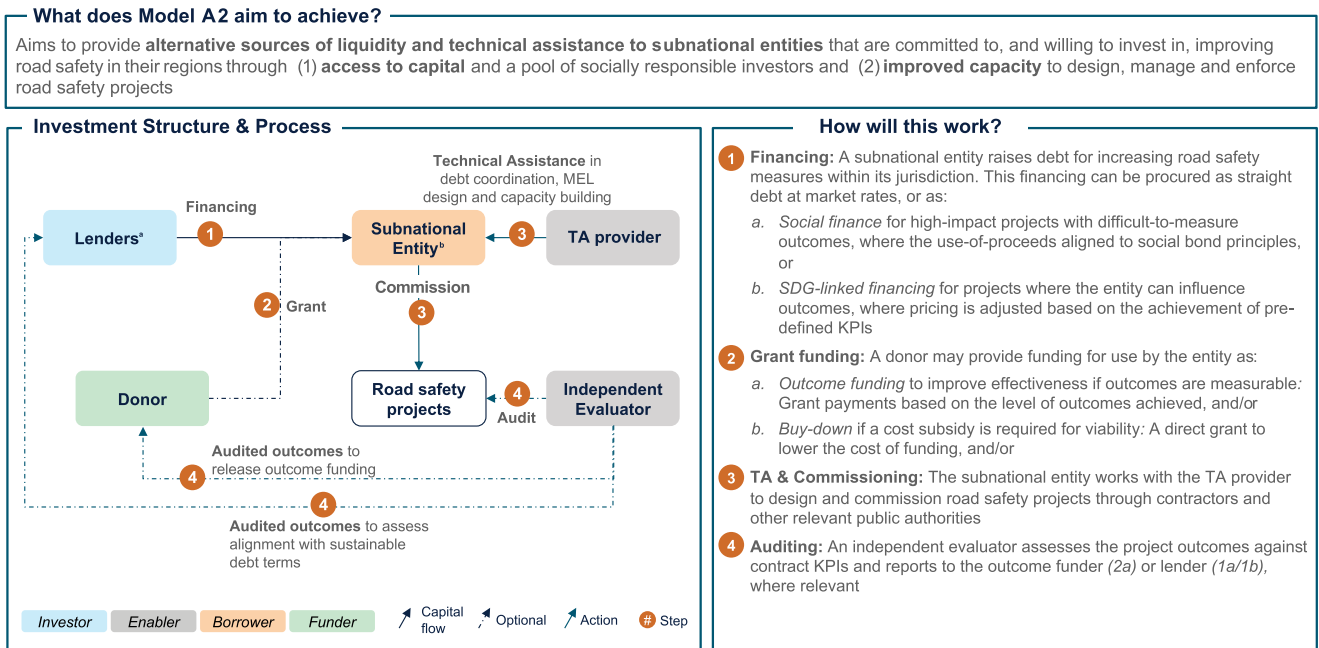
Note: Models A1 and A2 are both included within model A. Models E1, E2, and E3 are each included within Model E.

Model A: Social and Sustainability Bonds and Other Debt Instruments

A1 Overview: Social and Sustainability Bonds and other debt instruments



A2 Overview: Financing a subnational entity for road safety



Note: a. The lender could also serve as the TA provider, for example, in the case of the WBG; b. Could include state-owned enterprises (SOEs).

The following four graphics cover both Model A1 and Model A2, as applicable.

A Actors and roles: Which actors can be effectively engaged in Model A?

Actor function & role	What would each actor need to participate in Model A?	Potential target actors ^b (non-exhaustive)	
Investor SRIs/DFIs	<ul style="list-style-type: none"> Creditworthiness and fiscal space of borrower Financial viability of investment and data for appropriate risk evaluation Alignment of investment to social bond principles on management & use-of-proceeds, project selection & evaluation and reporting (<i>in the case of social finance</i>) or on definition of targets, KPIs, reporting and verification (<i>in the case of SDG-linked finance</i>) 	<ul style="list-style-type: none"> IFC, IDA or IBRD as national or subnational lender or sustainability finance investor Commercial banks active in the target geography with loan terms acceptable to the borrower NDBs^a and DFIs active in the region or in the transport sector in LMICs Socially responsible / ESG investors 	
Borrower	Multilateral	<ul style="list-style-type: none"> A clear need, demand, or case for investment in road safety in its jurisdiction 	<ul style="list-style-type: none"> IFC or other multilateral issuer
	National Treasury/Supranational Treasuries	<ul style="list-style-type: none"> Affordable financing on competitive terms A clear need, demand, or case for investment in road safety in its jurisdiction 	<ul style="list-style-type: none"> National treasuries that meet required credit rating standards and have a good regulatory environment for private investment and are able to generate SDG/Social Bond framework for issuance
	Subnational entity	<ul style="list-style-type: none"> Affordable financing on competitive terms A clear need, demand, or case for investment in road safety in its jurisdiction 	<ul style="list-style-type: none"> State or district governments / municipalities / SOEs entity that meets the required credit rating standards, debt burden and corruption perception
Funder	Outcome funder	<ul style="list-style-type: none"> An impact case for the achievement of outcomes cost-effectively A reliable independent evaluation for outcomes and impact 	<ul style="list-style-type: none"> Global health donors active in the target region Insurance companies who benefit from lower RTIs in the region GPRBA for low-income communities
	Grantor (<i>buy-down</i>)	<ul style="list-style-type: none"> A clear impact case towards achieving SDGs / health outcomes Use of reliable implementers with a strong track record 	<ul style="list-style-type: none"> CSRs of active corporates in target region(s) MDBs offering concessional capital products in the country IDA for regions in LICs
Enabler TA provider	<ul style="list-style-type: none"> Commitment and engagement from the public entity receiving support 	<ul style="list-style-type: none"> PPIAF/SNTA/IFC: The WB as a PPIAF / coordinator or as part of the subnational technical assistance (SNTA), IFC as part of debt offering, GPRBA as part of RBF NDBs and DFIs active in the region or in the transport sector in LMICs 	

Note: a. National development bank. b. Actors in blue = World Bank Group entities.

A Investment Barriers: What are key barriers limiting access to private capital to subnational entities, and how can Model A be designed to address them?





Which barriers does Model A aim to address?

Intentionality	<p><i>The benefit-to-cost ratio of road safety investments may be perceived as low, potentially due to:</i></p> <p>Low public demand: L/MICs may often not see public demand or activism for road safety among other competing public priorities</p> <p>Unclear investment case: Governments do not see the longer-term economic benefits of improving road safety</p>
RS project experience	<p>Subnational entities in L/MICs may lack the experience to Design RS programs that effectively achieve road safety targets</p> <p>Structure contracts to effectively hold commissionaires accountable for road safety measures</p>
Institutional capacity	<p>Subnational entities in L/MICs may lack the capacity and capabilities to Enforce road safety related norms and regulations</p>
Financial resources	<p>L/MICs may not be able to raise the required funds due to:</p> <p>Access to capital: L/MICs may not have access to a wide base of investors to address all their investment needs</p> <p>Affordability: Limitations in users' ability to pay for safer roads and fiscal space of the government</p> <p>Development priorities: DFIs may prioritize other global agendas for their investments</p> <p>Performance risk: Lack of success evidence raises risk profile of RS projects, making debt an unsuitable instrument</p>


Which instruments address these barriers?

- Buy-downs or outcome funding** can be used as financial support to encourage government prioritization for road safety investments
- Key design principles:**
 - Buy-downs must be tied to use-of-proceeds restrictions for road safety
 - Outcome funding must be sizeable enough to support investment
- Technical Assistance** can be offered to build knowledge and capacity around road safety regulatory best practices, program design, and implementation
- Key design principles:**
 - TA must ensure continuity by building capabilities for future program design and measuring and managing the impact of road safety measures
 - TA must assess the existing regulatory frameworks and enforcement capabilities in the subnational, and support updates where relevant
- Social or SDG-linked finance** could potentially provide lower cost of funds in the near-term and long-term once the public entity has established itself as a social debt issuer
- Key design principles:**
 - Investors must consider the borrowing entity's fiscal space, and the returns that can be generated from the investment prior to issuing additional debt
 - Use-of-proceeds and KPIs must be linked to the highest priority road safety issues which can create significant impact from the capital invested

A Applications: Which road safety programs are most suitable for Model A?

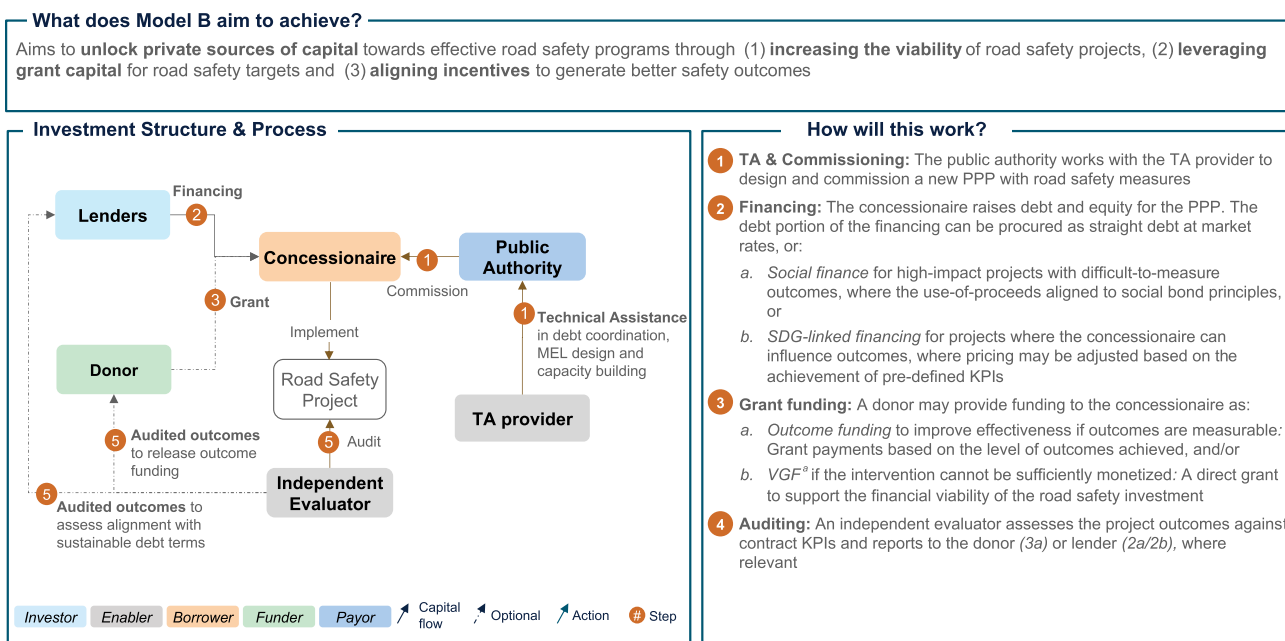
When could Model A be used?			
 Selection of road safety interventions: <ul style="list-style-type: none"> ✓ Low commercial viability: interventions that may not generate financial returns to support the investment or its commercials have not been proven, and ✓ Scalable programs: high-impact interventions with low to medium capex requirements which can be scaled at the subnational level, and/or ✓ Private sector limitations: interventions for which private sector capabilities are limited or private management is not permitted by the regulatory framework 			
Programs suitable for Model A	Implementation considerations	Key actors	Potential revenue sources
 Protective infrastructure for vulnerable users: Improving sidewalks, bike lanes, signage, etc. in a crowded city <i>Rationale:</i> Commercial viability is low, and beneficiaries (vulnerable road users) cannot be charged directly for such infrastructure	<ul style="list-style-type: none"> • Use-of-proceeds requirement: areas where RTIs are high for vulnerable users • Outcome metrics: Performance can be assessed for adherence of infrastructure to international standards 	Implementer: Contractors Authority: subnational transport authority Donor: Health or infrastructure donors	<ul style="list-style-type: none"> • Public healthcare systems can see lower costs through reduced injury and severity and could dedicate a portion of their budget to realize these savings • Insurance companies can see lower costs through reduced third-party claims and could dedicate a % of their premiums to realize these savings • Concessionaires can see fewer costs from road damage and could pay a fee as a % of toll revenue
 Emergency medical services: Purchasing and managing EMS fleets for emergency response for road crashes <i>Rationale:</i> Certain countries that have healthcare and emergency response are strictly under the public domain	<ul style="list-style-type: none"> • Use of proceeds requirement: zones where severe road crashes are a high risk and emergency care centers are sparse • Outcome metrics: Performance can be assessed for response times of EMS to the site of crash 	Implementer: Private fleet supplier Authority: subnational health authority Donor: Health donors	<ul style="list-style-type: none"> • Public healthcare systems can see lower costs through reduced injury and severity and could dedicate a portion of their budget to realize these savings • Insurance companies can see lower costs through reduced severity of injuries and size of claims and could dedicate a % of their premiums to realize these savings
 Automated speed enforcement: Installing and operating automated speed cameras of blackspots across a subnational <i>Rationale:</i> Certain countries may have traffic management strictly under the public domain	<ul style="list-style-type: none"> • Use of proceeds requirement: zones where speeding is a key cause of RTIs • Outcome metrics: Performance can be assessed for % of offenders penalized and the reduction in speed infringements over a period 	Implementer: Private technology supplier Authority: subnational traffic authority Donor (optional): Health or infrastructure donors	<ul style="list-style-type: none"> • Traffic authorities can realize savings on enforcement spend through more efficient speed management and generate revenues from traffic fines • Insurance companies can see lower costs through fewer crashes and reduced property damage and third-party claims and could dedicate a % of their premiums

A Applications: Which market contexts are most suitable for Model A?

Where could Model A be used?	
 Subnational regions in which: <ul style="list-style-type: none"> ✓ Road Safety agenda: road safety is a major issue for the subnational and high amongst other development priorities, and ✓ Creditworthiness: suitable credit rating for lenders and no history of mis-management or pilferage, and ✓ Transparency: the subnational entity promotes accountability and public oversight through access to information, and ✓ Fiscal space: the subnational entity is able to sustain additional debt for the planned road safety investments 	
What factors would further enable the implementation of Business Model A?	
Public sector	
Road safety priority	Road safety is an identified need in the region and is high on the public sector agenda
Public capacity	Adequate regulatory and enforcement capabilities (e.g., speed limits and clear fines), financial capacity, project operational or implementation capacity
Financial track-record	Public entity has a track record of raising debt and timely repayments
Ecosystem	
Local capabilities	Availability of willing and capable technology providers or contractors to implement and, where relevant, operate interventions
Availability of data	Adequate information is available to identify the key blackspots and causes of RTIs to determine the high-impact interventions
Donor interest	Availability of donors that are active within the target region (where concessional funding is needed)
What are the program-specific pre-requisites pertaining to Business Model A?	
P5. Speed Management	
Institutional strength	Adequate regulatory and enforcement capabilities (e.g., speed limits and clear fines)
Local capabilities	Availability of willing and capable technology providers or contractors to implement and operate interventions
Availability of data	Adequate information is available to identify the key blackspots and causes of RTIs to determine the high-impact interventions
P7. Post-crash EMS	
Local capabilities	Availability of willing and capable technology providers or contractors to implement and operate interventions

Model B: Financing a New PPP

B Overview: Financing a new PPP



Note: a. VGF = visibility gap funding.

