A Case Study of the Auto-rickshaw Sector in Mumbai

By,

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# Table of Contents

Table of Contents ............................................................................................................. 2

I. Introduction .................................................................................................................. 5
   Rationale for Study ........................................................................................................ 5
   Review of Literature ...................................................................................................... 6
   Methodology .................................................................................................................. 7
   Structure of Report ....................................................................................................... 9

II. Mumbai Profile ......................................................................................................... 10
   Area and Demographic Profile ..................................................................................... 10
      Population .................................................................................................................. 11
      Density and Housing ................................................................................................. 11
      Slums ......................................................................................................................... 11
      Sex ratio .................................................................................................................... 11
   Socio-Economics .......................................................................................................... 11
   Traffic and Transportation ............................................................................................ 13
      Mode share ............................................................................................................... 13

III. Profile of the Auto-rickshaw Sector ........................................................................ 16
   Regulations ................................................................................................................... 16
      Permits ....................................................................................................................... 16
      Fares ......................................................................................................................... 18
      Meters ....................................................................................................................... 20
   Market Characteristics ................................................................................................. 21
      Market Size and Age of Fleet .................................................................................... 21
      Engine and fuel characteristics .................................................................................. 22
   Operational Characteristics ......................................................................................... 22
      High demand locations .............................................................................................. 22
      Daily Trip Characteristics ......................................................................................... 23
   Profile of Auto-rickshaw Drivers ................................................................................ 23
      Age profile ............................................................................................................... 23
      Owner and renter drivers ........................................................................................... 24
   Economics ..................................................................................................................... 24
   Profile of Auto-rickshaw Users .................................................................................. 25
      Age profile ............................................................................................................... 25
      Income profile ......................................................................................................... 26
      Time of day characteristics ....................................................................................... 27
      Trip purpose .............................................................................................................. 28
      Frequency of Usage (Number of Trips per Week) ...................................................... 28
   Infrastructure ............................................................................................................... 29

IV. Current Challenges ................................................................................................ 32
   Drivers ......................................................................................................................... 32
      Union perspective ..................................................................................................... 33
   Passengers ................................................................................................................... 34
      Advantages ............................................................................................................... 34
      Problems ................................................................................................................... 34
   Researcher Observations ............................................................................................ 35
   Consumer Group Perspective ..................................................................................... 36
Government .............................................................................................................................. 37

V. Entrepreneur Initiatives ........................................................................................................... 39
  Smartphone applications .............................................................................................................. 39
    Motivation ................................................................................................................................. 39
    Impact ........................................................................................................................................ 40
  Future Plans ............................................................................................................................... 41
  Advertising ................................................................................................................................. 41
  Fleet systems .............................................................................................................................. 42

VI. Way Forward ........................................................................................................................... 42
  Training ......................................................................................................................................... 43
  Infrastructure .............................................................................................................................. 44
  Enforcement ............................................................................................................................... 44
  Supply and Demand .................................................................................................................... 44
  Fares ............................................................................................................................................ 45
  Fleet Services ............................................................................................................................. 45
  Drivers .......................................................................................................................................... 46

VII. Conclusions ........................................................................................................................... 46

Appendix A: Photographs of Auto-Rickshaw Locations, Infrastructure and Traffic ........................................ 47
References ....................................................................................................................................... 50
List of Figures:
Figure 2.1: Income Distribution (INR per person per month)
Figure 2.2: Income Distribution (INR per household per month)
Figure 2.3: Mode Share by Number of Trips: No Walk
Figure 2.4: Mode Share by Person*kilometer – No Walk
Figure 2.5: Mode Split for Work Trips
Figure 2.6: Mode Split for Education Trips
Figure 3.1: Permit Price Paid by Drivers
Figure 3.2: Age Characteristics of Auto-rickshaw Fleet
Figure 3.3: Locations of High Demand
Figure 3.4: Age Profile of Auto-rickshaw Drivers
Figure 3.5: Age Profile of Auto-rickshaw Passengers
Figure 3.6: Gender Profile of Auto-rickshaw Passengers
Figure 3.7: Income Distribution for Passengers
Figure 3.8: Usage of Auto-rickshaws by Time-of-day
Figure 3.9: Auto-rickshaw Usage by Trip Purpose
Figure 3.10: Number of Trips per Week
Figure 4.1: Key Issues facing Auto-rickshaw Drivers
Figure 4.2: Advantages of Auto-rickshaw Service
Figure 4.3: Problems faced by Auto-rickshaw Passengers

List of Tables:
Table 1.1: Thematic areas and information covered
Table 1.2: List of locations surveyed and observed in this study
Table 2.1: Access Modes to Railway Stations
Table 3.1: Contribution of Different Factors to Average Fare
Table 3.2: Parameters considered for Fare Revisions and their Relationships with Cost Elements of Table 3.1 above
Table 3.3: Daily Trip Characteristics of Auto-rickshaws
Table 3.4: Economics of Auto-rickshaw Operations
Table 3.5: Calculation of costs, revenue and profits per day
Table 3.6: Key Observations of High Demand Locations
Table 4.1: Personal observations of auto-rickshaw rides
Table 4.2: Economics of Permit Owners
Table 4.3: Cost Components of Auto-rickshaw Fare
Table 5.1: Smartphone Application Initiatives in Mumbai’s Auto-rickshaw Sector
Table 6.1: Recommendations for Mumbai’s Auto-rickshaw Service Improvements

List of Maps:
Map 1.1: Map of Mumbai with Survey and Observation Locations as well as Service Area for Auto-rickshaws
Map 2.1: Greater Mumbai Map
Map 2.2: Map showing division between Mumbai City and Suburban Mumbai
I. Introduction

Rationale for Study

Urbanization is on the rise throughout the world, and there is no better example of this than India. Thirty percent of the population in India lives in cities, a number increasing rapidly due to economic migration from rural areas. This migration places stress on urban infrastructure that is constantly catching up with this rapid growth. In particular, urban transportation is in high demand as new residents need ways to get to jobs, often living far away where housing is more affordable. Mumbai, as a city of over 12 million people, is no exception and has stark transportation challenges. In addition to private transport (personal vehicles, two-wheelers and cycles) and mass transit (trains and buses), there is a third form of transportation - intermediate public transport in the form of auto-rickshaws and taxis – that serve an important role in the transportation system of the city.

Auto-rickshaws provide door-to-door service and act as a feeder mode to public transit, with nine percent of train commuters using rickshaws to access the stations. While auto-rickshaws serve an integral transport role to residents of Mumbai, there are still problems with the current system, from the perspective of passengers, drivers, and the government.

The goal of this study is to better understand the role of auto-rickshaws in Mumbai’s transport system and the distinct challenges and opportunities that the sector presents in promoting a sustainable transport system for Mumbai. In particular, the focus of the study is on auto-rickshaws that provide a taxi service and not the share auto-rickshaws that provide fixed route informal public transport at some locations in Mumbai.

We aim to answer some of the following questions: How is the auto-rickshaw industry in Mumbai part of a sustainable urban transport system? How can auto-rickshaws provide comparable mobility to that of a private vehicle? How do auto-rickshaws benefit residents and drivers? What are areas for improvement from the driver, user and environmental perspectives?

This study of auto-rickshaws assumes that both sustainable urban transport and sustainable livelihoods are desirable in the future of Indian cities, in particular Mumbai. Sustainable urban transport aims to reduce reliance on automobiles and their corresponding problems of traffic congestion, air pollution (emissions) and road fatalities in favor of alternate forms of transport (such as non-motorized transport (NMT) and public transport) that allow the same degree of mobility.

\[1\] Note that this study does not focus on taxis, which also serve as an important intermediate public transport mode in Mumbai.
The Avoid-Shift-Improve (ASI) Framework provides the basis for pursuing and promoting sustainable urban transport. The framework is based on three strategies:

1. **Avoid** unnecessary trips
2. **Shift** to more sustainable transport modes such as public transport and NMT, and
3. **Improve** performance in all modes

**Review of Literature**

A recent publication highlights the role that auto-rickshaws can play in Indian cities in promoting sustainable urban transport, as part of the ASI framework. In particular, the study shows that auto-rickshaws can help catalyze the shift from private vehicles to more sustainable transport modes, by i) providing access to public transport such as buses and trains, and ii) serving as an alternative to private vehicles for more occasional trips requiring on-demand, door-to-door connectivity.

Sustainable livelihoods are those that contribute to better living conditions and an improvement of assets to help vulnerable populations withstand shocks and stresses to the system. In “Non-motorized Transport and Sustainable Development: Evidence from Calcutta,” the authors discuss the importance of jobs as rickshaw pullers for those “citizens on the knife edge of existence and they support many hundreds of thousands of dependents.” The Sustainable Livelihoods Approach considers access to five assets as crucial to being able to make a living:

- **Social** including networks, relationships, leadership;
- **Human** such as knowledge, health and education;
- **Natural** including access to potable water, land and nature;
- **Physical** such as infrastructure and technology; and
- **Financial** such as access to monetary income, credit and pension.

These studies highlight the role that auto-rickshaws can play in promoting sustainable urban transport and sustainable livelihoods. This study sets out to explore how Mumbai’s auto-rickshaws fit into a sustainable urban transport system and whether they are able to provide sustainable livelihoods to their drivers.

