Making in-roads

The politics of road safety in Mumbai

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This document contains preliminary research, analysis, findings and recommendations. It is being circulated to stimulate timely discussion and critical feedback, and to influence ongoing debate on the emerging issue of the political economy analysis of road safety.

Cover photo: Pedestrians try to cross the Bharatmata Intersection in busy traffic in the Island City of Mumbai © Prasad Shekhar/WRI India, 2018

About this case study

This study examines the political economy of road safety in India, with a focus on Mumbai. The idea is to identify the underlying factors embedded in the political, economic and social framework of the city which influence road safety.

This case study is part of a broader project that analyses the political economy of urban road safety issues, undertaken by the Overseas Development Institute (ODI) and the World Resources Institute (WRI), and funded by the FIA Foundation. It accompanies a theoretical background paper (Wales, 2017); two other case studies on Bogotá, Colombia, and Nairobi, Kenya; and a synthesis report.

The political economy of road safety

Political economy is a discipline with a long tradition in the social sciences. As an analytical approach, it seeks to understand the underlying reasons why things work the way they do and to identify the incentives and constraints impacting the behaviour of actors in a relevant system (Rocha Menocal, 2014). Characteristics of a political economy approach include:

- a concern with the role of formal and informal 'rules of the game'.
- an analysis of power and the processes of contestation and bargaining between economic and political elites.
- a focus on the interests of different groups.
- an analysis of how these interests impact development outcomes, at times to the detriment of broader development objectives.

In general, there has been a tendency within policy-making circles to treat road safety as a technical issue. Exploring road safety from a political economy perspective constitutes an emerging field of study which seeks to understand when, how and why road safety emerges as an issue of public concern and how reform efforts can be most effectively supported taking those dynamics into account. The most recent *Global Report on Road Safety* includes some key aspects related to the political economy of road safety such as political saliency and resource allocation. The report also emphasises the importance of having traffic safety on the political agenda as a manner to mobilise resources and public awareness on road safety issues (WHO, 2015).

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Acronyms

ADGP	Additional Director General of Police
BIGRS	Bloomberg Initiative for Global Road Safety
BNVSAP	Bharat New Vehicle Safety Assessment Program
CSO	civil society organisation
CSR	corporate social responsibility
GDP	gross domestic product
GoI	Government of India
GoM	Government of Maharashtra
MCGM	Municipal Corporation of Greater Mumbai
MMR	Mumbai Metropolitan Region
MMRDA	Mumbai Metropolitan Regional Development Authority
MMVR	Maharashtra Motor Vehicles Rules of 1989
MoHA	Ministry of Home Affairs
MoHFW	Ministry of Health and Family Welfare
MoI	Ministry of Heavy Industries and Public Enterprises
MoRTH	Ministry of Road Transport and Highways
MoT	Ministry of Transport
MoUD	Ministry of Urban Development
MPWD	Maharashtra Public Works Department
MSRDC	Maharashtra State Road Development Corporation
MTP	Mumbai Traffic Police
MVA	Motor Vehicle Act
NCAP	New Car Assessment Program
NRSC	National Road Safety Council
NGO	non-governmental organisation
NHAI	National Highway Authority of India
ODI	Overseas Development Institute
PIL	public interest litigation
RTO	Regional Transport Office
SRSC	State Road Safety Council
UDD	Urban Development Department
UN	United Nations
VRU	vulnerable road users
WHO	World Health Organization
WRI	World Resources Institute

Methodology

The study begins by exploring the city's historical background with a focus on transportation. An analysis of road crash data has been conducted to recognise the most vulnerable road user groups. Interviews of local road safety experts and public officials and a chronological study of the policy level interventions at national, state and local levels has been conducted to frame a picture of the state of road safety in Mumbai and India. The final stage of the study involves summarising challenges and identifying opportunities to improve road safety with a special focus on influencing political will.

Executive summary

The world has seen some major developments in road safety over the past two decades, such as the UN Decade of Action for Road Safety and the adoption of the 2030 Agenda for Sustainable Development. However, road safety is largely ignored in India, despite the scale of the challenge in the country. In 2015, India accounted for more road fatalities than any other country in the world, with close to 150,000 traffic fatalities officially reported. This translates into 12.3 road traffic fatalities for every 100,000 people – one of the highest rates in the region. Apart from the loss of life and severe financial and emotional stress caused to the victims' families, road crashes also result in significant productivity losses for the country. It is estimated that road crashes cost India close to 3% of its gross domestic product (GDP) ($8 billion) every year (Mohan, 2004; Balachandran, 2016).

While road safety is considered a serious public health issue and has been exhaustively researched internationally, research on road safety in India (apart from the representation of crash statistics) is sparse. Aiming to throw light on the subject in the Indian context, this paper examines the political economy of road safety in India, with a focus on Mumbai in order to understand the underlying factors embedded in the political, economic and social framework of the city that influence road safety. Such research is in its nascent stages, and India is currently undergoing significant economic reforms that are already having a significant impact on the urban transport sector. A study of these reforms, specifically in relation to road safety, would be a valuable addition to this study.

Road safety in Mumbai

Mumbai is the capital city of the state of Maharashtra and the most populous city in the country. The city's status as the commercial centre of the country has driven both its physical and financial growth over the past few centuries, and continues to do so. Mumbai's population has grown from approximately 3 million people in the 1960s to more than 12 million. Every day, millions of commuters use the city's transport infrastructure – both new (mostly roads) and old (public transportation). And while there have been efforts to augment this infrastructure, it still falls drastically short of meeting the city's needs: new developments are focused on motor vehicle infrastructure despite half of all daily trips being made on foot and only 5% made by private car.

Mumbai presents a good case for studying the political economy of road safety in the Indian context. The city enjoys considerable political attention as the state capital and is a key contributor to the Indian economy. But despite its strategic importance and significant investments in infrastructure in the city, Mumbai's road safety performance is mediocre. The rate of road traffic fatalities in the city is low (at 4.9 per 100,000), it ranks seventh in the country overall in terms of absolute numbers – and this is a huge number of lives.

Crash data obtained from the Mumbai police shows that more than 5,700 people died on the roads of Mumbai between 2006 and 2016, with 611 of these fatalities during 2015–2016 alone – a rate of almost 2 people per day (ADGP, 2015; RTO, 2015). Pedestrians, cyclists and two-wheelers users are found to be most vulnerable and constitute more than 90% of all road traffic fatalities. Young working populations –mostly men – are particularly affected. Research also shows that low-income people are disproportionately affected by traffic fatalities. Yet most investments in infrastructure target car users, which contribute less than 7% towards mode share and account for only 4% of all road traffic fatalities.

Policy interventions in road safety in India

Precipitated by international and national developments, the Indian government has made multiple attempts, mostly at the national level, to institutionalise road safety (the National Road Safety and Traffic Management Bill (2010), National Road Safety Policy (2010) and National Road Safety Bill (2014) being the most prominent among them). But these have faced resistance from various interest groups. More recent national efforts include the Government-led Motor Vehicles Amendment Bill. This bill promotes public transport; recognises for the first time in a statutory document that pedestrians are road users with specific safety needs; increases fines for traffic offences; promotes safer vehicle design; and requires centralised licensing and crash databases at the national level. There has also been a series of public interest litigations brought by citizens, which led to the establishment of the Supreme Court Committee for Road Safety and the Bombay High-power Committee. These may prove to be more successful, but the sustainability of such ad hoc efforts is questionable in the face of continued state-level resistance and loopholes, and limited power to mandate or coordinate change. The government needs to make changes from within its executive arm, and develop a coordinated strategy, that is actionable at national, state and local levels.

Challenges

Road safety in Mumbai is perceived as a personal responsibility by both the public and decision-makers, and victim blaming is common. It is true that citizens rarely follow traffic rules or even help crash victims on the road. But this is often considered a moral failing on the part of the individual, rather than the outcome of poor regulatory and judicial systems that have created a situation in which regulatory awareness and confidence in the judicial system is low. This emphasis on personal responsibility is also reflected in public policy, which neglects to consider the systemic issues that affect how people use the roads.

Road safety does not feature on any political party's agenda. Attention given to the subject by individual politicians at the national level has not filtered down to state and local levels. Competition between leaders of different political parties in Maharashtra's coalition government and public opinion (leading to re-election) influence the level of interest among elected representatives. Public decision-makers and private stakeholders perceive road safety as isolated from and in conflict with transportation policies and projects to address congestion and facilitate travel. Politically lucrative subjects such as building new roads often take priority over road safety improvements such as infrastructure provision for vulnerable road users and investments in public transport. This is a particular issue at the state and city level, and has also led to resistance against national initiatives for reform. At the state level, too, public institutions may deprioritise road safety if it interferes with more important considerations such as revenue collection.

The absence of a single actor or agency with the power and mandate to coordinate road safety issues at any level of government undermines attempts to shift towards a systemic approach to road safety. Instead power is spread over a range of agencies, which do not have it as their main function and lack coordination. The absence of a powerful agency with statutory backing, committed solely to the task of ensuring road safety, is a serious impediment to progress. Overseeing road safety is the secondary function performed by a multitude of public agencies, most of which do not communicate with each other. At the local level, Mumbai Traffic Police (MTP) is the most prominent public agency grappling with the task of traffic management and enforcement.

Opportunities

The UN Decade of Action for Road Safety is nearing its end in 2020 and India has not come close to fulfilling its commitment under the Brasilia Declaration, or contributing towards the achievement of Sustainable Development Goals target of reducing road fatalities by 50%. Action is urgently needed.

Policy and legislative reforms
To foster a systemic approach to improving road safety policy and legislative reforms are urgently needed at all levels of government. These include the amendment to the Motor Vehicle Act, a state road safety plan for Maharashtra, and the creation or attribution of state and city level institutions to take leadership on Road Safety action. To achieve this, the national Minister of Transport would need to secure political buy-in from opposing stakeholders through strategic engagement and re-iteration of road safety as a priority. At the city level, the Chief Minister and Maharashtra's Minister of Transport – two key state-level politicians – need to demonstrate committed leadership to ensure that crucial hurdles such as funding, support from other stakeholders such as transport unions and the private sector, and political support at the local level are crossed effectively.

Improving inter-agency coordination and building capacity
The MTP and the Municipal Corporation of Greater Mumbai (MCGM) are the two key agencies influencing road safety in Mumbai. The agencies currently operate in the absence of an action plan. Both MTP and MCGM enjoy the significant financial freedom and could invest in strategies to improve road safety if a framework was provided to encourage or require this. However, both agencies currently lack the institutional and technical capacity to deal with the complex problems of road safety. They often operate in isolation, ignoring and even undoing the work done by each other. Improved communication, combined with effective monitoring mechanisms and guidance under a state-level strategy for road safety would make improved inter-agency coordination more feasible.

Fostering political action
- Civil society organisations can, through legal channels, elicit government action on road safety. There are examples (Supreme Court Committee on Road Safety and Bombay High Powered Committee) where India's judiciary, acting on public interest litigations filed by such groups, has issued road safety related directives to the national and state governments with which they must comply.
- The Ministry for Road Transport and Highways (MoRTH) has the power to direct state governments to bring about reforms. The current minister has already had a positive influence on road safety in India and could further this by making the Chief Minister of Maharashtra and State Minister of Transport road safety 'champions'.
- Corporators are the only directly elected representatives of the city government. They can be influenced by increased attention and policy reform for road safety at higher levels of government, as well as upwardly from citizens and civil society group, who should hold them to account.
- Conferring additional powers on the Mayor of Mumbai could curb the state government's dominance over the city and enable the city administration to address pressing issues without its interference (WEF/PwC, 2016). This could lead to an increase in democratic accountability of the urban local body and more control over how the budget is allocated. The mayor should also ensure better coordination between different departments and political support for road safety initiatives.

1   Introduction

Mumbai is India's most populous city, and in the past decade, more than 5,700 people have died on its roads. During 2015–2016 alone 611 people died (almost 2 people every day) (ADGP, 2015; RTO, 2015). Compared with other Indian cities, Mumbai ranks seventh in terms of absolute number fatalities (behind Delhi, Jaipur, Bengaluru, Kanpur, Chennai and Lucknow). Its considerable population means the number of fatalities per 100,000 population is 4.9 – much lower than most major Indian cities, and comparable to rates in Beijing and Bangkok, for example (WRI, 2015). Mumbaikars spend, on average, close to an hour commuting every day, which is the longest commuting time in the country (NUMBEO, n.d.). They also have a poor negative view of road safety: according to a public perception survey, 82% of Mumbaikar respondents consider Indian roads to be unsafe, 92% feel unsafe walking and 58% feel that the issue of road safety is very important (SaveLIFE Foundation, 2017).

The world has seen some major developments in road safety over the past two decades, such as the UN Decade of Action for Road Safety and the adoption of the 2030 Agenda for Sustainable Development. But road safety is largely ignored in India, despite its rising global road safety and the scale of the challenge in the country. The UN Decade of Action for Road Safety is nearing its end in 2020 and India has not come close to fulfilling its Brasilia Declaration commitment or contributing towards the achievement of SDG target of reducing road fatalities by 50%.

Road traffic fatalities in many countries are significantly under- or misreported due to deficiencies in data reporting systems, according to the *Global Status Report on Road Safety* states that. But an algorithm developed by the World Health Organization (WHO) suggests that there were 207,551 road traffic fatalities in India in 2013 – almost 1.5 times the official reported figure of 137,572 (MoRTH, 2013). The WHO put India's road traffic fatality rate at 16.6 per 100,000 population, which is lower than that of China (18.8), Nepal (17.0) and Sri Lanka (17.4) but higher than Pakistan (14.2), Bangladesh (13.6) and Bhutan (15.1) (WHO, 2015a). The Government of India's official records show road traffic fatalities in the country have been increasing since 2013, with almost 150,000 reported in 2015. According to these statistics, there were 12.3 road traffic fatalities for every 100,000 people in the country.

Apart from the loss of life and severe financial and emotional stress caused to the victims' families, road crashes also result in significant productivity losses for the country. Crashes result in significant productivity losses for the country: every year, they cost India close to 3% ($8 billion) of its GDP (Mohan, 2004; Balachandran, 2016). Yet decision-makers at the highest levels of government have done little to address road safety, and it is beset by challenges of political inaction, opposition and vested interests of various stakeholders.

A largely overlooked subject in India, only a few analytical studies on road safety are available (Mittal, 2008; Mohan et al., 2015). Some papers present broad statistics on traffic crashes in the country but they do not examine the underlying factors responsible for the poor state of road safety. Literature that considers crash statistics or road safety strategies specific to Mumbai, or the state of Maharashtra, is not available at all. This lack of research on the subject is a further indication of its perceived importance (or lack thereof).

1.1   Understanding road safety

While road safety is considered a serious public health issue and has been exhaustively researched internationally, research on road safety in India, apart from the representation of crash statistics, is sparse. Aiming to throw light on the subject in the Indian context, this paper examines the political economy of road safety in India, with a focus on Mumbai. The idea is to understand the underlying factors embedded in the political, economic and social framework of the city which influence road safety. It is a part of a wider study conducted by the Overseas Development Institute (ODI) and the World Resources Institute (WRI) with funding from the FIA Foundation.

The study begins by exploring the city's historical background with a focus on transportation. An analysis of road crash data has been conducted to recognise the most vulnerable road user groups. Interviews of local road safety experts and public officials and a chronological study of the policy level interventions at national, state and local levels has been conducted to frame a picture of the state of road safety in Mumbai and India. The final stage of the study involves summarising challenges and identifying opportunities to improve road safety with a special focus on influencing political will.

2   Mumbai's transport infrastructure

2.1   Mumbai's population explosion

Mumbai was originally seven marshy islands that were joined, through an ambitious land reclamation and silting process, to create a 4.8 km-wide peninsula. Today, this area is known as Island City. As more land was reclaimed to join the Island City with Salsette Island, the extension came to be known as suburban Mumbai (Figure 2) (Risbud, 2003).

The economic and industrial growth of Mumbai after India gained independence in 1947 led to a population explosion in the city, which increased the strain on infrastructure. Island City and suburban Mumbai were put under one administration in 1950, known collectively as Greater Mumbai (Table 1 shows the current population of Greater Mumbai). The population of the suburbs overtook that of Island City in the 1970s and has been growing rapidly ever since. Mumbai today has one of the highest population densities in the world: of Maharashtra state's total population, 11% resides in Greater Mumbai, which accounts for only 0.2% of its area.