B Actors and roles: Which actors can be effectively engaged in Model B?

Actor function & role	What would each actor need to participate in Model B?	Potential target actors ^b (non-exhaustive)
Investor SRIs/DFIs	<ul style="list-style-type: none"> Creditworthiness and fiscal space of borrower Financial viability of investment and data for appropriate risk evaluation Alignment of investment to social bond principles on management & use-of-proceeds, project selection & evaluation and reporting (<i>in the case of social finance</i>) or on definition of targets, KPIs, reporting and verification (<i>in the case of SDG-linked finance</i>) 	<ul style="list-style-type: none"> IFC as a lender or sustainability finance investor Commercial banks active in the target geography with loan terms acceptable to the borrower NDBs^a and DFIs active in the region or in the transport sector in LMICs Socially responsible / ESG investors
Borrower Concessionaire	<ul style="list-style-type: none"> Sufficient funding to support the financial viability of the investment Regulatory framework and institutional capacity required to enable the project 	<ul style="list-style-type: none"> Road safety concessionaires that have length of experience and capability to manage more complex contractual setups (e.g., road, ATE, vehicle I&C concessionaires)
Payor Public authority	<ul style="list-style-type: none"> A clear need, demand, or case for investment in road safety in its jurisdiction A clear understanding of financial & implementation support to be provided 	<ul style="list-style-type: none"> Government entity that prioritizes the road safety agenda and has a low corruption perception
Funder Outcome funder	<ul style="list-style-type: none"> An impact case for the achievement of outcomes cost-effectively A reliable independent evaluation for outcomes and impact 	<ul style="list-style-type: none"> Global health donors active in the target region Insurance companies who benefit from lower RTIs in the region GPRBA for low-income communities
Funder VGF funder	<ul style="list-style-type: none"> A feasibility case to demonstrate project economic viability with VGF An impact case to demonstrate need for VGF 	<ul style="list-style-type: none"> NDBs and MDBs offering concessional capital products in the country Insurance companies who benefit from lower RTIs in the region IDA for regions in LICs
Enabler TA provider	<ul style="list-style-type: none"> Commitment and engagement from the public entity receiving support 	<ul style="list-style-type: none"> PPIAF/SNTA/IFC: The WB as a PPIAF / Coordinator or as part of the Subnational technical assistance (SNTA), IFC as part of lending NDBs and DFIs active in the region or in the transport sector in LMICs

Note: a. National development bank. b. Actors in blue = World Bank Group entities.

B Investment Barriers: What are key barriers preventing private financiers from investing in road safety, and how can Model B be designed to address them?

Which barriers does Model B aim to address?

Financial viability
Road safety offerings are not monetizable by private concessionaires from either:
End users: Low willingness to pay for road safety offerings due to low awareness around its impact
Public entities: Governments do not see the longer-term economic benefits of improving road safety and do not pay for road safety measures

RS prioritization
Investment in road safety in L/MICs is limited due to:
Lack of prioritization of road safety limiting appropriate incorporation in regulatory framework

Institutional capacity
Public authorities in L/MICs lack the capability to:
Design high impact road safety metrics
Manage RS measures beyond what is contractually required

Accountability
Private concessionaires are not held accountable for road safety outcomes due to:
M&E design that presents contractual loopholes whereby concessionaires achieve KPIs without addressing road safety
Penalty schemes that do not present sufficient incentive for the concessionaire to exceed targets

Which instruments address these barriers?

Viability gap funding (VGF) and credit enhancement on government payments can be used to support the financial viability of the concessionaire's investment
Key design principles:

- VGF must be sizeable to compensate for the investment required to provide high quality road safety measures
- Payment-based guarantee must be structured to provide sufficient coverage for financial risks and incorporate liquidity features for delayed payments

Technical Assistance can be offered to build knowhow and capacity around road safety regulatory best practices, program design, and implementation
Key design principles:

- TA must assess the existing regulatory frameworks and enforcement capabilities in the region, and where relevant, to ensure updates to regulations and enforcement practices to achieve road safety targets
- TA must also ensure continuity by building capabilities for future program design and measuring and managing the impact of road safety measures

Outcome funding based on the vetting of an independent evaluator can create incentives to increase concessionaire's efforts to increase road safety investments
Key design principles:

- Outcome funding must be sizeable enough to incentivize investment, however baselines and measurement of metrics must be thoroughly vetted
- The technical evaluator must have sufficient capabilities relevant to the program and geographic context and be empowered with the relevant data and authority to conduct its work effectively

B Applications: Which market contexts are most suitable for Model B? (1/2)

Where could Model B be used?

- Local contexts where:
- ✓ **PPP readiness:** the regulatory framework supports private implementation and there is an ecosystem of capable and willing private players, and
 - ✓ **Low corruption perception:** the public authority appropriately enforces and penalizes perpetrators for infringements, and
 - ✓ **High ease of contracting with the government:** public authorities are held accountable for procuring and upholding contracts

What factors would further enable the implementation of Business Model B?

Public sector	
Road Safety priority	Road safety is an identified need in the region and is high on the public sector agenda
Institutional strength	Adequate regulatory and enforcement capabilities (e.g., speed limits and clear fines), financial capacity, project operational or implementation capacity
Institutional coordination	Well-coordinated public sector where the relevant ministries are aligned on respective responsibilities
Low evidence of corruption	Traffic enforcement / police do not have a history of misconduct (e.g., bribery)
Procurement track-record	Public authority has a track record of honoring contractual financial obligations
Data Availability	
Available crash data	Sufficient data is available to identify the key causes of RTIs to design high-impact interventions
Public registration systems & data	Capabilities and information in place to identify, track and penalize offenses, (e.g., vehicle registration data, resident addresses)
Measurable outcome data	Sufficient data is available to measure and track key outcomes required to secure outcome funding
Ecosystem	
Donor interest	Availability of donors that are active with the target region (where concessional funding is needed)
Local private capacity	Mature sector of capable road safety concessionaires to finance, implement and operate interventions
Affordability	Affordability of end user pricing (e.g., toll fees,) to consider the income levels of the target population

B Applications: Which road safety programs are most suitable for Model B?

When could Model B be used?



Selection of road safety interventions:

- ✓ **High capex programs:** high-impact interventions with medium to high capex requirements, and
- ✓ **Strong private ecosystem:** interventions for which private sector capabilities are strong and private management is encouraged by the regulatory framework

Programs suitable for Model B	Implementation considerations	Key actors	Potential revenue sources
<p>A Major road and urban form development or road safety upgrade: designing and building road infrastructure with an iRAP rating of 3-star or higher</p> <p><i>Rationale:</i> Commercial viability is insufficient, and concessionaires cannot monetize road safety measures sufficiently to justify their investment without charging more expensive tolls</p>	<ul style="list-style-type: none"> • Use-of-proceeds requirement: road safety measures within the concession prioritized by a certified, independent evaluator • Outcome metrics: Performance can be assessed for adherence of infrastructure to international standards and reduction of road crashes and RTIs 	<p>Implementer(s): road concessionaires, independent evaluator</p> <p>Authority: Transport & traffic authorities</p> <p>Donor(s): Donors keen on Road safety</p>	<ul style="list-style-type: none"> • Concessionaires can generate revenues from users as direct or shadow tolls or through the authority as availability payments • Public healthcare systems can see lower costs through reduced injury and severity and could dedicate a portion of their budget to realize these savings • Insurance companies can see lower costs through fewer crashes and reduced property damage and third-party claims and could dedicate a % of their premiums to realize these savings
<p>B Vehicle inspection & certification: building a vehicle inspection center network</p> <p><i>Rationale:</i> The ability for concessionaires to recoup their investment in high quality, certified I&C services is highly dependent on institutional capacity to regulate vehicle standards and enforce regular inspection and certification</p>	<ul style="list-style-type: none"> • Use of proceeds requirement: inspection and certification systems and services certified by an independent evaluator • Outcome metrics: Performance can be assessed for reduction in failure rates of registered vehicles over a period 	<p>Implementer(s): vehicle inspection providers, independent evaluator</p> <p>Authority: Transport & industry authorities</p> <p>Donor(s): Donors keen on Road Safety, Vehicle insurers, Auto-companies CSR</p>	<ul style="list-style-type: none"> • Vehicle I&C providers can generate revenues from user fees, including inspection and penalty fees • Auto-companies can see higher sales of after-market parts and services and could dedicate a % of their incremental sales • Insurance companies can see lower costs through fewer crashes and reduced property damage and third-party claims and could dedicate a % of their premiums to realize these savings • Infrastructure companies can see fewer maintenance costs through fewer crashes and road detriment and could dedicate a % of toll revenue

B Applications: Which market contexts are most suitable for Model B? (2/2)

Where could Model B be used?



Local contexts where:

- ✓ **PPP readiness:** the regulatory framework supports private implementation and there is an ecosystem of capable and willing private players, and
- ✓ **Low corruption perception:** the public authority appropriately enforces and penalizes perpetrators for infringements, and
- ✓ **High ease of contracting with the government:** public authorities are held accountable for procuring and upholding contracts

What are the program-specific pre-requisites pertaining to Business Model B?

P1. Vehicle Inspection & Certification

Institutional strength	Adequate regulatory and enforcement capabilities (e.g., speed limits and clear fines), financial capacity, project operational capacity
Public registration systems & data	Capabilities and information in place to identify, track and penalize offenses, (e.g., vehicle registration data, resident addresses)
Affordability	Affordability of end user pricing (e.g., inspection fees) to consider the income levels of the target population

P5. Speed Management

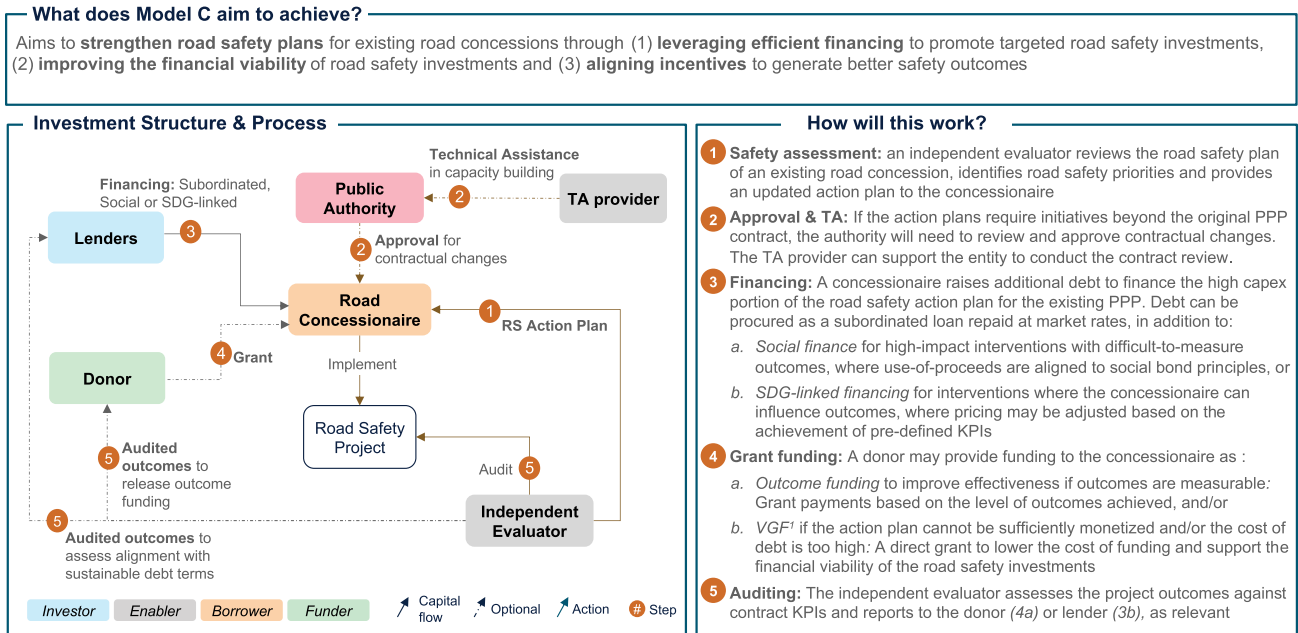
Institutional strength	Adequate regulatory and enforcement capabilities (e.g., speed limits and clear fines), financial capacity, project operational capacity
Available crash data	Sufficient data is available to identify the key causes of RTIs to design high-impact interventions
Public registration systems & data	Capabilities and information in place to identify, track and penalize offenses, (e.g., vehicle registration data, resident addresses)

P7./P8. Post-crash care

Donor interest	Availability of donors that are active with the target region (where concessional funding is needed)
Local private capacity	Mature sector of capable road safety concessionaires to finance, implement and operate interventions

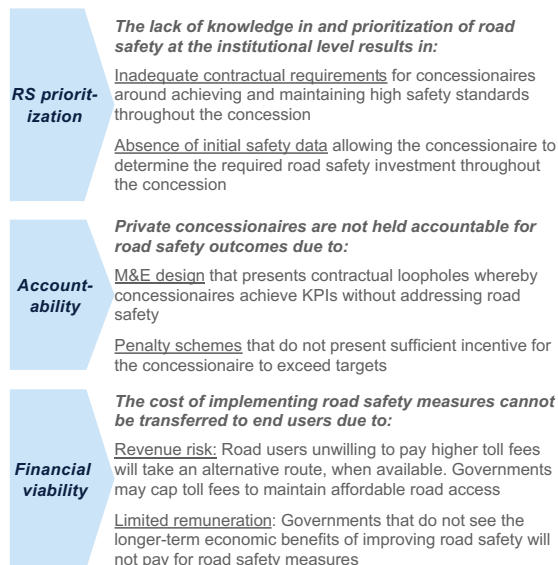
Model C: Additional Debt for an Existing Road PPP

C Overview: Additional debt for an existing road PPP

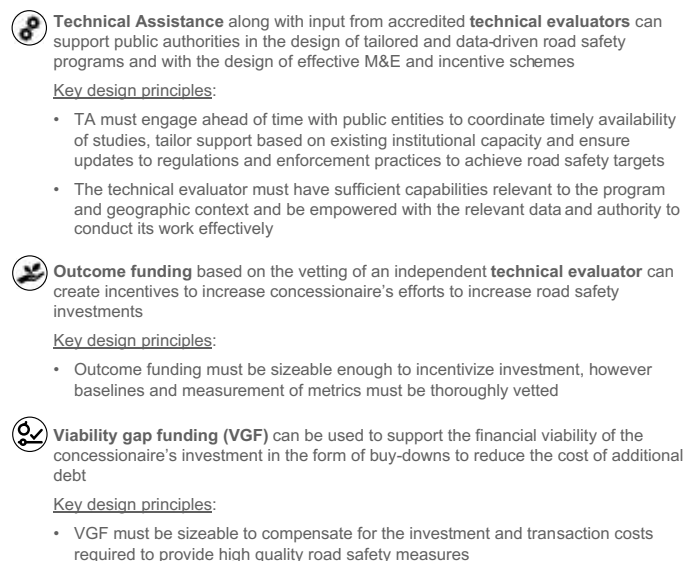


C Investment Barriers: What are key barriers preventing private financiers from investing adequately in road safety, and how can Model C be designed to address them?