The study is based on a ground-level assessment of the sector and its role, with the aim to understanding several potential challenges that it faces. Up to this point, there has been no comprehensive study of the auto-rickshaw sector in Mumbai. Auto-rickshaws have been studied in other Indian cities, and transport studies have been done in Mumbai, but never has one solely focused on studying all the aspects of Mumbai’s auto-rickshaw sector.
Methodology

The research included both quantitative and qualitative methods to form a case study of the auto-rickshaw industry in Mumbai. In order to gain an accurate picture of the system, significant background research on Mumbai was completed pertaining to demographics, transportation system characteristics, market characteristics and current infrastructure. This included document review of government records and laws as well as existing literature available on auto-rickshaws. Further, a structured survey of 500 auto-rickshaw drivers and 500 auto-rickshaw passengers was completed over a 10-day period in July 2012 at eleven high demand locations around the Suburbs of Mumbai to get detailed information on driver and user characteristics and their challenges.

Table 1.1 presents a description of the thematic areas covered in this study.

Table 1.1: Thematic areas and information covered

<table>
<thead>
<tr>
<th>Thematic area</th>
<th>Information included</th>
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</thead>
<tbody>
<tr>
<td><strong>Mumbai Profile</strong></td>
<td>Area and demographics</td>
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<td></td>
<td>Socio-economics</td>
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<tr>
<td></td>
<td>Traffic and transportation</td>
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<tr>
<td><strong>Regulations</strong></td>
<td>Permits</td>
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<tr>
<td></td>
<td>Fares</td>
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<tr>
<td></td>
<td>Meters</td>
</tr>
<tr>
<td><strong>Market Characteristics</strong></td>
<td>Fleet Size</td>
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<td></td>
<td>Age of fleet</td>
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<td></td>
<td>Engine and fuel characteristics</td>
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<tr>
<td><strong>Operational Characteristics</strong></td>
<td>High demand locations</td>
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<tr>
<td></td>
<td>Daily trip characteristics</td>
</tr>
<tr>
<td><strong>Driver Profile</strong></td>
<td>Age profile</td>
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<tr>
<td></td>
<td>Owner and renter drivers</td>
</tr>
<tr>
<td><strong>Economics</strong></td>
<td>Driver costs and earnings</td>
</tr>
<tr>
<td><strong>User Profile</strong></td>
<td>Age profile</td>
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<td></td>
<td>Gender profile</td>
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<tr>
<td></td>
<td>Income profile</td>
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<tr>
<td></td>
<td>Time of day characteristics</td>
</tr>
<tr>
<td></td>
<td>Trip purpose</td>
</tr>
<tr>
<td></td>
<td>Frequency of use</td>
</tr>
<tr>
<td><strong>Infrastructure</strong></td>
<td>Auto-rickshaw parking facilities</td>
</tr>
<tr>
<td><strong>Current Challenges</strong></td>
<td>Drivers</td>
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<tr>
<td></td>
<td>Passengers</td>
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<tr>
<td></td>
<td>Government</td>
</tr>
<tr>
<td><strong>Entrepreneur Initiatives</strong></td>
<td>Innovative business ventures in the auto-rickshaw sector</td>
</tr>
</tbody>
</table>
Table 1.2: List of locations surveyed and observed in this study:

<table>
<thead>
<tr>
<th>Locations</th>
<th>Observation</th>
<th>Driver Survey</th>
<th>Passenger Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandra rail station (East and West)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Khar rail station (East and West)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Santacruz rail station (East and West)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vile Parle rail station (East and West)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andheri rail station (East and West)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Jogeshwari rail station (East and West)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic airport, Juhu</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Bandra Kurla Complex</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Globus Mall/Bhabha Hospital</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Linking Road, Bandra West</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>CNG fueling station (near Sion East - Anik Depot)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kurla West Rail Station</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

The auto-rickshaw driver and passenger surveys were conducted between nine a.m. and six p.m., Monday through Saturday. The results of this survey were used to determine market, driver, user, operating and economic characteristics. Additionally, systematic observation of areas of high-demand for auto-rickshaws including train stations, the domestic airport, schools, malls and hospitals was completed, to get information on current state of operations and infrastructure conditions.
Map 1.1: Map of Mumbai with Survey and Observation Locations as well as Service Area for Auto-rickshaws

Source: Google Maps

In addition to the above sources, interviews were conducted to gain perspectives from various stakeholders including the government, entrepreneurs, civil society, driver unions, and the Mumbai Traffic Police.

Structure of Report

The report begins with a city profile of Mumbai (section II), including demographics, socio-economics, and transportation system characteristics. Section III presents a profile of the auto-rickshaw sector in Mumbai focusing specifically on regulations, market characteristics, driver profile, operational characteristics, economics, user profile, and infrastructure. Section IV summarizes the current challenges of the industry, from passenger, driver and other stakeholder perspectives. Section V discusses some of the initiatives that have been taken up by the private sector (entrepreneurs) in Mumbai, the challenges they are facing, and the benefits of their initiatives. The final section discusses the future of the auto-rickshaw sector in Mumbai, along with recommendations.
II. Mumbai Profile

Mumbai is located on the west coast of India and is the capital of the state of Maharashtra. Its location is prime owing to proximity to the coast, and is considered to be the financial capital of India and home to the Bollywood film industry. Mumbai was originally created on seven distinct islands, and has grown upward and outward since then. Greater Mumbai comprises Mumbai City (the Island City) south of Mahim Bay and Suburban Mumbai stretching north to Dahisar and east to Thane Creek. The Mumbai Metropolitan Region (MMR) also includes the areas of Thane, Navi Mumbai, Kalyan-Dombivali, Vasai-Virar, Mira-Bhayandar, Bhiwandi-Nizampur, and Ulhasnagar. While we include facts about Greater Mumbai and the Mumbai Metropolitan Region in this section, the auto-rickshaw report focuses solely on Suburban Mumbai.

Map 2.1: Greater Mumbai Map; vii Map 2.2: Map showing division between Mumbai City and Suburban Mumbai viii

Area and Demographic Profile

The total area of Greater Mumbai is 437.71 square kilometers. The majority of this is Suburban Mumbai, which measures 370 square kilometers while Mumbai City is 67.79 square kilometers. ix
Population
The population of Greater Mumbai has tripled in the last fifty years, from a population of 4.15 million in 1961 to 12.5 million in 2011. It is now the sixth largest city in the world. The city has been steadily expanding due to increased economic migration.

Density and Housing
This has created higher density living and more expensive housing which has in turn pushed people into the suburbs. This is represented in the higher population of Suburban Mumbai at 9.3 million compared to Mumbai City, which has only 3.15 million persons. The expansion of Mumbai has largely followed the suburban train lines, allowing commuters to remain within easy access to offices in the south while finding more affordable housing in the north. This however has put an increased strain on suburban rail lines. Despite the northern growth, both Suburban Mumbai and Mumbai City have high densities: 20,925 persons per square kilometer and 20,038 persons per square kilometer, respectively.

Slums
Greater Mumbai also has a large portion of slums; the total slum population in Greater Mumbai was 6.5 million in 2008, which represents 54 percent of the population. Eighty-three percent of these slums are located in the Suburban area.

Sex ratio
Just over 50 percent of residents are male, with a sex ratio of 852 females for every 1000 males. The literacy rate for persons above 7 years of age is 90.28 percent.

Socio-Economics
Mumbai is a center/hub for financial services, information technology (IT), information technology enabled services (ITES), media, entertainment, hospitality and tourism. While much of industry is still concentrated in Mumbai City, there has been a push to expand business locales to other areas so that pressure on the transport sector will be better distributed. To this end, there has been a concerted effort since the mid-1990's to shift or expand the financial district to the Bandra Kurla Complex in the Suburbs. Andheri-Kurla Road in the north has also become a center for IT and ITES.

In 2008, the Mumbai Metropolitan Region Development Authority (MMRDA) commissioned a Comprehensive Transportation Study (CTS) for the Mumbai Metropolitan Region (MMR), which included a Home Interview Survey (HIS) of 66,000 households over one year. Precise income data for Greater Mumbai is
unavailable and so data on the Mumbai Metropolitan Region is covered here. Average individual income and average household income in MMR were found to be INR 5,400 per month and INR 8,100 per month per family, respectively. Thirty-nine percent of individuals make INR 3,000-5,000 per month and thirty percent of individuals make 5,000-10,000 per month (see figures 2.1 and 2.2).

**Figure 2.1: Income Distribution (INR per person per month)**

Source: Comprehensive Transportation Study for the Mumbai Metropolitan Region

**Figure 2.2: Income Distribution (INR per household per month)**

Source: Comprehensive Transportation Study for the Mumbai Metropolitan Region
Traffic and Transportation

There is no scarcity of transportation options in Mumbai. A thick network of roads encompasses the city as well as three train lines, buses, taxis and auto-rickshaws. Auto-rickshaws, by law, are relegated to Suburban Mumbai, with Bandra and Sion being the southernmost neighborhoods where auto-rickshaws can ply, while the northern boundaries of operation are the limits of the Mumbai Metropolitan Region (MMR).

The road network runs mostly north to south with smaller roads connecting along the east and west. There are three major highways: the Western Express Highway, the Eastern Express Highway and the Sion-Panvel Highway. According to a Road Network Inventory Analysis done in the CTS, 47 percent of roads in Greater Mumbai have “good” pavement condition (over satisfactory or poor). However, there are many old and narrow streets throughout the city that suffer from a lack of maintenance and traffic and parking enforcement.