This tremendous growth, together with the confined geography of the city, has severely strained its infrastructure. On the one hand, the city functions as a financial hub with the highest per capita income in the country. On the other, Greater Mumbai has a strong socioeconomic divide, with a significant percentage of its population living in slums. This section of the population has little access to planned infrastructure, despite contributing significantly to the city's economy. In response, the Government of Maharashtra created the Mumbai Metropolitan Region (MMR) in 1975 to redirect growth to the metropolitan region. The MMR is significantly larger than Greater Mumbai and has a much lower population density (Census Organization of India, 2011). It contributes to a significant flow of commuters into the city and, as such, to the problem of road safety in Mumbai. However, due to the unavailability of data, this study does not include the MMR in its analysis.

Greater Mumbai is a classic example of a mixed land-use city. It is also a good example of organically occurring, transit-oriented development. Due to heavy commercial

Figure 1   Population growth by decade in Island City and suburban Mumbai
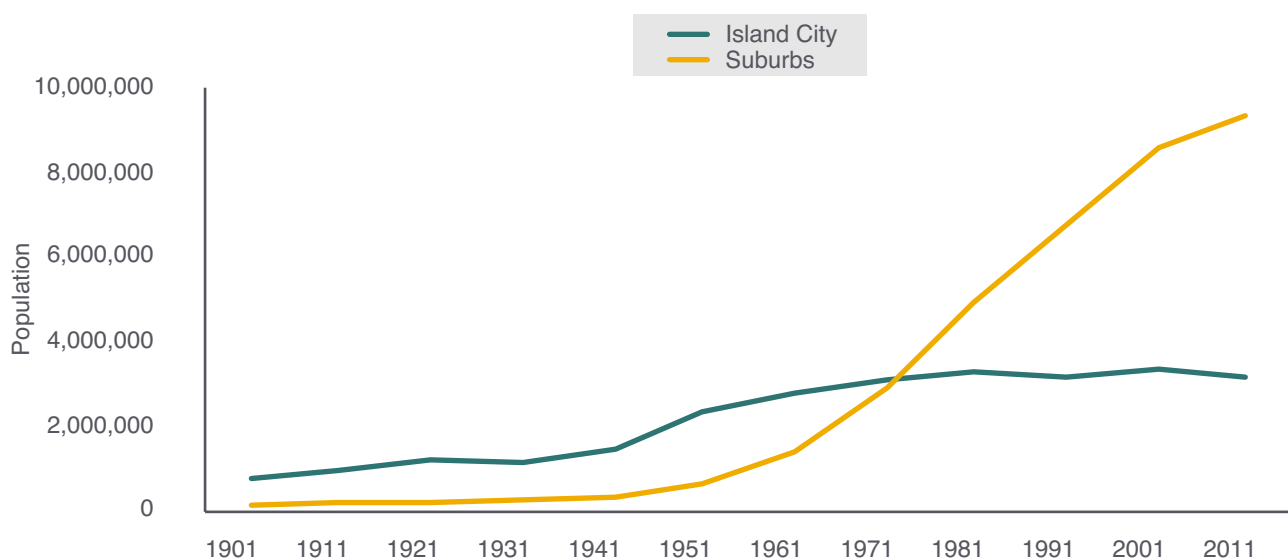
Source: MMRDA, 2003; Census Organization of India, 2011.

Figure 2   Study area delineation

Thane District

Suburban District

Navi Mumbai

Mumbai City

Raigad District

Mumbai, INDIA

National highways
Arterial roads
Other roads
Railways
Metro 1

Water
Park
Land
Transport

Mi   2   4
Km   2   4   6   8

N
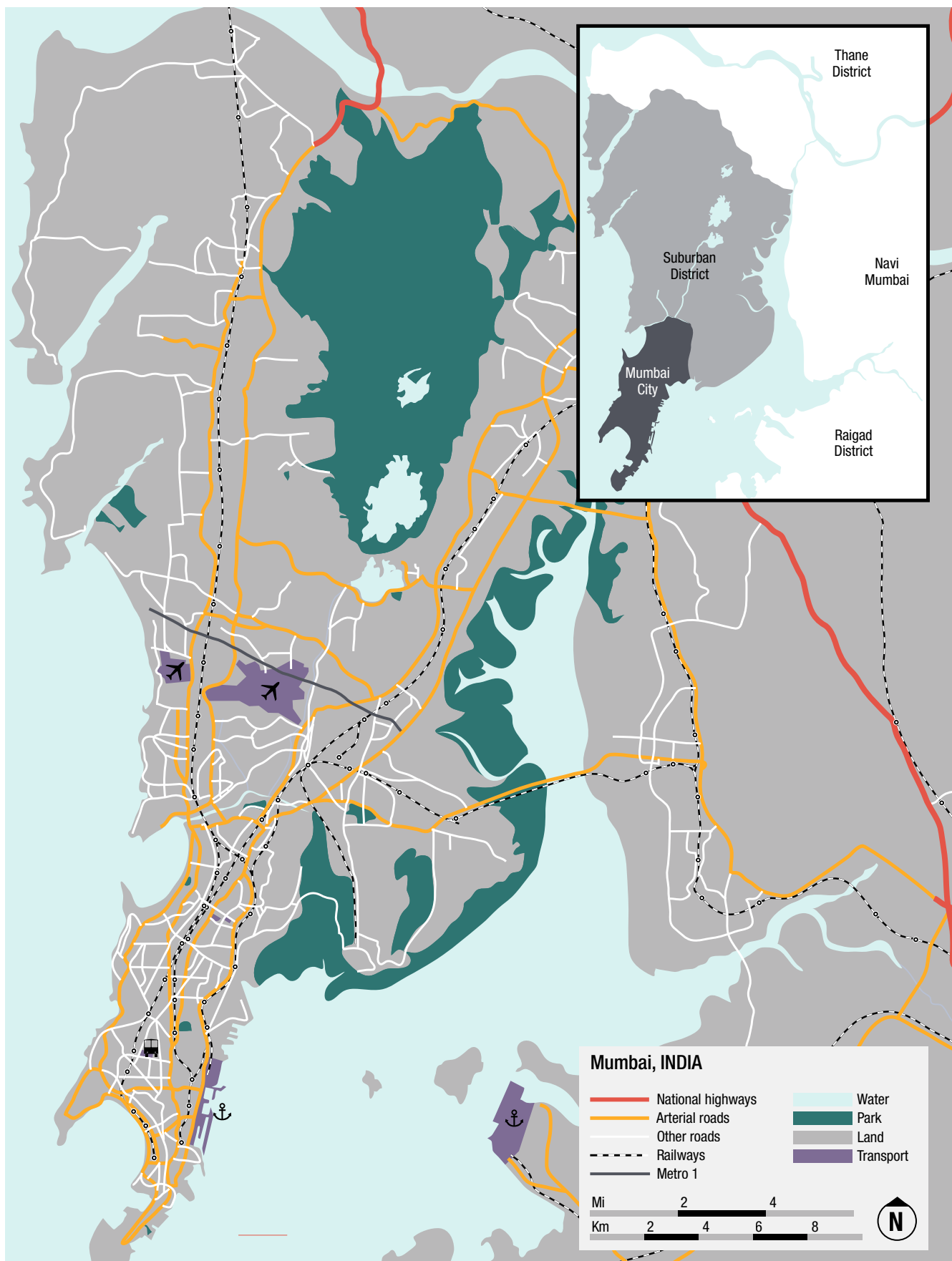
Source: Pai, 2014.

Table 1   Population, area and density of Island City, suburban Mumbai and Maharashtra, 2011

	Island City	Suburban Mumbai	Total (Greater Mumbai)	Maharashtra State
Total population	3.1 million	9.3 million	12.4 million	112.4 million
Area (km²)	69	389	458	307,713
Density (persons per km²)	45,594	23,973	27,228	365

Source: Census Organization of India, 2011; CMP, 2016; Risbud, 2003.

activity and high land values around the suburban rail stations, high density residential developments have been constructed near them. About 25% of Greater Mumbai's developed area is residential (MCGM, 2012). Because of limited room for expansion, the city has one of the most expensive real estate markets in the world. Most of the residential areas are situated in the suburbs. Greater Mumbai has one of the highest annual per capita incomes in India ($4,500) (Praja Foundation, 2017). At the same time, the cost of living in Mumbai is also very high. People living in formal housing settlements are dependent on the rail network, buses, and private vehicles. Mumbaikars' average expenditure on transportation is the highest in the country at close to 11% of their total income (Cropper and Bhattacharya, 2012; CMP 2016). More than half of Greater Mumbai's population live in slums or hutments (Census Organization of India, 2001), and these individuals have very different mobility patterns to those of people living in planned housing. Cycling and walking account for over 60 percent of all trips, and low-income families living in informal settlements spend 16% of their total income on transportation.

Greater Mumbai and its adjoining MMR cities have a complex interrelationship, with each being interdependent for employment and housing. Approximately 700,000 people enter Greater Mumbai from surrounding areas during the morning rush-hour. They commute between cities using public transport. The problem of congestion is also significant.

Discussions between public officials around the improvement of public transport and augmentation of road networks started as early as 1962. The Regional Plan for Mumbai (then 'Bombay') Metropolitan Region, prepared by the Bombay Metropolitan Regional Development Authority in 1973, proposed several inter-regional, intra-regional and intra-city connections (Nallathiga, 2010), none of which have come to fruition. The delineation of the Mumbai Metropolitan Region (MMR) in 1975 and several other investments in road and public transport have not helped ease congestion either.

2.2   Roads in Greater Mumbai

Mumbai, as a peninsula, has a linear transportation network. North–south road and rail connections are very good, but east–west connections in the city are not well established. Apart from a few connectors such as Jogeshwari-Vikhroli Link Road, east and west remain largely unconnected. People must traverse the length of the city to access the other side, which increases travel time significantly. Over the past few years, there has been a rapid increase in the total number of vehicles on Greater Mumbai's roads (Figures 3 and 4). As of March 2015, there were more than 2.5 million vehicles registered in the city, and Mumbai's growth rate for both total vehicles and two-wheelers is now ahead of that of Maharashtra State (Figure 3).

Figure 3   Annual growth rates of all vehicles and two-wheelers in Maharashtra and Greater Mumbai
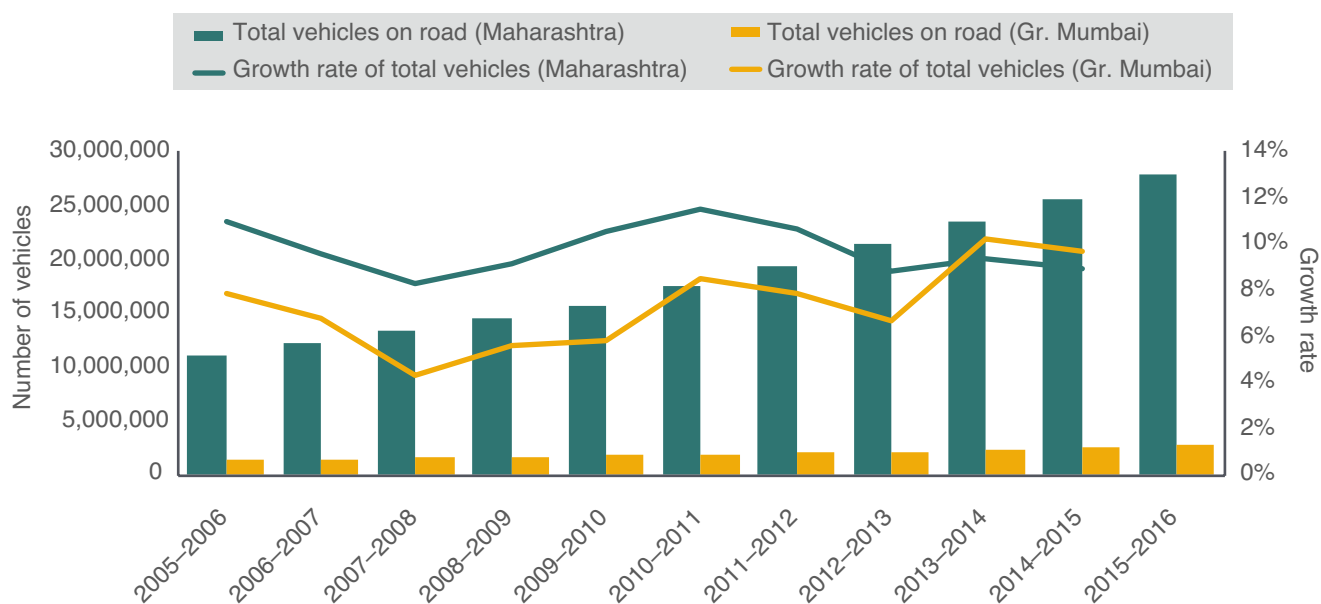
Source: RTO, Motor Vehicles Department 2006–2015.

Figure 4   Annual growth rates of two-wheelers in Maharashtra and Greater Mumbai

Legend:
- Two-wheelers on road (Maharashtra)
- Two-wheelers on road (Gr. Mumbai)
- Growth rate of two-wheelers (Maharashtra)
- Growth rate of two-wheelers (Gr. Mumbai)
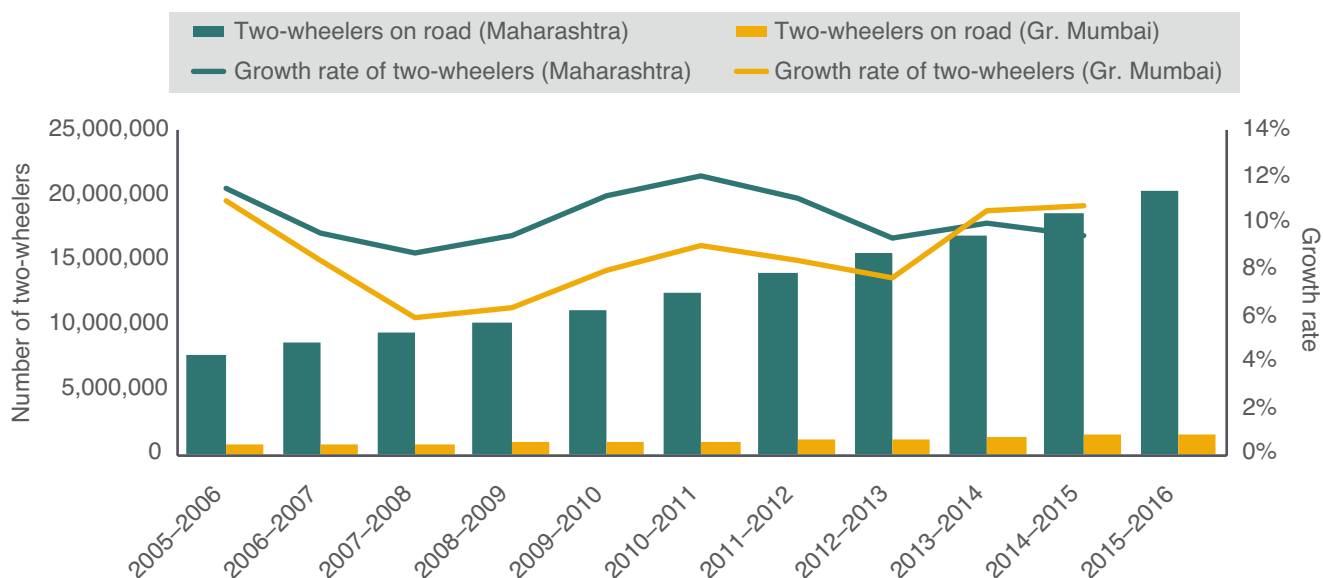
Source: RTO, Motor Vehicles Department 2006–2015.

There have been several significant additions to the city's road network over the last two decades. Multiple flyovers were built along the main arterial roads (Eastern Express Highway, Western Express Highway, Lal Bahadur Shastri Marg and the Island City) during the late 1990s and early 2000s. These were built at a cost of more than $100 million (MSRDC, 2014). Two other developments were the Eastern Freeway and the The Santacruz Chembur Link Road. The Eastern Freeway is a 17-km road (a mix of elevated, tunnelled and at-grade roads) that was built at a cost of $116 million and opened in 2013. It is a high-speed corridor linearly connecting the eastern parts of the city. The Santacruz Chembur Link Road is a 6.5 km-long road that offers east–west connectivity and cost $67 million to build.

A 34 km-long Coastal Road, to be built in two phases with an estimated cost of $2.2 billion, has also been proposed. This proposed development, which involves a significant land reclamation component, has met with opposition from various sections of society. Professionals had questioned the project's stated benefits and environmental feasibility (Wagh and Indorewala, 2015), but it has now received final clearance and will soon be built (Gupta, 2017).

