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Smart and Sustainable Transport: Taxi and Limousine Sector



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Perspective On Taxi & Limousine Sector

Emerging Trends In The Taxi & Limousine Sector

Taxis and limousines are an essential part of the public transport mix - but receive little policy thinking in Malaysia

Advantages of taxi services

- Provide the “missing link” between mass public transport and end-destinations, encouraging use of public transport for arterial journeys
- Offer a much faster alternative than bus transport (no stopping to pick/drop passengers)
- Higher security and convenience for passengers than bus or train
- Able to carry shopping and luggage
- Operates at any time of day or night
- Allows reduced car-ownership



Malaysian Policy Approach

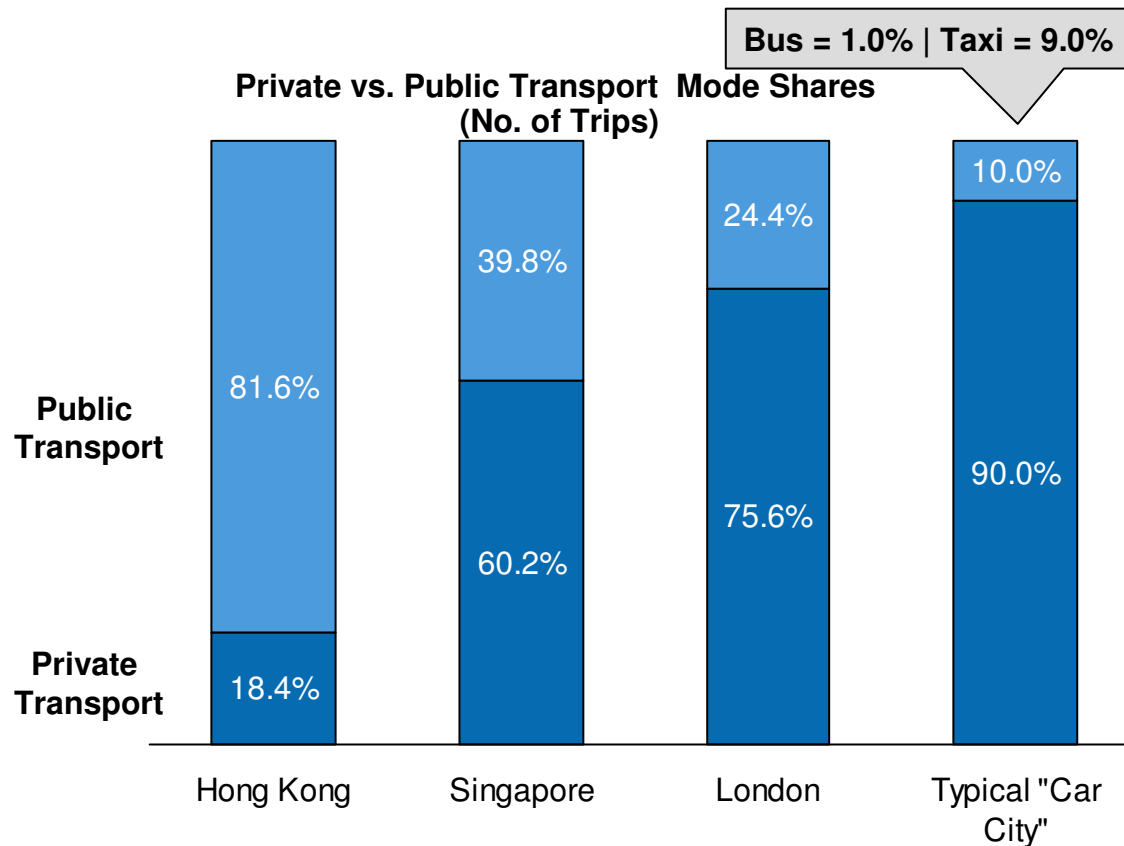
- Taxis are only mentioned in the GTP:
 - for tourists
 - as a source of complaints
 - needing to be regulated
- In general, there is little to no discussion on taxis in policy documents relating to public transport
- Taxi licences are traditionally used as a way to promote certain business sectors
- Focus on safety and service for passengers is not high
- No focus on creating a world-class taxi service

Conclusion

Many Malaysian policymakers do not see taxis as part of public transport

In “car cities”, public transport tends to have a small share of the total motorized passenger trips made ...

Split of Total Motorized Passenger Trips between Public and Private Transport



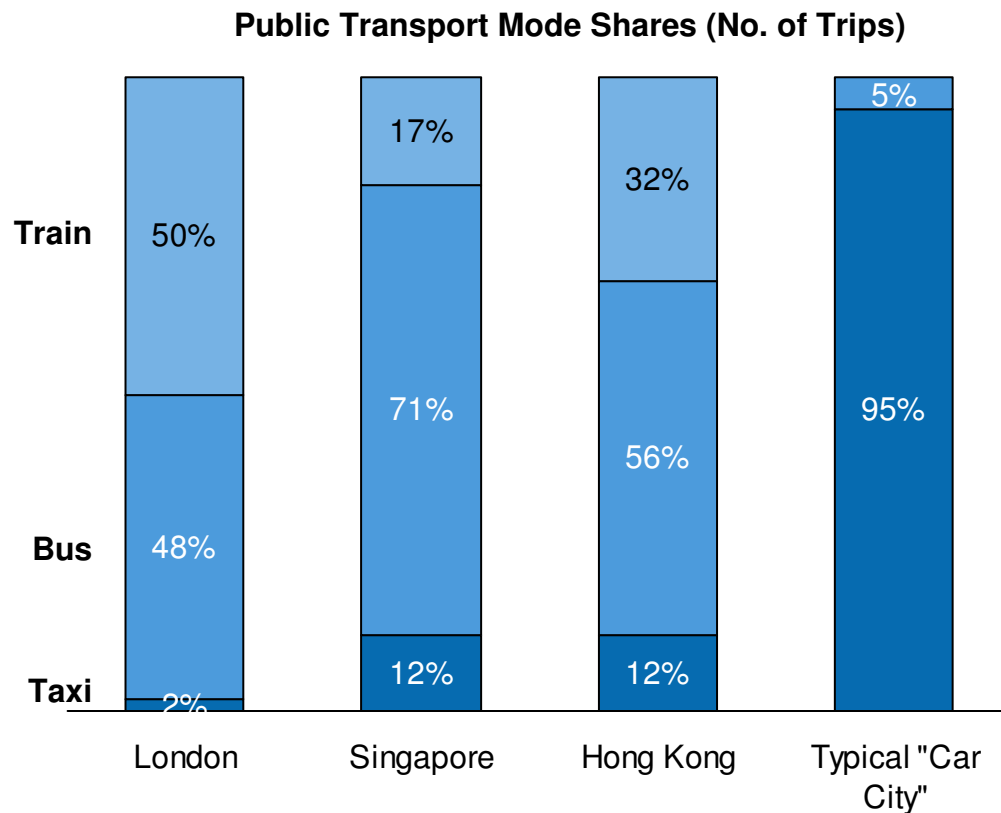
Possible Reasons for Low Modal Share of Public Transport