Ownership of private vehicles in Greater Mumbai has been on the rise with almost 600,000 private cars and 1.5 million two-wheelers as of March 2011. In recent years there has been increased funding for roads and flyovers. According to Greater Mumbai’s budget estimates for 2012-13, there is a capital provision of Rs. 14.7 billion for road works compared to only Rs. 7.1 billion in 2011-12, an increase of 106 percent.

There are three rail lines. The Western and Central Railways connect Mumbai with areas around the country, as well as run suburban and freight trains. The Harbour line is a suburban train that runs along the east side of Mumbai City and then splits to the west and east in the North. Data from 2005 reveals that there were close to 6 million rail passenger trips per day on Mumbai’s suburban train system.

Mode share

Mode share data for Mumbai has been obtained from the Comprehensive Transportation Study conducted by the MMRDA in 2008. Figures 2a and 2b show that the majority of trips in the MMR are taken by train or bus. Taxis and rickshaws represent nine percent of mode share.
Similarly, most work-bound travelers use train as their primary mode of transportation (Figure 1.5). Schoolchildren split between train and bus as their primary mode for traveling to school (Figure 1.6). However, sixteen percent of education trips are taken by rickshaw, which is the fourth most used method of transport.
The table below shows that nine percent of train travellers use an auto-rickshaw to get to or from the train station in the Suburbs, which is the third most used form of transport after walking or bussing.

**Table 2.1: Access Modes to Railway Stations**

<table>
<thead>
<tr>
<th>Modes</th>
<th>Island City (%)</th>
<th>Suburbs (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk at both ends</td>
<td>82</td>
<td>61</td>
</tr>
<tr>
<td>Bus at either/both ends</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>Auto rickshaw at either/both ends</td>
<td>2</td>
<td>9</td>
</tr>
</tbody>
</table>
### Chartered Bus

<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Combinations</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Comprehensive Transportation Study for the Mumbai Metropolitan Region

The CTS also covers some other important information, as noted below:

- **Usage**: Most of those surveyed use autos once in a day (58.8 percent), while 22.3 percent use them occasionally, 15.1 percent once in a week, and 3.7 percent more than one trip in a day.xxvi
- **Trip purposes**: Most trips by auto-rickshaws are for work (58 percent), while 20 percent are for home, and fewer trips are for education, business, shopping, health, entertainment, social and other.xxvii
- **Trip lengths**: Average trip length in auto-rickshaws ranges between 9 to 36 minutes at various locations, with an average of 18 minutes.xxviii This is less than the average trip lengths of two-wheelers (24 minutes), taxis (30 minutes) and car/jeep/van (59 minutes).xxix

These figures show that in the MMR, auto-rickshaws are being used every day for short trips, mostly to and from work.

### III. Profile of the Auto-rickshaw Sector

As noted in Section I, this section focuses on key aspects of Mumbai’s auto-rickshaw sector, including policy and regulation, market characteristics, operational characteristics, user and driver profiles, and infrastructure.

#### Regulations

**Permits**

According to the Motor Transport Statistics of Maharashtra 2010-2011, there were 108,715 auto-rickshaws on the road in Greater Mumbai as of March 2011.xxx The same source also reports that as of March 2011, there were 118,477 valid (live) permits in Greater Mumbai.xxxi Recent news reports indicate that the State government of Maharashtra is looking to draft a policy document on permits in the coming months.xxxii

The government is no longer issuing new permits. Under Section 74, (3)(a) of the Maharashtra State Motor Vehicles Act of 1998, the state government has the right to limit the number of contract carriages (which include auto-rickshaws) with consideration of the number of vehicles and road conditions.xxxiii

The State Motor Vehicle Department lists the fee for an auto-rickshaw permit (metered motor cab) as Rs. 100.xxxiv However, because of the cap on the issue of
new permits, the price of permits has become overinflated. Of those 198 drivers surveyed who paid for their permit there were four drivers who paid Rs. 50 or 100, which is at or below the legal price. Of the others, the price paid was Rs. 40,000 – 90,000 for a five-year lease with an average of Rs. 67,908. As the chart below shows, the majority of permit holders paid between Rs. 60,000-70,000, which is more than 600 times the legal price. This data thus shows how current permit policies are impacting the economics of auto-rickshaw operations, which will be discussed further in a later section.

![Figure 3.1: Permit Price Paid by Drivers](image)

Source: EMBARQ Driver Surveys
Note: This chart represents the total number of survey respondents who paid for their permits, which is 198.

Most permit-holders hold onto their permits or pass them down through family. Because of this, it is difficult and expensive for newcomers to get into the auto-rickshaw business. Although it is illegal to use a permit that is not under your name, many drivers lease permits from permit-holders for a period of 5 to 10 years, which represent the costs in the bar graph above. Alternately, drivers pay daily rent to permit-holders, which driver surveys found could be up to Rs. 300 with an average of approximately Rs 160 daily.

Section 74, (2) of the Maharashtra State Motor Vehicles Act of 1998 additionally lists the following conditions that can be attached to any permit for contract-carriages that is issued:

i. That the vehicle can only ply in a specified area or on specified route
ii. The maximum number of passengers and weight of luggage
iii. The type of goods that can be carried
iv. That specified fares or rates of fares will be charged and the fare table should be exhibited in the vehicle
v. That a specified weight of passengers’ luggage shall be carried free of charge and any additional charge will be at a specified rate
vi. That a taximeter shall be fitted on the vehicle and maintained in proper working order
vii. That specified standards of comfort and cleanliness are maintained in the vehicle
viii. The plying of the vehicle or carrying of the passengers shall not be refused

In addition, a driver is required by law to submit their vehicle to an inspection annually in order to renew their Certificate of Fitness. Vehicles must also possess a Pollution Under Control (PUC) test certificate, which are valid for one year.

There are not many conditions that lead to a permit being revoked from its owner. In many cases, violations of the permit conditions have been punished with a fine. This is now changing. With the rise of electronic meters in late spring/early summer of 2012, there have been several cases of e-meter tampering. To deter other tamperers, permits have been retracted from those permit-holders who have been caught with tampered meters.

In 2006, Mumbai passed the Fleet Taxi Service Scheme, which allowed private companies to operate fleet taxis with trained drivers and dispatch services. There has been no similar scheme passed for auto-rickshaws. Fleet auto-rickshaw schemes are on the rise around India and there is a need to better understand whether there are benefits to fleet operations in Mumbai and if so, how to encourage permit policy reforms to allow these systems. One fledgling fleet service in Mumbai will be discussed further in the Entrepreneur Initiatives section.

**Fares**

In 1996, the Government of Maharashtra, appointed a seven-person committee under the chairmanship of PMA Hakim (“the Hakim Committee”) to create a formula to revise taxi fares in Greater Mumbai. At the time, taxi unions protested that fare revisions up to that point, which did account for petrol price increases, were ad hoc and that a more scientific basis for fare revisions was needed.

The goal was to create a formula that could be used to revise the fare periodically due to increasing input costs. The fares were decided for taxis, and a subsequent committee formed in 2006 under the chairmanship of the Transport Commissioner decided to apply the same for auto-rickshaws, presumably accounting for difference in fare components like petrol cost and insurance among others. The Committee recommended in February 2010 that the fare of Rs.10 may be fixed for the initial 1.6 kms and Rs. 6 for each subsequent km, which was subsequently raised in April 2012 to Rs. 12 for the initial distance and Rs. 7 for every km thereafter.

More recently, the one-man committee formed by the Maharashtra State Government (consisting of PMA Hakeem) submitted its recommendations for fare revisions, choosing to make a separate provision of fare structure for auto-
rickshaws in the city. Among its main objectives, the Committee aimed to look at
cost-based fare structures that varied with fuel usage, a formula for future fare
revisions, minimum distance considerations in the fare, and fares for share-a-
rickshaw schemes and pre-paid services. It conceded that the existing formula
for fare determination, which was based on taxis, required revision to better suit
auto-rickshaws. Having taken into account the views of the auto-rickshaw union,
as well as passengers’ and consumers’ viewpoints, the committee decided upon
the following fare structure:

1. Annual interest and depreciation: Rs. 7,921 + Rs. 9,771 = Rs.17,692
2. Annual burden of other fixed costs namely taxes and insurance premium
   for comprehensive policy: Rs. 4,546
3. Maintenance:
   a) Annual cost of repair and maintenance of an auto-rickshaw operating
      in only one shift: Rs. 21,000
   b) Annual cost of repair and maintenance of an auto-rickshaw operating
      in two shifts: Rs. 25,000
4. Annual provision for the cost of living of the family of the driver of the
   auto-rickshaw: Rs. 12,000 X12 = Rs. 1,44,000
5. Average number of revenue earning kms in a shift per year (assuming 300
   working days: 67 x 300 = 20,100 kms
6. Average kms run per kg of CNG: 28.5 km
7. Average percentage of idle distance run by an auto-rickshaw: 18%

Furthermore, the committee found that the following factors contributed to the
fare, considering both, fixed and variable costs of operating an auto-rickshaw for
Mumbai:

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest and depreciation</td>
<td>51.8 paise</td>
</tr>
<tr>
<td>Insurance and taxes</td>
<td>13.3 paise</td>
</tr>
<tr>
<td>Fuel</td>
<td>164.3 paise</td>
</tr>
<tr>
<td>Repairs and maintenance</td>
<td>69.7 paise</td>
</tr>
<tr>
<td>Cost of living</td>
<td>716.4 paise</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1015.5 paise (Rs. 10.15)</strong></td>
</tr>
</tbody>
</table>

Finally, the recommendation for revising the fare periodically was left to the
Regional Transport Authority, with the following components indicating how the
fare should ideally change:

1. Interest and depreciation: (Latest price in rupees of a new auto-
rickshaw) divided by 2703.
2. Insurance and taxes: (Latest total amount of insurance and all taxes in
   rupees) divided by 341.8
3. Fuel: (Latest cost of one kg of CNG in rupees) multiplied by 4.964
4. Repairs and maintenance: (Latest price in rupees of a new auto-
rickshaw) divided by 2678 plus (CPI number for the latest available
   month) divided by 11.707
5. Cost of living: (CPI number for the latest available month) multiplied by 3.512

The report goes on to state that since the fuel costs differ depending on the fuel used by the auto-rickshaw, there should be distinctive changes made according to the fuel that an auto-rickshaw runs on. It was further suggested that the additional fare of 25% presently charged for journeys after midnight, be increased to 30%. Similarly, the committee also recommends separate fare structures for share-auto-rickshaws as well as pre-paid auto-rickshaws (should they become operational). The government formally accepted all the recommendations of the Hakim Committee on October 11th 2012, enforcing a fare increase for auto-rickshaws in Mumbai at Rs. 15 for the initial 1.6km and Rs. 9.87 for every subsequent km. New tariff cards have been issued, and e-meters are being recalibrated to ensure that the new fares are in effect.

While many organizations and representatives (from government, unions as well as passengers/consumers) were consulted during the deliberations of the committee, the recommendations were met with general disapproval and displeasure. Many users have called for boycotts and even demanded rolling back of the new fares. Currently, a public interest litigation (PIL) has been filed countering the fare hike, which proposed that the government appoint an expert panel to decide some of the components of the revised fare, which is being considered.

**Meters**
As cited above, the State Motor Vehicle Rules require that a taximeter must be affixed to an auto-rickshaw and maintained in proper working order. For the majority of auto-rickshaws in Mumbai, that means a mechanical meter. Unfortunately, these meters are grossly outdated. The meter shows a tariff, which then has to be crosschecked with a constantly updated fare chart to determine the appropriate price. According to passenger surveys, often meters are tampered with or fare charts are fabricated and so customers never know whether they are getting the correct fare.

Because of this, Mumbai is in the process of rolling out new electronic meters (e-meters) across the city and as of the end of June 2012 over 10,000 e-meters had been installed. Auto-rickshaw owners are required to install an electronic meter in their vehicle at their next annual vehicle fitness certification test. These updated meters show the kilometerage, waiting time and actual fare to be paid, easing the payment process between drivers and passengers. As already mentioned, there have been reported cases of e-meter tampering but these are much less common and are being punished appropriately.
Market Characteristics

Market Size and Age of Fleet

As mentioned previously, there are 108,715 auto-rickshaws plying in Greater Mumbai. Driver surveys conducted as part of this study found that vehicles range from 6 months to 15 years old, with the average age of a vehicle being 5.5 years. Over half the vehicles are less than 5 years old, with only 3 percent of vehicles more than 10 years old. The recent Hakim Committee Report emphasized that auto unions felt that if older vehicles are in “good condition” and ran on clean fuel, then they should be allowed to ply. No regulation has been made in this regard, although there has been a recent proposal by the State Transport Authority to fix the maximum age of auto-rickshaws at 16 years.

Figure 3.2: Age Characteristics of Auto-rickshaw Fleet

Source: EMBARQ Driver Surveys
Engine and fuel characteristics
Our survey found that most vehicles in Greater Mumbai (77.4 percent) have 2-stroke engines while only 22.6 percent have 4-stroke engines. The 4-stroke engines, while more expensive to repair, are less prone to break downs and create less emissions.

The State government reports that in Greater Mumbai in 2011, 98 percent of auto-rickshaws (106,876) ran on compressed natural gas (CNG) while only 1,839 auto-rickshaws ran on petrol\textsuperscript{xlvii}

Operational Characteristics
As mentioned previously, auto-rickshaws are restricted to Suburban Mumbai, with Bandra and Sion being the southernmost neighborhoods that they are permitted to ply in.

High demand locations
High demand locations for auto-rickshaw usage include all train stations on all three lines as auto-rickshaws supplement walking and bus service as a feeder mode to suburban rail. Other frequented areas are hospitals, malls, office buildings and recreational areas. Figure 3.3 shows locations of high demand based on driver surveys. The top ten locations are represented. Large percentages of drivers ply in Andheri, Band Stand (Bandra West) and the Bandra Kurla Complex, among others.

Figure 3.3. Locations of High Demand

Note: This chart represents the top ten locations based on driver surveys of frequent location. All of these locations had ten or more responses.
**Daily Trip Characteristics**

According to our survey, an average driver spends almost ten hours a day or around 105 kilometers plying their auto-rickshaw. About 10.4 percent of those kilometers are without passengers (empty). Drivers take about 17 trips per day, each lasting an average of 5.25 kilometers. Table 3.3 shows the range of figures we found in our study:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average hours of operation</strong></td>
<td>10</td>
</tr>
<tr>
<td><strong>Average daily kilometers traveled</strong></td>
<td>105</td>
</tr>
<tr>
<td><strong>Average share of empty kilometers traveled</strong></td>
<td>10.2%</td>
</tr>
<tr>
<td><strong>Average trip length (in kilometers)</strong></td>
<td>5.25</td>
</tr>
<tr>
<td><strong>Average daily trips</strong></td>
<td>18</td>
</tr>
</tbody>
</table>

Source: EMBARQ Driver Surveys

*Notes: Average trip length was estimated from average daily kilometers, average daily trips and share of empty kilometers traveled.*

**Profile of Auto-rickshaw Drivers**

**Age profile**

According to our survey, the auto-rickshaw drivers in Mumbai range in age from 23 to 58, with an average age of 37.5. Over half the drivers are between the ages of 30-40 years and another ¼ are between the ages of 40-50 years. Less than 16% are in the age group of 20-30 years, showing that Mumbai drivers tend to be middle-aged and not younger or older men as represented by our sample.

**Figure 3.4: Age Profile of Auto-rickshaw Drivers**

Source: EMBARQ Driver Surveys
Owner and renter drivers

It is significant that eighty percent of drivers surveyed were found to rent their vehicle while only twenty percent own their vehicle. This contributes profoundly to the economics of auto-rickshaws. Those who rent are paying more via rent and earning less profit, primarily due to reduced profits as a result of paying rent.

Economics

It is hard to accurately determine whether auto-rickshaw driving provides sustainable livelihoods. On the one hand, there are at least 108,715 jobs as auto-rickshaw drivers. This number could be twice as high since permit-holders can rent out their permit or vehicle for at least one shift per day. Amounting to nearly 200,000 jobs made available by auto-rickshaws. Driving an auto-rickshaw also requires very little training or education so the profession is open to a wide portion of the population. On the other hand, the industry can be cost-prohibitive with the high price of permits and vehicles and the necessity of most drivers to take out loans in order to lease permits or purchase vehicles. This section reviews the average costs and revenues associated with driving an auto-rickshaw.

Table 3.4: Economics of Auto-rickshaw Operations

<table>
<thead>
<tr>
<th></th>
<th>Renter-Driver</th>
<th>Owner-Driver</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capital Costs (Rs):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permit</td>
<td>-</td>
<td>67,900</td>
</tr>
<tr>
<td>Vehicle incl. taxes &amp; fees</td>
<td>-</td>
<td>165,730</td>
</tr>
<tr>
<td><strong>Daily Costs (Rs.):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel</td>
<td>132.5</td>
<td>132.5</td>
</tr>
<tr>
<td>Rent</td>
<td>160</td>
<td>-</td>
</tr>
<tr>
<td><strong>Other Costs (Rs.):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance (monthly average divided by 26 days)</td>
<td>-</td>
<td>41.75</td>
</tr>
<tr>
<td><strong>Daily Revenue (Rs.):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fares</td>
<td>650</td>
<td>650</td>
</tr>
</tbody>
</table>

Source: EMBARQ Driver Surveys
Note: Daily fares were calculated based on average trip length, current fare corresponding to that trip length and number of trips.
Table 3.5: Calculation of costs, revenue and profits per day

<table>
<thead>
<tr>
<th></th>
<th>Renter-Driver</th>
<th>Owner-Driver</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capital Costs (Rs):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equated monthly installment (EMI) for permit and vehicle</td>
<td>-</td>
<td>96.5</td>
</tr>
<tr>
<td><strong>Daily Costs (Rs.):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel</td>
<td>132.5</td>
<td>132.5</td>
</tr>
<tr>
<td>Rent</td>
<td>160</td>
<td>-</td>
</tr>
<tr>
<td><strong>Other Costs (Rs.):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance (monthly average divided by 26 days)</td>
<td>-</td>
<td>41.75</td>
</tr>
<tr>
<td><strong>TOTAL COSTS:</strong></td>
<td>292.5</td>
<td>270.75</td>
</tr>
<tr>
<td><strong>Daily Revenue (Rs.):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fares</td>
<td>650</td>
<td>650</td>
</tr>
<tr>
<td><strong>TOTAL REVENUE:</strong></td>
<td>650</td>
<td>650</td>
</tr>
<tr>
<td><strong>Total Daily Profit:</strong></td>
<td>357.5</td>
<td>379.25</td>
</tr>
</tbody>
</table>

Source: EMBARQ Driver Surveys
Note: Daily fare was calculated based on average trip length, current fare corresponding to that trip length and number of trips.