2.3   Public transport in Greater Mumbai

Greater Mumbai has an extensive suburban rail network that connects areas both within and outside the city, and has a daily ridership of 7 million passengers. The railway connections extend to several neighbouring cities such as Vasai-Virar, Thane and Kalyan. A significant percentage of the city workforce commutes daily from these areas. While the socioeconomic profile of suburban rail users is generally very diverse, 57% earn $800 or more per month (Abhyankar, et

al., 2012). Mumbai is also developing a metro rail network – phase 1 of Mumbai Metro, which started operations in 2014. It now has a daily ridership of 250,000 passengers along the 11.4 km route. It is the only mode of public transport providing east–west connectivity, and is scarcely able to meet the high level of demand. When completed, Mumbai Metro will span 200 km and will serve a significant proportion of

Figure 5   Mode share in Greater Mumbai, 2016, by number of trips
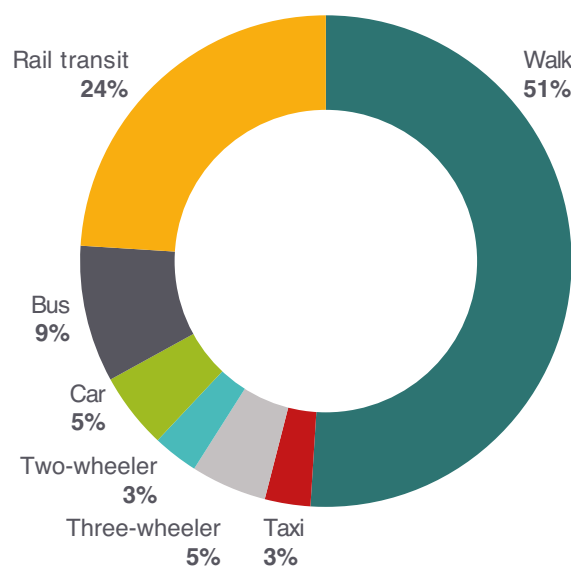
- Rail transit **24%**
- Walk **51%**
- Bus **9%**
- Car **5%**
- Two-wheeler **3%**
- Three-wheeler **5%**
- Taxi **3%**

Note: there is no non-motorised transport percentage in the CMP, so it was not included in this graph.
Source: derived from data in CMP, 2016.

the city's population. Mumbai Monorail, planned as a feeder service to the suburban rail system, is 8.93 km long (in its first phase) and has a daily ridership of less than 20,000. This low ridership, combined with high operating costs, has resulted in daily losses of $13,800 for the operating and maintenance agency, Mumbai Metropolitan Regional Development Authority (MMRDA) (Rawal, 2017).

The road-based public transport network in the city is also substantial: Brihanmumbai Electric Supply & Transport Undertaking runs more than 3,500 buses within the city limits. The buses tend to be slow, due to high levels of congestion in the city, and as such commuters prefer suburban rail (which is much faster). Nevertheless, the bus network has a daily ridership of 5.5 million trips.

Other important modes of intermediate public transport in Mumbai are taxis and three-wheelers or auto-rickshaws. The taxis are widely used in South Mumbai for short-distance trips. Three-wheelers (or rickshaws) are permitted to operate only in the northern suburbs, where they provide last-mile connectivity for rail and bus users. They also operate as shared rickshaws within the suburbs. Taxis and rickshaws also operate over longer distances, transporting people to different areas of the city. Figure 5 shows the mode split in Greater Mumbai.

3   Road safety in Mumbai

3.1   Traffic collisions

Maharashtra, India's second most populous state, accounted for 9% of all road traffic fatalities in India in 2015. In absolute numbers, it state ranked third in India and first in the region, with 13,212 fatalities. The rate of fatalities was 12.2 per 100,000 population, close to the national average and much below that of states such as Tamil Nadu (21.2), Telangana (20.2) and Karnataka (17.8), among others.

But of all fatalities due to unnatural causes, traffic collisions accounted for 37% – the greatest cause of such fatalities in the state. In 2015, an average of 38 people died every day on Maharashtra's roads, with one road traffic fatality happening every 18 km of road. In 2015, the number of injuries sustained in traffic collisions fell from the previous year. But the total number of collisions and fatalities both rose, suggesting that the severity of crashes had increased. The share of fatalities increased from 23% in 2013 to 26% in 2015, while the share of minor injuries reduced from 34% to 31%.

With 611 fatalities in 2015 alone, Greater Mumbai contributed to 4.6% of all road traffic fatalities in Maharashtra, higher than any other city in the state (Table 2).[1] In absolute numbers, Mumbai has more than double the number of fatalities than every other city, except Pune. However, its fatality rate is among the lowest.

Figure 6   Number of fatalities, 1999–2015

■ Number of fatalities
1999 — 411
2000 — 441
2001 — 523
2002 — 462
2003 — 394
2004 — 534
2005 — 654
2006 — 669
2007 — 623
2008 — 621
2009 — 620
2010 — 549
2011 — 563
2012 — 488
2013 — 502
2014 — 527
2015 — 611
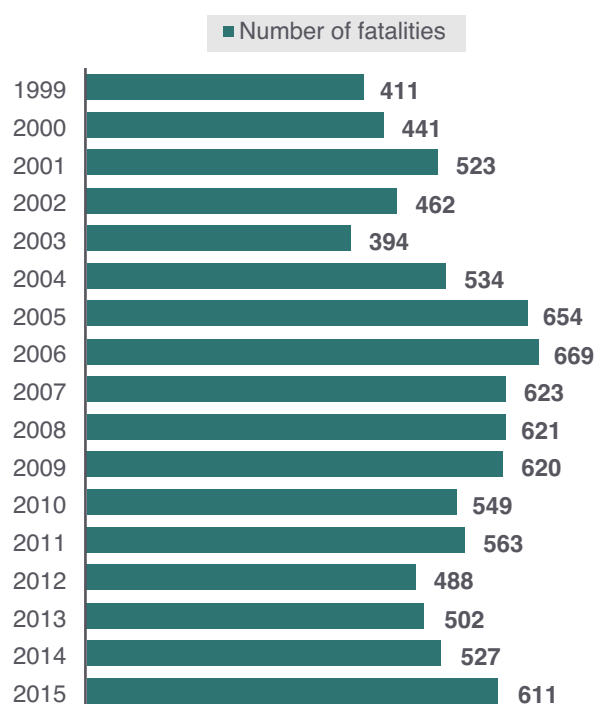
Source: RTO, 1999–2015.

Table 2   Road crash statistics for major cities in Maharastra

City	Road traffic fatalities, 2015	Fatalities per 100,000 population
Nashik City	234	15.7
Aurangabad City	170	14.5
Thane City	266	14.4
Pune City	438	14.0
Nagpur City	260	10.8
Mumbai City	611	4.9

Source: ADGP, 2015.

1   In India, the collection of crash data is the sole responsibility of the traffic police and is an overlooked aspect of road safety. As stated in the Global Status Report on Road Safety 2015, there are severe shortcomings in crash data collection and reporting. For this study, researchers obtained crash data from the office of Maharashtra Additional Director General of Police (ADGP), Traffic. While crash data for Mumbai was considered accurate and reliable at the broad level (total number of fatalities and injuries), the collection process raised many concerns regarding its quality. The author was, as a result, unable to consider many subsets of the data collected. The absence of socio-economic data pertaining to crash victims makes a more detailed analysis difficult. This analysis can be considered as a subject for future research. More details about the reporting and collection procedure are given in Annex A.

Mumbai has managed to contain the number of fatalities resulting from road crashes (Figure 6) (there were 657 road collision fatalities in the city in 1985 – 8 fatalities per 100,000 people (Chengappa, 1985)). But rather than being the result of any serious efforts on the part of the authorities, this trend can be attributed to reduced speeds due to increased congestion in the city (CMP, 2016). In particular, infrastructure for vulnerable road users (VRUs) – for instance, pedestrians, cyclists and motorized two-wheeler users – is less than adequate, and their share in road crash fatalities has been increasing (section 3.2).

The number of road fatalities in Mumbai has oscillated between 400 and 600 for the past decade, with several significant spikes (Figure 6). Discussions with local road safety experts pointed towards the construction of flyovers during the early 2000s as the cause of increased road fatalities during 2006, and 2012–2015. More recently, fluctuations in fatalities coincide with the construction of high-speed corridors (Santacruz Chembur Link Road and Eastern Freeway) in 2012 and 2013. Poor design of these roads and flyovers is a possible cause of high fatalities (Datar, 2017; Mathew, 2017).

3.2   Traffic fatalities by mode and gender

VRUs accounted for an estimated 91% of all fatalities in Mumbai in 2015, with almost half of all road traffic fatalities being pedestrians. Car users, meanwhile, accounted for only 4% of all fatalities. While this number is much lower than cities such as Nagpur (18%) and Navi Mumbai (9%), it is higher than Thane (1%) and Pune (2%). This number is also much lower than Delhi (24%). From 2013 to 2015, fatalities occurring in the two-wheeler category (both drivers and passengers) have been consistently increasing (31% in 2013 and 34% in 2014 versus 34.1% in 2015), and fatalities for two-wheeler passengers alone are also on the rise (9.5% in 2013, 10.1% in 2014 and 11.3% in 2015).

Figure 7   Distribution of fatalities by mode, 2015
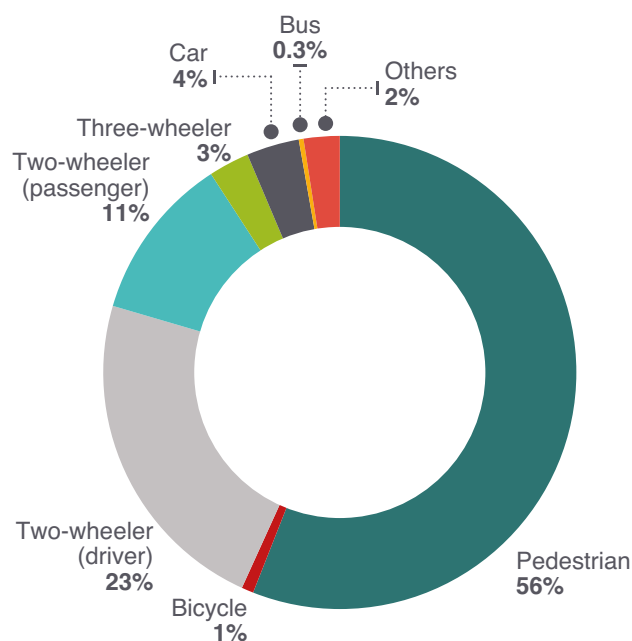
Source: ADGP, 2015.

Public transportation, such as, buses, account for less than 1% of all road fatalities in the city.

The high proportion of VRU fatalities is explained partly by the relatively low use of cars in the city and, in greater part, by dangerous road conditions. Space is limited, allowing little room for defensive behaviour; infrastructure is unsafe; traffic rules difficult to enforce; and little deference is shown to the rules of the road (Mathew, 2017). Poor and inadequate pedestrian infrastructure has also contributed to the high number of pedestrian fatalities: several areas in the city lack sidewalks. Where present, sidewalks are too narrow, too high or broken, and they tend to rarely be used. On-street parking and the unplanned presence of informal

Figure 8   Mode share and related fatalities, 2015
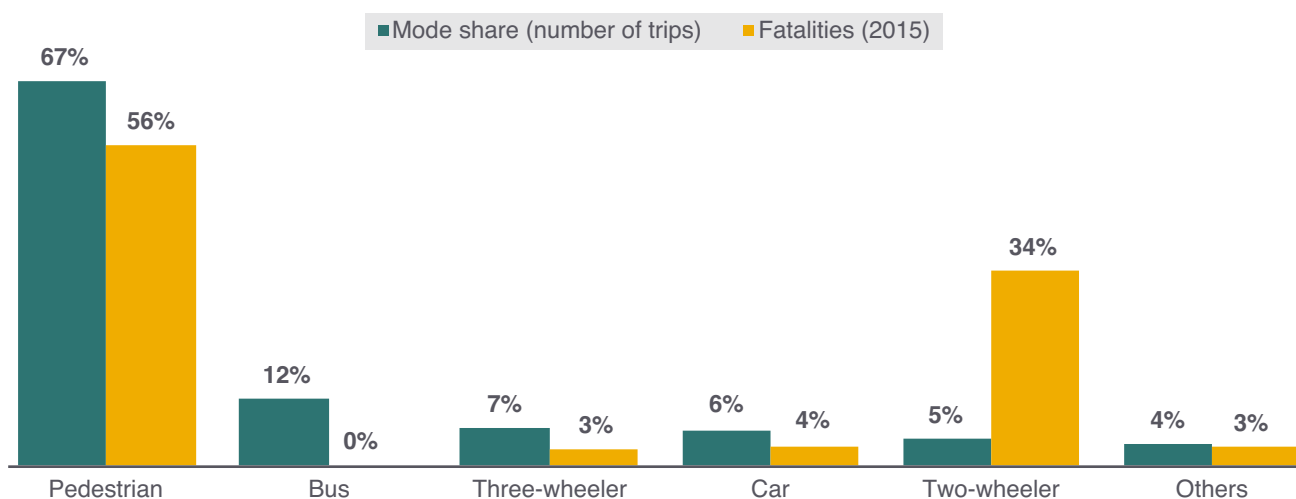
Note: There is no non-motorised transport percentage in the CMP, so it was not included in this graph.
Source: ADGP, 2015.

vendors on sidewalks also force pedestrians to walk on non-pedestrianised roads, exposing them to vehicular traffic (Datar, 2017).

When road traffic fatalities are compared with mode shares in the city (Figure 8), the plight of vulnerable user groups is further highlighted. Two-wheelers – which constitute around 4.6% of all trips – account for 34% of all road fatalities. The risk is much higher for this user group compared to others, even as the exposure (in terms of the number of trips) is low. In the case of pedestrians and cyclists, risk and exposure are both high. Public transport (buses) on the other hand, offers the least risk.

There are also significant differences across male and female road user groups (Table 3). This highlights the need for gender-specific considerations in road safety strategies such as customised awareness campaigns, gender inclusive road infrastructure and gender-sensitive enforcement strategies. Males account for more than 80% of all road fatalities, a distribution that has remained almost constant between 2013 and 2015. Figure 9 shows the distribution of fatalities by mode and gender in 2015. For several modes – for example, two-wheelers (driver) – almost all fatalities are men (96%). For other modes, there is a comparatively higher share of female fatalities for modes such as walking (26%), two-wheelers (passenger) (23%) and bicycles (20%). This is also demonstrated in the fatality distribution by mode for each gender. Of all female road fatalities, 77% were pedestrians. And while 27% of all male fatalities are of two-wheeler drivers, this number is only 5% for females. While there is a low percentage of female two-wheeler drivers in the city, passenger fatalities for this road user group are high (14%). Of all female fatalities, 97% are vulnerable road users.