- Engrained “car culture” can make people extremely reluctant to use public transport
- A well-developed road network can facilitate car use
- Few penalties may exist for car use:
 - parking in the city centres is cheap and easy to find
 - no prioritization exists for public transport
- Residential areas with poor public transport force initial car use - only a good park and ride network will encourage switch

Source: UITP Cities Database (2001)

... and in car cities, public transport modal split is weighted very heavily in favour of taxis leading to higher demand

Public Transport – Split between Bus and Taxi



Reasons for Reliance on Taxis

- The public bus sector may have suffered from chronic underinvestment resulting in a low level of customer service
- Too many licenses may have been granted to taxi operators, resulting in a large taxi fleet¹⁾
- Taxi fares may be priced too cheaply relative to bus fares
- Public buses may be thought of for low income workers and there may be no motivation to extend services to new market segments
- Environmental factors, such as high temperatures and rain may make waiting for an unreliable bus network unattractive

1) In many cities, taxi licenses have been granted to provide a source of income to residents, rather than to meet demand from the travelling public; in these cities, the taxi sector can often be oversupplied

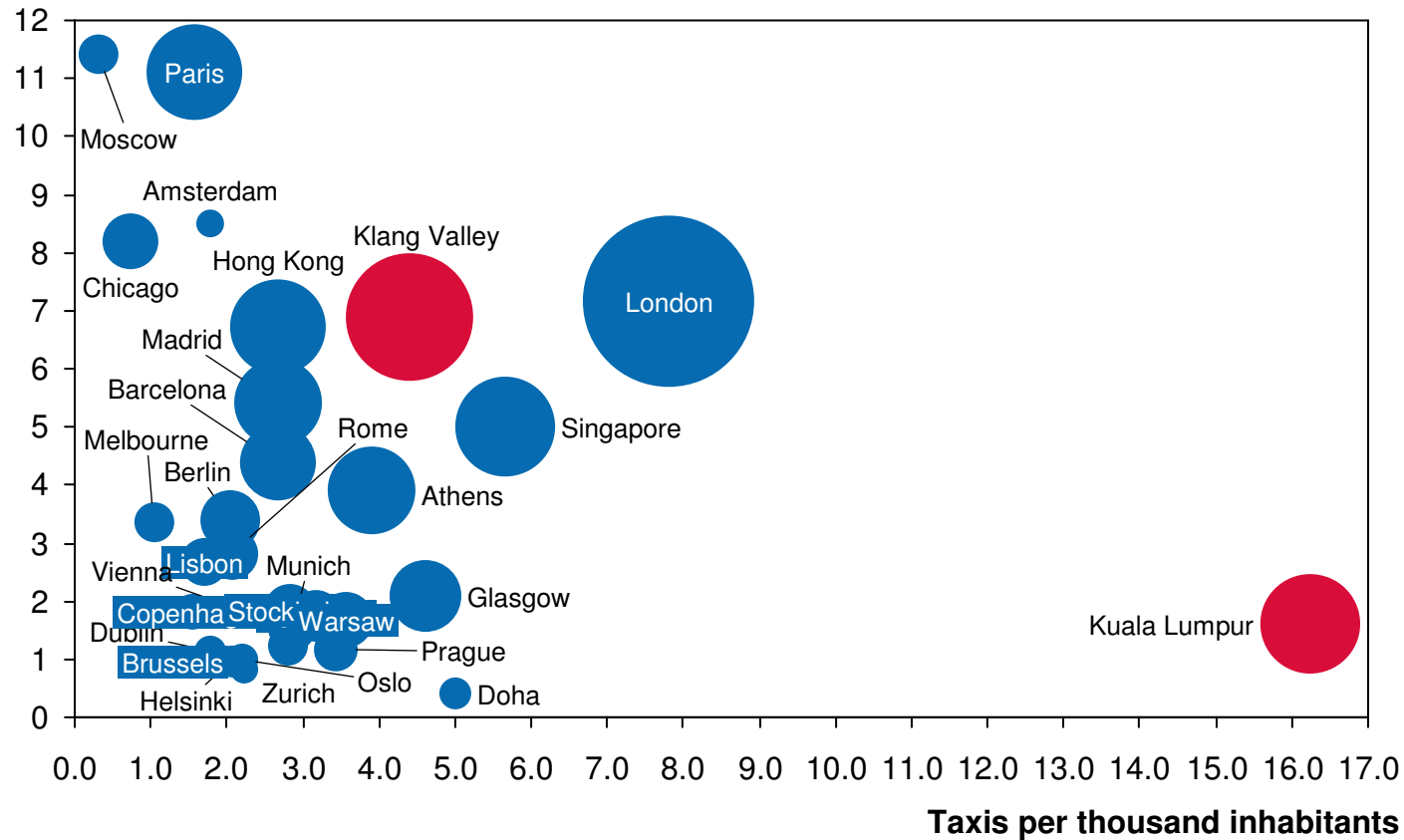
Source: UITP Cities Database (2001); Booz & Company Analysis

There is a wide distribution of population and number of taxis per thousand inhabitants - KL is dramatically higher than other cities

ESTIMATE

Population Versus Taxi per Inhabitants ('000)