What barriers does Model C aim to solve?



Which instruments address these barriers?



C Applications: Which road safety programs are most suitable for Model C?

When could Model C be used?			
<p> Selection of road safety interventions:</p> <ul style="list-style-type: none"> ✓ Existing road concession with safety concerns: high-impact interventions for road concessions with high RTIs, and ✓ Available crash data: Adequate data is available to identify the key blackspots and causes of RTIs to prioritize high-impact interventions, and ✓ High capex measures: interventions with medium to high capex requirements 			
Programs suitable for Model C	Implementation considerations	Key actors	Potential revenue sources
<p> Major road safety upgrade: upgrading road infrastructure to an iRAP standard of 3-star or more</p> <p><i>Rationale:</i> Capital requirements are high, commercial viability with high-cost financing or capped tolls may be insufficient and improvements could reduce road safety externalities on concessionaires</p>	<ul style="list-style-type: none"> • Use-of-proceeds requirement: safety improvement measures within the concession • Outcome metrics: Performance can be assessed for adherence of infrastructure to international standards 	<p>Implementer: road concessionaire</p> <p>Authority: Transport & traffic authorities</p> <p>Donor(s): Health or infrastructure donors</p>	<ul style="list-style-type: none"> • Concessionaires can see lower costs associated with incident management, maintenance and performance penalties, lower revenue losses from reduced crash-related congestion and can generate revenues by increasing toll fees • Public entities can see lower costs through reduced healthcare costs and income loss and could dedicate a portion of their budgets to realize these savings or increase availability payments for upgraded concessions • Insurance companies can see lower costs through fewer crashes and reduced property damage and third-party claims and could dedicate a % of their premiums to realize these savings
<p> Improved post-crash response: improving the service level of existing emergency medical response</p> <p><i>Rationale:</i> Commercial viability is low and investment in improved EMS could reduce road safety externalities and increase toll revenue for concessionaires</p>	<ul style="list-style-type: none"> • Use of proceeds requirement: zones where fatal RTIs are high and emergency response services are inadequate • Outcome metrics: Performance can be assessed for response times of EMS to the crash site 	<p>Implementer: road concessionaire</p> <p>Authority: Transport & traffic authorities / State health authority</p> <p>Donor(s): Health or infrastructure donors</p>	<ul style="list-style-type: none"> • Concessionaires can see lower costs associated with performance penalties, lower revenue losses from reduced crash-related congestion and can generate revenues by increasing toll fees • Public healthcare systems can see lower costs through reduced injury and severity and could dedicate a portion of their budget to realize these savings • Insurance companies can see lower costs through reduced severity of injuries and size of claims and could dedicate a % of their premiums to realize these savings

C Actors and roles: Which actors can be effectively engaged in Model C?

Actor function & role	What would each actor need to participate in Model C?	Potential target actors ^b (non-exhaustive)
<p>Investor SRI/DFIs</p>	<ul style="list-style-type: none"> • Creditworthiness and track record of borrower • Financial viability of investment and data for appropriate risk evaluation • Alignment of investment to social bond principles on management & use-of-proceeds, project selection & evaluation and reporting (<i>in the case of social finance</i>) or on definition of targets, KPIs, reporting and verification (<i>in the case of SDG-linked finance</i>) 	<ul style="list-style-type: none"> • IFC as a lender, a sub-loan provider (as part of Blended Finance Facility) – subject to additional indebtedness conditions – or sustainability finance investor • Commercial banks active in the target geography with loan terms acceptable to the borrower • NDBs^a and DFIs active in the region or in the transport sector in LMICs • Socially responsible / ESG investors
<p>Borrower Road Concessionaire</p>	<ul style="list-style-type: none"> • PPP framework that allows flexibility to upgrade existing concession • Incentive from government to improve attractiveness of investment • Affordable financing to support the financial viability of the investment or to reduce financial risk 	<ul style="list-style-type: none"> • Road concessionaires for existing PPPs in the region that have capabilities to conduct road safety upgrades to standard
<p>Funder Outcome funder</p>	<ul style="list-style-type: none"> • An impact case and cost-effectiveness for achievement of outcomes • A reliable independent evaluation for outcomes and impact 	<ul style="list-style-type: none"> • Global health donors active in the target region • Insurance companies who benefit from lower RTIs in the region • GPRBA for low-income communities
<p>Funder VGF funder</p>	<ul style="list-style-type: none"> • A feasibility case to demonstrate project economic viability with VGF • A clear impact case towards achieving SDGs / health outcomes 	<ul style="list-style-type: none"> • NDBs and MDBs offering concessional capital products in the country • Insurance companies who benefit from lower RTIs in the region • IDA for regions in LICs
<p>Enabler TA provider</p>	<ul style="list-style-type: none"> • Commitment and engagement from the public entity receiving support 	<ul style="list-style-type: none"> • PPIAF/SNTA/IFC: The WB as a PPIAF / Coordinator or as part of the Subnational technical assistance (SNTA) • NDBs and DFIs active in the region or in the transport sector in LMICs

Note: a. National development bank. b. Actors in blue = World Bank Group entities.

C Applications: Which market contexts are most suitable for Model C?

Where could Model C be used?

Local contexts where:

- ✓ **PPP Institutional capacity:** PPP framework on road safety allows flexibility expanding scope to increase safety outcomes, and/or
- ✓ **Accelerated RS procedures:** PPP framework allows for fast-track amendments reserved for measures that increase safety outcomes

What factors would further enable the implementation of Business Model C?

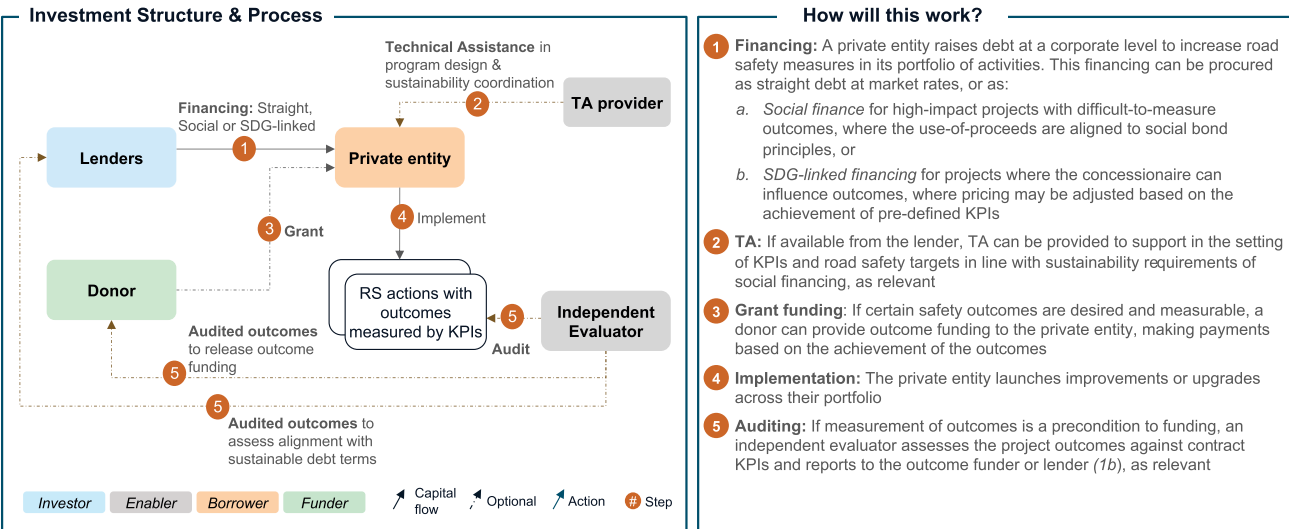
Public Sector Capacity	
Road Safety priority	Road safety is an identified need in the region and is high on the public sector agenda and within road PPP contracts
Institutional strength	Adequate regulatory and enforcement capabilities, financial capacity, project operational or implementation capacity and enforcement capacity
Institutional coordination	Well-coordinated public sector where the relevant ministries are aligned on respective responsibilities to support flexibility in PPP contracts
Procurement track-record	Public authority has a track record of honoring contractual financial obligations
Data Availability	
Measurable outcome data	Adequate information is available to measure and track key outcomes required to secure outcome funding
Market Dynamics	
Donor interest	Availability of donors that are active within the target region (where concessional funding is needed)
Affordability	Affordability of end user pricing (e.g., toll fees) to consider the income levels of the target population
What are the program-specific pre-requisites pertaining to Business Model C?	
P5. Speed Management	
Institutional strength	Adequate regulatory and enforcement capabilities (e.g., speed limits and clear fines)
P7. Post-Crash EMS	
Donor interest	Availability of health donors that are active within the target region

Model D: Corporate Financing

D Overview: Direct financing to a corporate entity towards increasing road safety

What does Model D aim to achieve?

Aims to provide an **efficient way** of incorporating road safety across **multiple assets** by (1) leveraging **efficient financing** to promote road safety investment, (2) providing advisory support to **develop effective KPIs and targets** and (3) **aligning incentives** to generate better safety outcomes



D Actors and roles: Which actors can be effectively engaged in Model D?

Actor function & role	What would each actor need to participate in Model D?	Potential target actors ^d (non-exhaustive)	
Investor SRIs/DFIs	<ul style="list-style-type: none"> Creditworthy borrower with fiscal space and sufficient track record to allow risk assessment Sufficient data to assess viability of safety targets (<i>in the case of SDG-linked finance</i>) Alignment of investment to social bond principles on management & use-of-proceeds, project selection & evaluation and reporting (<i>in the case of social finance</i>) or on definition of targets, KPIs, reporting and verification (<i>in the case of SDG-linked finance</i>) 	<ul style="list-style-type: none"> IFC as a lender or sustainability finance investor Commercial banks active in the target geography with loan terms acceptable to the borrower NDBs^a and DFIs active in the region or in the transport sector in LMICs Socially responsible / ESG investors 	
Borrower	Road sponsor	<ul style="list-style-type: none"> Affordable financing on competitive terms to support investment viability Regulatory approval required to enable the project An impact case for the achievement of SRI-related or ESG-related metrics 	<ul style="list-style-type: none"> Road sponsors with several active concessions in a region that have capabilities to conduct road safety upgrades to standard
	Vehicle fleet manager	<ul style="list-style-type: none"> Affordable financing on competitive terms to support investment viability Advisory support provided for program execution & monitoring Favorable regulatory environment to support import and leasing of vehicles 	<ul style="list-style-type: none"> Commercial fleet owners or TNCs^b with large operations, a good understanding of credit of operators in its network and established contracts with end users (i.e., cargo owners) Mobility companies e.g. Uber; taxi companies
	Commercial fleet customers ^c	<ul style="list-style-type: none"> Affordable financing on competitive terms to support investment viability An impact case for the achievement of SDG or ESG-related metrics to report on in CSR / sustainability reports 	<ul style="list-style-type: none"> Commercial commodity corporates with sizeable operations and a CSR interest in improving road safety, (e.g., oil & gas companies, beverage companies)
	Vehicle Manufacturers	<ul style="list-style-type: none"> Affordable financing on competitive terms to support investment viability An impact case for the achievement of SDG or ESG related metrics to report against 	<ul style="list-style-type: none"> Vehicle manufacturers
Funder Outcome funder	<ul style="list-style-type: none"> An impact case for the achievement of outcomes cost-effectively A reliable independent evaluation for outcomes and impact 	<ul style="list-style-type: none"> Global health donors active in the target region Insurance companies who benefit from lower RTIs in the region GPRBA for low-income communities 	
Enabler TA provider	<ul style="list-style-type: none"> Commitment and engagement from the private entity receiving support 	<ul style="list-style-type: none"> IFC as part of lending NDBs and DFIs as part of lending 	

Note: a. National development bank. b. Transportation networking companies; c. this actor category will be most suitable for sustainability-linked financing, that is, unrestricted use of proceeds for general corporate purposes with road safety outcomes linked to SDGs. d. Actors in blue = World Bank Group entities.

D Investment Barriers: What are key barriers preventing corporates from investing in road safety, and how can the instruments be designed to address them?

Which barriers does Model D aim to address?

Financial viability

Road safety offerings are not monetizable by private concessionaires from either:

End users: Low willingness to pay for road safety offerings due to low awareness around its impact

Public entities: Governments do not see the longer-term economic benefits of improving road safety and do not pay for road safety measures

RS accountability

Corporates do not prioritize road safety over other social issues primarily due to:

Financier accountability: road safety is not embedded in ESG criteria for corporates, so they are not held accountable by their shareholders to prioritize road safety investments

Contractual accountability: M&E design that presents ineffective road safety KPIs and penalty schemes with insufficient incentives for entities to exceed targets

Which instruments address these barriers?

-  **Outcome funding**, such as buy-downs, can be used to support the financial viability of the financier's investment in road safety by providing lower cost of capital
Key design principles:
 - Outcome funding must be sizeable enough to incentivize investment, however baselines and measurement of metrics must be thoroughly vetted
-  **Sustainability-linked financing** with SPTs based on the vetting of an **independent evaluator** can create incentives to increase the entity's efforts to increase road safety investments
Key design principles:
 - Baselines and measurement of metrics must be thoroughly vetted and related to the existing sustainability strategy and ESG metrics the corporate is aligned to
 - The technical evaluator must have sufficient capabilities relevant to the program and geographic context and be empowered with the relevant data
-  **Technical assistance** provided by DFIs as part of the financing package to the entity can support in the design of sustainable instruments and compliance with principles, if applicable
Key design principles:
 - TA must engage with corporates to ensure design of the instrument and reporting mechanisms present clear alignment with the interests of shareholders

D Applications: Which road safety programs are most suitable for Model D?

When could Model D be used?