Table 3   Distribution of fatalities by gender, 2015

Road user type	Total fatalities	Total fatalities (%)	Male fatalities	Male fatalities (%)	Female fatalities	Female fatalities (%)
Pedestrian	342	56%	253	51%	89	77%
Bicycle	5	1%	4	1%	1	1%
Two-wheeler (driver)	139	23%	133	27%	6	5%
Two-wheeler (passenger)	69	11%	53	11%	16	14%
Three-wheeler	17	3%	16	3%	1	1%
Cars	22	4%	21	4%	1	1%
Buses	2	0%	2	0%	0	0%
Others	15	2%	14	3%	1	1%
Total	**611**	**100%**	**496**	**100%**	**115**	**100%**

Figure 9   Fatalities by mode, 2015
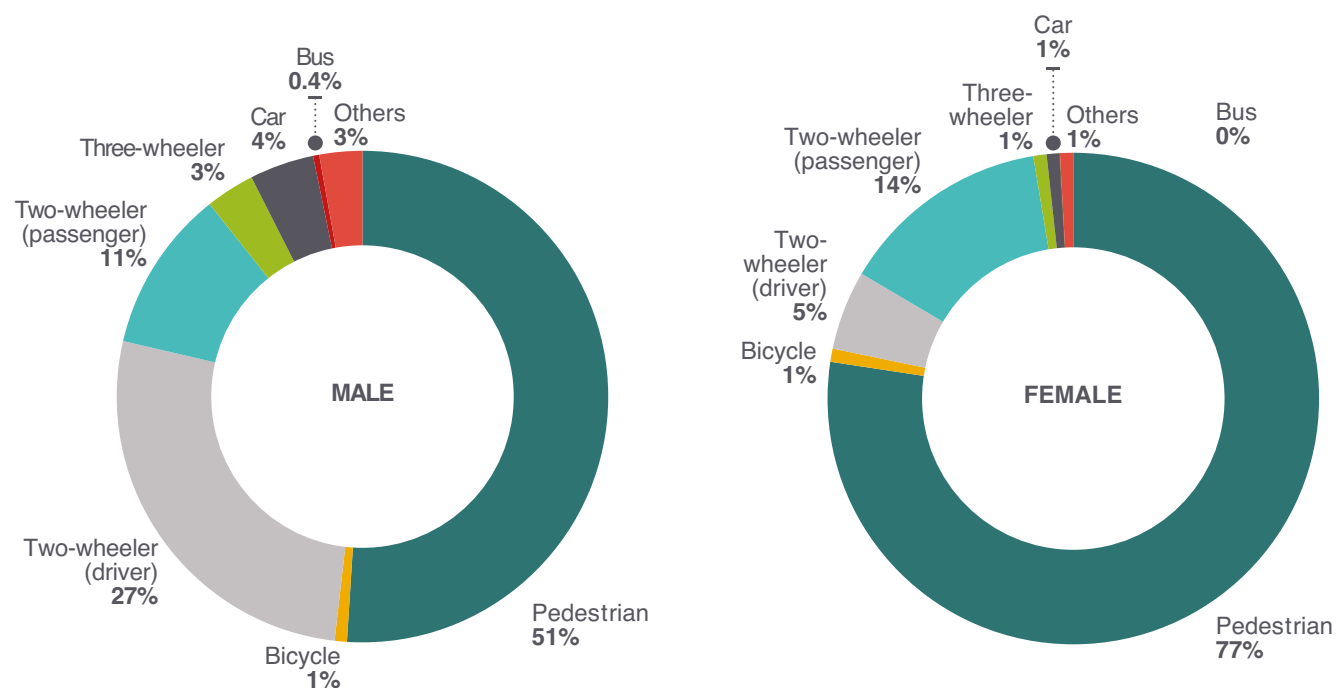
Source: ADGP, 2015.

Discussions with road safety experts highlighted cultural factors that contribute to VRU fatalities. Most women wear saris (which has led to a protective feature, named the 'sari guard', being made part of the standard two-wheeler design in India). Indian women prefer to ride side saddle for cultural reasons. This sitting position makes them very vulnerable to falling off the vehicle. Interviewees also spoke about poor enforcement of helmet laws for two-wheeler passengers in the city. While *driver* compliance with the helmet rule is estimated to be around 90% in Mumbai, *passenger* compliance is almost nil. Women and children, who account for most two-wheeler passengers, often do not wear helmets. Women perhaps choose not to, but children have little choice: the helmet market in Mumbai (and other parts of the country) caters to adults only, which means finding helmets to fit children is almost impossible (Kumar, G., 2017).

3.3   Traffic fatalities by age and gender

The 14–24 and 25–64 years age groups accounted for most road traffic fatalities in Mumbai in 2015 (Figure 10). The 65+ years age group seems to be most affected by road collisions. The rate of fatalities in this age group (9.3 fatalities per 100,000 population) was almost twice the rate

Table 4   Rates of fatalities by age group and gender, 2015

Age group	Total fatalities per 100,000 population	Male fatalities per 100,000 male population	Female fatalities per 100,000 female population
<15 years	1.6	1.5	1.8
15–24 years	6.1	9.3	1.9
25–64 years	5.4	8.5	1.8
65+ years	9.3	14.0	4.9

of fatalities in younger age groups (around 6.0 fatalities per 100,000 population or less). Children (under 15 years) are the only under-represented age group. Nevertheless, 45 children died in road crashes in 2015 – a number that has almost doubled since 2014 (when 29 children died). This emphasises the need for safe zones around schools (Silverman, n.d.). Data on the numbers or percentage of children aged under 10 using two-wheelers are not available, but a recent study observes that such children comprised about 5.5% of all two-wheeler fatalities in regions with high two-wheeler usage (Bhalla and Mohan, 2015). And, as mentioned in the previous section, helmets for children are very difficult to find in the Indian market and use of them among children rarely enforced.

Figure 10 Fatalities by mode, 2015
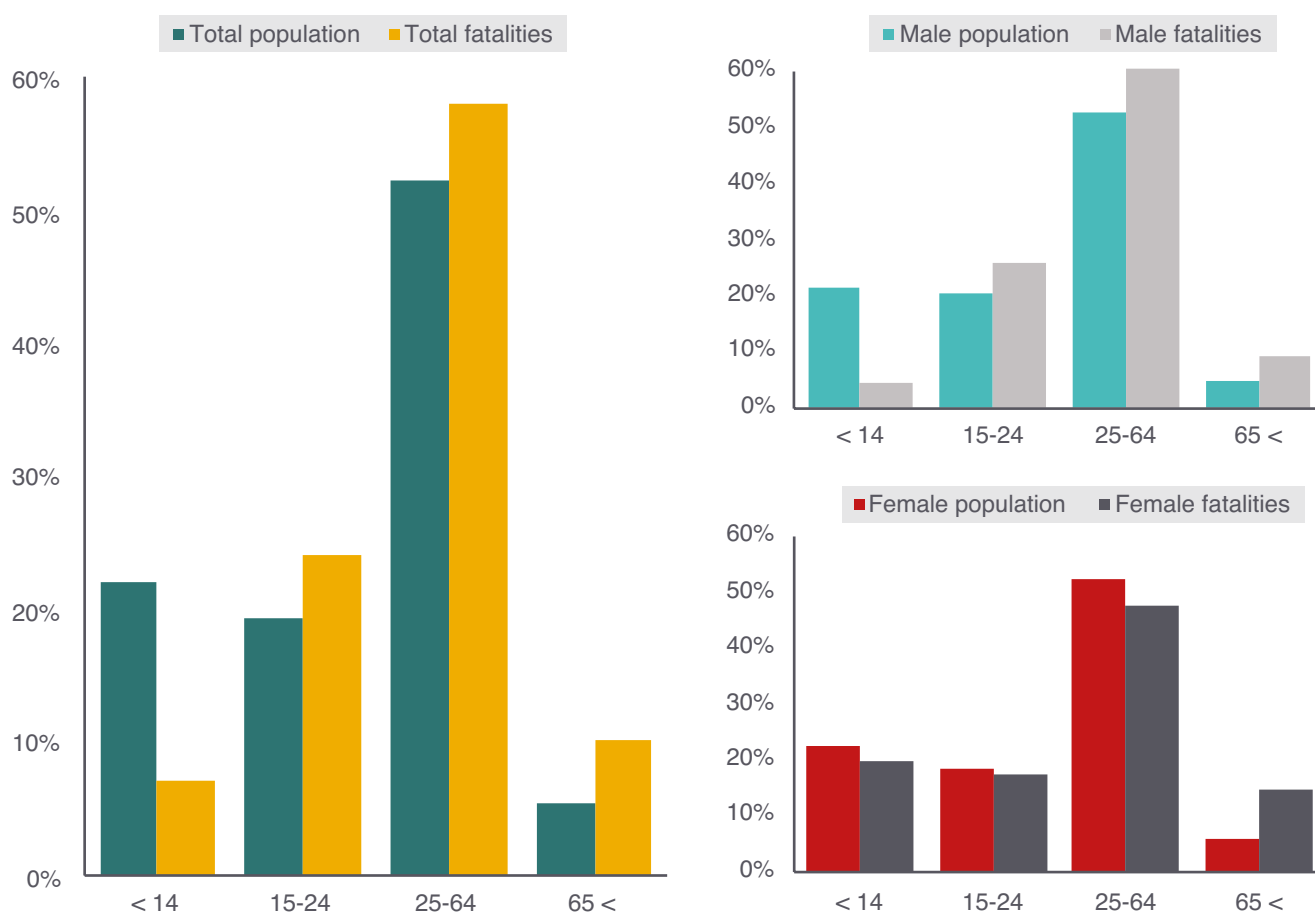
Source: ADGP, 2015.

Fatality trends differ among male and female age groups. For example, the incidence of road traffic fatalities is higher among men in the 15–24 and 25–64 years age groups, while younger and older women (<15 years, and 65+ years) demonstrate higher shares of fatalities. Rates for men are, however, substantially higher than those for women (Table 3). These trends might be due to a higher percentage of young two-wheeler users among men. Crash data correlating mode with age, which would be crucial to further identifying vulnerable groups, is not reported by the police department.

3.4 Temporal distribution of fatalities and injuries

The total numbers of fatalities and injuries are highest during the peak hours (morning and evening) (Figure 11). This could be due to more collisions arising during peak hours due to the mixed traffic of varying speeds and more vehicles and people on the road. Around 60% of the road network in Mumbai has an average journey speed of less than 20 km per hour (CMP, 2016). During off-peak hours, fatalities mostly occur during early evening and late night. This could be due to higher speeds, lower visibility and lower levels of enforcement during these hours. The share of fatalities is higher during the early morning and late-night hours, suggesting increased injury severity at higher speeds.

Figure 11 Distribution of fatalities and injuries by time of day and their share in each time period
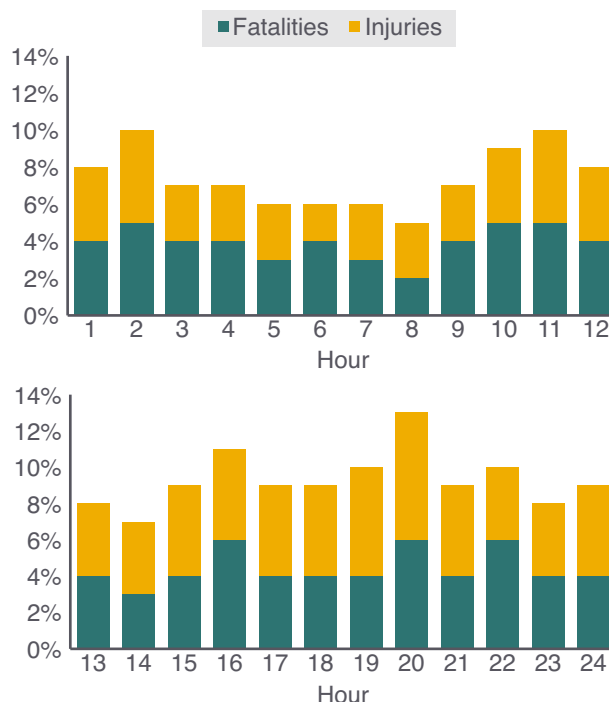
Source: ADGP, 2015.

Figure 12 Distribution of traffic offences by type, 2015

Without tail/brake light
2%

Drunk driving
1%

Dark glass
3%

Without helmet
17%

No parking
27%

Other Cases
45%

Dangerous driving
1%

Improper number plate
2%

Without seatbelts
3%

Excess speed; Overtaking; Overload and Marathi number plate
0%
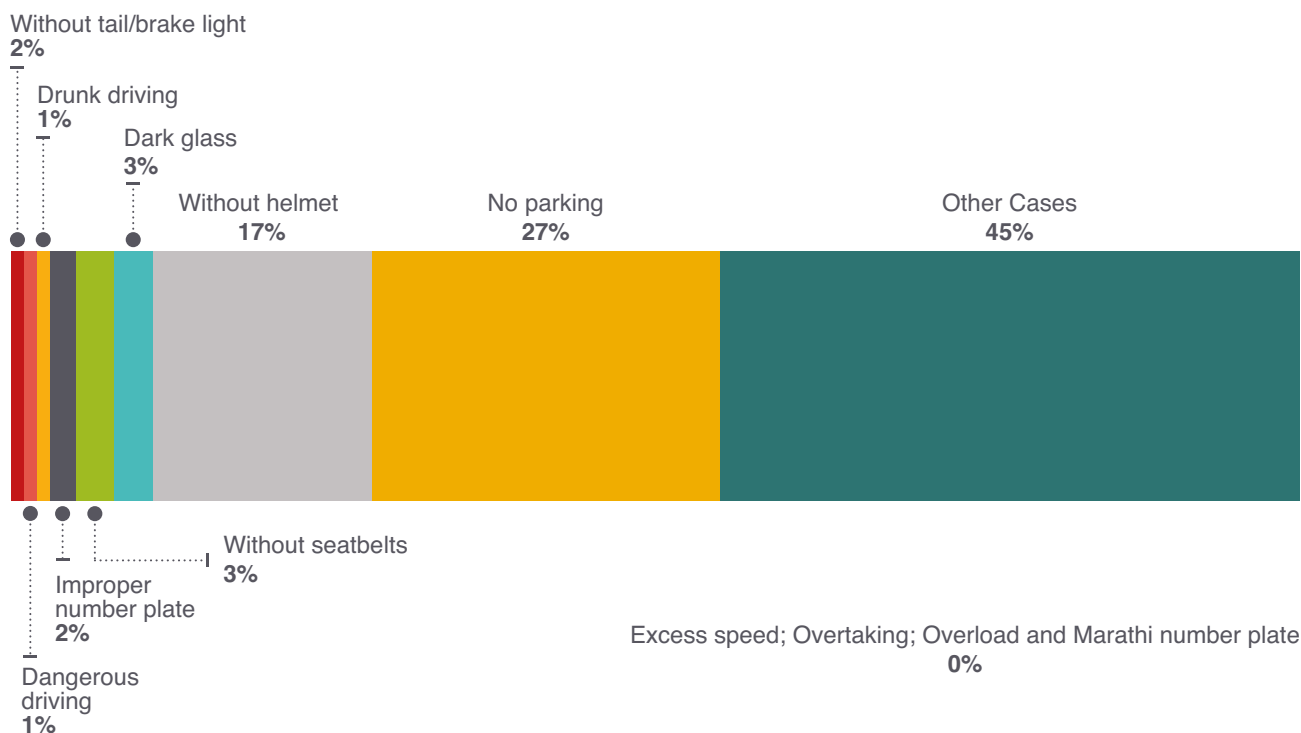
Note: The 'other cases' category, which makes up nearly half the offences (44.84%), is not defined by the police. A 0% share implies that while the category exists, no offences were recorded in that particular year. This statistic, once again highlights shortcomings in the way data is recorded.
Source: ADGP, 2015.

3.5   Traffic offences

Traffic offences data pertains to fines levied as part of everyday enforcement or special enforcement drives undertaken by the Mumbai traffic police (Figure 12). Over the past few years, offences involving not wearing seatbelts or helmets have increased from 12% in 2010 to 20% in 2015. There is also a mismatch between traffic offences and cause of fatalities (as mentioned in police records). Only 0.11% of all traffic offenders were booked for speeding in 2015. Contrary to this statistic, speeding was mentioned in 81.5% of all fatalities as the cause of the fatality. It is unclear whether this discrepancy is due to poor enforcement or incorrect data reporting. This further highlights the need for reliable crash data.

3.6   Geographic distribution of traffic fatalities in Mumbai

Traffic fatalities in Mumbai are heavily concentrated along the city's arterial roads (Vital Strategies, 2017). The three main arterials, running the length of the city, are Western Express Highway, Eastern Express Highway and Lal Bahadur Shastri Marg (Figure 13). The Western and Eastern Express Highways are very wide (six lanes) in suburban Mumbai, with 17 flyovers on the Western Express Highway and 11 on the Eastern Express Highway. Fatalities are especially high in the middle portion of Greater Mumbai, along with the suburbs closer to the Island City. They are also slightly more concentrated in the western suburbs. Clustering can be seen, too, at certain intersections on these arterials (e.g. Airoli–Mulund intersection).

In Island City, fatalities are more disperse and do not follow a specific pattern. Some clustering can be seen on certain flyovers, and fatalities also occur in the denser areas of the older part of the city. These areas are old settlements that are now predominantly commercial. They are highly congested and experience heavy traffic. There is also a higher density of fatalities along newly constructed roads in the city (Santacruz–Chembur Link Road and Eastern Freeway). These roads – which started operating as recently as 2014 – are built for higher-speed traffic, of 60 km/h and above, and several fatalities are also seen on the low-speed roads connecting the city road network to these new high-speed corridors. This suggests either a difference between the two in infrastructure quality or poorly designed infrastructure connecting old and new roads.