As these tables show, on an average, renter-drivers make close to Rs. 357.5 per day, while owner-drivers make close to Rs. 379.25 per day. Assuming they work six days a week, renter-drivers have a monthly income of Rs. 9295 and owner-drivers a monthly income of Rs. 9860. These numbers do not include the amount that owner-drivers may make from renting out their vehicle for at least one shift per day.

Profile of Auto-rickshaw Users

Age profile
Of passengers surveyed, the ages range from 17 to 69, with the average user age being 38.5. As seen in the chart, most users are between 30-40 years old, with fewer passengers above 50 years of age.
Gender profile
Passengers surveyed were mostly male, at 61 percent.

Income profile
A majority of passengers (58 percent) have an income between Rs. 10,000-20,000 per month. This is slightly higher than the average income for residents of MMR determined in the CTS of Rs. 5,400 per month, although 22 percent of auto-rickshaw passengers surveyed in this study have a monthly income within the Rs. 5,000-10,000 range.
Figure 3.7: Income Distribution for Passengers

Source: EMBARQ Passenger Surveys
Note: This chart represents the total number of survey respondents who answered the income question: 385.

Time of day characteristics
The survey found that the majority of auto-rickshaw passengers use auto-rickshaws in the morning (83 percent) and evening (66.7 percent). This is largely indicative of the usage of auto-rickshaws as a feeder service to the suburban train stations, for daily work commute trips.

Midday, late night and afternoon are much less popular times to use rickshaws.

Figure 3.8: Usage of Auto-rickshaws by Time-of-day

Source: EMBARQ Passenger Surveys
Trip purpose

The trip timings presented above further reflect the trip purpose: 76 percent of passengers surveyed said they primarily use auto-rickshaws to access work, followed by shopping, school and health care. Thus those that are using auto-rickshaws in the morning and evening are most likely travelling to and from work or to and from other transport modes, which take them to work.

Figure 3.9: Auto-rickshaw Usage by Trip Purpose

[Diagram showing trip purpose distribution: Work 76%, Shopping 10%, School 7%, Health Care 7%, Recreation 0%]

Source: EMBARQ Passenger Surveys

Frequency of Usage (Number of Trips per Week)

A majority of auto-rickshaw passengers (58%) say that they use rickshaws 10-15 times per week, which is about once or twice a day. Twenty-three percent say they use rickshaws 1-5 times per week and 15 percent say they use rickshaws 5-10 times per week, with over 15 trips per week being rare.

Figure 3.10: Number of Trips per Week

[Diagram showing frequency distribution: 10-15 trips 58%, 5-10 trips 15%, 1-5 trips 23%, 15-20 trips 2%, 20-25 trips 2%, 25-30 trips 0%]

Source: EMBARQ Passenger Surveys
Infrastructure

Nine field visits were performed of areas of high demand around the city to get a sense of on-the-ground conditions for auto-rickshaws, such as auto-rickshaw stands.

According to a July 3rd, 2012 article in Mumbai Mirror, the Mumbai Suburbs are supposed to have 700 auto-rickshaw stands. These stands are marked with a yellow pole that is topped with a circular sign that dictates the number of auto-rickshaws that can park in that space. Drivers parked at a stand are not allowed to refuse passengers. However, only a handful of stands were visible. Furthermore, the Mirror article quotes a union representative who claims that 95 percent of the 700 stands have vanished. Additionally, the Hakim Committee Report of 2012 suggests a coordinated effort on part of the Motor Vehicles Department, Traffic Police and Municipal authorities in order to ensure auto stands are used for the benefit of both, users as well as drivers.

Clockwise from left: (A) An auto-rickshaw stand and queue at Bandra West train station, evening. (B) The chaos of share autos at Bandra East train station, morning. (C) Waiting autos at Bandra Kurla Complex, mid-morning. (D) Waiting passengers at Jogeshwari West, evening.
Most sites were characterized by a lack of organization. Rickshaws arrive and depart haphazardly, often blocking traffic or cutting in front of other cars or pedestrians. In contrast, some places like Bandra West and Jogeshwari East had formal auto stands. In other places, passengers and auto-rickshaws organized themselves in informal auto stands. In areas where there were other options, like abundant buses, passengers often bypass the auto-rickshaws in favor of these. This was particularly evident in Bandra East, where an established but informal system of share autos exists, and it is impossible to not get a share auto. Some train station exits, like Khar East, empty onto narrow streets and no auto-rickshaws were observed. Instead, people walked to access the station. At other sites, like Vile Parle West, narrow streets and tight corners did not prohibit auto-rickshaws and only made for a crowded and competitive system. Often, rickshaws were not present immediately next to train station exits and one had to travel to a main intersection a block or two away to access the auto-rickshaws.

At the domestic airport in Juhu, auto-rickshaws arrive along with cars and taxis at three domestic terminals and are available at the auto-rickshaw stands.

Anecdotal evidence shows that it is easy and affordable (rickshaws run on meter) when traveling to the airport from Mumbai but that it is much more difficult leaving the airport via auto-rickshaw. In one instance, a passenger was grossly overcharged while another user is frequently refused service since her home is located near to the airport. While there are several companies that run pre-paid taxis from the airports, there is no such system for pre-paid auto-rickshaws, which could potentially prevent the aforementioned problems.

Table 3.6 summarizes the observations at each of the locations that were visited.

**Table 3.6: Key Observations of High Demand Locations**

<table>
<thead>
<tr>
<th>Location</th>
<th>Key Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandra West rail station</td>
<td>Auto-rickshaw stand; Wide 2-lane road with plenty of room for waiting autos; Multiple bus stops; Skywalk</td>
</tr>
<tr>
<td>Location</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Bandra East rail station</td>
<td>Slums across from station and between station and street; Narrow 2-lane road with lots of traffic; High amount of bus stops and passengers waiting for frequent buses; Almost entirely share autos; Skywalk</td>
</tr>
<tr>
<td>Khar West rail station</td>
<td>No buses; Share autos; Wide road</td>
</tr>
<tr>
<td>Khar East rail station</td>
<td>Narrow roads and no auto-rickshaws; Walkers only</td>
</tr>
<tr>
<td>Santacruz West rail station</td>
<td>Skywalk; Many shops, street vendors and stalls; Auto-rickshaws congregating about a block away from station entrance; Informal queue in street; Bus stops</td>
</tr>
<tr>
<td>Santacruz East rail station</td>
<td>Bus depot; Moderate amount of auto-rickshaws</td>
</tr>
<tr>
<td>Vile Parle West rail station</td>
<td>Skywalk; Narrow, curved road; High demand</td>
</tr>
<tr>
<td>Vile Parle East rail station</td>
<td>Bus stops; Low amount of auto-rickshaws and people</td>
</tr>
<tr>
<td>Andheri West rail station</td>
<td>Bus depot; Lots of foot traffic; High demand; Share autos</td>
</tr>
<tr>
<td>Andheri East rail station</td>
<td>Bus stops; Informal queue in street; Skywalk; Wide road</td>
</tr>
<tr>
<td>Jogeshwari West rail station</td>
<td>Bus depot; Low amount of auto-rickshaws and people</td>
</tr>
<tr>
<td>Jogeshwari East rail station</td>
<td>Auto-rickshaw stand; Wide road</td>
</tr>
<tr>
<td>Domestic airport, Juhu</td>
<td>Organized method of dropping off passengers at departure gate with other modes; Designated pick-up area for auto-rickshaws outside of Arrivals with drivers waiting; Some drivers picking up passengers in Departures area or other thoroughfare</td>
</tr>
<tr>
<td>Bandra Kurla Complex</td>
<td>Wide roads; Wide sidewalks; Bike lanes; Multiple bus stops throughout; Multiple areas of concentration of waiting autos – on main road, in front of large buildings; Some drivers taking breaks, drinking tea, etc.</td>
</tr>
<tr>
<td>Globus Mall/Bhabha Hospital</td>
<td>Wide road; Off main road (Hill Road); Street stalls; Bus stops; Lots of private vehicle, taxi and auto-rickshaw traffic in both directions; Many auto-rickshaw drivers parked and taking breaks or waiting for passengers; High demand</td>
</tr>
</tbody>
</table>
IV. Current Challenges

Drivers

The auto-rickshaw driver surveys conducted for this study solicited information from drivers on the key issues/challenges faced by them. The top complaints from drivers were about traffic police and traffic police charging fines (35 percent and 32 percent respectively). Following that, passengers and traffic were main concerns. Other problems highlighted include lack of parking, lack of permits, and rain.

Figure 4.1: Key Issues facing Auto-rickshaw Drivers

Complaints about traffic include increased fuel usage and traffic congestion. This can be partly attributed to the growth in motor vehicles.