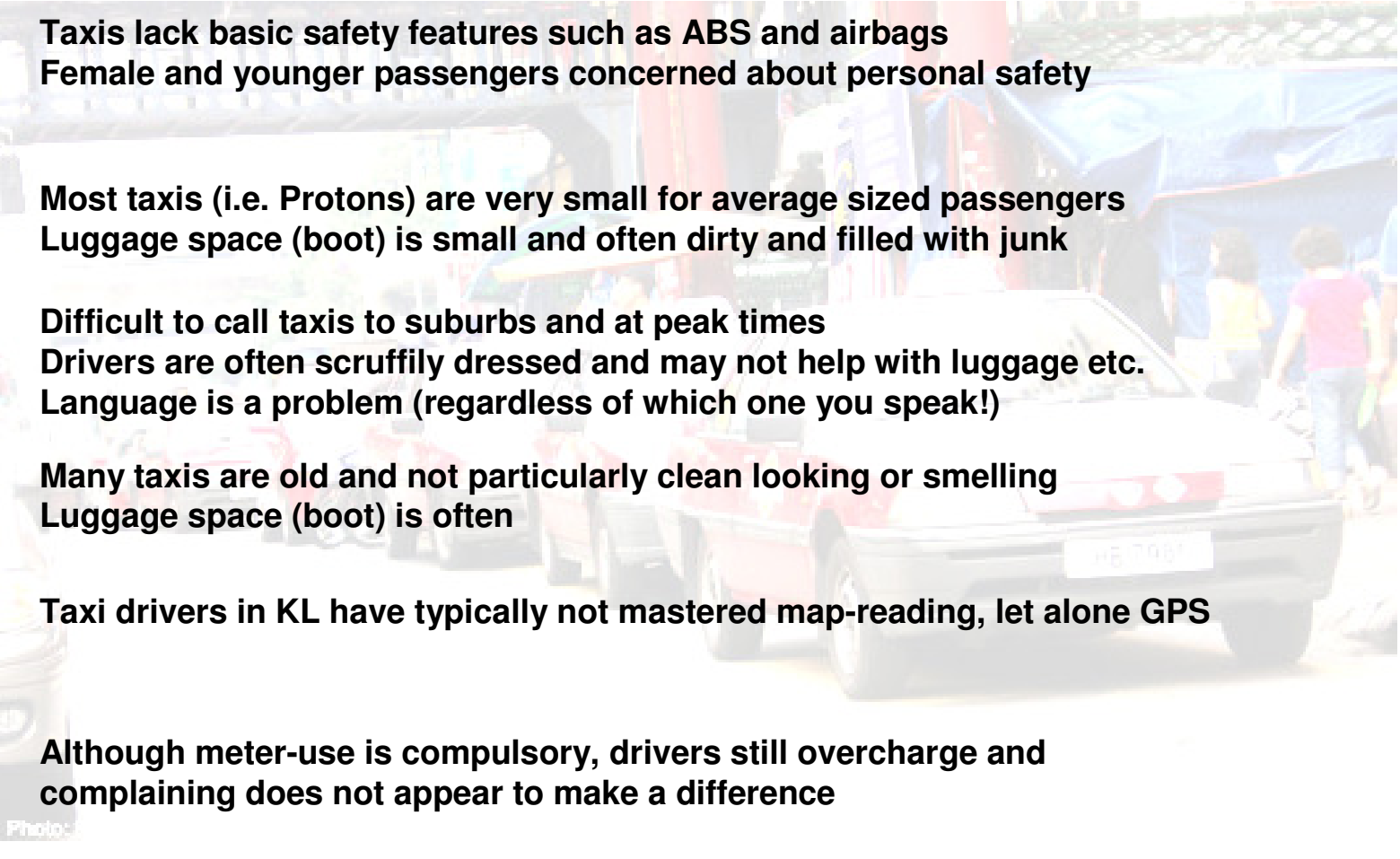
Population Mn



Observations
<ul style="list-style-type: none"> ▪ Taxi density is driven by many factors such as licensing policy, availability of good public transport alternatives and inner-city parking options ▪ KL and Selangor together has a more “normal” level of taxi provision

Note: Size of bubble represents taxi fleet size; Int'l cities 2001 and 2007
 Source: Euro Monitor (2009); UITP Cities Database (2001); CVLB; Booz & Company Analysis

Despite the large number of taxis, consumers are not satisfied with the taxi service in the Klang Valley



Safety
Taxis lack basic safety features such as ABS and airbags
Female and younger passengers concerned about personal safety

Size
Most taxis (i.e. Protons) are very small for average sized passengers
Luggage space (boot) is small and often dirty and filled with junk

Availability & Service
Difficult to call taxis to suburbs and at peak times
Drivers are often scruffily dressed and may not help with luggage etc.
Language is a problem (regardless of which one you speak!)

Ambience
Many taxis are old and not particularly clean looking or smelling
Luggage space (boot) is often

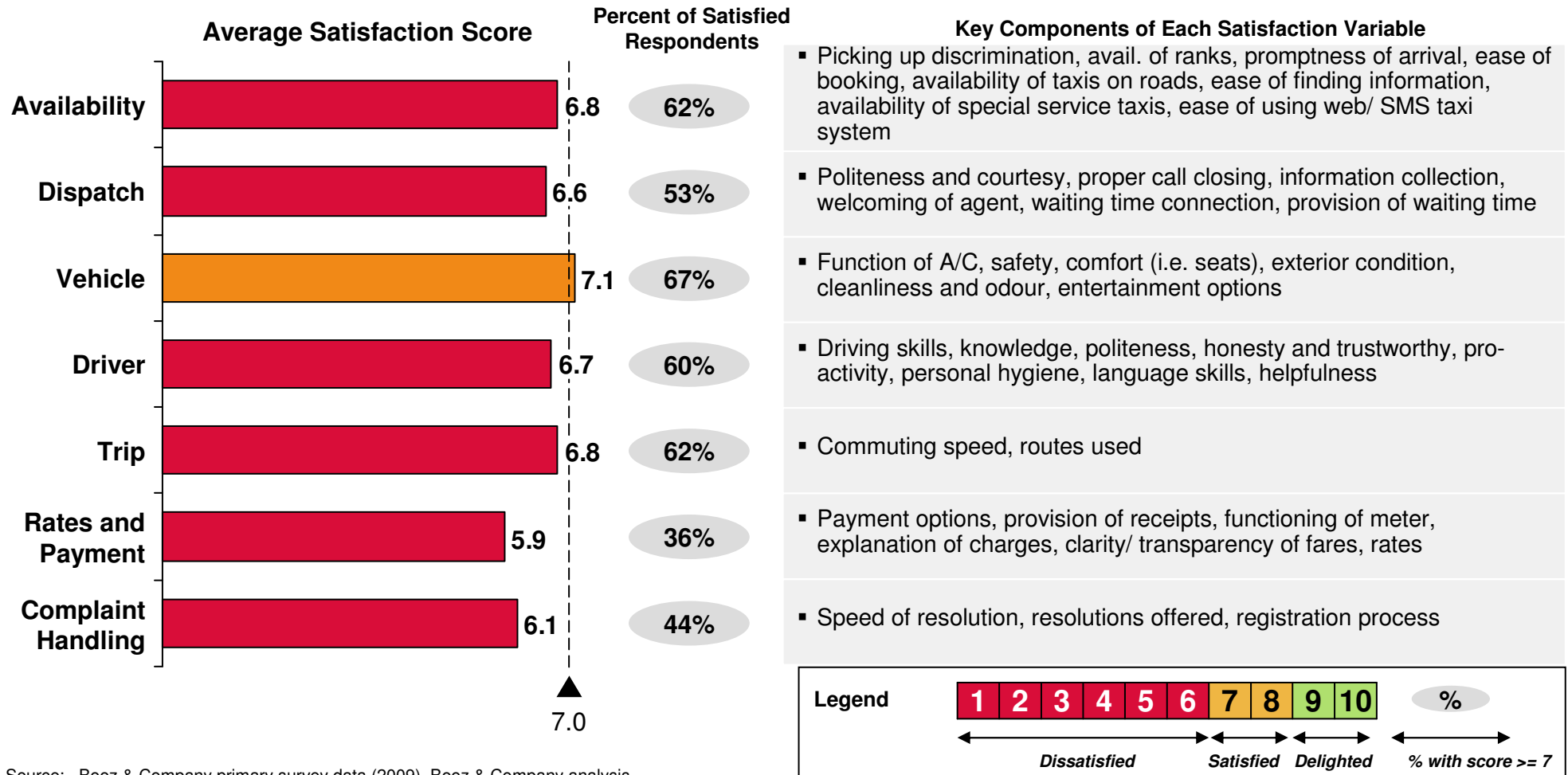
Navigation
Taxi drivers in KL have typically not mastered map-reading, let alone GPS