Figure 13 Geographic distribution of traffic fatalities in Mumbai, 2015

Thane District

Suburban District

Navi Mumbai

Mumbai City

Raigad District

Mumbai, INDIA

━━━ Geographic distribution of traffic fatalities

━━━ National highways
━━━ Arterial roads
━━━ Other roads

Water
Park
Land
Transport

| Mi | 2 | 4 |
| Km | 2 | 4 | 6 | 8 |

N
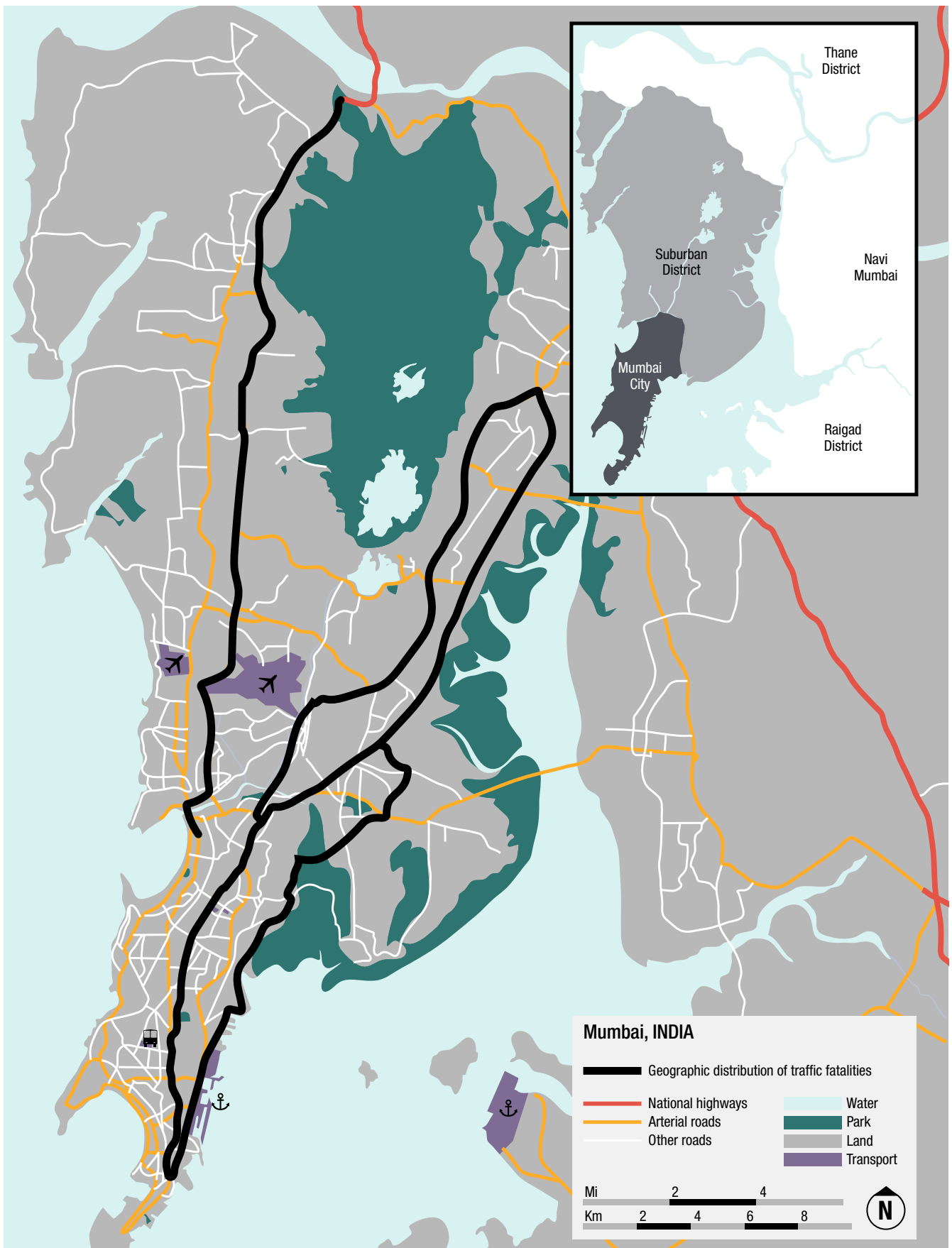
Source: MTP, 2015.

4 Policy and governance related to road safety in Mumbai

India's commitment to international goals – such as those identified in the Brasilia Declaration (WHO, 2015) – have driven forward the country's efforts to improve road safety over the past few years. The Road Transport and Safety Bill (2014) and, more recently, the Supreme Court Committee on Road Safety (2015) and Motor Vehicles Amendment Bill (2017) are particularly notable initiatives.

While decision-makers recognise the importance of such frameworks, there is currently no coordinated strategy for road safety in India. This is detrimental to the progress of road safety efforts (Figure 14), and means that successes to date have been marginal. By studying these efforts – even the less successful ones – we can, however, shed light on the politics of road safety reform.

4.1 Road safety policy and legislation

4.1.1 Overview

The Indian government has made multiple attempts – mostly at the national level – to institutionalise road safety, the most prominent of which are the National Road Safety and Traffic Management Bill (2010) and the Road Transport and Safety Bill (2014). These attempts have been resisted by various interest groups for political or financial reasons. The opposition objected to increases in fines for committing traffic offences, and state governments felt their administrative and financial powers were being encroached upon by the central government. Transport unions in the country have also opposed the laws, which once passed, would mean stricter rules and financial penalties for breaking them, thereby affecting their livelihoods.

The Motor Vehicles Act of 1988, with its amendments, is currently the only major piece of legislation that directly impacts road safety. The current iteration is focused mostly on vehicle safety, but the latest amendment, if passed by the Parliament, should bring much-needed attention to vulnerable road users.

Global commitments such as the United Nations Decade of Action for Road Safety (2011–2020), adoption of Sustainable Development Goals and signing of Brasilia Declaration have put pressure on political representatives at the national level to convert words into action. With cooperation from international organisations such as Global NCAP, programs such as BNVSAP will be instrumental in improving vehicle safety and educating the consumer about roadworthiness of vehicles. At the state level, initiatives such as the Bloomberg Initiative for Global Road Safety (BIGRS) have been successful in engaging elected representatives at the state level securing commitments to invest in road safety.

Citizen and civil society efforts have been more successful than government-led initiatives in bringing about attention to and reforms in the road safety sector. Public interest litigation filed by citizen groups leading to the formation of the Mumbai High-Power Committee (2014) and the Supreme Court Committee on Road Safety (2014) demonstrate that, with the right push, it is possible to spur action. But the sustainability of such ad hoc efforts is questionable: the government needs to make changes from within the executive and develop a coordinated strategy that is actionable at all national, state and local levels.

4.1.2 Road safety in pre-independence India and the Motor Vehicles Act (1855–2018)

India's Fatal Accidents Act of 1855 gives crash victims the right to compensation. This Act was replaced by the Motor Vehicles Act (MVA) of 1939. The MVA broached topics such as licensing, the responsibility of the road user to follow traffic rules, use of helmets by two-wheeler drivers, vehicle insurance, compensation for crash victims, and punishments and fines for traffic offenders. The Act was amended once in 1956 before the current version was adopted in 1988.

The Motor Vehicles Act (MVA) of 1988 relates to all road transport vehicles in India. It specifies a regulatory framework for vehicle design standards, safety inspections, permits, and road safety. The Act provides for the creation of a National Road Safety Council (NRSC). It also requires that each state set up a State Road Safety Council (SRSC) and District Road Safety Committees. By 2010, however, these councils (at state and district levels) had still not been set up by the state governments. The Councils' limitation to act only as an advisory body rather than a regulatory one diminished its importance to a great degree (The Hindu, 2001).

Figure 14 Major road safety related laws and policies in India

■ Legislative interventions   ■ GoI led initiatives   ■ International development

Motor Vehicles Act (MVA 1988)
Current version of the Act is introduced

1988

1992

74th Constitutional Amendment Act
Empowers urban local bodies

Seatbelt Law
Use of seatbelts for front seat
passengers made mandatory in India

1999

2000

Seatbelt Law
Seatbelts for all four seats
made mandatory in India

National Road Safety Policy
Safer infrastructure, safer vehicles
and safer drivers

Sundar Committee Report
Recommends an independent
technical road safety body

NRSTMB Bill
Not passed by Parliament;
National and State Road Safety
Councils (NRSC) reinstituted

2007

NRSC forms 5 Working Groups
Make recommendations
on 5 Es of Road Safety

**Decade of Action for Road Safety
(2011–2020)**
UN adopts global goal of halving
road traffic fatalities by 50%

2010

2011

Road Transport and Safety Bill 2014
Not passed due to severe
opposition by stakeholders

2012

Mumbai High Power Committee
Issues directives to local agencies
to improve urban transport

2014

**Helmets made compulsory fordriver
and pillion rider in Maharashtra**
Compliance not achieved

2015

2030 Agenda for Sustainable Development
UN sets SDG targets (3.6 and 11.2)

2016

2017

India signs Brasilia Declaration
India commits to reducing road traffic fatalities
by 50% by 2020

**MVA Amendments Bill
passed by Lok Sabha**
Likely to have significant
impact on road safety

Bloomberg Initiative for Global Road Safety
Mumbai receives funding and expertise
to tackle road safety

**Bharat New Vehicle Safety
Assessment Program**
India chapter of Global
NCAP established

Supreme Court Committee on Road Safety
Issues directives to states to reduce facilities

Source: MoRTH, 2015; GoI, 2015; Parihar, 2014.

Until 2008, the NRSC had convened only 7 times in 15 years (Mittal, 2008). The almost-dormant council was reconstituted in 2010, after the National Road Safety and Traffic Management Bill was introduced (and rejected) in the Parliament (section 4.1.7). The Minister for Road Transport and Highways serves as the Chair of this Council and the Minister of State for Road Transport and Highways serves as the vice-chair. Ministers in charge of road transport for all states and union territories) serve as members of the Council. It has representation from various other public departments such as Home Affairs, Heavy Industry and Urban Development, and various academic institutions (MoRTH, 2015). Most states, including Maharashtra, have set up state-level councils and district level committees.

The main function of these councils at various levels of government is advisory; they do not have any decision-making authority or statutory backing. Nor do they have the power to allocate funding for road safety or decide how the road safety fund should be spent. Chaired by political representatives, their effectiveness is dependent on the priorities of the government in power. As their creation is mandated by the Motor Vehicles Act of 1988, the focus is usually on vehicle safety and not pedestrians and cyclists. Even after being reconstituted in 2010, most of the state road safety councils remained dormant. They have been revived once again following orders of the Supreme Court Committee on Road Safety, constituted in 2015.

The MVA was amended in 1994, 2000, and 2001, with the latest Motor Vehicles Amendments Bill proposed in 2016 and tabled in 2017. This Bill makes substantial changes to the Act and is likely to have a significant impact on road safety regulation and enforcement. It promotes public transport and is the first statutory document to recognise pedestrians as road users, as well as the need for regulatory interventions to improve their safety. It seeks stricter enforcement of traffic rules by significantly increasing the fines for traffic offences. The Bill also promotes safer vehicle design technology and mandates the creation of centralised licensing and crash databases at the national level (Bhatt, 2016). There was widespread opposition to some elements of the bill from both houses of Parliament, state governments and other stakeholders such as unions. For example, the Opposition has argued that the proposed increase in fines may lead to an increase in corruption and will not necessarily improve levels of enforcement. However, there was an agreement across political parties that road safety was an issue which needed to be addressed urgently. The Union Minister of Transport appealed all political parties to support the Bill lest more lives are lost in road crashes (The Indian Express, 2016a). It was passed in the Lower House of the Indian Parliament in March 2017 and is currently awaiting approval from the Upper House.

4.1.3   74th Constitution Amendment Act of 1992
This legislation gave constitutional status to the municipalities and brought them under the purview of judicial review. The Act aims to revitalise and strengthen the urban local bodies so that they may function as effective units of local government. It defines functions which must be performed by city-level agencies. While road safety itself has not been explicitly stated as a responsibility of the urban local body, functions such as urban and town planning, planning for economic and social development, planning of roads and bridges, ensuring public health, and safeguarding the interests of weaker sections of the society have an impact on how road safety is perceived by the municipal agencies (GoI, 1992).

4.1.4   Seatbelt and helmet laws, 1988–2000
The Ministry of Road Transport and Highways (MoRTH) mandated installation of front seatbelts in all motor vehicles in 1994. Use of seatbelts, however, was not made mandatory until 1999. Seatbelts, and their use, on all seats (front and rear) in four-wheelers, were mandated by the MVA in 2002. In major cities, enforcement of this law has been stringent, and has yielded good results (though enforcement across the rest of the country remains weak). A survey of ten major Indian cities showed that 63% people do not wear seatbelts while driving a car (SaveLIFE Foundation, 2017).

Enforcement of helmet-use in India is very different. Driving, or riding as a passenger, without wearing a helmet is a punishable offence under the MVA. Enforcement of this rule has met with opposition from various religious and ethnic groups. For example, the Sikh community opposes this rule because it interferes with their religious practice of wearing turbans. This community is currently exempt from the rule. There have been several efforts by various states (apart from MoRTH's awareness campaigns) to enforce helmet use among two-wheelers users. For example, in February 2016, the Bombay High Court issued circulars to the Maharashtra Motor Vehicles Department to ensure helmet use by both the driver and pillion rider. It also directed two-wheeler dealer to sell two helmets (for the driver and passenger) with every two-wheeler (Mohammed, 2016). Enforcement of this directive has been inadequate. While Delhi has achieved a near 100% compliance rate for both driver and two-wheeler passengers, Mumbai is close to 90% in the case of drivers but achieves very low compliance for two-wheeler passengers (Koregaonkar, 2017).

In another instance, in July 2016, the Government of Maharashtra asked Maharashtra Petrol Dealers Association to refuse the sale of fuel to any two-wheeler driver not wearing a helmet (India Today, 2016). Due to objections from the Petrol Dealers Association as well as the opposing party in Maharashtra, the government went back on its decision. Instead, it asked all fuel stations to report vehicle registration numbers of offenders (Indian Express, 2016b), which did not prove as an effective adherent.

4.1.5   Sundar Committee Report, 2007
Recognising the need to contain burgeoning road collisions and fatalities in the country, the Cabinet Committee on Infrastructure headed by the Prime Minister directed MoRTH to present a note to the Empowered Committee of Secretaries for the creation of a Directorate of Road Safety

and Traffic Management and the amendment of traffic laws as required. An expert committee under the chairmanship of S. Sundar, Distinguished Fellow, The Energy and Resources Institute (TERI) was formed in 2005 to analyse the state of road safety in India and recommend reforms. Several area experts contributed to the committee's findings. It concluded that existing institutions are weak and not focused on road safety. The committee also recognized the need for a single agency to deal with the wide spectrum of problems associated with road safety (GoI, 2007a). For the first time in India, road safety was identified as a public health issue and the committee proposed strategies focused on preventing injuries rather than crashes.

The Committee proposed a National Road Safety and Traffic Management Act (NRSTM Act). It proposed national and state-level Road Safety and Traffic Management Boards with decision-making authority on the regulation and advancement of road safety and traffic management. Along with the statutory authority to set standards, these boards would comprise of experts (in addition to government representatives) providing technical inputs. Most of the Committee's recommendations were tweaked by the government and the resulting National Road Safety and Traffic Management Bill was not passed in the Parliament. These have been explained in detail later in the report.

4.1.6   National Road Safety Policy, 2010

Based on the recommendations of the Sundar Committee, MoRTH framed the National Road Safety Policy, which was approved by the Union Cabinet in 2010. The policy outlines the initiatives to be taken by the government at all levels to improve road safety in the country. It emphasises safer infrastructure, safer vehicles, and safer drivers as key to reducing road traffic fatalities. The formulation of the policy led to the framing of the National Road Safety and Traffic Management Board Bill of 2010.

While the National Road Safety Policy has been guiding investment priorities in road safety for the national government, it has done little for the states. As per directions from MoRTH, most of the states in India, including Maharashtra, have formulated their own road safety policies. Most of them, except for a few, read the same as the national policy. This points towards the lack of attention given to the problem by the state governments.

4.1.7   National Road Safety and Traffic Management Board Bill, 2010

Following up on the Sundar Committee's recommendations, MoRTH proposed the National Road Safety and Traffic Management Board Bill in 2010. The Bill made a few significant changes to the earlier bill drafted by the Sundar Committee. It diminished the role of states to almost nil and limited the scope of the bill to national highways. Since the board could make recommendations on road safety only in relation to national highways (which form just 2% of the total road length of India), its mandate was severely limited. The Standing Committee on Transport,

Tourism and Culture, which reviewed the bill, did not recommend passing it for this reason. Instead, it proposed a reconsideration of the institutions mandated by MVA 1988. Because of this recommendation, NRSC and SRSCs were re-constituted. It also proposed the formulation of a National Road Safety Policy (GoI, 2010a).