Selection of road safety interventions:

- ✓ **Benefits of scale** when deployed across assets within a country, and
- ✓ **Measurable outcomes** (in the case of outcome funding / SDG-linked financing)
- ✓ **Strong private ecosystem**: interventions where private management is encouraged by regulatory framework

Programs suitable for Model D	Implementation considerations	Key actors	Potential revenue sources
Vehicle fleet upgrade: upgrading vehicle fleet through renewal or fleet acquisition <i>Rationale:</i> major fleet operators can benefit from cost-efficient procurement of vehicles & safety technologies	<ul style="list-style-type: none"> • Use of proceeds requirement: vehicle upgrades that significantly improve roadworthiness • Outcome metrics: Performance can be assessed for adherence of vehicles to international safety specifications and reduction of RTIs 	Implementer(s): fleet operators Public authority: Transport & industry authorities Donor(s): None	<ul style="list-style-type: none"> • Fleet owners can generate revenues by charging vehicle lease payments to fleet operators and end customer availability fees • Fleet operators can generate savings from greater fuel efficiency and lower costs associated with maintenance and crash-related property damage and may generate revenues from charging customers higher fees due to improved services • Auto-companies can see higher sales of after-market parts and services and could dedicate a % of their incremental sales • Infrastructure companies can see fewer maintenance costs through fewer crashes and road detriment and could dedicate a % of toll revenue
Manufacture safer vehicles: Vehicle manufacturers design and build vehicles to a safer specification <i>Rationale:</i> vehicle manufacturers can benefit from safety technologies and set a standard for safer vehicles	<ul style="list-style-type: none"> • Use of proceeds requirement: manufacturing of vehicles that significantly improve roadworthiness • Outcome metrics: Performance can be assessed for adherence of vehicles to international safety specifications, e.g. global NCAP scores 	Implementer(s): vehicle manufacturers Public authority: Transport & industry authorities Donor(s): None	<ul style="list-style-type: none"> • Auto-companies could benefit from better sales and reduced risk due to higher safety rating
CSR-related initiatives for road concessions*: Behavioral awareness and education campaigns for road users <i>Rationale:</i> non-revenue generating expenses that are linked to a corporate-level mission	<ul style="list-style-type: none"> • Use of proceeds requirement: campaigns and education initiatives for which local data is available, there is evidence on potential impact and attributable outcomes can be measured • Outcome metrics: Performance can be assessed for reach or specific change in behaviour 	Implementer(s): media and education providers Public authority: Traffic authority Donor(s): (optional): Health or infrastructure donors	<ul style="list-style-type: none"> • Concessionaires can see fewer operating & maintenance costs through fewer crashes and road detriment and could dedicate a % of toll revenue • Commodities companies can see fewer costs in property damage and state penalties through fewer crashes and could dedicate a % of revenues towards CSR

Note: a. CSR-related initiatives will be most suitable for sustainability-linked financing, that is, non-restricted use-of-proceeds for general corporate purposes with road safety outcomes linked to SDGs.

D Applications: Which market contexts are most suitable for Model D?

Where could Model D be used?



Local contexts where:

- ✓ **Supportive regulatory environment:** the regulatory framework supports private implementation, and
- ✓ **Strong private ecosystem:** There is an ecosystem of private entities that are socially responsible and creditworthy

What factors would further enable the implementation of Business Model D?

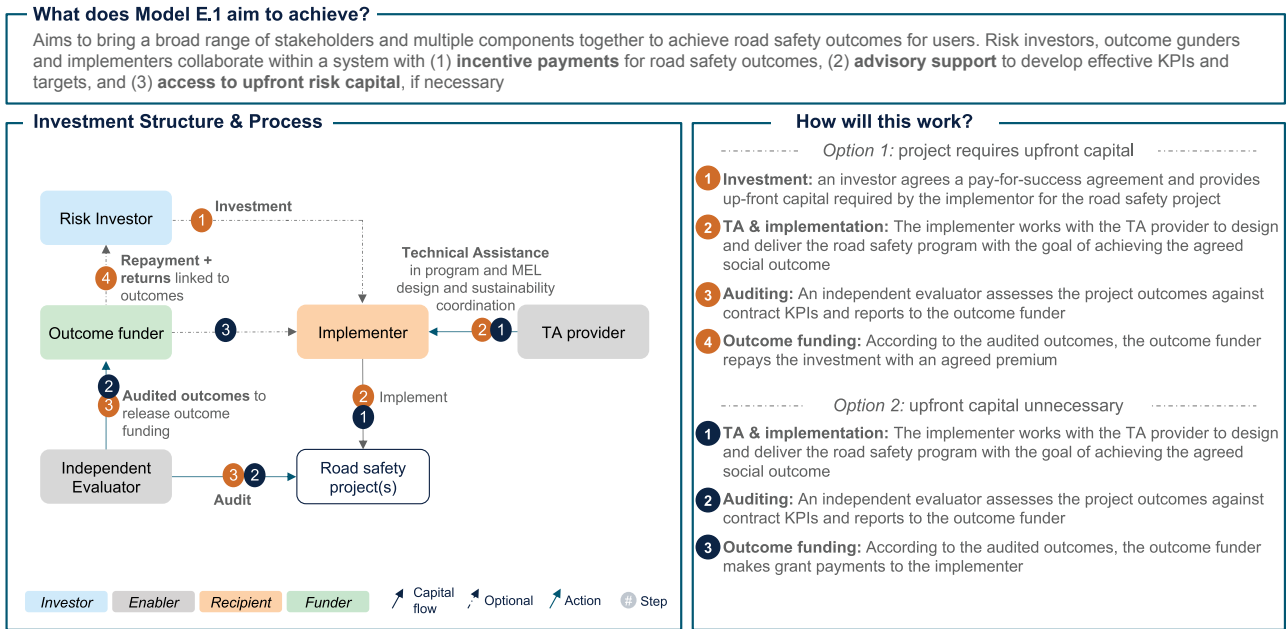
Public sector	
Road Safety priority	Road safety is an identified need in the region and is high on the public sector agenda
Institutional strength	Adequate regulatory and enforcement capabilities (e.g., speed limits and clear fines), financial capacity, project operational or implementation capacity and enforcement capacity
Institutional coordination	Well-coordinated public sector where the relevant ministries are aligned on respective responsibilities
Data Availability	
Available baseline data	Sufficient data is available to determine a baseline and develop appropriate targets and monitor progress towards the targets
Measurable outcome data	Sufficient data is available to measure and track key outcomes required to secure outcome funding
Ecosystem	
Local private capacity	Mature sector of capable road safety concessionaires to finance, implement and operate interventions

What are the program-specific pre-requisites pertaining to Business Model D?

P2. Vehicle fleet upgrade	
Favorable trade policies	Vehicle import duty rates not too high to discourage imports of newer, safer vehicles

Model E: Outcomes-Based Funding and Financing

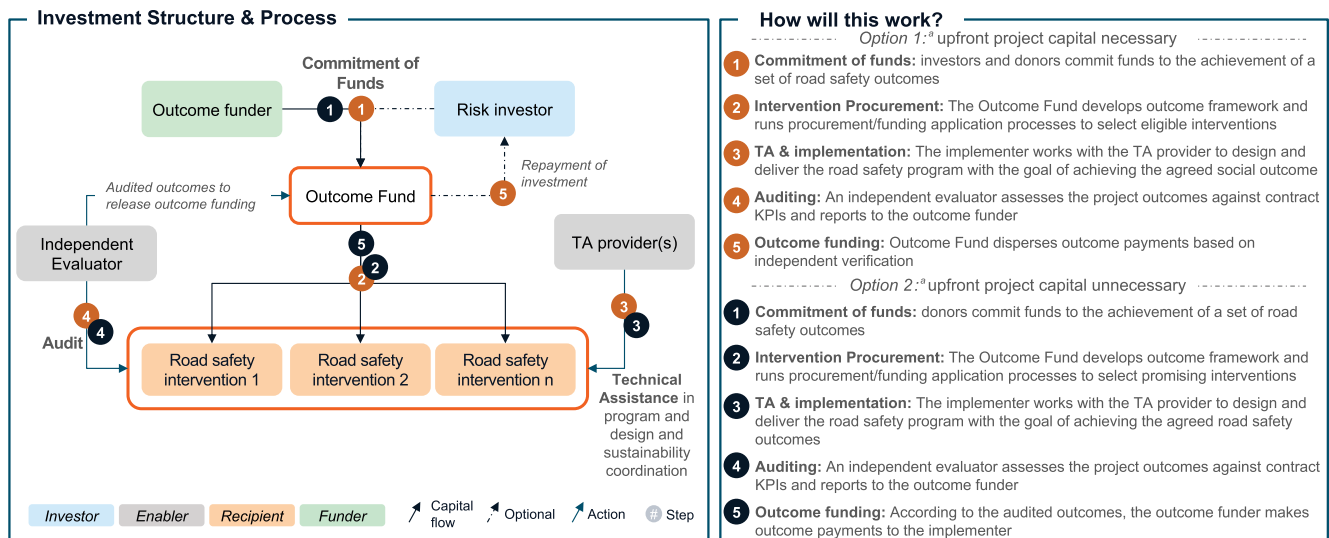
E1 Overview: Outcome funding to a public or private entity



E2 Overview: Outcomes Fund

What does Model E2 aim to achieve?

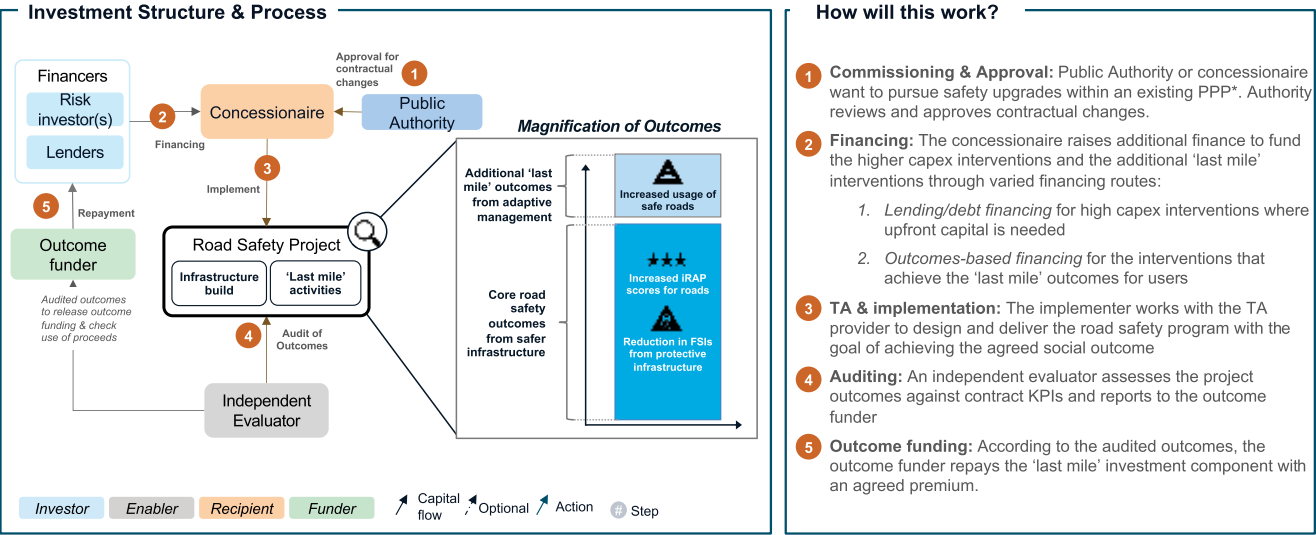
Aims to scale outcomes-based funding with a programmatic approach, by contracting multiple outcome-based contracts under a common outcome payment framework and alongside an aligned source of investment. A programmatic approach will enable streamlining of processes and deepening of the evidence base for relevant road safety interventions and projects.



Note: a. In practice, the Outcome Fund could be designed to embrace both options.

E3 Overview: 'Last-mile' Outcomes-funding

What does Model E3 aim to achieve?
 Aims to deploy outcome-based financing alongside other large scale investment structures (e.g. Models A-D) to complement the system level KPIs and objectives embedded in those structures. By deploying Model E alongside, the overall investment model is enhanced to achieve an additional level of "spill over" or "last mile" outcomes that can more adaptively respond to end user needs.



* Here, Model E.3 is complementary to Model B. A similar approach will apply when used alongside other investment structures

The following graphics are applicable to all three iterations of Model E.

E Actors and roles: Which actors can be effectively engaged in Model E?

Actor function & role	What would each actor need to participate in Model E?	Potential target actors ^b (non-exhaustive)
Investor (SRIs/DFIs)	<ul style="list-style-type: none"> Sufficient benchmark data to conduct thorough risk assessment Balanced risk-return model with potential for high returns and loss protection 	<ul style="list-style-type: none"> IFC as an equity (risk) investor Insurance companies who benefit from lower RTIs in the region NDBs^a and DFIs active in the region or in the transport sector in LMICs Socially responsible / ESG investors
Recipient (Implementer)	<ul style="list-style-type: none"> Favorable regulatory environment required to enable the project Availability of baseline data and attainable outcomes Advisory support provided for program design & execution 	<ul style="list-style-type: none"> NGOs, non-profits or international development organizations with strong capabilities in the intervention and active in the target geography Contractors with capabilities in the intervention
Funder (Public entity / Donor)	<ul style="list-style-type: none"> Expected financial benefit to justify required project capital, e.g., savings in medical expenditures, reduction in lost economic output Availability of baseline data and measurability of agreed outcomes An impact case for the achievement of outcomes cost-effectively A reliable independent evaluation for outcomes and impact 	<ul style="list-style-type: none"> Relevant government entity with available funding and financial interest in the intervention Global health donors active in the target region Insurance companies who benefit from lower RTIs in the region GRBA for low-income communities
Enabler (TA provider)	<ul style="list-style-type: none"> Commitment from the entity receiving support Timely engagement from the coordinating actors to minimize transaction costs 	<ul style="list-style-type: none"> PPIAF/SNTA/IFC: The WB as a PPIAF / Coordinator or as part of the Subnational technical assistance (SNTA), IFC as part of debt offering, GRBA as part of RBF NDBs and DFIs active in the region or in the transport sector in LMICs Social consultancy organizations or thinktanks active and experienced in innovative finance Legal advisory firms active in target regions

Note: a. National development bank. b. Actors in blue = World Bank Group entities.

E Investment Barriers: What are key barriers preventing implementation of road safety projects, and how can the instruments be designed to address them?

Which barriers does Model E aim to address?