Overcharging
Although meter-use is compulsory, drivers still overcharge and complaining does not appear to make a difference

Satisfaction with taxi services can be measured across a set of dimensions that comprises the passenger experience as a whole

Service & Supply - Example Assessment of Satisfaction with Service

CLIENT EXAMPLE



Source: Booz & Company primary survey data (2009), Booz & Company analysis

Best in class taxi and limousine sector is focused on quality of services, integration with public transport and accessibility

Elements of Best in Class Taxi and Limousine Sector

Key Objective for the Sector

- *Provide taxis and limousines as part of an integrated city wide transportation system with quality of service among the best in the world and provides fair competition and opportunity for all operators.*

Key Elements of Objective for the Sector

- **Integration with public transportation system** – sector works in an integrated manner with the public transportation modes in the city (i.e., bus, and metro,) supporting traffic demand as needed as part of a “whole” transportation system
- **Globally leading quality of service** – Taxis and limousine operators provide services that are leading by standards of service around the world
- **Fair competition** – Operators are able to compete fairly for market opportunities
- **Accessibility** – Passengers across different socioeconomic segments are able to access the services

Perspective On Taxi & Limousine Sector

Emerging Trends In The Taxi & Limousine Sector

Service & Supply

Market Economics

Regulation & Governance

In New York a Passenger Information Monitor with different functionalities is now installed in all yellow taxis

Service Improvements - Passenger Information Monitor in New York Taxis

Description
<ul style="list-style-type: none">▪ The Passenger Information Monitor (PIM) has been mandated for all New York Taxis by the Taxis and Limousines Commission (TLC)▪ The PIM is a flat seatback screen used to deliver contents and services▪ Contents include:<ul style="list-style-type: none">– News, sports, and weather,– TLC Public Service Announcements (PSAs)– Real-time map of the passenger's location▪ It will also allow payment by credit/ debit cards through a point sale terminal in the PIM integrated with the fare meter



Example of a PIM in a New York Taxi

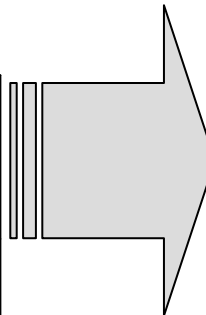
- The PMI has been developed according to **five principles**;
 - Position the PIM primarily as a non-commercial offering
 - Highlight passenger control
 - Create brief and memorable public announcements
 - Offer useful services
 - Provide a context-specific ride

Dubai limousines have DVD screens - these applications might be implemented in taxis as well

Service Improvement in Dubai

Evolution of Taxi Services

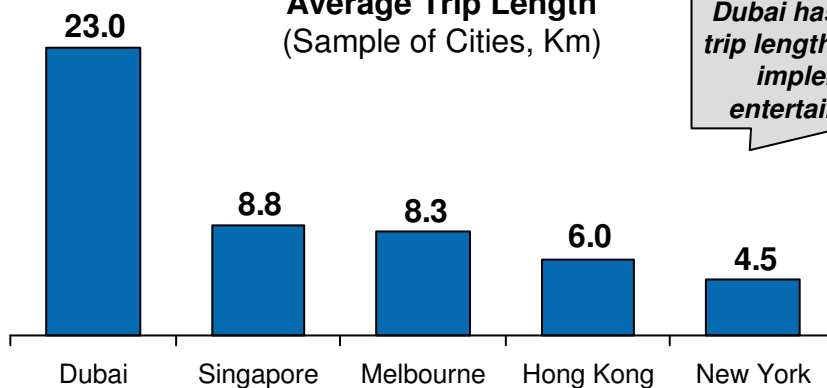
Entertainment Systems	<ul style="list-style-type: none"> To be considered in the medium term
Innovative Taxi Vehicles	<ul style="list-style-type: none"> To be considered in the long term according evolution of technologies and design options



Implementation of Digital Screen

- In Dubai the average length of trips is higher than in other cities, entertainment systems on board can make more pleasant the trip;
 - Dubai is expected to continue to expand so that trip length might increase further
 - However parts of long trips are also expected to shift to the newly opened metro rail system
- Implementation of digital screens would have other benefits, for example it would allow:
 - Increased non operational revenues by displaying advertisements
 - Inform tourists and inhabitants regarding major events happening in the city
 - Facilitate credit/ debit card payments

Average Trip Length (Sample of Cities, Km)



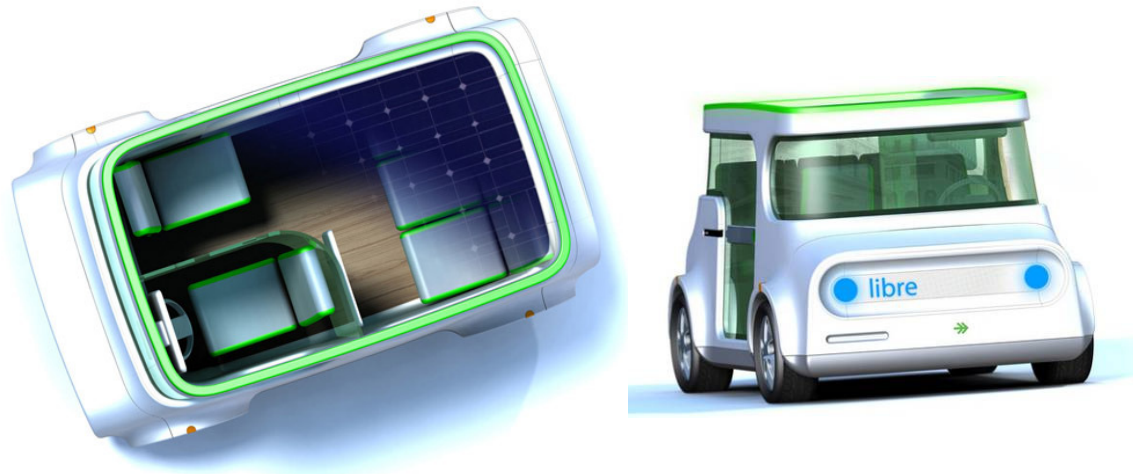
Dubai has a very high av. trip length - it might justify implementation of entertainment screens