4.1.8   Working groups on the five E's of road safety, 2012

On the recommendation of NRSC in 2011, MoRTH formed five working groups on the five Es of road safety: education; engineering of roads; engineering of vehicles; enforcement; and emergency care. These groups submitted their recommendations to the government in 2012. For example, the Working Group on Road Engineering pointed out that the mediocre quality of crash data made it hard to demonstrate the efficacy of various road safety strategies. Budgetary constraints also pose a problem, particularly for lower hierarchy roads. The group recommended that 'highway and urban road design standards and guidelines be made consistent with … international best practices' (GoI, 2012). The working group also recommended formulation of a National Road Safety Policy, National Road Safety Fund, and State and District Road Safety Councils. It proposed conducting road safety audits for all national and state highways, improving vehicle design, and mandatory crash tests (Kumar, S., n.d.). Several recommendations of these working groups have been adopted by MoRTH, but only recently.

4.1.9   Mumbai High Power Committee of 2012

A public interest litigation was filed in the High Court of Bombay by the Bombay Bar Association (after one of its lawyers was involved in a scuffle with a traffic policeman over a traffic offence) in 2010. This public interest litigation questioned the inaction of the city government regarding road traffic in the city of Mumbai, specifically on issues such as improper regulation and operation of traffic, technology, enforcement and manpower. The Bombay High Court conducted several hearings in which these issues were discussed. After holding a joint hearing of all agencies on the matter, the Court established a High-Power Committee in 2012. The High-Power Committee was chaired by a senior official from the Home Department and comprised officials and three urban transport professionals. After several discussions, the Committee proposed an action plan to address urban transport issues facing the city. The plan identified several priority actions:

• expand the Mumbai traffic police force
• improve design and signals at junctions
• develop intelligent transportation systems
• reform the Motor Vehicles Department
• restrict registration of vehicles
• share data and information
• improve detection of traffic-related offences
• improve enforcement of penalties
• enhance the use of enforcement technologies

The action plan prepared by the High-Power Committee was comprehensive and most of the activities specified in the action plan impact road safety. The committee identified lead and assisting agencies to implement the activities and specified a timeframe of implementation for each action item.

The public interest litigation of 2010 is a good example of how concerned citizens (a group of lawyers in this case) can demand action from the government through the judiciary. It compelled city officials to analyse the urban transport scenario in Mumbai and come up with an action plan to address vital issues. Five years on, some recommendations have been partially addressed by the city government. For example, the Mumbai Traffic Police installed closed-circuit television cameras at several locations in Mumbai in 2016. A centralised state-level licensing database was introduced in 2016. These actions were also a result of initiatives being taken at the national level (national road safety policy, setting up of the Supreme Courts Committee on Road Safety (section 14.1.1). Design improvements to intersections were (and are being) undertaken, although not much progress has been made. Overall, compliance with the Court's directives has been poor (Bombay Bar Association & Another v/s State of Maharashtra & Others, 2016). While road traffic fatalities fell from 611 in 2015 to 562 in 2016, four years after the Committee was formed, the long-term success from these partial measures remains to be seen.

4.1.10 Road Transport and Safety Bill, 2014

The Road Transport and Safety Bill of 2014 was proposed by the Bharatiya Janata Party-led national government, which is currently in power in India. A week after the government was sworn in, in May 2014, Gopinath Munde, the Rural Development Minister, was killed in a car crash. This incident renewed the debate over road safety. The government took up the issue of priority and presented the Road Transport and Safety Bill to the Parliament for approval in 2014.

Recognising the need for a change in outlook towards road safety, and building on the findings of the Sunder Committee, this bill is notable for its shift in focus – from motor vehicles to the safety of road users. Major highlights of the Bill were the proposed independent national level authority for road safety, unified licensing and vehicle registry systems, heavier penalties for traffic offenders and a two-tier permit system for public transport vehicles (Singh, 2017a). Several stakeholder groups, including state governments, opposed the Bill. For example, transport owners' associations objected to truck owners being held accountable for criminal negligence (due to freight vehicles being overloaded and truck drivers usually fleeing the crash-site). The Bill also met with opposition from auto-manufacturers regarding the setting of minimum standards for safety in vehicles, which do not currently exist. Governments of states with prominent auto-manufacturing industries also opposed the Bill. Other state governments also objected to the proposal to centralise driver licensing

and vehicle registration procedures, citing revenue losses (Tiwari, P., 2014). To appease various stakeholders, diluted versions of the bill were brought out twice. However, no version has yet been passed by Parliament.

4.1.11 Public interest litigation and Supreme Court Committee on Road Safety, 2014

Following another public interest litigation case (filed by S. Rajaseekaran, an orthopaedic surgeon from Coimbatore, Tamil Nadu) in 2012, India's Supreme Court appointed a Committee on Road Safety in 2014 to supervise the central and state governments with regards to actions undertaken by them to improve road safety. The Committee has been issuing directives to all states in 2015 with a view to improving road safety. For example, the Committee on Road Safety has directed all states to formulate road safety policies, prepare state-level road safety action plans, activate state road safety councils, establish a road safety fund and conduct road safety audits at the design, construction and operation stages and rectify black spots among other instructions (Rathod, 2017). States have been slow to respond (Supreme Court Committee on Road Safety, 2017). They are, however, compelled to implement the directives, lest they are held in contempt of the Supreme Court (and are subject to a punishment or fine levied by the Court).

While the judicial arm of the Government of India is willing to ensure that existing laws are implemented by the concerned parties, it is reluctant to intrude upon the functions of the legislature and executive branches, which formulate law and policy. For this reason, the Supreme Court of India has rarely been involved in the subject of road safety. It has, however, expressed concern over the inaction of the Union and state governments in tackling the problem. The public interest litigation case of 2012 elicited a strong response from the Court because of the global attention given to road safety (UN Decade of Action for Road Safety and the Brasilia Declaration) as well as the national developments (non-passage of the Road Transport and Safety Bill). Its impact on road safety remains to be seen.

The Supreme Court has, in other rare instances, attempted to compel national and state governments to address the problem of road safety. In December 2016, the Supreme Court issued directives to remove liquor stores located within 500 meters of all national and state highways (which came into effect on April 1 2017). This was one following a public interest litigation filed by Harman Sindhu, a road collision victim turned road safety activist in the Haryana and Punjab High Court in 2012. The Supreme Court also cited NRSC's policy decision (taken in 2004) to ban the sale of alcohol along highways (Dutt, 2017).

While the presence of liquor stores along highways may promote instances of drunk-driving, they are also a significant source of revenue for the government. Several state governments, including Maharashtra, denotified stretches of highways to lower hierarchy roads. The Supreme Court diluted its directive in July 2017, when it stated that the ban does not apply to roads passing through cities. This allowed liquor stores to continue functioning

within city limits (Rajagopal, 2017). This incident shows that states are not yet ready to prioritise road safety at the cost of revenue losses.

4.1.12 Bharat New Vehicle Safety Assessment Program, 2017

Bharat New Vehicle Safety Assessment Program (BNVSAP), India chapter of the Global New Car Assessment Program (Global NCAP) was launched in 2017. New cars entering the Indian market will now be subjected to crash tests and assigned star ratings based on the results. Initially slated to be launched in 2014 with an aim of standardising safety features in cars, BNVSAP hopes to apply more stringent safety norms on four wheelers (Mahajan, 2017). It will also help potential vehicle buyers make informed decisions with regards to safety.

4.1.13 Global developments, 2010–2017

The United Nations (UN) General Assembly adopted Resolution 64/255 (9) in 2010, which designated 2011–2020 as the Decade of Action for Road Safety. The Assembly adopted a global goal of reducing road traffic fatalities by half during the Decade of Action (UN, 2011). The UN Road Safety Collaboration, consisting of governments, UN agencies, multilateral institutions and non-governmental organisations (NGOs) developed a Global Plan for the Decade of Action for Road Safety to provide an overall framework for action. The plan is meant to act both as a guide for countries, and as a facilitator for coordinated and concerted action towards achieving the goal of 50% reduction in road traffic fatalities.

In addition to the UN General Assembly's efforts, the UN adopted the 2030 Agenda for Sustainable Development in 2015. The Sustainable Development Goals (SDGs), identified in the Agenda, build upon the Millennium Development Goals (MDGs), which were adopted in United Nations Millennium Declaration, the outcome document of the Millennium Summit. While no mention of road safety was made in the MDGs, it is mentioned in two SDGs:

1. Goal 3 pertains to ensuring 'healthy lives and promoting well-being for all at all ages'. Target 3.6 aims to halve the number of global fatalities and injuries from road traffic collisions by 2020 (WHO, 2017).
2. Goal 11 talks about making cities and human settlements inclusive, safe, resilient and sustainable. Target 11.2 aims to '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' (by 2030) (WHO, 2017).

Following the announcement of the SDGs, world leaders attended the 2nd Global High-Level Conference on Road Safety in 2015. The aim of this conference was to chart progress at the mid-point of the Decade of Action for Road Safety 2011–2020. Around 2,200 delegates – including the Indian Minister of Transport, Shri Nitin Gadkari – adopted the Brasilia Declaration on Road Safety, through which they agreed on ways to halve road traffic fatalities in their respective countries by the end of this decade. Following this commitment, the Indian government has undertaken several road safety initiatives. A few of these are identification and remediation of collision black-spots, incorporating engineering solutions at the design stage, formulating and implementing safety standards for automobiles, coordinating trauma care and generating public awareness. Barring black-spot identification and rectification, these initiatives are still in the planning stages. Most of them are being implemented first on the national highways, which form a very small percentage of roads in the country. Coordination with various departments at the state level has been poor and not much has been done on lower-hierarchy roads.

In 2015, Bloomberg Philanthropies announced the second phase of the Bloomberg Initiative for Global Road Safety (BIGRS, initially launched in 2010). Committing $125 million, it chose 10 cities around the world on which to focus road safety efforts (Bloomberg Philanthropies, 2015). Mumbai is the only city in India to be selected under this programme. BIGRS works at the national level as well as the local level to influence legislation and implement road safety interventions respectively.

These developments, in addition to committing political leadership in India towards road safety, have brought about a change in the way road safety in perceived by decision makers. Concepts of safe systems approach and Vision Zero have been introduced (GoI, 2015). Differing greatly from traditional road safety philosophy, the safe system approach is a holistic approach towards improving road safety with an aim of creating a transport system which is more 'human proof'. Vision Zero is a strategy to eliminate all traffic fatalities and severe injuries while increasing safe, healthy, equitable mobility for all. While the focal point is the road user, the solutions concentrate on other elements of the transportation system such as road infrastructure and vehicles. This approach is particularly relevant for a middle-income country such as India where most of the road users are pedestrians, two-wheeler users or cyclists. The concepts have been instrumental in shifting focus, at least at the national level, to safe and inclusive infrastructure.

4.2 Governance structure and funding for road safety

The Indian government has a federal structure, with legislative, executive and judicial arms at the national, state and local levels. Decision-making tends to be top-down, and national and state levels share decision-making powers while functioning independently. For example, while policy issues such as defence and industry are on the Union List (governed centrally), road transport is on the

State List. Motorised vehicles, on the other hand, are on the Concurrent List – that is, jointly governed by national and state governments. All decisions pertaining to road transport at the state level (state highways and lower-hierarchy roads) are taken by the state government, which also has autonomy to pass laws in this policy area.

There are many different actors involved in road safety in Mumbai. The Ministry of Road Transport and Highways (MoRTH) (at the national level) and the Department of Transport (at the state level) are key players in road safety in Maharashtra, and in Mumbai itself, traffic police and the municipal corporation design, build and manage most road infrastructure. There are also several other agencies working towards road safety at all levels of government, but the lack of coordination between them is a significant deterrent to the improvement of road safety despite increases in funding to the issue in recent years. Private players, such as automobile manufacturers, have come to play an important role in the road safety ecosystem, providing both expertise and funding. Lastly, civil society, with a focus on bigger sustainability and social equality issues, has been instrumental in provoking action from the government. Tools such as public litigations and public–private–civil society partnerships have been useful in emphasising the need to focus on road safety.

4.2.1   Government institutions

National-level institutions
As with most democratic governments, the legislative branch in India is responsible for formulating policy and national laws, while the executive arm of the government is responsible for implementing laws and programs, including those pertaining to road safety in the country. It also oversees the planning and development of national highways.

The key implementing agency for all road safety policy, legislation and works is the MoRTH, headed by the Union Minister for Road Transport and Highways. The MoRTH is the focal ministry responsible for implementing the Motor Vehicles Act 1988 (through the Motor Vehicles Department) and collaborates with several ministries to do so. It is also responsible for: ensuring the adoption of standards in vehicle and road design; initiating education and awareness programmes (for instance, establishing Institutes of Driver Training and Research); and emergency care schemes, such as the Good Samaritan Guidelines (Singh, 2017b). The MoRTH, which is advised by the National Road Safety Council, guides all state-government-led transport planning.

The Minister, the elected leader of MoRTH, plays a key role in setting the agenda and identifying the MoRTH's priorities. But while the current Union Minister for Road Transport and Highways has made road safety a government priority (National Road Safety Policy, NRSTM Bill), he has been unable to pass relevant legislation. Implementation is constrained by other institutional actors including the Official Opposition (the opposing political party in the Lower House of the Parliament), the legislative branch

of government (Parliamentary Committees) and other independent bodies seeking to protect their own interests (such as the automobile and transport industry lobbies).

State- and local-level institutions in Maharashtra
The Department of Transport for Maharashtra is advised by the Maharashtra Road Safety Council. The Council is chaired by the State Minister for Transport and the state ministers of the Public Works Department and Home Affairs are elected representatives. Administrative heads of relevant departments (roads, police, health etc) are members of the Council. As at the national level, the state council's role is to advise the government on road safety matters. It meets once every six months to review plans for road safety measures, implementation strategies and monitoring mechanisms. The Maharashtra Road Safety Council is slightly more powerful than the National Road Safety Council as all of the key decision-makers – such as the State Minister for Transport, Municipal Commissioner of MCGM and Joint Commissioner of Police, Traffic – are direct members.

The organisational structure at the local level is slightly different. Because Mumbai doesn't fall under a district, it is directly overseen by state-, regional- and local-level agencies. The primary agency responsible for the urban governance of Mumbai Suburban is MCGM –one of the largest urban local bodies in Asia. MCGM has considerable decision-making autonomy. It has two heads: the Mayor of Mumbai is the elected head of the agency (a 2.5-year tenure) while the Municipal Commissioner is the appointed head (appointed by the Government of Maharashtra). MCGM is responsible for all infrastructure development in the city, including roads. The Brihanmumbai Electric Supply & Transport Undertaking bus service is also housed under MCGM.

Mumbai Traffic Police (MTP) is responsible for the enforcement of traffic rules. Mumbai, as the state capital, has a separate department overseeing traffic that is headed up by the Joint Commissioner of Police, Traffic. As well as overseeing traffic rules, MTP works with MCGM to manage traffic movement and enforce speeds. While MTP is responsible for deciding speed limits in the city, MCGM is responsible for installing signage. MTP is also responsible for collecting and reporting crash data for the city. The agency frequently works with the Motor Vehicles Department (also referred to as Regional Transport Office – RTO) to implement enforcement techniques. Recently, MTP has introduced 'e-Challans', which is an electronic payment system for traffic fines.

But discussions with local experts suggested that local agencies are not playing the roles that they should when it comes to road safety. The absence of a well-coordinated approach was also evident. In Mumbai (and most Indian cities) the traffic police determine how traffic moves and at what speeds. Given that design and posted speeds should be the same, this task should be undertaken by the agency that designs roads (in the case of Mumbai, this is MCGM) (Mathew, 2017). The police should instead act as representatives of the legal system, coming in only when

a traffic offence is committed or a collision takes place. In short, they should act as enforcers and not regulators. Through safe road design, it is MCGM that should ensure prevention of crashes.

The RTO's primary role is to ensure safety on the roads of Mumbai. It enforces traffic rules using flying squads that provide support to MTP and identify overloaded passenger and freight vehicles; ensures the competence of drivers on the road through stringent and transparent licensing procedures; and ensures the roadworthiness of vehicles by performing safety checks. Poor communication means coordination between various local public agencies is lacking. While MTP works closely with both MCGM and RTO, coordination between MCGM and RTO has been non-existent due to their functions being entirely separate (Shinde, 2017).

Public agencies display a lack of ownership when it comes to discussing the problem of road safety, stating that ensuring road safety is the responsibility of the traffic police (Ingle, 2017). They also tend to hold road users responsible for crashes, rather than unsafe road design; during interviews, public officials often cited reckless driver behaviour as the main cause of collisions, while poor infrastructure was never mentioned.