Police and Traffic Police are clearly the main problem facing auto-rickshaw drivers. Many drivers complained that they were unfairly or without reason charged fines by the Traffic Police. Furthermore, a large portion of drivers mentioned that Police and Traffic Police harassed the drivers. This may come in the form of stopping them to check for licenses and permits or approaching them about refusals and tampered meters. On the one hand, it is good that there is some level of enforcement occurring but on the other hand, the Police seem to be arbitrarily targeting drivers or alternately, not treating drivers respectfully.

While complaints about passengers were minor compared to those about the Traffic Police, this figure still represents the intrinsic tension between auto-
rickshaw passengers and drivers in Mumbai. Because of the mechanical meter system and the perceived amount of tampering that occurs, there is inherent distrust between the two parties. Neither knows whether they are going to have to argue with the other over the fare when they depart the vehicle. Because there are so many rickshaws, one experience (good or bad) has no effect on a subsequent experience. Drivers are used to being harassed or not paid correctly as passengers are used to being refused or overcharged.

The problems presented by the auto-rickshaw drivers with the police as well as passengers tell of distrust. Drivers (whether errant or otherwise) are often not recognized for their service. Instead, they are treated unfavourably by both parties. In reaction to such harassment, they feel less accountable towards the public for providing quality transport service. This ultimately leads to a vicious cycle of distrust.

Other issues that drivers did not mention of those are health and wellness. Working ten hour shifts, the drivers are at high risk of exposure for air pollution caused by vehicles. They also are vulnerable to back problems from poor suspension and sitting long hours.

Union perspective

The president and general secretary of a prominent auto-rickshaw driver union in Mumbai was interviewed as part of this study, who illuminated a number of other concerns from the driver’s perspective. The key issues raised by the union leaders are highlighted below:

• **Driver education and healthcare**: A main concern is that social aspects such as education and healthcare of drivers are not being considered. Union leaders argue that auto-rickshaws and their drivers provide a service that improves the city, yet the current fare system does not account for these aspects. Drivers do not make enough to adequately pay for their own education and health care. This feeds into the sustainable livelihood question. If they are not making enough to provide for these basic services, then the employment is not sustainable. Union views aside, although driver education with regards to safety and policy may provide value to the service, formal education has not been considered before in determination of fares.

• **Permits**: The union representatives also believe that the current restriction of permits has led to the decline in quality and availability of autos. They consider it to be a problem of supply and demand: the current permit restrictions have created a situation where there is an undersupply of auto-rickshaws with high demand, which affects quality of service. With an increase in permits, they believe that quality would increase and there would not be the same problems with availability.
Passengers
The passenger surveys conducted in this study obtained information on both advantages as well as challenges associated with auto-rickshaw service in Mumbai. These are discussed below:

Advantages
Figure 4.2 highlights the advantages mentioned by passengers of using auto-rickshaws in Mumbai. As this graph shows, the main advantage to using auto-rickshaws is their speed. Seventy-two percent of those who felt there were advantages cited speed as the main benefit. Specifically, thirty percent prefer rickshaws because they are faster than the bus. Another five percent responded that they liked using auto-rickshaws because they are the same price or cheaper than the bus and a smaller percentage cite that autos ply where buses do not. This shows that auto-rickshaws are in direct competition with buses in Mumbai. Commuters face a choice with time and money, where auto-rickshaws are often favoured due to greater comfort, safety, availability and luggage room.

Problems
Figure 4.3 below highlights the key problems faced by auto-rickshaw passengers.
The largest number of complaints from passengers was for refusals at 38 percent followed by lack of availability at 26 percent. Overcharging, price disagreements and complaints about incorrect meters came from 16 percent of passengers. Other problems include traffic, high fares and rude behavior by drivers.

Again, the complaints of refusals, overcharging, inaccurate meters and rude drivers represent the tension between drivers and passengers. Availability is also key, while five percent cited this as an advantage, 26 percent cited lack of availability as an important issue. Availability and refusals are related as well: often there are autos available but the drivers refuse to go to the destination requested. This is illegal but difficult to enforce unless a police officer is immediately on hand.

Other relevant concerns not mentioned by surveyed passengers include safety, exposure to pollution, poor suspension, and susceptibility to rain. Auto-rickshaws in Mumbai lack doors and seatbelts, in addition to having the roof (usually made of PVC-coated Polyester fabric or canvas). These features create a lack of protection of passengers and drivers in the case of an accident, especially with larger vehicles like cars, trucks and buses. Because of the lack of windows and doors, passengers are exposed to air pollution from traffic congestion and forces of nature like wind. While most rickshaws have door curtains that provide some degree of protection from the rain, passengers are still likely to get wet during a rainstorm.

**Researcher Observations**

From daily trips in auto-rickshaws, the researcher had her own experiences. From June 25 – July 30, 2012, the researcher recorded the following in Table 4.1 regarding each rickshaw ride (representing 35 trips).
**Table 4.1: Personal observations of auto-rickshaw rides**

<table>
<thead>
<tr>
<th>Observations</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refusals</td>
<td>13</td>
<td>35</td>
</tr>
<tr>
<td>Understand/know destination</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>E-meter</td>
<td>12</td>
<td>23</td>
</tr>
<tr>
<td>Fare table used</td>
<td>6</td>
<td>29</td>
</tr>
<tr>
<td>Overcharged</td>
<td>10</td>
<td>25</td>
</tr>
</tbody>
</table>

While refusals did occur, the majority of drivers agreed to ply to a destination. Most drivers were also able to understand the destination desired and/or knew where to go. Although most drivers did not use fare tables to determine the correct fare, the researcher was usually charged the correct amount (based on her own fare knowledge).

**Consumer Group Perspective**

Mumbai Grahak Panchayat (MGP), a consumer interest group in Mumbai, has been active in pushing for improvements in the auto-rickshaw sector and was interviewed as representatives of the users of auto-rickshaws. They cited one of the main advantages of the rickshaw is that it is an everyman’s transport, almost anyone can access because they are fast and relatively affordable. They want to maintain fares at the bare minimum to keep them affordable. They recognize that this means that the quality cannot improve too much or else auto-rickshaws will become unaffordable. Their idea of the problems in the sector echo the passenger survey:

1) Lack of availability, refusals  
2) Overcharging  
3) Rude behavior  
4) Condition of auto (lacking headlights and meter lights, torn seats)

MGP also has more complex concerns than the average customer. First they believe that the basic fare formula is flawed because it depends on a minimum distance of 1.6 kilometers (or 1 mile). They had petitioned the Hakim Committee to revise the minimum distance to be 1 kilometer as more in line with the standard metric system that is used in India. Arguing that auto-rickshaws serve as feeder services, the Committee disregarded competing claims from the auto-rickshaw union to increase the minimum distance, citing that lowering the minimum distance may effectively increase instances of refusals, thus creating a disincentive for the driver.

Secondly, MGP acknowledges that the unions seek to establish pensions for auto-rickshaw drivers but disagree that this is the responsibility of the government and the public since they believe rickshaws are not a government service.
MGP extends support to drivers by conceding that the rent for a permit is indeed exorbitantly high and that they believe that permit-owners are making excessive profits and in the process taking advantage of renter-drivers and consumers. Their argument is represented in the below table:

**Table 4.2: Economics of Permit Owners**

<table>
<thead>
<tr>
<th>Capital Costs (Rs):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Permit</td>
<td>-</td>
</tr>
<tr>
<td>Vehicle</td>
<td>1.4 lakh</td>
</tr>
</tbody>
</table>

| Costs (Rs.): loan interest, repairs and maintenance and taxes | 47,040 |

<table>
<thead>
<tr>
<th>Revenue (Rs.):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rent (Rs. 200 per shift per day)</td>
<td>1.2 lakh</td>
</tr>
<tr>
<td>Profit (Rs.):</td>
<td>72,690</td>
</tr>
</tbody>
</table>

Source: The Times of India, Mumbai

This profit of Rs. 72,690 represents a 52 percent in investment, meaning that they could pay off their initial investment in less than two years. Because of this, MGP is seeking for the government to set standard rent at Rs. 100 instead of Rs. 200. This is in contrast with the estimate derivable from the EMBARQ Driver surveys, which are found to be Rs. 1.18 lakh of profit for the driver in a year. If we consider the vehicle and permit costs associated with drivers in our sample, a similar conclusion can be reached regarding breaking even on the investment in a permit and vehicle. The costs of the vehicle as well as the permit cost were found to slightly differ.

Additionally, MGP seeks to lower the minimum fare and the fare for each additional kilometer. They represent their argument in the following figures:

**Table 4.3: Cost Components of Auto-rickshaw Fare**

<table>
<thead>
<tr>
<th>Expenses</th>
<th>Component of Fare (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle cost, etc.</td>
<td>1.14 per km</td>
</tr>
<tr>
<td>Cost of Living Index</td>
<td>4.33 per km</td>
</tr>
<tr>
<td>CNG per kg</td>
<td>1.29 per km</td>
</tr>
<tr>
<td>Taxes and Insurance</td>
<td>0.17 per km</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6.93 per km</strong></td>
</tr>
</tbody>
</table>

Source: The Times of India, Mumbai

Based on these numbers, the MGP argues that the minimum fare should be Rs. 8 (with an additional Re. 1 as a driver incentive) instead of Rs. 12.

**Government**

Representatives from three government agencies were interviewed as part of this study, as indicated below:
The Traffic Police of Mumbai, who primarily deal with the movement of traffic but also do enforcement of traffic violations. They share this responsibility with the Regional Transport Office (RTO)’s flying squads.