Note; 1) Dubai 2009, Singapore 2004, Melbourne 2007, Hong Kong 2008, New York 2004

Source: Singapore Land Transport Authority; Hong Kong Transport Department; NY TLC, NY Taxicab Fact Book 2004; Taxi Report of Essential Services Commission Victoria; Booz & Company analysis

New prototypes of taxis focus on providing higher level of comfort to increase overall service

Service Improvement - Examples of Prototypes of Innovative Taxi Vehicles



Mx-Libris Taxi

- Mx-libris is a taxi concept created for Latin America
- The design uses fuel cells and a drive-by-wire steering system to optimize the interior space of the taxi
- The cabin is asymmetrical to promote interaction between the passengers - they can sit in three seats at the back and in one facing the rear
- The vehicle is intended to be a zero-emission taxi



New Taxi

- Taxi concept that holds six passengers
- The design sits on four wheels and features a separate driver's cab and passenger cab
- The back features two rows of three seats facing each other with ample legroom
- The rear features sliding doors on both sides to allow passengers to easily get in and out
- The driver has ample space and sits higher than the passengers

Source: Mx-Libris Taxi website; New Taxi website; Booz & Company analysis

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Service & Supply

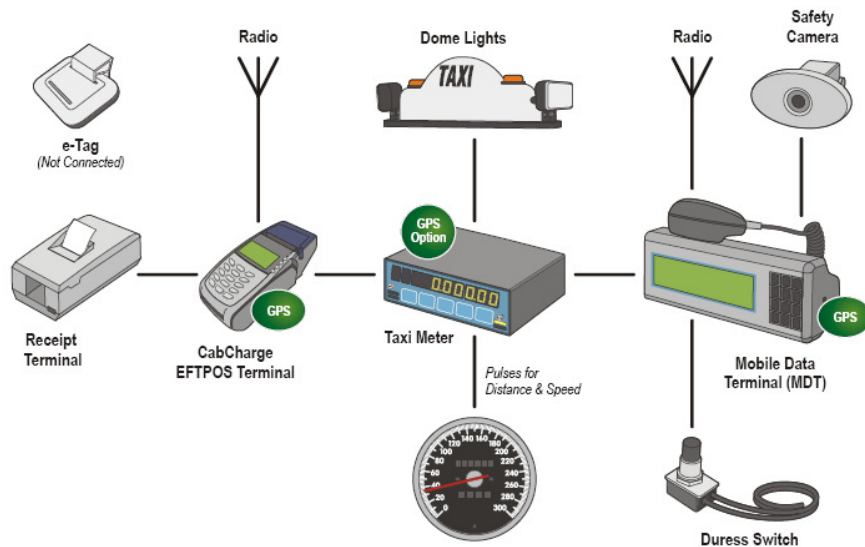
Market Economics

Regulation & Governance

Fleet management technologies are in use by many operators around the world

Higher Efficiency - Fleet Management Systems

Network Technologies: Overview of Current Situation



- Automated vehicle management systems are GPS based
- They allow to provide information on;
 - Taxi location and status
 - Trip origin
 - Destination and costs
 - Taxi usage (time hired/ time not hired)
 - Kilometres travelled

Advantages

Passengers

- Provide passengers information about the taxi trip, identification of lost items, etc.

Network Service Providers

- Dispatch taxis based on whether they are already hired, how long they have been waiting, or how close they are to a passenger

Fleet owners (Operators):

- Allow operators to understand what their taxis are doing during a driver shift and want to understand how they can best operate their fleet

Taxi regulators:

- Use collected information for planning purposes or for compliance purposes

Source: Victoria Department of Transport: Next Generation Taxi Technology Options Discussion Paper, 2008; Booz & Company analysis

Among taxi technologies there are also a set of new booking systems provided by specialized companies...

NON EXHAUSTIVE

Higher Efficiency - Booking Systems

Examples	Description
Ring Back	<ul style="list-style-type: none"> ▪ When the driver arrives at the pick-up point he simply presses a button on the data terminal to tell the system to initiate Ring Back ▪ The system will then ring the customer's phone alerting them that their taxi is waiting outside
Text Back	<ul style="list-style-type: none"> ▪ The taxi company composes the messages that suit the company's needs - messages can be sent to the customer's phone at different times e.g. <ul style="list-style-type: none"> – When the job has been dispatched – When the taxi is waiting outside – As a 'thank you' a few minutes after the journey has been completed
Interactive Voice Response	<ul style="list-style-type: none"> ▪ A special server checks the status of inbound calls to the telephone system of the taxi company ▪ The system will speak to the customer directly, ask whether they want a cab from that location or whether they wish to speak to an operator ▪ A simple option of pressing a number key will then book the job directly onto the system
E-booking	<ul style="list-style-type: none"> ▪ E-Booking allows costumers to simply book the taxi on line ▪ It also offers many options to the user such as different job types, job history and multiple vias ▪ Customers can also track their car on a street level GPS map to monitor the job's progress
Taxi Box	<ul style="list-style-type: none"> ▪ Remote booking point for customers in shopping mall, station or leisure complex ▪ Taxi Box automatically accepts bookings from a frequently used location; <ul style="list-style-type: none"> – By inserting a coin (refunded against the taxi fare) the customer receives a ticketed confirmation of booking and an estimated time to pick-up – It can also have a slot for a customer 'loyalty' cards

Source: Booz & Company analysis

...as well as a set of fares collection systems

NON EXHAUSTIVE

Higher Efficiency - Fares Collection Systems

Example	Description
Credit Card/Debit Card Payment System	<ul style="list-style-type: none"> ▪ The equipment is installed in the rear of the cab to provide a high level of security as passengers swipe their own card and are in control during the transaction ▪ The payment might be also possible through a point-of-sale terminal in the Passenger Information Monitors, when available (e.g. New York) - the PIM is integrated with the fare meter and its card-swipe and keypad interface allow passengers to pay drivers with debit/ credit cards
Loyalty and Rewards Scheme	<ul style="list-style-type: none"> ▪ Loyalty card scheme for regular customers ▪ It provides customers points and rewards for using the taxi service
Pre-Pay and Top Up	<ul style="list-style-type: none"> ▪ Gift or top-up cards, where cards can be pre-loaded with credit, similar to pay-as-you-go schemes ▪ The taxi customers can then pay for their journeys with pre-paid top-up card ▪ E.g. beneficial to parents who want to make sure their children can always get a taxi home