Financial viability

Road safety offerings are not monetizable from either:

End users: Low willingness to pay for road safety offerings due to low awareness around its impact

Public entities: Governments unwilling to pay for road safety measures given the lack of evidence and impact base

Outcome uncertainty

Investors are reluctant to invest in interventions that do not meet their risk profile despite high return potential:

Data availability: is a challenge in L/MICs

Local adaptation: the intervention has not been tried and tested in the local setting, introducing an element of uncertainty

Financial resources

L/MICs may not be able to raise the required funds or take on debt due to:

Access to capital: L/MICs may not have access to a wide base of investors to address all their investment needs

Fiscal space: some L/MICs don't have the fiscal space to take on and service additional debt

Development priorities: Health donors do not see road safety as a health challenge and prioritize other health agendas to fund

Performance risk: lack of success evidence raises risk profile of RS projects, making debt an unsuitable instrument

Which instruments address these barriers?

-  **Outcome funding** can be used as the repayment of road safety projects in absence of revenue streams

Key design principles:

 - Potential upside of investor returns must be sizeable to counterbalance the outcome uncertainty and incentivize participation of risk investors
 - Available baseline data and measurement of metrics must be thoroughly vetted by relevant technical experts to ensure measurability of outcomes and assessment of risk by investors

-  **Technical Assistance** from multiple relevant experts can support in the design of tailored and data-driven interventions, the design and feasibility of the financial structure and the design of effective M&E

Key design principles:

 - TA must engage ahead of time with public entities to coordinate timely availability of benchmark data, tailor support based on local context and support with any environmental enablers
 - TA providers must have sufficient capabilities relevant to the program and geographic context


-  **Risk capital** can be sought for projects requiring upfront capital




Key design principles:

 - Intervention evidence and risk-reward profile must be suitable to engage investors
 - Progress payments can be designed for intermediate outcomes to accelerate return of capital and improve the financial profile for investors

E Applications: Which road safety programs are most suitable for Model E?

When could Model E be used?

-  Selection of road safety interventions:
- ✓ Road safety intervention is not monetizable, and
 - ✓ Low capex is required (in the case of option 2, where upfront capital is not used), and
 - ✓ Attributable and measurable outcomes can be attained, and
 - ✓ Significant potential for savings has been identified and can be quantified (in the case where the outcome funder is a public entity)

Programs suitable for Model E	Implementation considerations	Key actors	Potential outcome funding sources
 Road safety upgrade: conducting minor road upgrades to an iRAP standard of 3-star or more <i>Rationale:</i> Commercial viability may be insufficient, outcomes can be measured and attributed	<ul style="list-style-type: none"> • Use-of-proceeds requirement: safety improvement measures within the concession • Outcome metrics: Performance can be assessed for adherence of infrastructure to international standards 	<p>Implementer: road contractor</p> <p>Authority: Transport & traffic authorities</p> <p>Donor(s): Health or infrastructure donors</p>	<ul style="list-style-type: none"> • Public entities can see lower costs through reduced healthcare costs and income loss and could dedicate a portion of their budgets or earmark traffic infringements to realize these savings • Insurance companies can see lower costs through fewer crashes and reduced property damage and third-party claims and could dedicate a % of their premiums to realize these savings • Infrastructure companies can see fewer maintenance costs through fewer crashes and road detriment and could dedicate a % of toll revenue • Healthcare funders active in the country can see quantifiable impact outcomes to report on and could direct funding to intervention
 Improved post-crash response: improving the provision of existing emergency medical response services <i>Rationale:</i> Commercial viability is low, capital requirements are low	<ul style="list-style-type: none"> • Use of proceeds requirement: areas where fatal RTIs are high and emergency response services are inadequate • Outcome metrics: Performance can be assessed for response times of EMS to the crash site 	<p>Implementer: medical service providers</p> <p>Authority: Transport & traffic authorities / State health authority</p> <p>Donor(s): Health donors</p>	
 Regionalized trauma care: expansion or upgrade of existing trauma network <i>Rationale:</i> Commercial viability is low, upfront capex is required, outcomes are measurable	<ul style="list-style-type: none"> • Use of proceeds requirement: expansion in capacity or improvement of service level of trauma care for road crash victims • Outcome metrics: Performance can be assessed for reduction in DALYs 	<p>Implementer: medical service providers</p> <p>Authority: State health authority</p> <p>Donor(s): Health donors</p>	

E Applications: Which market contexts are most suitable for Model E?

Where could Model E be used?



Local contexts where:

- ✓ **The need for road safety is high:** road safety is identified as an acute challenge in the country, and
- ✓ **Donor interest:** Availability of donors that are active with the target region and willing to participate as outcome funders

What factors would further enable the implementation of Model E?

Public sector

Institutional capacity Where a public entity is implementing the project, the entity should have capacity to contract it and maintain strong oversight

Data Availability

Available baseline data Sufficient data is available to determine a baseline and develop appropriate targets and monitor progress towards the targets

Measurable outcome data The tools or systems are in place to measure and track key outcomes required to secure outcome funding

Ecosystem

Implementer capacity Availability of capable service and technology providers willing to work in the target region

What are the program-specific pre-requisites pertaining to Model E?

P7. EMS

Implementer capacity Availability of willing and capable technology providers or contractors to implement and operate interventions

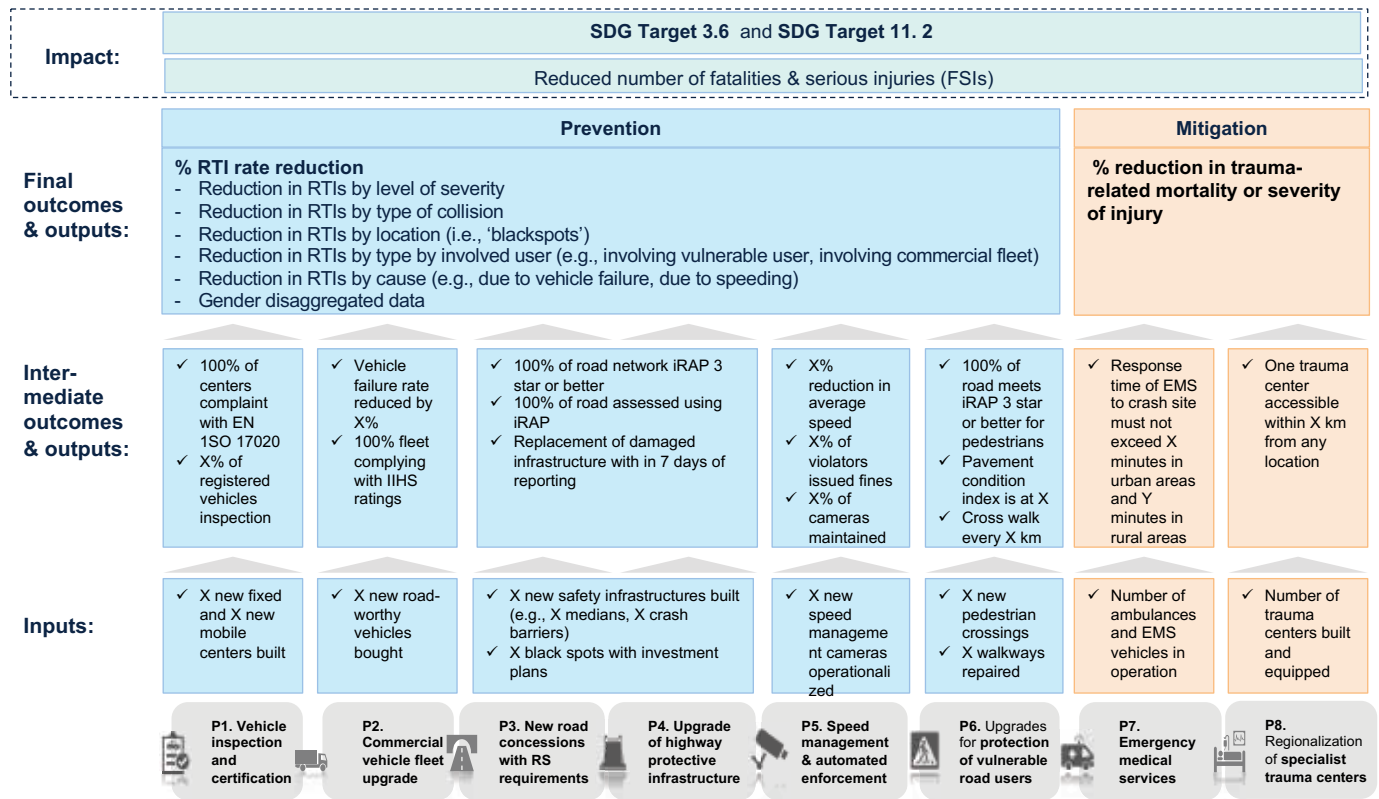
P8. Trauma care centers

Implementer capacity Availability of willing and capable technology providers or contractors to implement and operate interventions

Appendix D. Results Framework Illustration for All Eight Project Archetypes

Figure D.1 provides an illustration of the results framework that can be considered for each of the eight project archetypes (P1 to P8) highlighted in this report. This figure is purely for illustrative purposes, showing some of the types of outcomes and associated outputs that can be considered at the input, intermediate, and final outcome levels.

Figure D.1. Illustration of a Results Framework Aligned with SDGs



Source: Original figure produced for this publication.

Appendix E. Country Analysis for 10 Select Low- and Middle-Income Countries

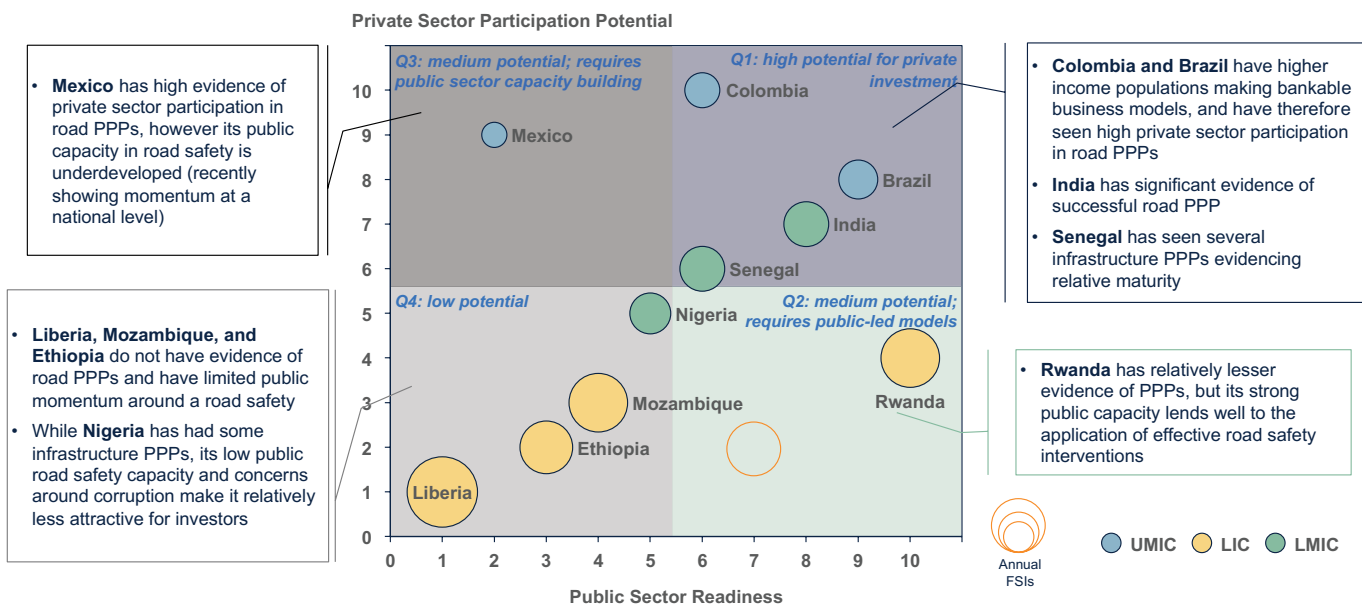
Considering the country contexts for which road safety projects could be applied, an analysis of 10 low- and middle-income countries (LMICs) was conducted across the low-income to upper-middle-income countries range. These countries were analyzed along two primary dimensions: (1) private sector participation potential and (2) public sector readiness. To determine this, the following key metrics were analyzed:

1. The presence of road safety agency regulations for road safety
2. The World Health Organization (WHO) enforcement rating of regulations
3. Data availability and capacity

4. Corruption perception index
5. Level of countries' investment in infrastructure
6. Public-private partnership (PPP) readiness within the public sector
7. Countries' experience with infrastructure PPPs
8. Countries' experience with road PPPs

A summary of the final synthesis resulting from this analysis is shown in figure E.1, where those in the top right quadrant have both the necessary public sector readiness as well as potential for private sector investment.

Figure E.1. Public Sector Readiness and Private Sector Participation Potential for 10 Countries



Source: Own Original figure produced for this publication.

Cross-country comparisons in a matrix format: The matrix serves to assist high-level analysis between countries on the two dimensions of public sector readiness and private sector participation. In Quadrant IV, both private sector and public sector capacity are too weak for road safety investments. In Quadrants III and IV, technical assistance to create maturity in the private and public sectors could be used to move the local context toward Quadrant I—where the necessary public and private sector readiness exist.

Private sector participation: Brazil, Colombia, and India have strong track records in public-private partnerships (PPPs), and though Mexico has seen several road PPPs, it also has had several hiccups around failed PPPs. Ethiopia, Rwanda, and Senegal could be likely candidates for new road concessions or road safety PPPs given potential pipeline opportunities. However, lower incomes entail they may require donor subsidization for road safety investments. Nigeria does not have sufficient evidence for successful PPPs in the road sector and high corruption perceptions, making only potential road safety PPPs suitable.

Public sector readiness: Colombia and India also see strong potential in direct investments to governments given their credit ratings and relative debt sustainability. Brazil's lower sovereign credit rating and Mexico's corruption perception make them less attractive for public investment. Senegal and Rwanda have lower corruption and debt

burdens that could be considered for International Development Association (IDA) financing despite lower credit ratings. Liberia and Mozambique do not have high enough potential for private participation, and with high corruption perceptions and debt burden, they may only be suited for official development assistance (ODA) or donor-funded road safety interventions.

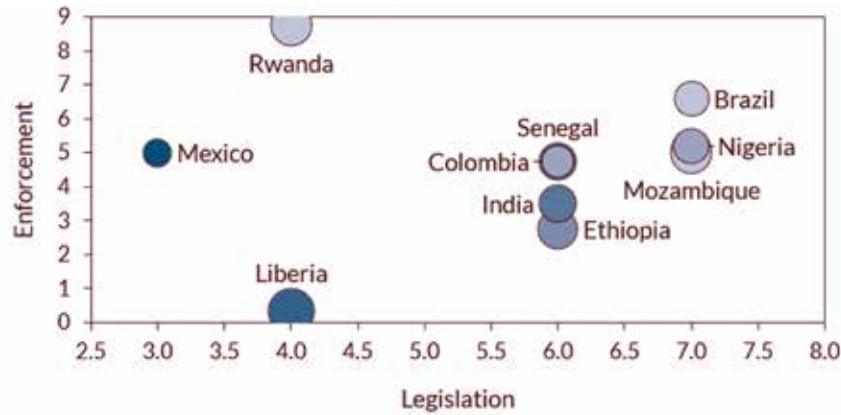
Regulatory frameworks, enforcement, and causes of RTIs

Further analysis of the key drivers of road traffic incidents (RTIs) found that poor road infrastructure, poor vehicle condition, and poor road user behavior (in part due to weak enforcement) were major challenges across countries.