The Regional Transport Office (RTO) is a government agency that is in charge of vehicle registration, driver licenses, certification, taxes, and all laws that regulate vehicles.

The Mumbai Transportation Support Unit (MTSU) is a semi-governmental organization that was set up per an agreement with the Government of Maharashtra and the World Bank Cities Alliance. MTSU advises on and monitors projects that are undertaken by city agencies for the improvement and transformation of Mumbai.

There were five common complaints amongst at least two of the three groups.

- First there is an issue of safety of auto-rickshaws on highways. Auto-rickshaws are meant for shorter distances, argues the representative of MTSU, and should not be allowed on highways as it is very unsafe having them compete with faster and larger vehicles. The RTO agrees, but complains that enforcement of this is near to impossible.
- The second common concern is that of space availability. Both the MTSU and the Traffic Police emphasized that there is a competition for space, particularly around train stations, which causes traffic congestion and pollution. It also makes it difficult for competing modes such as walking and buses to access the stations. Space should be better regulated to address this.
- Another problem is with incentives. Both the MTSU and the RTO representatives argue that incentives need to be flipped to encourage public transport over private vehicles and auto-rickshaws. The MTSU says because the minimum fare is so low, people take auto-rickshaws for distances of even less than one kilometer. If the minimum fare were higher, people would be more likely to walk or opt for public transport. The RTO further adds that additional auto-rickshaw permits should not be released because that would be against the goal of promoting public transport.
- A fourth concern is over driver behavior, ethics and training. The RTO representative believes that driver behavior is often lacking and this results from a dearth of good training. The representative of the Traffic Police sees the problem as one of ethics. In order to prevent drivers from tampering with meters, there needs to be a national sentiment for honest service that is currently lacking. Additional training and regular interaction with drivers could aid in this.
- The final common problem from the government perspective is with infrastructure. The RTO representative stressed that the main problem was with infrastructure, not enforcement and that it was necessary to create infrastructure that molds behavior. The Traffic Police representative also complained about auto-rickshaw stands. They said that although there had been a system of demarking spaces for auto-
rickshaws, the increasing density and prevalence of informal settlements and hawkers invading footpaths make them hard to maintain.

V. Entrepreneur Initiatives

There are a number of entrepreneur initiatives that have sprung up in the auto-rickshaw sector in Mumbai and India as a whole. Eight entrepreneurs were interviewed in this sector to get their take on the challenges, the motivation for creating their businesses, the benefits of their initiative and the problems they face.

Smartphone applications

Five creators of smartphone apps for auto-rickshaw users that help to fill the gap in public knowledge about fare calculations were interviewed. This mainly arises due to outdated mechanical meters, resulting in confusion and inaccuracy about the correct fare to be paid.

The table below showcases some of the apps and their features:

Table 5.1: Smartphone Application Initiatives in Mumbai’s Auto-rickshaw Sector

<table>
<thead>
<tr>
<th>Date established</th>
<th>Current # of users</th>
<th>Fare meter</th>
<th>GPS</th>
<th>Calculate distance</th>
<th>Pre-programmed fares for different cities</th>
<th>Panic button</th>
<th>Ridesharing</th>
<th>Driver rating</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuk-Tuk Meter 2^</td>
<td>Aug 2011</td>
<td>60000</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>free</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-Rix Meter^iii</td>
<td>Feb 2012</td>
<td>500</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>free</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suruk^iv</td>
<td>Aug 2010</td>
<td>40000</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>free</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mumbai Auto^v</td>
<td>June 2010</td>
<td>80000</td>
<td>x</td>
<td>x</td>
<td>free</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smartmumbaker^v</td>
<td>April 2012</td>
<td>Invite-only</td>
<td>x</td>
<td>free</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-Indicator^vi</td>
<td>May 2010</td>
<td>2500000</td>
<td>x</td>
<td>x</td>
<td>free</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Interviews and application websites

Motivation

Amongst the app creators, the universal catalyst was to make it easier for passengers to correctly calculate fares without having to rely on the (sometimes tampered) mechanical meters and fare charts. This is an effort to give the passenger some measure of power and not be at the will of the driver. The creator of M-Indicator hopes that his app will create discipline and accountability by creating a check on the driver. Several creators also highlighted the difficulty of traveling to a new city and being unfamiliar with its fare rules. These apps serve a dual purpose: they show accurate fares for meter readings and also ensure that the passenger is not being taken on a roundabout route. M-Indicator’s creator also stressed that there is an increasing
need for comfortable transportation with increasing incomes; auto-rickshaws represent the cheapest form of comfortable transport that are also able to connect micro-regions within a city.

The creators of Suruk went a step further than fare calculation after their survey of auto-rickshaw users found that passengers’ main concern after tampered meters was safety. For that reason the Suruk app incorporates a panic button so that users can alert an emergency contact with their location if in trouble. The app also allows users to rate drivers based on their registration numbers. Mumbai Auto launched the day after a fare change in Mumbai that made the mechanical meters more complicated to read. The creator wanted a quick and easy solution, so users can just punch in the meter reading and instantly get the corresponding price. M-indicator provides comprehensive information on the transport network in Mumbai, including train and bus timetables, and taxi/auto-rickshaw fares.

From left to right: Screenshots from (A) Suruk meter (B) Tuk-Tuk meter 2 (C) M-Indicator
Source: Applications’ websites

Impact

Most app creators have received enthusiastic feedback about their products. Tuk-Tuk Meter’s creator said that lots of drivers have contacted the company and are excited to learn the actual distance they have traveled. The creator of Mumbai Auto and SmartMumbaikar mentioned that a few drivers have even downloaded their app to help calculate fares. On the flip side, users of A-Rix Meter have mentioned that drivers are unhappy when they are shown how inaccurate their meter is.

Overall, the apps have helped many save time and money. They may also provide guidance and orientation to those who are new to Mumbai. Such apps were ahead of the curve relative to the governmental efforts to bring about user awareness, mainly by making available the correct fares for rickshaw rides.
It is important to note that these apps are only available on smartphones, which the majority of Mumbaikars (including drivers) don’t own. While users number in the tens of thousands, Mumbai is a city of over 12 million. Large-scale usage of these apps is not a practical solution to the problem and a more widespread fix is necessary.

**Future Plans**

With the rolling out of electronic meters in Mumbai, it will remain to be seen whether the replacement of mechanical meters will eliminate the need for these helpful apps here. These apps will continue providing users with a way to double-check the fares until they trust the e-meter’s reliability. Beyond that, most of the app creators also have ideas to expand their businesses along related paths.

**Advertising**

An innovative company in India is taking advantage of rickshaw ride times and the ample space the rickshaws provide for advertising. MeterDown, started in early 2010 by three college classmates, created a magazine for in-ride entertainment and sells advertising space on auto-rickshaws. One of the founders of this initiative was interviewed about their motivation to start the business and the impacts it has had.

The three media, journalism and advertising students saw a wasted opportunity in their long auto-rickshaw rides through Bangalore, where they were attending school (sometimes 45 minutes in traffic). They found an opportunity to capitalize on the lengthy average travel time in auto-rickshaws, as well as the blank walls of the auto. This has also found mention in the Hakim Committee Report of 2012.

MeterDown initially approached rickshaw driver unions to reach a broader audience and gain credibility. They started off with just 200 auto-rickshaws in Mumbai and now work with five unions and 2,000 rickshaws. They began with a monthly magazine that is attached to a shelf facing the passenger seat. They now sell advertising space inside and outside the rickshaw on stickers, interior walls, the exterior hood and even backlit LED panels.

The greatest impact has been for drivers. The drivers are paid a portion of the revenue from the ads in their vehicle at the end of each month, which ensures that the ad will survive in the vehicle until payday. This brings an additional source of income to the drivers.

The founder also said that they have gotten good feedback from the drivers, both on the amount of people reading the magazine and the magazine itself. Many Mumbai auto-rickshaw drivers don’t read English, but some have a family member translate and also enjoy the articles. There is one particular feature that profiles the lives of different drivers, which they particularly enjoy.
MeterDown plans to expand, both in Mumbai, and in other cities around India. They think their model is easy to implement in other places as well as scalable, though there are unique legal challenges in each new city.

**Fleet systems**

As discussed previously, there is currently no scheme for fleet auto-rickshaws in Mumbai as yet.

Surprisingly a fleet-service company was started in June 2011 called Rickshawale. According to the company’s website, Rickshawale offers a 24 hour service with reservations made by phone or online. Reservations can be made up to 24 hours in advance, or within 20 minutes of your desired departure. They also promise safer trips with trained and qualified drivers, whose credentials are sent to your phone prior to the start of your trip. The company charges a service fee of Rs. 20 for these benefits. Rickshawale’s site also lists numerous benefits for drivers including insurance, repairs, mobile phones, training, financing opportunities and increased income.

Unfortunately, the creator of Rickshawale, Hemant Jain could not be reached for an interview. An attempt to use the service in late June 2012 was unsuccessful. A July 20th article in the Hindustan Times reports that the service was still running but that its total number of bookings had fallen. However, a later article that same day wrote that the Regional Transport Office and Mumbai Autorickshawmen’s Union have declared the service unauthorized. It is unclear whether the business still exists or has been shut down and their webpage remains unavailable.