MCGM is the richest municipal corporation in the country (Praja Foundation, 2016a). As such, MTP suggested road-safety-related design improvements, most of which MCGM has been able to implement on the ground (Koregaonkar, 2017). The RTO is the only public agency lacking financial resources to deploy more resources on Mumbai's roads. However, its role has undergone a gradual change in recent years, with an increased focus on meeting revenue collection targets rather than ensuring safety. For example, the flying squads are under pressure to target offences that bring in higher fines.

4.2.2   Role of the private sector and civil society in road safety in India and Mumbai

Over the last two decades, the private sector has participated heavily in roads in India, bringing with it financial resources and improved operational efficiency in transport projects. The private sector has been able to plug gaps in technical capacity and match the increasing demand for improved

mobility in India (Puri, 2003). Automobile manufacturers in India actively work with the Indian government to set vehicle design and safety standards (Society of Indian Automobile Manufacturers, SIAM gives inputs to the technical committee responsible) (SIAM, n.d.). Automobile manufacturers work with local and state governments to conduct vehicle testing and capacity-building (NATRIP, n.d.). Maruti Suzuki, a popular car manufacturer in India with an annual output of 1.5 million cars, operates six Institutes of Driving and Traffic Research in collaboration with various state governments (IDTR, n.d.).

India's poor road safety record also affects the industrial sector: road crashes result in the delayed transportation of raw materials and finished products, causing financial losses for manufacturing industries. Moreover, loss in personnel hinders the employer growth and affects their reputation as a safe employment provider (FICCI, 2016). Private businesses work with local and state governments to conduct driver training and awareness programmes as part of in-house road safety initiatives and corporate social responsibility. Maruti Suzuki has opened 421 Maruti Driving Schools all over the country (Maruti Suzuki, n.d.). The private sector is deeply entrenched in the road safety sector and can exercise considerable influence in its working.

Civil society is the third key player in road safety, after the government and the private sector. Civil society organisations working on sustainability address wider, multi-sectoral issues such as social equity which the other two players don't. Public interest litigations initiated by NGOs have incited government action. Civil society has the distinct advantage of being able to forge partnerships with the government, the private sector and citizens. A good example of such a partnership between civil society and the government is the Bloomberg Initiative for Road Safety and working in Mumbai. Another successful partnership between the three key players is the Zero Fatality Corridor Project on the Mumbai Pune Expressway (Box 1).

4.2.3   Funding for road safety in India

One of the MoRTH's main responsibilities is the design and construction of national highways in India. In 2016/17, out of its budget of $11.2 billion, $30.0 million

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Box 1   Road safety partnership between the public sector, private sector and civil society

The Mumbai–Pune Expressway is a notoriously unsafe high-speed corridor connecting the cities of Mumbai and Pune. More than 1,300 people died on this stretch of road between 2010 and 2015.

In 2016, the 'Zero Fatality Corridor Project on the Mumbai–Pune Expressway' project was launched as a partnership between Maharashtra State Road Development Corporation (the public agency responsible for maintaining the expressway), in partnership with Mahindra & Mahindra (prominent Indian automakers), JP Research India (a road and automotive safety research organisation) and SAVELife Foundation (a road safety NGO).

The project team conducted detailed analysis of crashes occurring on the Mumbai–Pune Expressway and safety audits, and implemented all-inclusive interventions based on engineering, enforcement, education and emergency care. It found that seemingly minor road design elements, such as landscaping, were leading to fatal crashes. Over 1,000 unsafe spots were addressed through changes in road design. As a result, road crash fatalities fell by 45% in the first three quarters of 2017 (Singh, 2017c).

(roughly 0.27%) was allocated for 'Research Training and Studies and Other Road Safety Schemes'. This may cover activities such as road safety programmes, the creation of national highways facilities for extending relief to collision victims, the establishment of a National Road Safety Board, strengthening of public transport, research and development, and training. However, only $21.5 million was actually spent during the fiscal year. In the 2017/18 budget, this allocation has been increased marginally to $37.5 million (0.3%) of the total budget ($12.5 billion) (MoRTH, 2017). During 2016 Road Safety Week, the MoRTH also earmarked $1.6 billion for implementing safe road design through rectification of black spots along national highways over the next five years, until 2020 (GoI, 2016).

At the state level, capital expenditure in road safety is undertaken by Maharashtra Public Works Departments and other road building agencies such as Maharashtra State Road Development Corporation (MSRDC) and Mumbai Metropolitan Region Development Authority (MMRDA). Budgets of both the Maharashtra Public Works Departments and MMRDA do not have specific road safety heads. They do, however, allocate resources for roadworks (around $716 million).

The MSRDC organisation itself is not allocated a budget by the state government, but instead funds its projects by market borrowings (MSRDC, n.d.). To provide for non-capital expenditure for road safety, the Government of Maharashtra established the Maharashtra Road Safety Fund in 2016. Revenue collections from traffic fines and a road safety levy contribute to this fund. While any public agency can apply to use this fund, the expenditure must be approved by a committee comprised of senior government officials. The Supreme Court Committee on road safety has specified guidelines for the expenditure of this fund. The road safety fund has not been spent by the Government of Maharashtra so far, and details pertaining to the total amount collected are unavailable.

At the local level, MCGM had a 2017/18 budget of over $3.7 billion (down from $5.5 billion in 2016/17). While road safety is not a separate budget head, approximately 7.5% ($283 million) of the total budget for 2017/18 has been allocated to 'roads and traffic', which includes road repair work (CARE Ratings, 2017). Road safety work in India and Maharashtra seems to be sufficiently – if not comfortably – funded. At the national level, road safety financing has been increasing year on year. At the state and local levels, too, a considerable percentage of the budget has been set aside for roadworks, and sometimes specifically for road safety. With the introduction of the Maharashtra Road Safety Fund, various initiatives can be undertaken by the government. However, since the expenditure is often dictated by the government's outlook towards the problem, it remains to be seen if more urgent needs such as safe infrastructure and enforcement are given priority over strategies such as driver education. Further research in the area, which considers this aspect in detail, will provide useful insights.

5 Challenges to improving road safety in Mumbai

5.1 No strong legislative framework

Different national governments in India have tried to address road safety and revamp the institutional setup at the highest level. But opposition from non-ruling parties and pressure from other interest groups have made progress difficult. The absence of a strong legislative framework is a major contributing factor. The Motor Vehicles Act of 1988 is the only statutory document that addresses road safety, and it has shortcomings.

5.2 Political differences and competing priorities

At the state level, the Chief Minister and State Minister for Transport are key players who can champion road safety. As Maharashtra has a coalition government, the Chief Minister and the Minister of Transport belong to different political parties. The former belongs to the political party with a national-level majority, and the latter, to the party that won the municipal elections. And despite being part of the same coalition, they differ in their opinion from time to time. For example: after a Supreme Court order banned the sale of alcohol within 500 metres of highways, the Government of Maharashtra denotified certain stretches of road to circumvent the ban, an action that the Minister of Transport called detrimental to the cause of road safety in a letter to the Chief Minister (Times of India, 2017).

5.3 Competing priorities and external pressures

Issues of competing priorities (as was demonstrated by the alcohol ban) and public opinion (leading to re-election) also influence elected representatives' levels of interest in road safety. Elected local-level ward councillors or corporators can play a liaison role, coordinating between the municipal corporation and the citizens, and with the government to ensure effective implementation of projects. Ward committees, mandated by the 74th Constitution Amendment Act of 1992 and chaired by the ward councillor, can also be an effective tool by which to understand and address citizens' concerns, who are committee members. Having the same political priorities as their higher counterparts, roads are usually high on the list of priorities of ward councillors. However, their concerns are limited only to repairs or building new roads: in the past few years, councillors have ignored important issues and instead focused on other concerns such as 'renaming of roads' to recognise political figures – one of the most debated matters (Praja Foundation, 2016a).

5.4 The focus on safer driving, not safer road building

Road crashes tend to be considered the fault of the driver(s) involved (Indian Express, 2015). As such, the government views road safety as a personal responsibility and not a public health issue that merits political action. All tiers of government lack a systems-based approach to tackling road safety issues: current approaches to the problem are driver- and vehicle-oriented. Building forgiving infrastructure –which is the cornerstone of the safe systems approach – is rarely spoken of by key influencers, especially at the state and local levels. Instead, most road safety efforts focus on driver education and public awareness campaigns. No unified regulatory framework and no strong road safety authority exist to encourage a broader approach.

5.5 A lack of coordination and communication

Transport in India is overseen by a plethora of agencies that do not communicate or coordinate with each other. This has led to multiple piecemeal efforts being made at various levels without significant results. At the city level, lack of strong leadership (in the form of a strong mayor) also proves detrimental to the cause of road safety.

The remits of local and state agencies have undergone significant changes over the past few decades. For example, the primary role of the Motor Vehicles Department has changed from licensing, registration and enforcement to revenue generation. Traffic-related tasks performed by

MCGM and MTP are also highly interlinked. For example, while the speed limit along a stretch of road is decided by MTP, the signage is installed by MCGM. This leads to problems such as incorrectly installed signage at locations with poor visibility. Moreover, when a problem arises, agencies refuse to take ownership and instead blame each other. It is difficult, too, to identify problems or causes of road traffic collisions, which is a first step in making improvements: methods of crash data collection are highly flawed and there is no scientific investigation of the reason for crashes. Inaccurate and incomplete data does not provide a good basis for informed decision-making.

5.6   Disinterest and mistrust among the public

Reluctance among citizens to help crash victims on the road was mentioned by most interviewees as a particular systemic issue impeding road safety in Mumbai and India more broadly. Bystanders, who play a critical role

in getting medical help to the victim, have been legally protected by the Good Samaritan Law since 2016. This protection, present earlier in the form of guidelines by the MoRTH, was written into a law after a public interest litigation was filed by the road safety NGO SaveLIFE Foundation (Supreme Court of India, 2012). But awareness of the law and confidence in the judicial system remains low (Singh, 2017b).

Harassment at the hands of the police and a slow judicial process might also be to blame. Interactions with authorities and dealing with the judiciary to obtain meagre compensation may take up to several years, and families of crash victims are often unwilling to go through it. Interviewees also stated that traffic management and enforcement is made very difficult because citizens are not willing to follow the rules (Patil, 2017; Ingle, 2017). This behaviour may stem from a feeling of disillusionment with the political and economic system. Corruption and the ability to get away with committing a traffic offence are two factors that may lead to irresponsible driver behaviour (CMS India, 2017).

Figure 15   Factors inhibiting improvement of road safety in Mumbai

POLITICAL/ POLICY RELATED	INSTITUTIONAL	INFRASTRUCTURE	ENFORCEMENT	SOCIAL/CULTURAL
Absence of a strong road safety policy or legislation at the national or state level	Public agencies display a lack of ownership and are not held accountable for poor road safety	Poorly designed and inadequate infrastructure	Difficult conditions for enforcement of traffic rules	Citizens not willing to follow rules or help crash victims
Opposition from influential groups prevent reforms from being introduced	Mismatched roles of local agencies; focus on revenue generation rather than road safety	Mixed traffic; low per capita availability of road space in Mumbai	Police officials responsible for managing traffic in addition to enforcing rules	Cultural factors (i.e. female attire and riding side-saddle) contribute to female injuries
Conflicting political priorities of elected representatives at the state level detrimental to road safety	Lack of institutional capacity to tackle road safety at all levels of government	Low-quality public transport	Non-compliance of helmet rule among two-wheeler passengers, females and children	Reluctance to interact with the system, which is slow and often harassess citizens

Source: author's own.

6   Opportunities to improve road safety in Mumbai

6.1   Policy and legislative reforms

Policy and legislative reforms are urgently required at all levels of government. At the national level, the Motor Vehicles Amendment Bill of 2017 will greatly improve road safety in India once passed by the upper house of Parliament. Through strategic engagement techniques and reiteration of road safety as a priority, the national Minister of Transport can obtain political buy-in from opposing stakeholders, albeit at the cost of a temporary slump in public opinion (due to some of the consequences of the Act such as higher fines for traffic offences) according to experts interviewed. Political support can also ensure increased funding for road safety at both national and state levels.

In the absence of a road safety law, Maharashtra should formulate a State Road Safety Action Plan (currently under preparation) which can act as a unifying guidance document for road safety. The plan will set a common goal for the state, identify priority areas, set time-bound targets and outline detailed activities required to decrease the road traffic fatality rate. The State Road Safety Action Plan will also establish a monitoring mechanism, which will enable a periodic evaluation of the work being done in the state and identify strategies for course correction.

The Government of India's federal structure – with independent tiers of government at national and state levels – offers an opportunity for states to formulate their own legislation. State-level legislation can ensure that departments overseeing development and maintenance of all state-owned roads focus on improving road safety. The goal for the Government of Maharashtra should be to enact legislation that establishes a road safety authority. While such an authority may have an organisational structure similar to that of Maharashtra Road Safety Council (with the State Transport Minister as its head), it must be a statutory body with strong legal backing and decision-making powers. In addition to elected and appointed members, a road safety authority should also comprise road safety experts who can view the problem in a data-led manner and help the authority implement evidence-backed strategies.

The successful implementation of the Action Plan and establishment of a road safety authority will require support from the two, key state-level politicians: the Chief Minister and Maharashtra's Minister of Transport. To ensure that crucial hurdles such as funding, support from other stakeholders such as transport unions and the private sector, and political support at the local level can be overcome, these decision-makers will need to show committed leadership.

6.2   Improving inter-agency coordination and building capacity

The Mumbai Traffic Police (MTP) and the Municipal Corporation of Greater Mumbai (MCGM) are the two key agencies influencing road safety in Mumbai. Working at the lowest level in the hierarchy gives them a certain autonomy to implement rules according to their own interpretation (in the absence of any guiding legislation or action plan). Both MTP and MCGM enjoy significant financial freedom and can also invest in strategies to improve road safety. Of the two, MTP is directly involved in critical aspects of road safety such as the movement of people and vehicles and enforcement of rules: its representatives are present on the ground to manage traffic. However, both agencies currently lack the institutional and technical capacity to deal with the complex problems of road safety. They often operate in isolation, ignoring and even undoing the work done by the other. Improving interagency coordination is therefore essential. This is possible in the presence of a state-level strategy for road safety and focused leadership.

There is also an urgent need for technical training of personnel in other local agencies. In 2015, the Government of India launched the Atal Mission for Rejuvenation and Urban Transformation. One of the components of this programme is building capacity at the individual and institutional levels in urban local bodies. This programme could be an effective instrument through which to educate and train officials in road safety issues.

6.3   Fostering political action

India's judiciary can exert significant influence and urge action from the elected arm of the government. It has the power to issue directives to the national and state governments with these institutions must comply. It is also the only legal channel through which citizens may demand action on issues that the government is neglecting. The work done by the Supreme Court Committee on Road Safety and Mumbai High-Power Committee are good examples of this influence. The judiciary is in a powerful position to bring about a more permanent institutional arrangement for road safety through its directives.

The jurisdiction of the MoRTH, headed by the Minister for Road Transport and Highways, is limited to national highways, but the ministry does have the power to direct state governments to bring about reforms. The politically elected head, the Union Minister of Transport is a key actor in the road safety ecosystem: he makes most policy and financial decisions regarding road transport and therefore road safety. The current minister has had a particularly positive influence on road safety in India. His commitment to reducing fatalities by 50% by 2020 through the Brasilia Declaration has been instrumental in initiating a discussion on road safety at the national level. He also made sure that road safety receives central government funding. This elected representative can be an important influencer, and has the potential to make the Chief Minister of Maharashtra and State Minister of Transport road safety 'champions'.

The role of the local councillors, or corporators – like that of state heads – has significant scope for improvement. Corporators are the only directly elected representatives of government. Whether independent or affiliated with a political party, they contest and win or lose elections by putting forward locally relevant agendas. They also work closely with the local urban body to deliver on campaign promises. But while road *repairs* regularly feature on these actors' agendas, road *safety* does not. Establishing road safety as a political priority at national and state levels should have a cascading effect, increasing its salience at local level too. Citizens can also demand road safety action from these political figures (see also section 6.4).

Another way in which to address problems facing cities is to empower elected local urban bodies – such as mayors. Conferring additional powers city mayors can curb the state government's dominance over the city and enable the city administration to address pressing issues without interference (WEF/PwC, 2016). Given the nature of competing for political priorities, this reform does not guarantee road safety improvements but it will increase democratic accountability of the local urban body and improve control over how budgets are allocated. The mayor can also facilitate coordination between different departments and garner political support for road safety initiatives.