Credit card payment system in Chicago

- Taxi drivers are satisfied because it;
 - Helps minimize potential disputes with customers
 - Increases security of transactions

Source: Booz & Company analysis

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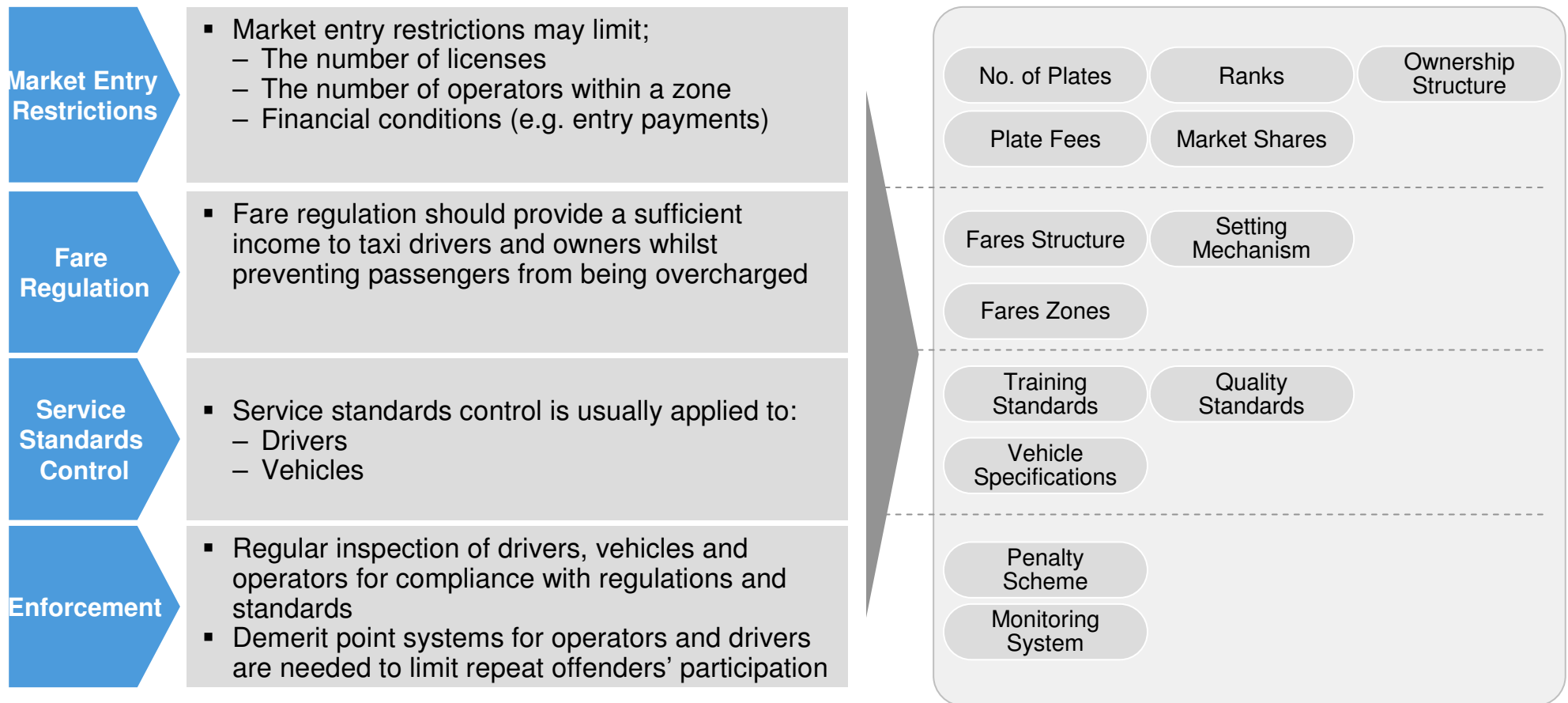
Service & Supply

Market Economics

Regulation & Governance

The scope of the regulatory framework for a taxi and limousine sector is developed across four areas

Scope of Regulations in a Taxi & Limousine Sector



Source: Booz & Company analysis

Trends in regulation have been centred on accessibility, security, modal integration and environmental sustainability

Emerging Trends in Regulations

Trends	Description	Examples
1 Accessibility	<ul style="list-style-type: none"> ▪ Percent of the fleet for people with special needs OR ▪ Adapt all taxis to people with special need ▪ Give incentive to operators providing services for people with special needs or directly to people with disabilities 	<ul style="list-style-type: none"> ▪ London and New York ▪ Different countries: Belgium, Germany, Ireland, Spain, Finland, Norway, Nederland, UK, Australia, New Zealand, United States
2 Security	<ul style="list-style-type: none"> ▪ Adopt security measures that include; <ul style="list-style-type: none"> - Safety cameras on taxi vehicles - Driver protection screens - Visible logos on taxis indicating official taxis or limousines 	<ul style="list-style-type: none"> ▪ Victoria ▪ New York
3 Inter-modal Integration	<ul style="list-style-type: none"> ▪ Integrate taxis with other transport modes, e.g.; <ul style="list-style-type: none"> - Joint tariffs and joint ticketing (e.g. Smartcard payment options) - Passenger information monitors 	<ul style="list-style-type: none"> ▪ Singapore ▪ New York
4 Environmental Sustainability	<ul style="list-style-type: none"> ▪ Develop “low emission” taxis, e.g.; <ul style="list-style-type: none"> - Hybrid cars using two or more distinct power sources - Conventional cars with bio-fuel - Offset carbon emissions from conventional fuel combustion 	<ul style="list-style-type: none"> ▪ New York ▪ Mexico City ▪ London ▪ Mumbai