As illustrated in figure E.2, seven out of 10 countries have implemented all or almost all key road safety regulations (according to the WHO's *Global Status Report on Road Safety 2018*).

However, according to the same source, most have insufficient enforcement scores, especially Ethiopia and India. Liberia and Rwanda are both missing three key regulations; however, Rwanda has high enforcement while Liberia has very poor enforcement. Mexico is missing several key regulations according to the 2018 report. However, Mexico has notably seen some momentum to improve its safety. Other key public challenges in the country set include lack of coordination and capacity, and lack of earmarked funding.

Figure E.2. Regulatory Framework and Enforcement Ratings for 10 Countries

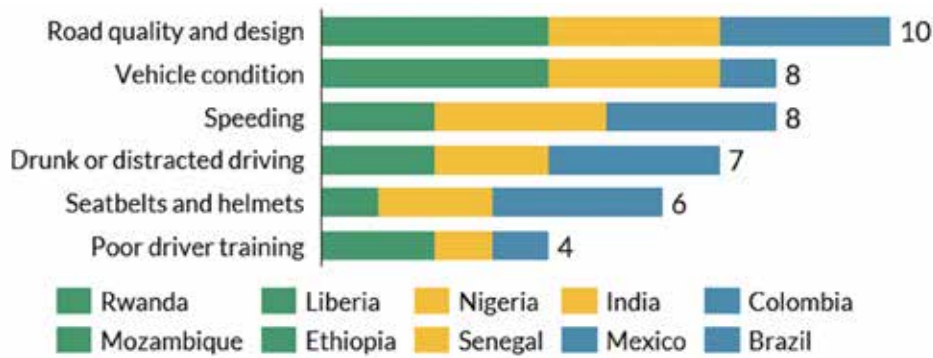


Source: WHO 2018.

Analysis of the underlying top causes of RTIs at the country level was also conducted, as illustrated in figure E.3. All 10 countries have low road quality standards, resulting in fatal and serious injuries (FSIs) that can be addressed through road upgrades with appropriate safety standards incorporated. The two leading issues were found to be around poor vehicle

condition and speeding. These then pointed to road safety interventions such as vehicle inspections and automated speed enforcement technologies. The remaining risk factors causing FSIs on roads are best addressed by incorporating effective driver education and awareness and behavior change campaigns.

Figure E.3. Top Causes of Road FSIs Across 10 Countries



Sources: WHO Global Road Safety Report (2018)

Source: WHO 2018.

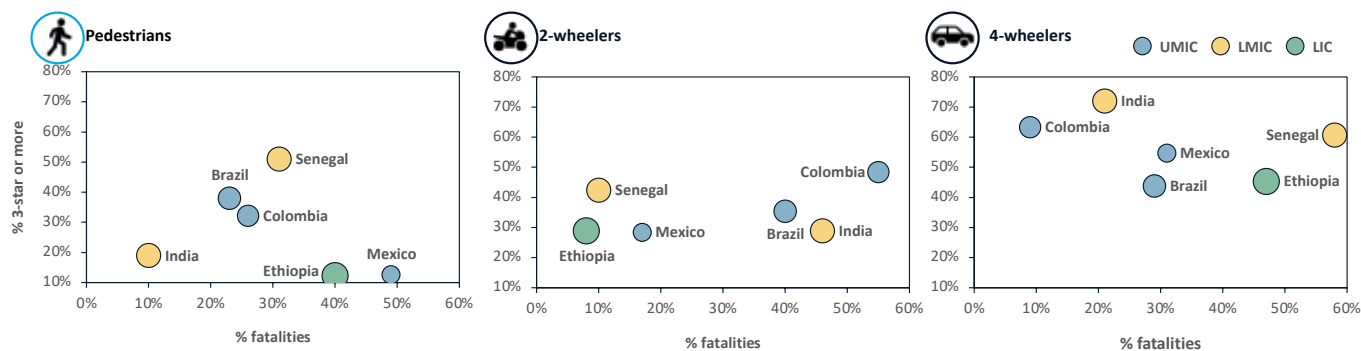
Looking deeper into the available International Road Assessment Programme (iRAP) data (publicly available at the iRAP big data tool: <https://www.vaccines-forroads.org/irap-big-data-tool/>), a dissection of which types of infrastructure treatments are most needed was possible. iRAP also provide a free to use iRAP demonstrator (<https://www.irap.org/project/star-rating-demonstrator/>), which can help a user evaluate the impact of different countermeasures given an input of baseline data, and the iRAP Road Safety Toolkit (<http://toolkit.irap.org/>) also provides an overview of the most effective infrastructure treatments.

Which areas are most critical to treat can be evaluated as is done in figure E.4, where the percentage of road fatalities represented by the user type (pedestrian, two-wheeler, or four-wheeler) is plotted against the percentage of the road network that is at an iRAP three-star or better rating. Therefore, those points

arising in the bottom right quadrant are of the highest concern as they represent a high percentage of deaths, and the road infrastructure is unsafe for them.

Using this, it becomes apparent all countries in the data set appear to have road infrastructure that is more developed for four-wheelers and should seek to improve its design standards for vulnerable users, such as, two-wheelers and pedestrians. Ethiopia and Mexico should focus on making their infrastructure safer for pedestrians, while Senegal might consider behavior change campaigns. Brazil, Colombia, and India should consider safety interventions for two-wheelers, including appropriate infrastructure design, and identify behavior change campaigns such as helmet wearing. For four-wheelers, poor infrastructure may be less of a concern, and road user behavior and vehicle condition interventions should be considered for Ethiopia and Senegal.

Figure E.4. Percentage of Road Fatalities Relative and Road Safety Ratings per User Type



Source: Original figure produced for this publication, based on iRAP data.

Note: iRAP assessments are not currently available for Rwanda, Nigeria, Liberia, and Mozambique.

Reference

WHO (World Health Organization). 2018. *Global Status Report on Road Safety 2018*. Geneva: WHO. Accessed March 11, 2021. <https://www.who.int/publications/i/item/9789241565684>.

Appendix F. Implementation Guides by Project Archetype

Vehicle inspection and certification: Private financier invests in public-private partnership (PPP) to build a network of inspection and certification centers to improve roadworthiness of vehicles

	Contract design and commissioning	Development and execution	Monitoring and evaluation
Activities^a	<ol style="list-style-type: none"> 1. Update the policy and regulatory frameworks to support vehicle certification requirements^c if required 2. Assess program viability and potential additional revenue contributions from savings of auto-insurance and automotive companies, with TA support 3. Develop a PPP contract with TA support to incorporate global best practices adapted to local needs, and set award criteria 4. Establish baselines for performance measurement 5. Conduct bidding process and award contract 	<ol style="list-style-type: none"> 1. Build centers using requisite financing and TA support to develop IT infrastructure, employee training, etc. as planned 2. Collect user-fees for inspection and certification services at centers 3. Collect penalties for inspection delays and infringement through automated systems where applicable 	<ol style="list-style-type: none"> 1. Monitor concessionaire service levels and analyze performance on adherence and infringement across the network to improve processes 2. Conduct audits on equipment and service levels across the network, and measure contractual KPIs^c to issue performance certificate and trigger any pre-defined penalties/bonuses
Actors^b	<ul style="list-style-type: none"> • PPP issuing authority, e.g., Transport ministry • Regulator for vehicle standards, e.g., Trade or Transport ministry • TA provider, e.g., IFC, GRSF, ASECAP • Additional revenue providers, e.g., auto-insurance, auto-sales and infrastructure companies 	<ul style="list-style-type: none"> • Vehicle I&C concessionaire • Subcontractors responsible for delivering required technology or services • Enforcement authority, e.g., Police traffic department • Financier, e.g., IFC, institutional SRLs 	<ul style="list-style-type: none"> • PPP authority, e.g., Transport ministries • Traffic authority managing vehicle registration & testing, driver licensing databases • Independent evaluator, e.g., TÜV SÜD, Dekra, Intertek, Applus • Outcome funding, e.g., GPRBA
Potential WBG role	<ul style="list-style-type: none"> • TA: Updates to regulatory framework • TA: Sourcing additional program funding • TA: Contract design, bid process, and award criteria 	<ul style="list-style-type: none"> • Financier: provide project finance • TA: Sustainability debt coordination 	<ul style="list-style-type: none"> • Donor: performance payments • TA: Design of M&E framework • TA: Enforcement capacity strengthening

Note: a. Activities will vary by country and setting and must be tailored to local context; b. noncomprehensive. c. See next graphic for details.

Pre-requisites for effective implementation

Regulations must mandate standards and regimes for vehicle inspection and certification (I&C) center quality control and for vehicle owners to seek I&C services:

- **Vehicle safety standards:** minimum safety standards for new and/or secondhand vehicles by vehicle type (airbags, electronic stability control, etc.)
- **Vehicle I&C regime** defining (1) the scope of inspection, (2) the standards and validity of certification for inspected vehicles, (3) the supervision of centers and (4) procedure for reporting noncompliant vehicles
- **Vehicle registration and inspection regime:** regime for vehicles owners to comply with on registration, inspection, mandatory repairs and clearance of fines

Public capacity is required to penalize infringements effectively, thereby ensuring adherence to registration and inspection regulations:




- **Vehicle registration database:** Established and enforced legislation for registration of vehicles that include inspection schemes
- **Institutional coordination:** Strong coordination on responsibility of the PPP issuing authority, vehicle regulating authority and traffic enforcement authority to enforce regulations and oversee PPP
- **Effective enforcement:** penalties scheme for incompletion with vehicle registration, licensing, inspection schedules and repairs

Illustrative KPIs and targets^a

KPIs	Targets & standards	Relevant data requirements
Inspection network coverage	# of fixed and mobile centers per X population (for urban and rural areas)	Facility registration data
EN ISO Compliance	100% of centers compliant with EN ISO 17020	Auditor quality audits on equipment and centers
% of registered vehicles inspected	X% of registered vehicles inspected and meeting safety standards in region Y	National /state-level vehicle registration data
Frequency adherence (96/96/EC directive)	% of first inspections (4y after registration) after follow-on inspection (every 2y)	Results for each inspected vehicle from I&C centers

Note: a. Examples of KPIs from research, for example, case studies; actual M&E framework will be designed with the enforcing authority, financier, and a road safety expert, and must be tailored to local context.

Commercial vehicle fleet upgrade: Fleet managers upgrade their vehicles to achieve roadworthiness through complete vehicle renewal or safety upgrades

	Contract design and commissioning	Development and execution	Monitoring and evaluation
 Activities^a	<ol style="list-style-type: none"> 1. Conduct an economic assessment on existing fleet and a risk assessment of operator and customer network, with TA support, if needed 2. TA to support with securing reduced insurance premiums on renewed fleet 3. Establish safety baselines on existing fleet for performance measurement 	<ol style="list-style-type: none"> 1. Purchase safety technology or new vehicles and scrap old vehicles using TA support as required 2. Establish financial lease (with title transfer^c) with affiliated operators and set up availability-based contracts with customers, using TA support as required 3. Claim savings on insurance premiums, as relevant 4. Collect lease payments from operators 5. Collect monthly availability fees and use-based fees from end users, as relevant 	<ol style="list-style-type: none"> 1. Conduct audits on fleet technology and operation adherence with standards, and measure contractual KPIs^d to issue performance certificate and trigger any pre-defined bonuses, as relevant
 Actors^b	<ul style="list-style-type: none"> • Regulator for vehicle renewal / import, e.g., Trade ministry, Customs authority • Fleet management entity implementing project, e.g., TNC, e-logistics company • Auto-insurers providing premium reduction • Rating agency, e.g., IIHS, Global NCAP • TA provider, e.g., IFC, GRSF, ASECAP 	<ul style="list-style-type: none"> • Fleet management entity, e.g., Transportation Network Company, e-logistics company • Fleet operators • Automotive companies providing vehicle technology • Auto-insurers providing premium reduction • Financier providing conditional financing, e.g., IFC 	<ul style="list-style-type: none"> • Financier providing conditional financing, such as SLLs4, e.g., IFC or other DFIs • Independent evaluator, e.g., TÜV SÜD, Dekra, Intertek, Applus, IIHS, Global NCAP
 Potential WBG role	<ul style="list-style-type: none"> • TA: Fleet assessment coordination • TA: Insurance premium reduction negotiation 	<ul style="list-style-type: none"> • Financier: provide corporate finance • TA: Sustainability debt coordination • TA: policy reform to incentivize vehicle scrapping 	<ul style="list-style-type: none"> • TA: Design of M&E framework • TA: Coordination of independent evaluation

Note: a. Activities will vary by country and setting and must be tailored to local context; b. noncomprehensive; c. Operator obtains title of vehicle upon expiration of lease; d. See next graphic for details.

Pre-requisites for effective implementation

- Regulations** must mandate standards for vehicle owners to register and license their vehicles:
- **Vehicle registration regulations** for drivers to comply with on vehicle registration and licensing
 - **Vehicle leasing legislations:** regulations permitting leasing of vehicles and transfer of ownership
- Public capacity** is required to ensure availability of required data:
- **Vehicle registration database:** Established and enforced legislation for registration of vehicles
 - **Effective enforcement:** penalties scheme for incompletion with appropriate vehicle registration

Enabling policies

- **Vehicle scrapping regime:** established regulations on procedures of vehicle scrapping and disposal
- **Vehicle leasing legislations:** regulations permitting leasing of vehicles and transfer of ownership
- **Taxation of imported vehicle:** Trad policies and duty rates that encourage imports of new and safety-compliant vehicles

Illustrative KPIs and targets^a

	Targets & Standards	Relevant data requirements
IIHS roadworthy fleet	100% of fleet complying with IIHS ratings on crashworthiness and crash avoidance mitigation	Fleet registration; Fleet rating audit reports
96/96/EC maintained fleet	Vehicle failure rate reduced by X% per year and inspection frequency of once every X years according as per 96/96/EC directive	Fleet maintenance audit reports; inspection certification reports
Crash rate reduction	Crash rate less than X per year	RTI statistics (police investigative report, auto-insurance claims databases); vehicle registration database
Old vehicles scrapped	100% of older non-compliant vehicles to be scrapped and recycled appropriately	Proof of disposal reports

Note: a. Examples of KPIs from research, for example, case studies; actual M&E framework will be designed with the enforcing authority, financier, and a road safety expert, and must be tailored to local context.