Outside India, there are several examples of elected city mayors who have tackled urban development and successfully transformed cities (for example, in Bogotá,

Mexico City and New York). In India, some limited attempts have been made to similarly empower these political figures. For example, in 2016, a member of the Lower House introduced a private bill that proposed amendments to the Constitution of India to strengthen local governments. One recommendation was to elect a city mayor directly and make them the executive head of the municipality. This bill is still under consideration in Parliament, but as a private bill that sets out significant reform, it is unlikely to be passed.

The media in also play an important role in encouraging political action: by increasing public awareness and debunking common misconceptions about why road crashes happen, the media can bring the issue of road safety to the public and political fore. Pressure from the citizens and well-intentioned media can go a long way in establishing road safety as a political priority (key informant interviews).

6.4   Citizen engagement efforts

Civil society groups can help further citizen engagement in road safety, and championing by citizens can inspire political action. Equally, political road safety champions have inspired increased citizen involvement: the Swachh Bharat Abhiyan (Clean India Campaign) citizenship engagement campaign, launched by the Government of India in 2014, was marketed as a social movement rather than a programme. Its success depended heavily on citizens' involvement in the cause of cleanliness, and residents in a neighbourhood organised clean-up drives and engaged with locally elected representatives on the subject. In 2017, the citizens were also then asked to rate the success of the programme in their respective neighbourhoods, thus holding local bodies accountable (FE, 2017).

6.5   Role of global road safety community, civil society and private partners

Committing to global road safety goals set by the international community is crucial for India to maintain its global reputation. But India has signed up to such commitments, nationally it has been difficult to overcome internal opposition and introduce productive measures. Three sets of non-government actors play a critical role in keeping road safety on the policy-makers' agenda and curbing opposition. First, international agencies such as the UN, WHO and the World Bank can influence political will in favour of road safety by educating decision-makers, which they have been doing through initiatives such as BIGRS. Secondly, civil society, through advocacy, can draw attention to road safety thereby advancing policy and legislative reforms. NGOs in India have often worked with the government in the areas of advisory, capacity building and public outreach programmes. Thirdly, the private sector can also play an important role by contributing technical know-how and financial resources for improving road safety.

Opportunities for further research

1. **Socioeconomic analysis of crash data.** Absence of socioeconomic data prevented a detailed analysis of crash statistics as part of the study. Further research focusing on aspects such as occupation, education, income, geographic location (i.e. ward or neighbourhood) of crash victims could help determine if there are specific groups of population who are disproportionally affected by road safety issues in the city and why. Such studies could delve deeper into the role of the local councillors, i.e., corporators in improving the state of road safety in the city.

2. **Funding for road safety.** While this study has attempted to determine the extent of funding available for road safety at various levels of government in India, it has not been able to go into detail due to lack of information, especially at the state and local levels. A more detailed analysis of each public agency's budget, along with flow of funds into the road safety sector from non-government sources such as the private sector and development agencies will help in completing the financial picture. The share of road safety activities in the total budget for road development reflects the political focus on the sector and such research will add significant value.

3. **Role of citizens in improving road safety.** Road user behaviour is influenced by many factors, often not in direct control of decision makers. While the study briefly touches upon some of these factors which drive citizens to follow (or flout) traffic laws or assist victims of crashes, further research into social, cultural and political factors will be useful in pinpointing potential areas of governance reform.

4. **Impact of Motor Vehicles Amendment (2017) on Improving Road Safety.** The Amendment, if approved by law makers, could prove to be a landmark legislation and significantly affect road safety. Several objections pertaining to sharing of administrative and fiscal powers and the Amendment's ability to change road user behaviour effectively have been raised by interest groups. The researcher proposes a study of the political and economic implications of the Amendment on road safety to be conducted in the future. This research will be useful in assessing whether India requires a legislation specifically formulated to address road safety challenges.

5. **Further analysis of lobbies in Mumbai itself, as well as the scope and limitations of civil society action.** The scope of this case study focused on experts and decision makers involved explicitly in road safety. An even broader understanding of the civil society and party-political landscape and its salience for road safety issues could be gained from interviewing a wider range of participants in future research efforts.

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Legislation
Motor Vehicles Act, 1988 (India)
Motor Vehicles Act, 1939 (India)
Draft Road Transport and Safety Bill 2014 (India)
The Constitution (Seventy-Fourth Amendment) Act, 1992 (India)

Annexes

Annex A

Table A1 Susceptibility to crashes and fatalities

	Highly susceptible	Susceptible	Least susceptible
Road user	Pedestrians	Cyclists	Road-based public transport users
	Two-wheeler (drivers and passengers)	Car users	Three-wheeler users
Age group	25–44 years (males)	45–64 years (males)	<15 years (males)
		25–44 years (females)	>55 years (males)
	45–64 years (females)	<15 years (females)	15–24 years (females)
		15–24 years (males)	
Gender	Female pedestrians	Male two-wheeler passengers	Male public transport and car users
	Male pedestrians		
	Male two-wheeler drivers		Female public transport and car users
	Female passengers in two-wheelers		
Time of day	Late night and very early morning (between 00:00 and 06:00)	Morning peak (between 09:00 and 12:00)	Early morning (between 06:00 and 09:00)
	Start and end of evening peak (between 16:00 and 17:00, and 20:00 and 21:00)	Evening peak (between 17:00 and 20:00)c	Afternoon (between 14:00 and 15:00)

Figure B1 Institutional setup for road safety in India at the national level
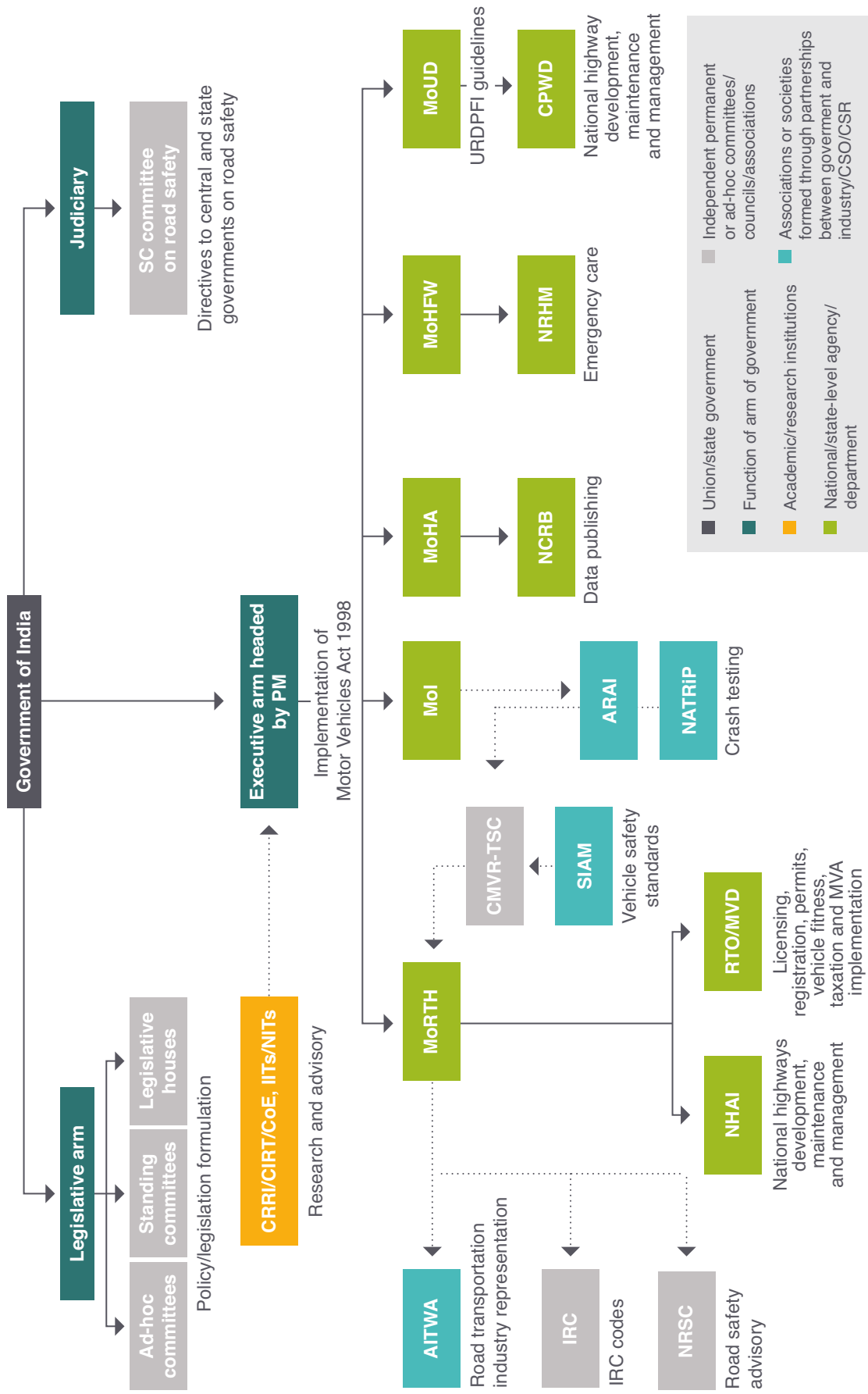

AITWA – All India Transporters Welfare Association; ARAI – Automotive Research Association of India; CIRT – Central Institute of Road Transport; CMVR-TSC – Central Motor Vehicles Rules -Technical Standing Committee; CoE – Centre of Excellence; CPWD – Central Public Works Department; CRRI – Central Road Research Department; IITs – Indian Institutes of Technology; IRC – Indian Road Congress; MVD – Motor Vehicles Deparment; NATRiP – National Automotive Testing and R&D Infrastructure Project; NCRB – National Crime Records Bureau; NITs – National Institutes of Technolgoy; NRHM – National Rural Health Mission; NRSC – National Remote Sensing Centre; SIAM – Society of Indian Automobile Manufactures; URDPFI – Urban and Regional Development Plans Formulation and Implementation.

Source: various.

Figure C1 Institutional setup for road safety in India (at the state and local level)
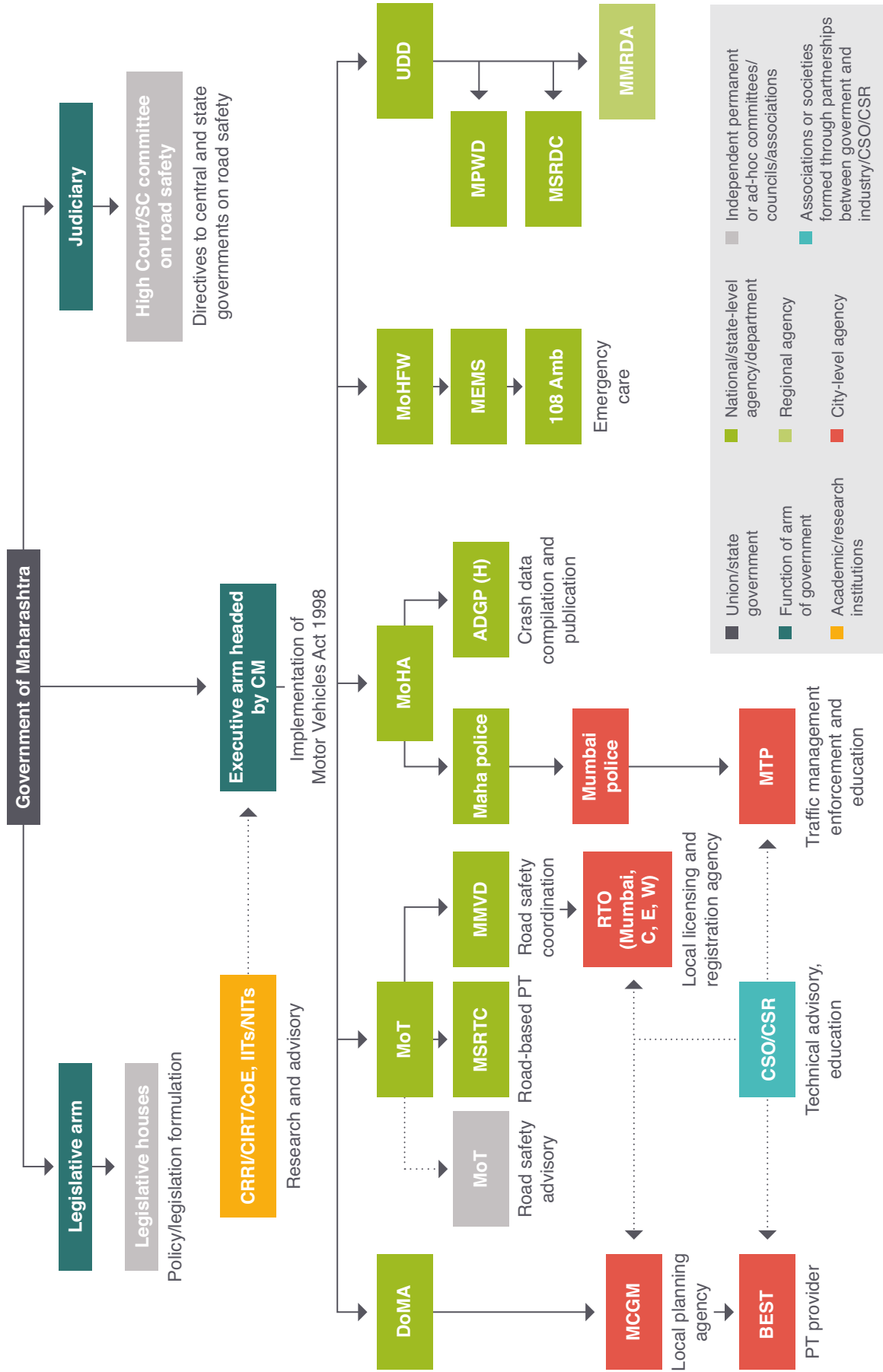
Note: CIRT – Central Institute of Road Transport; CoE – Centre of Excellence; CRRI – Central Road Research Institute; IITs – Indian Institutes of Technology; MMVD – Maharashtra Motor Vehicle Department; MSRTC – Maharashtra State Road Transport Corporation; NITs – National Institutes of Technology.
Source: various.

Annex D

Collection of crash data is solely the responsibility of traffic police in India. For this study, crash data was obtained from the office of Maharashtra Additional Director General of Police, Highways (ADGP). The data was found to be of poor quality and the researchers were unable to analyse many questions. For example, ADGP's office reports statistics pertaining to 'Cause of Accident'. In 2015, 68% of all fatalities were attributed to 'fault of the driver'. The remain 22% were attributed to 'fault of the driver of another vehicle'. Under 'Fault of Driver,' 80% of fatalities occurred due to 'over-speeding' and only 4% due to 'vehicle not giving right of way to the pedestrian.' The actual causes of crashes and fatalities probably involved these and other factors but they cannot be discerned from the data. Improper road design is rarely mentioned as a possible cause.

The process of data collection in the state of Maharashtra is as follows. Crash details are recorded at the site of the crash. At the end of each month, the police station compiles information from all crash data collection forms and sends it to the Office of Superintendent of Police. This office (one for each district) receives information from all Police Stations located within the district. The same information, compiled at the district level, is sent to the Office of Additional Director General of Police at the state level, which then reports it at the state and national levels. Unfortunately, a lot of the information collected at the site of the collision is lost in the process of being transmitted up the hierarchy of authorities. The data collected are often unreliable. For the purposes of this study, data was collected from two sources: The Office of the Additional Director General of Police (Maharashtra) and the Motor Vehicles Department/ RTO (Maharashtra). Table D1 shows the heads under which the data was received.

Table D1 Data collected from various sources

Name of organisation	Administrative level	Data heads	Year
Office of Additional Director General of Police, Maharashtra	Mumbai Commissionerate/ Greater Mumbai	Number of crashes, fatalities and Injuries by age and gender of victim, mode of vehicle, age of vehicle, nature of crash, cause of crash, fault of driver, type of manoeuvre, carriageway width, type of junction, nature of injury (serious or minor), location (nearby landmark), type of license of driver, type of road (national highway, state highway or other road), weather condition, road condition, month and time of day	2013, 2014 and 2015
Office of Additional Director General of Police, Maharashtra	Mumbai Commissionerate/ Greater Mumbai	Number of traffic offences and number of fines collected	2010 to 2016 (until November)
Regional Transport Office	Mumbai Commissionerate/ Greater Mumbai	Number of vehicles on road	2005–2006 to 2015–2016
Census of India	Mumbai Commissionerate/ Greater Mumbai	Population	2011

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