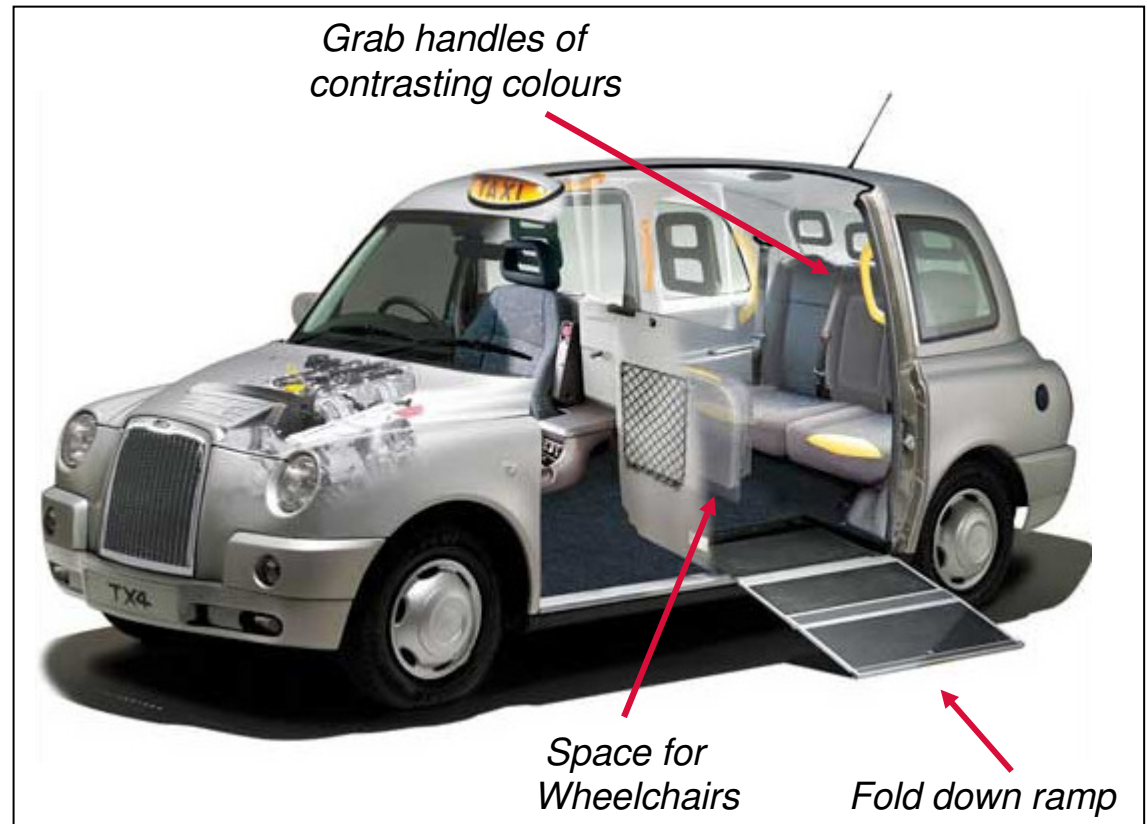
Source: Booz & Company analysis

In London all taxis are accessible by regulation to passengers with disabilities

1 Accessibility of London Taxis

Accessibility in London black cabs

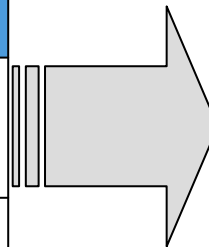
- In London all licensed taxis (black cabs) are accessible to wheelchair users
- These vehicles use a convenient fold down ramp that allows a dignified entrance into the vehicle by wheelchair users
- Blind or visually impaired people can obtain a TAXI sign to assist you in hailing a taxi in the street - signs are available from the Royal National Institute for the Blind
- Inside most black cabs there are grab handles of contrasting colours making them easier to locate for those passengers who are visually impaired
- It is a legal requirement that both taxis and private hire vehicles carry assistance dogs and the dogs must be allowed to stay with their owners and be carried at no extra charge



Regulators often provide incentives to promote mobility of passengers with disabilities

1 Incentives to Promote Taxi Accessibility to People with Disabilities - Selected Examples

Country / City	Description
Australia	<ul style="list-style-type: none"> Different programmes to subsidize the cost of taxi travel for people with disabilities
New Zealand	<ul style="list-style-type: none"> Total Mobility is a nation-wide scheme aimed at assisting people with disabilities The scheme includes 50% discount on taxi fares for eligible clients
United Kingdom - London	<ul style="list-style-type: none"> Taxicard provides subsidies to people with serious disabilities It is funded by participating London boroughs and the Mayor of London
United States	<ul style="list-style-type: none"> Various Taxi Subsidy Schemes that are city or county based



Victoria's Multi Purpose Taxi Programme - Australia

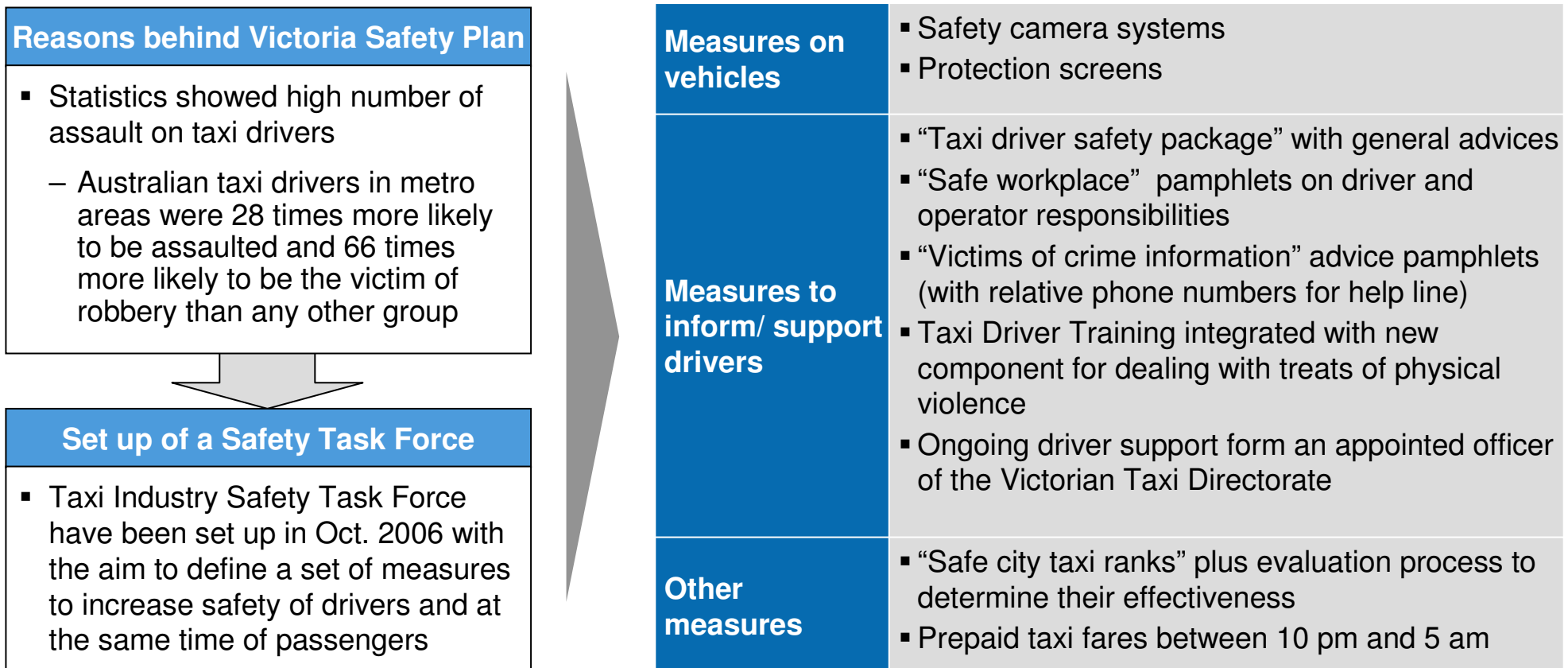


- The membership card costs \$16.50 and is valid for six years
- The card is provided with a microchip
- Members have 50% discount on taxi fare
- Eligible cardholders: Residents of Victoria, with a severe and permanent disability that prevents them from using public transport by themselves