Commercial vehicle fleet upgrade: Fleet managers upgrade their vehicles to achieve roadworthiness through complete vehicle renewal or safety upgrades

	Contract design and commissioning	Development and execution	Monitoring and evaluation
Activities^a	<ol style="list-style-type: none"> 1. Conduct road safety baseline assessment on a road network to be concessioned 2. Establish a road safety investment plan 3. Update regulatory frameworks to support road safety requirements* if required, with TA support 4. Develop a new road PPP contract with TA support to incorporate global best practices adapted to local needs, and set award criteria 5. Conduct bidding process and award contract 	<ol style="list-style-type: none"> 1. Build, manage and operate road infrastructure according to the road safety investment plan using requisite financing and TA support 2. Collect user-fees from road operation as tolls, availability payments, etc., as relevant 3. Collect penalties for infringement through automated systems, where legally authorized 	<ol style="list-style-type: none"> 1. Monitor concessionaire service levels and analyze performance on adherence and infringements across the concession to improve road management and operation, as relevant 2. Conduct audits on road standards and service levels across the concession, and measure contractual KPIs^a to issue performance certificate and trigger any pre-defined penalties/bonuses
Actors^b	<ul style="list-style-type: none"> • PPP issuing authority, e.g., Transport ministry • Regulator for road design standards, e.g., Transport ministry • Road safety expert for road safety assessment and investment plan, e.g., iRAP, Pavesys, Halcrow • TA provider, e.g., IFC, GRSF, IRD, Vias 	<ul style="list-style-type: none"> • Road concessionaire, e.g., Vinci, Macquarie • Subcontractors responsible for delivering required safety technology or services, e.g., Kapsch, Sensys Gatso • Enforcement authority, e.g., Police traffic department • Financier, e.g., IFC, institutional SRIs 	<ul style="list-style-type: none"> • PPP authority, e.g., Transport ministries • Traffic authority managing RTI database, e.g., police traffic department • Independent evaluator, e.g., iRAP, Pavesys, Halcrow • Donor providing outcome funding, e.g., GPRBA, DFID, CDC, local health ministry
Potential WBG role	<ul style="list-style-type: none"> • TA: Baseline safety data coordination • TA: Updates to regulatory framework • TA: Contract design, bid process, and award criteria 	<ul style="list-style-type: none"> • Financier: provide project finance • TA: Sustainability debt coordination 	<ul style="list-style-type: none"> • Donor: performance payments • TA: Design of M&E framework • TA: Enforcement capacity strengthening

Note: a. Activities will vary by country and setting and must be tailored to local context; b. noncomprehensive; c. See next graphic for details.

Pre-requisites for effective implementation

Regulations must mandate standards and regimes for concessionaire to follow and auditors to evaluate performance:

- **Road safety standards:** regulations on road standards for geometric and design characteristics per classification of roads, for road maintenance and work zones, and for safety facilities and devices, and infrastructure specifications for non-motorized traffic areas and crossings
- **Auditor certification:** regulations on licensing and certifying organizations to conduct road assessments, inspections and audits

Public capacity is required to ensure availability of required data:

- **RTI database:** established and enforced legislation for reliable, transparent data collection on RTI statistics, investigation and consequences
- **Institutional coordination:** Strong coordination on responsibility of transport and traffic authorities to enforce regulations and oversee PPP and ensure availability of RTI data

Illustrative KPIs and targets^a

KPIs	Targets & Standards	Relevant data requirements
iRAP 3-star or better	100% of road network compliant with iRAP 3-star or better	Road safety design audits
Crash rate reduction	Crash rate maintained below X per year	RTI statistics (e.g.: camera monitoring); RTI investigative data
Fatality rate reduction	X% minimum reduction in fatalities from pre-concession	RTI victim statistics and medical reports
Road availability	Replacement of damaged infrastructure within 7 days of reporting	Monitoring data (e.g., camera monitoring) and/or or contract of works completion; road safety audits

Note: a. Examples of KPIs from research, for example, case studies; actual M&E framework will be designed with the enforcing authority, financier, and a road safety expert, and must be tailored to local context.

Road safety upgrades on highways: Upgrading highway infrastructure for protective infrastructure that adheres to iRAP's three-star or better rating

	Contract design and commissioning	Development and execution	Monitoring and evaluation
Activities^a	<ol style="list-style-type: none"> 1. Conduct road safety baseline assessment on a road network and establish a road safety upgrade investment plan 2. Update the regulatory frameworks to support accelerated contract amendments^c for road safety measures with TA support 3. Negotiate additional revenue source to support financial viability of the safety investment plan 4. Obtain necessary contract change approvals and update PPP with TA support to incorporate global best practices adapted to local needs 	<ol style="list-style-type: none"> 1. Complete infrastructural upgrades and improvements according to the road safety investment plan using requisite financing and TA support 2. Collect additional revenue as per updated contract via tolls or availability payments 	<ol style="list-style-type: none"> 1. Monitor road design standards and analyze performance on adherence and infringements to improve road management and operation, as relevant 2. Conduct audits on road standards and service levels across the concession, and measure contractual KPIs^d to issue performance certificate and trigger pre-defined bonus scheme, if relevant
Actors^b	<p>PPP issuing authority, e.g., Transport ministry</p> <p>Regulator for road design standards, e.g., Transport ministry</p> <p>Road safety expert for road safety assessment and investment plan, e.g., iRAP, Pavesys, Halcrow</p> <p>TA provider, e.g., IFC, GRSF, IRD, Vias</p>	<p>Road concessionaires, e.g., Vinci, Macquarie</p> <p>Road contractors, e.g., ACS, Bechtel, L&T</p> <p>Subcontractors, e.g., Kapsch, Sensys Gatso</p> <p>Enforcement authority, e.g., Police traffic department</p> <p>Financier e.g., IFC, institutional SRIs</p>	<p>PPP authority, e.g., Transport ministries</p> <p>Traffic authority managing RTI database, e.g., police traffic department</p> <p>Independent evaluator, e.g. iRAP, Pavesys, Halcrow</p> <p>Donor providing outcome funding, e.g., GPRBA, DFID, CDC, local health ministry</p>
Potential WBG role	<ul style="list-style-type: none"> • TA: Baseline safety data coordination • TA: Updates to regulatory framework • TA: Contract design, bid process, and award criteria 	<ul style="list-style-type: none"> • Financier: provide project finance • TA: Sustainability debt coordination 	<ul style="list-style-type: none"> • Donor: performance payments • TA: Design of M&E framework • TA: Enforcement capacity strengthening

Note: a. Activities will vary by country and setting and must be tailored to local context; b. noncomprehensive; c. Land acquisition issues cited as major obstacle; d. See next graphic for details.



Pre-requisites for effective implementation

Regulations must mandate standards and regimes for concessionaire to follow and auditors to evaluate performance:

- **Road safety standards:** regulations on road standards for geometric and design characteristics per classification of roads, with regards to road works, safety facilities and barriers, and non-motorized traffic areas
- **Auditor certification:** regulations on licensing and certifying organizations to conduct road assessments, inspections and audits

Public capacity is required to ensure availability of required data:

- **RTI database:** established and enforced legislation for reliable, transparent data collection on RTI statistics, investigation and consequences
- **Institutional coordination:** Strong coordination on responsibility of transport and traffic authorities to enforce regulations and oversee PPP and ensure availability of RTI data



Illustrative KPIs and targets^a

KPIs	Targets & Standards	Relevant data requirements
Safety assessment coverage	100% of road assessed using iRAP method by qualified evaluators	GIS-linked photographic / video data collected
iRAP 3-star or better	100% of road network compliant with iRAP 3-star or better	Road safety design audits
Crash rate reduction	X% minimum reduction in fatalities in pre-identified hotspot zones	RTI statistics (e.g.: camera monitoring); RTI investigative data
RTI severity reduction	X% decrease in the # of slight injuries, serious injuries and fatalities	RTI victim statistics (police reports) and medical reports (EMS/hospital database)

Note: a. Examples of KPIs from research, for example, case studies; actual M&E framework will be designed with the enforcing authority, financier, and a road safety expert, and must be tailored to local context.

Speed management and automated enforcement: Upgrading roads with speed-reducing infrastructure and automated enforcement devices on high-speeding networks

	Contract design and commissioning	Development and execution	Monitoring and evaluation
Activities^a	<ol style="list-style-type: none"> Update the policy and regulatory frameworks to support speed regulations and PPPs authorizing private speed management^c Conduct assessment on target road network to identify high-risk spots and road sections Develop a speed enforcement PPP contract with TA to incorporate global best practices adapted to local needs, and set award criteria Conduct bidding process and award contract 	<ol style="list-style-type: none"> Develop program using requisite financing and TA support to purchase and install traffic monitoring equipment at high-risk spots, build technology platform and IT infrastructure and build speed-limiting infrastructure, as required Issue tickets, prepare court documentation and collect penalties for verified traffic violations captured by cameras, as relevant Collect availability payments, as relevant 	<ol style="list-style-type: none"> Monitor speed management standards and analyze performance on adherence and verification of infringements to calibrate and improve speed management, as relevant Conduct routine audits on technology and enforcement process, and measure contractual KPIs^c to issue performance certificate and trigger any pre-defined penalties/bonuses
Actors^b	<ul style="list-style-type: none"> PPP issuing authority, e.g., Transport ministry Regulator for traffic enforcement, e.g., Ministry of Transport, Ministry of Justice, Police Authorities Road safety expert for road safety assessment and investment plan, e.g., Pavesys, Halcrow TA provider, e.g., IFC, GRSF, IRD, Vias 	<ul style="list-style-type: none"> Private contractor, e.g., Sensys Gatso, ITS Subcontractors delivering outsourced technology or services, e.g., Bechtel, Kapsch Local telecommunications provider to support back-office setup and database integration Enforcement authority verifying infringements, e.g., Justice department, police department Financier, e.g., IFC, institutional SRIs 	<ul style="list-style-type: none"> PPP authority, e.g., Transport ministries Enforcement authority, e.g., Police traffic department Independent evaluator, e.g., NMi, SGS
Potential WBG role	<ul style="list-style-type: none"> TA: Baseline safety data coordination TA: Updates to regulatory framework TA: Contract design, bid process, and award criteria 	<ul style="list-style-type: none"> Financier: provide project finance TA: Sustainability debt coordination 	<ul style="list-style-type: none"> TA: Design of M&E framework TA: Enforcement capacity strengthening

Note: a. Activities will vary by country and setting and must be tailored to local context; b. noncomprehensive; c. See next graphic for details.

Pre-requisites for effective implementation

Regulations must mandate standards and regimes permitting private enforcement and for road users to be tracked and traced:

- Speed regulations:** regulations on speed management per road classification, including speed limits, signage and infrastructure
- Licensing for private enforcement:** established regulatory framework to license private contractor to monitor, access, record and enforce traffic offenses
- Vehicle registration and inspection regulations:** regulations for drivers to comply with on vehicle registration, vehicle inspection and clearance of fines

Public capacity is required to penalize infringements effectively, thereby ensuring adherence to speed regulations

- RTI database:** established and enforced legislation for reliable, transparent data collection on RTI statistics, investigation and consequences
- Vehicle and driver licensing database:** Established and enforced legislation for vehicle registration and issuance of driver and vehicle licenses
- Institutional coordination:** Strong coordination on responsibility and cooperation of transport and traffic authorities with private entity to enforce regulations
- Effective enforcement:** penalties scheme for incompletion with safe driving, including sufficient fine levels and fine collection conditions, and established process to identify, reach and notify offender (e.g., home address, contact number)

Illustrative KPIs and targets^a

KPIs	Targets & Standards	Relevant data requirements
Violators fined	100% of violators issued with fines	Periodic reports on fine issuance and speed measurement
Reduced average speed	X% reduction in # of violations compared to quarterly average of prior year	Automated measurement of speeding
Fines verified	100% of fines collected verified by official traffic authority	Periodic reports on fine issuance and speed measurement
Calibrated cameras	100% of operating cameras calibrated for consistency, accuracy and reliability and maintained at less than X% fault detection	Independent evaluator periodic audit reports

Note: a. Examples of KPIs from research, for example, case studies; actual M&E framework will be designed with the enforcing authority, financier, and a road safety expert, and must be tailored to local context.

Upgrades for protection of vulnerable users: Upgrading roads in urban settings to protect vulnerable road users that adheres to iRAP’s three-star or better rating for pedestrians, cyclists, and motorcyclists

	Contract design and commissioning	Development and execution	Monitoring and evaluation
Activities^a	<ol style="list-style-type: none"> 1. Conduct road safety baseline assessment on target roads in urban settings and establish a vulnerable road safety upgrade investment plan 2. Develop a contract with TA support to incorporate global best practices adapted to local needs 3. Secure financing and necessary viability gap funding to lower cost of capital with TA support 4. Conduct bidding process and award contract 	<ol style="list-style-type: none"> 1. Build infrastructural upgrades and improvements according to the road safety investment plan using requisite financing 2. Collect contract payment fee 	<ol style="list-style-type: none"> 1. Monitor road design standards and analyze performance on adherence and infringements to improve road management and operation, as relevant 2. Conduct audits on road standards and service levels across the concession, and measure contractual KPIs^c to issue performance certificate 3. Collect performance-based payments, as relevant
Actors^b	<ul style="list-style-type: none"> • Contract issuing authority, e.g., subnational entity • Regulator for municipal road safety standards, e.g., state transport ministry, subnational entity • Road safety expert for road safety assessment and investment plan, e.g., iRAP, Pavsys, Halcrow • TA provider, e.g., IFC, GRSF, IRD, Vias • Donor providing VGF, e.g., DFID, CDC 	<ul style="list-style-type: none"> • Road contractors, e.g., ACS, Bechtel, L&T • Subcontractors, e.g., Sensys Gatso • Enforcement authority, e.g., local police traffic department • Financier, e.g., IFC, institutional SRIs 	<ul style="list-style-type: none"> • Enforcement authority, e.g., local police traffic department • Independent evaluator, e.g., iRAP, Pavsys, Halcrow • Outcome funder, e.g., GPRBA, DFID, CDC, local health ministry
Potential WBG role	<ul style="list-style-type: none"> • TA: Baseline safety data coordination • TA: Contract design, bid process, and award criteria • Financier: provide subnational financing • TA: Sustainability debt coordination 	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • Donor: performance payments • TA: Design of M&E framework • TA: Enforcement capacity strengthening

Note: a. Activities will vary by country and setting and must be tailored to local context; b. noncomprehensive; c. See next graphic for details.