**VI. Way Forward**

This box represents a summary of problems as perceived by passengers, drivers, unions, consumer group and various government representatives and potential solutions:

*Table 6.1: Recommendations for Mumbai’s Auto-rickshaw Service Improvements*

<table>
<thead>
<tr>
<th>Main Problems</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition of vehicle</td>
<td>Higher standards and enforcement for condition of vehicle (like working lights), perhaps regulated at annual fitness test; Fleet service</td>
</tr>
<tr>
<td>Enforcement issues: evidence, complaint mechanism</td>
<td>Increased/improved enforcement</td>
</tr>
<tr>
<td>Fares: social aspects, minimum distance/charge, rent</td>
<td>Revision of fare equation (Hakim Committee 2012); Regulation of rent</td>
</tr>
</tbody>
</table>
Reforming the auto-rickshaw industry in order to address all concerns will involve a holistic approach that engages all stakeholders.

**Training**
In the current system, there are no training or education requirements for auto-rickshaw drivers. While this allows for employment to be open to a wide portion of the population, it can often prove to be a problem with passenger relations and levels of service. Of the problems listed above, a training program could help with overcharging, refusals, tampered meters, driver behavior and driver-passenger tension. Training could potentially educate drivers on the fare and costs that go into its calculation, so that they become aware of the components of the fare. Such a measure could provide for the honest service sentiment that the Traffic Police hopes for. Parties including the Mumbai Grahak Panchayat, auto-rickshaw unions and the RTO expressed interest in better training during our interviews. According to a recent article in The Hindustan Times, Mumbai Autorickshawmen's Union is planning to organize a training camp for its 25,000 members to address refusals, impolite behavior and health concerns. In our interview with the RTO, the representative expressed interest in a joint training
program between a private company and the RTO. This would be a good place to start to educate all Mumbai auto-rickshaw drivers.

**Infrastructure**
The infrastructure at high-demand locations around Mumbai is clearly lacking, a problem recognized by all parties. Both the MGP and auto unions have expressed a desire for increased stands. Ultimately, this is a question of maintenance and enforcement since there were previously hundreds of stands around the city. This problem is intrinsically related to space issues, particularly around train stations. There is intense competition for space between pedestrians, auto-rickshaws, buses and cars. There needs to be better planning implemented around stations to ensure access for all modes. Designated areas for buses, enforced sidewalks, and auto stands would all contribute to ease congestion. However, this also requires enforcement and maintenance to ensure these regulations are being followed.

**Enforcement**
Enforcement is a major issue and contributes to the problems of vehicle condition, overcharging, tampered meters, highway safety, infrastructure, space availability and tampered meters. However, the Traffic Police representative admitted that they were understaffed. Officials from the RTO mentioned that they had just recruited seventeen staff to enforce auto-rickshaw violations. Yet, seventeen officers for nearly 100,000 drivers come across as a feeble enforcement ratio. It would be very helpful if the RTO and Traffic Police were able to work together and present a united and coordinated front against violators, doubling enforcement. The Traffic Police also needs to reconsider their own training and interaction with auto-rickshaw drivers. Over 60 percent of driver respondents cited problems and unfair fines with Police and Traffic Police as a major problem. Drivers in Mumbai clearly feel harassed and authorities should attempt to work with drivers and unions to establish a better and more lawful service. More recently, the recent fare hikes have resulted in a stricter demand for carrying the latest tariff cards, with the Traffic Police and Road Transport Authority officials taking an active role in bringing those with outdated or tampered tariff cards to the book.

**Supply and Demand**
The tenets of supply and demand were a common refrain when explaining the problems of the auto-rickshaw industry in Mumbai, particularly with availability and quality of service in the survey. As discussed, the number of auto-rickshaw permits in Mumbai is limited to just over 100,000 permits for over 12 million potential passengers. That is about 11 autos for every 1200 people. Because of this, drivers are able to dictate terms, including price, availability, and level of service. Reform is needed so that this is not the case. However, an increase in the amount of permits would also continue to encourage using auto-rickshaws over public transport. A compromise needs to be reached to balance these conflicting problems.
Fares

The fare equation was recently revised by the Hakim Committee, suggesting several new measures for auto-rickshaw fares. In supplementing this, there are many factors that need to be considered. Besides the oppositional demands of the unions and the consumer group (one for higher fares and one for lower fares) there are the matters of incentives and social conditions to be considered. Lower fares are encouraging people to use auto-rickshaws for purposes that may otherwise be served by walking or taking the bus. Thirty-five percent of passenger respondents cited the often lower cost and faster trip of auto-rickshaws over buses in Mumbai as major advantages in using auto-rickshaws. This means that auto-rickshaws, while contributing to sustainable transport modes by acting as a feeder service, are chipping away at the share of these sustainable transport modes.

In addition, while the current fare equation reflects cost of living for drivers, it does not take into account costs for health care, education, and basic human and financial assets that should be provided in order to create sustainable livelihoods, as suggested by the Hakim Committee 2012 report. Appropriate revision of fare policy should incorporate all concerns to fairly accommodate both drivers and consumers and to ensure that auto-rickshaws are in their proper place in the sustainable transport system. Based on the economic data compiled in this report, there is an opportunity to contribute to the fare revision work of the Hakim Committee, the unions and the MGP.

Fleet Services

Despite the uncertainty over success of Rickshawale, Mumbai’s only fleet auto-rickshaw scheme to date, a fleet auto-rickshaw service would help to address many of the problems seen in Mumbai including vehicle condition, overcharging, driver-passenger tension, airport-specific problems, training and social benefits for drivers. As passengers noted in our survey, the advantage of auto-rickshaws is that they are fast and affordable. Rickshawale takes away both of these benefits, since you have to book a rickshaw at least twenty minutes in advance and they charge an extra Rs. 20 per trip. One way to address this would be to have a similar set up as some of the fleet taxis in Mumbai. For example, one can book a Cool Cab in advance but also find them on many streets to flag down. A good approach would be to have drivers organized and trained under a fleet service and available for both on-call and street side service. The higher charge may be inevitable for higher level of quality but users could choose to pay the higher cost.

Another opportunity for fleet auto-rickshaws is pre-paid autos at the airport. Currently, one can take an auto-rickshaw from the airport but will often face refusals or extreme overcharging. A pre-paid auto-rickshaw, similar to the pre-paid taxi services that already exist, would solve these issues and make taking a rickshaw home from the airport a much easier endeavor.

For both these ideas, it would be necessary to first pass a fleet auto-rickshaw scheme similar to that passed for taxis in 2006. The RTO official we spoke with
suggested bringing a proven model (from another city) and recruiting permit-holders in Mumbai who would be interested, and then approaching government for approval. It was expressed that the government in Mumbai does not want to be the guinea pig for an untested service but would be willing to approve a proven model.

Drivers
The drivers are the key in a reformed auto-rickshaw system. Throughout the research we continually encountered drivers who feel unrepresented and stigmatized. Every driver approached for the survey was eager to discuss the challenges they face. Even with union representation, they do not feel that their voices are being heard and they are constantly the target of harassment by both police and passengers. The work of MeterDown also shows this – from the excitement of being featured in the magazine and their interest in the articles themselves. By engaging them in the reform process, drivers will have more of a stake in the success of any improvements and the image of the auto-rickshaw driver. If you make an auto-rickshaw driver happy you will be rewarded with better service. This also is the reason why health and education benefits should be provided for auto-rickshaw drivers, whether through an increase in fares to provide for pensions, regulation of rent prices or some other program. While driving an auto-rickshaw provides a basic living wage, they are unable to pay for additional amenities to improve their quality of life.

VII. Conclusions

It is clear that auto-rickshaws have contributed to shifting trips made by private vehicle by acting as a feeder mode to public transit and serving occasional trips. They certainly provide benefits of fast and affordable service to residents. However, in some cases auto-rickshaws are replacing trips made by bus or walking. These trips need to be discouraged by reversing incentives to make public transit cheaper and more reliable and improving walking conditions.

As it currently stands, auto-rickshaw does not represent a full sustainable livelihood. While drivers are able to support themselves and their families, the need for higher wages is evident in the rampant meter tampering and fare card falsification. In addition, drivers lack access to human and financial assets by being unable to provide for healthcare and education. Fare revisions and other regulations need to address this issue.

While the auto-rickshaw industry in Mumbai is very complex and rife with tension, it has clear opportunities for improvements and some changes are already being made. Further attention should focus on driver training, enhanced infrastructure and enforcement, permit and fare reform, investigation into fleet auto-rickshaw services and driver engagement.
Appendix A: Photographs of Auto-Rickshaw Locations, Infrastructure and Traffic

(A) Line at fueling station, BKC, mid-morning, (B) Bandra West station characterized by wide streets, mid-morning
(C) Traffic outside of Bandra East station, morning. (D) Auto-rickshaw drivers shouting destinations at Bandra East Station, morning

(E) Haphazard rickshaws at Santacruz West, morning; (F) Line of rickshaws in BKC, morning
(G) Auto-rickshaws waiting/taking breaks out front of Bhabha hospital, Bandra West, morning. (H) Auto-rickshaw stand at Jogeshwari East, evening.

(I) Wide streets and sparse rickshaws at Khar West, mid-morning. (J) Traffic and waiting auto-rickshaws backed up at Santacruz East, mid-morning.
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