Pre-requisites for effective implementation

Regulations must mandate standards and regimes for concessionaire to follow and auditors to evaluate performance:

- **Road safety standards:** regulations on road standards for non-motorized traffic areas, with separation for vulnerable road users
- **Auditor certification:** regulations on licensing and certifying organizations to conduct road assessments, inspections and audits

Public capacity is required to ensure availability of required data:

- **RTI database:** established and enforced legislation for reliable, transparent data collection on RTI statistics, investigation and consequences

Illustrative KPIs and targets^a

KPIs	Targets & Standards	Relevant data requirements
iRAP 3-star or better	100% of target infrastructure compliant with iRAP 3-star or better	Road safety design audits
Vulnerable user collision reduction	X% minimum reduction in crashes involving vulnerable road users in pre-identified hotspot zones	RTI statistics (e.g.: camera monitoring); RTI investigative data
Pavement condition index	Pavement condition index at X (0-100), Y of 365 days	Pavement condition audit report
Infrastructure accessibility	X% of pedestrian roads accessible to users of all abilities	Inventory data for all pedestrian access facilities
Network completeness	X% of residences within Y km to predefined “community destinations”	GIS data on transportation network for all modes
Crossing opportunities	One crosswalk every X km in high density setting or pedestrian bridge every Y km on high-speed roads	GIS data on transportation network for all modes, aerial photography

Note: a. Examples of KPIs from research, for example, case studies; actual M&E framework will be designed with the enforcing authority, financier, and a road safety expert, and must be tailored to local context.

Effective post-crash care: Providing emergency medical services and regionalized trauma care network for road crash victims

	Contract design and commissioning	Development and execution	Monitoring and evaluation
Activities^a	<ol style="list-style-type: none"> 1. Conduct baseline assessment in target region of RTIs and existing medical service network 2. Assess existing medical capabilities and GPS mapping system with TA support, as relevant 3. Develop an EMS PPP contract with TA support to incorporate global best practices adapted to local needs, and set award criteria, as relevant 4. Conduct bidding process and award contract, if relevant 	<ol style="list-style-type: none"> 1. Develop program using requisite financing and TA support to purchase and operate EMS vehicles, equipment and materials, build and run call centers, set up GPS mapping system and communications infrastructure, build and operate specialized medical centers and train medical personnel, as required 2. Launch community sensitization to increase awareness of EMS and call number 3. Provide medical expenditure reports and collect reimbursement 	<ol style="list-style-type: none"> 1. Monitor medical services standards and analyze performance on adherence to improve service levels, as relevant 2. Conduct audits on medical care provision, patient data recording systems and financial expenditures, and measure contractual KPIs^c to issue performance certificate and trigger any pre-defined bonuses
Actors^b	<ul style="list-style-type: none"> • PPP issuing authority, e.g., Transport or health ministry, state government • Regulator for healthcare provision, e.g., Ministry of Health • TA provider, e.g., IFC, GRSF, WHO 	<ul style="list-style-type: none"> • Road or medical concessionaire • Subcontractors delivering medical equipment and medical training services • GPS technology provider • PPP authority, e.g., Transport or health ministry • Financier, e.g., IFC, institutional SRIs 	<ul style="list-style-type: none"> • PPP authority, e.g., Transport or health ministry • Enforcement authority, e.g., health ministry • Independent evaluator, e.g., AIHA • Donor providing outcome funding, e.g., GPRBA, DFID, CDC, local health ministry
Potential WBG role	<ul style="list-style-type: none"> • TA: Baseline safety data coordination • TA: Contract design, bid process, and award criteria 	<ul style="list-style-type: none"> • Financier or donor: provide risk capital or outcome funds • TA: Sustainability debt coordination • TA: coordinating capacity building via international providers 	<ul style="list-style-type: none"> • Donor: performance payments • TA: Design of M&E framework

Note: a. Activities will vary by country and setting and must be tailored to local context; b. noncomprehensive; c. See next graphic for details.

Pre-requisites for effective implementation

Regulations must mandate standards and regimes permitting private medical services provision and patient data access:

- **Medico-legal protection**: established regulatory framework in place to protect EMS providers against legal exposure
- **Licensing for private patient care**: established regulatory framework to license private contractor to monitor, access, record patient medical data

Public capacity is required to ensure adoption of medical services through equitable access to vulnerable populations:

- **Public funding** for access to critical medical services
- **Institutional coordination**: Strong coordination on issuing and funding PPPs between transport and health authorities
- **Integrated patient care database**: established and enforced legislation for reliable data recording and integration of emergency treatment and hospital care

Illustrative KPIs and targets^a

KPIs	Targets & Standards	Relevant data requirements
EMS access coverage	One ambulance per X million population in urban and Y million in rural	GIS data, Ambulance fleet registration
Access to trauma care	One trauma center accessible within X km from any location	GIS data, trauma center registration data
Calls responded	X% of emergencies from road crashes responded to	Call logs database from EMS provider / call center; patient care log and report
Medical responsiveness	Response time of EMS to crash site must not exceed X minutes in urban areas and Y minutes in rural areas	Call logs database from EMS provider / call center; patient care log and report
Reduction in DALY	X% reduction in trauma-related mortality or injury	Patient care EMS report, hospital treatment records for a number of years

Note: a. Examples of KPIs from research, for example, case studies; actual M&E framework will be designed with the enforcing authority, financier, and a road safety expert, and must be tailored to local context.

Glossary

Blended finance is the use of catalytic capital from public or philanthropic sources to increase private sector investment in sustainable development (Convergence). More specifically, it is the use of concessional donor funds to mitigate specific investment risks and help rebalance risk-reward profiles of pioneering, high-impact investments so that they have the potential to become commercially viable over time (International Finance Corporation).

Catalytic/concessional capital accepts disproportionate risk and/or concessionary return to generate positive impact and enable third-party investment that otherwise would not be possible (Convergence).

Commercial fleet is the collection of motor vehicles owned or leased by an organization in pursuit of its business or organizational objectives.

Corporate social responsibility (CSR) is the act of incorporating environmental and social concerns into a company's planning and operations and can include the creation of funds.

Counterparty risk is the likelihood or probability that one of those involved in a transaction might default on their contractual obligation.

Credit risk is the possibility of a loss resulting from a borrower's failure to repay a loan or meet contractual obligations.

Currency risk refers to the losses that an international financial transaction may incur due to currency fluctuations. It is also known as foreign exchange risk.

Development finance institutions (DFIs) are specialized development banks or subsidiaries set up to support private sector development in developing countries. They are usually majority-owned by national governments and source their capital from national or international development funds or benefit from government guarantees. This ensures their creditworthiness, which enables them to raise large amounts of money on international capital markets and provide financing on very competitive terms (Organisation for Economic Co-operation and Development; OECD).

Environmental, Social, and Governance (ESG) reporting relates to the disclosure of data by investors and corporations on a business's impact on the areas of the environmental, social, and corporate governance.

Green bonds are any type of bond instrument where the proceeds will be exclusively applied to finance or refinance, in part or in full, new and/or existing eligible green projects and that are aligned with the four core components of the Green Bond Principles (International Capital Market Association; ICMA).

Guarantee is a contract by a third party (guarantor) to back the debt of a second party (the creditor) for its payments to the ultimate debtholder (investor).

Impact bonds are a type of outcomes-based funding where private investors provide up-front capital to service providers to deliver an intervention or program to achieve measurable outcomes for a target population. Upon the achievement of the agreed-upon outcomes, the investors are then repaid with a premium by an outcome funder. Investors bear the risk that their investments may not be repaid in full if the outcomes are not achieved.

Impact investments are investments that seek to generate positive social and environmental outcomes, alongside financial returns (Global Impact Investing Network; GIIN).

International Road Assessment Programme (iRAP) is a registered charity with a vision of a world free of high-risk roads for all road users. The iRAP global standard for road safety has been applied in more than 100 countries, and its star-rating models form the basis of the UN Member State agreed Global Road Safety Performance Targets in support of SDG Target 3.6 to halve road deaths and injuries by 2030 (International Road Assessment Programme; iRAP).

iRAP star ratings for pedestrians, cyclists, motorcyclists, and vehicle occupants provide an objective measure of the likelihood of a crash occurring and its severity. One star is the least safe and five star is the safest. Star ratings are based on road inspection data conducted in accordance with iRAP methodology and provide a simple and objective measure of the level of safety that is “built in” to the road for vehicle occupants, motorcyclists, bicyclists, and pedestrians (iRAP).

Junior debt refers to bonds or other forms of debt issued with a lower priority for repayment than other (more senior) debt claims in the case of default.

Low- and middle-income countries (LMICs) are categorized based on the World Bank assignment of the world’s economies to four income groups: low, lower-middle, upper-middle, and high-income countries, of which LMICs are the three lowest. The classifications are based on gross national income (GNI) per capita in current US\$ (using the Atlas method exchange rates) of the previous year. In 2020, low-income countries had a GNI per capita less than US\$1,306, lower-middle income between US\$1,036 and US\$4,054, and upper-middle income between US\$4,046 and US\$12,535 (World Bank).

Monitoring and evaluation (M&E) is the systematic process of collecting and analyzing information to track an activity’s progress toward a certain target in order to inform management decisions.

Multilateral development banks (MDBs) are supranational institutions set up by sovereign states, which are their shareholders. Their remits reflect the development aid and cooperation policies established by these states. They have the common task of fostering economic and social progress in developing countries by financing projects, supporting investment, and generating capital for the benefit of all global citizens (European Investment Bank; EIB).

Outcomes-based funding is a type of funding that, rather than funding the delivery of an intervention (the inputs to a program or project), is only provided when positive outcomes have been achieved by the program or project, and these outcomes have been verified. Impact bonds are a form of outcomes-based funding.

Outcomes funds pool capital from one or more outcome funders to pay for a set of predefined outcomes, allowing for the deployment of multiple impact bonds under one structure. As in all outcomes-based funding structures, payments are only made if those predefined outcomes are met.

Private sector is the part of the national economy that is not under direct government control. This includes both the real and financial sectors (World Bank).

Public-private partnerships (PPPs) are long-term contracts between a private party and a government entity to provide a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration can be linked to performance (World Bank).

Road concessions are public-private partnership agreements between the government and a private sector corporation pertaining to the service of roads. Under a typical concession contract, a private sector firm builds or rehabilitates, maintains, operates, and finances a road for a period between 20 and 30 years. It is common that the commissioning authority, be it local or central, grants the private firm the privilege of receiving toll payments from road users (Inter-American Development Bank; IDB).

Road safety audit is the formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team. It qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users (Federal Highway Administration; FHWA).

Social bonds are any type of bond instrument where the proceeds will be exclusively applied to finance or refinance in part or in full new and/or existing eligible social projects and that are aligned with the Social Bond Principles (ICMA).

Social finance is financing that supports actions mitigating or addressing a specific social issue and/or seeking to achieve positive social outcomes especially but not exclusively for a target population(s) (ICMA).

Social loans are any type of loan instrument made available exclusively to finance or refinance, in whole or in part, new and/or existing eligible Social Projects (Loan Market Association; LMA).

Socially responsible investment refers to investing with the aim of achieving financial returns while respecting specific ethical, environmental, and/or social criteria (ICMA).

Sustainability bonds are bonds where the proceeds will be exclusively applied to finance or refinance a combination of both green and social projects (ICMA).

Sustainability-linked bonds are any type of bond instrument for which the financial and/or structural characteristics can vary depending on whether the issuer achieves predefined sustainability/ESG objectives. In that sense, issuers are thereby committing explicitly (including in the bond documentation) to future improvements in sustainability outcome(s) within a predefined timeline. Sustainability-linked bonds (SLBs) are a forward-looking performance-based instrument. Those objectives are (1) measured through predefined key performance indicators (KPIs) and (2) assessed against predefined sustainability performance targets. The proceeds of SLBs are intended to be used for general purposes, hence the use of proceeds is not a determinant in its categorization. Thus, please note that SLBs are not to be confused with Sustainability Bonds that is, use of proceeds bonds (ICMA).

Sustainability-linked loans (SLLs) are any types of loan instruments and/or contingent facilities (such as bonding lines, guarantee lines, or letters of credit) that incentivize the borrower's achievement of ambitious, predetermined sustainability performance objectives. The borrower's sustainability performance is measured using sustainability performance targets (SPTs), which include KPIs, external ratings, and/or equivalent metrics and which measure improvements in the borrower's sustainability profile. The use of proceeds in relation to a SLL is not a determinant in its categorization and, in most instances, sustainability-linked loans will be used for general corporate purposes. Instead of determining specific uses of proceeds, SLL look to improve the borrower's sustainability profile by aligning loan terms to the borrower's performance against the relevant predetermined SPTs (ICMA).

Sustainable Development Goals (SDGs) refer to 17 integrated and indivisible goals with 169 associated targets and form the core of the 2030 Agenda for Sustainable Development adopted by the United Nations on September 25, 2015, which has as its goal ending poverty, protecting the planet, and ensuring prosperity for all. Each goal has specific targets to be achieved by 2030. These goals and targets have been designed for consideration by national governments but have also been increasingly used as appropriate by corporates (ICMA).

Sustainable finance incorporates climate, green, and social finance while also adding wider considerations concerning the longer-term economic sustainability of the organizations that are being funded, as well as the role and stability of the overall financial system in which they operate (ICMA).

Technical assistance is nonfinancial assistance provided by local or international specialists. It can take the form of sharing information and expertise, instruction, skills training, transmission of working knowledge, and consulting services and may also involve the transfer of technical data (United Nations Educational, Scientific, and Cultural Organization; UNESCO).

Themed use-of-proceeds bond is a standard recourse-to-the-issuer debt obligation for which the proceeds shall be credited to a sub-account, moved to a sub-portfolio, or otherwise tracked by the issuer and attested to by a formal internal process that will be linked to the issuer's lending and investment operations for eligible investments under the theme (ICMA).

Viability gap funding is a grant to support projects that are economically justified but not financially viable.

Vulnerable road users are nonmotorized road users, such as pedestrians and cyclists, as well as motorcyclists and persons with disabilities or reduced mobility and orientation (European Union; EU).

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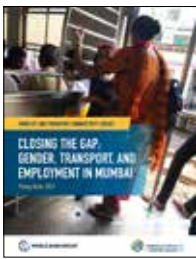
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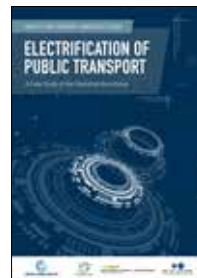
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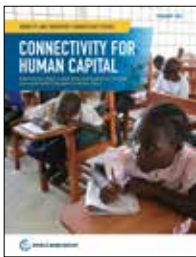
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