Source: Victoria Taxi Directorate (Australia); New York Yellow Book (2007) ; Booz & Company analysis

Victoria has implemented a set of taxi security measures that are consider best practices

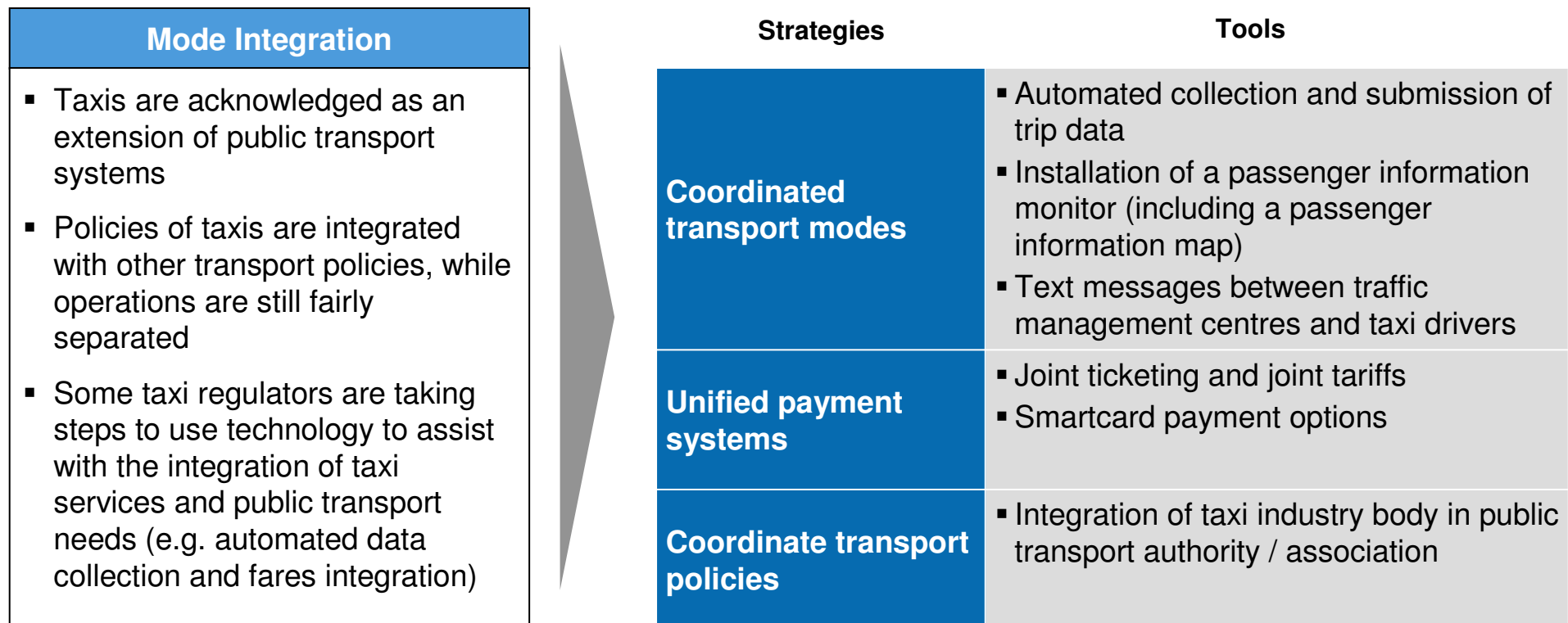
2 Security on Taxis - Victoria Case Study



Source: Victoria Taxi Directorate (Australia); Booz & Company analysis

Focus of inter-modality in transport policies is to improve service through better coordination and payment systems

3 Modal Integration



Smartcards are used in all Shanghai taxis and in Singapore SMRT taxis

3 Mode Integration - Shanghai and Singapore

Shanghai - SPTC

- The Shanghai Public Transportation Card (SPTC) is a contactless card, utilizing RFID technology
- It can be used for
 - Buses and trolleybuses
 - Metros
 - Ferries
 - Taxis
 - Tourist centres
 - Car parks
 - Fuel stations
 - Expressways
 - Airport Maglev

SPTC - Examples



- Five types of card exist: standard, memorial, mini, personalized and watch
- Only the standard card has a refundable deposit

Singapore - EZ-Link

- The EZ-Link card is a contactless smart card based on the Sony FeliCa smartcard technology and used for the payment of;
 - Public transportation fares
 - Some retails and schools
 - SMRT Taxis (since Dec. 2008)
- It is currently under study the possibility of using the card in a wide variety of payment applications
- Cards are sold, distributed and managed by EZ-Link Pte. Ltd., a subsidiary of Singapore's Land Transport Authority



EZ-Link Card



EZ-Link card reader used by SMRT

Source: SPTC website; Land Transport Authority in Singapore; Booz & Company analysis

New York, Mexico City, London and Mumbai are implementing environmentally friendly vehicles

4 Environmental Sustainability

Taxis - E.g. of Best Practice	
New York	<ul style="list-style-type: none"> All taxis should get at least 30 mpg by 2012
Mexico City	<ul style="list-style-type: none"> Mexico's National Institute of Ecology is collaborating on a project with Honda to evaluate the Civic as a taxi option that would reduce fuel consumption
London	<ul style="list-style-type: none"> Taxi owners are required to invest in less-polluting vehicles, install abatement technologies, or convert vehicles to run on alternative fuels—measures are expected to reduce taxi emissions by up to 50 percent
Mumbai	<ul style="list-style-type: none"> All taxis run on CNG - they almost 40,000

Limousines - New Regulation in New York
<ul style="list-style-type: none"> In New York there are currently about 10,000 limousines that emit 272,000 tons of CO2 equivalents annually Currently, taxis average 12-15 miles per gallon (15-20 litres/100 km) Regulation wants cut their greenhouse gas emissions by half Hybrid cars will save owner-operator drivers upwards of \$5,000 per year in gasoline expenses, approximately 50% of their current fuel costs - these savings will allow drivers to cover, in just one year, the additional cost of purchasing a new hybrid car

Source: New York Yellow Book (2007); New York Press Review; Booz & Company analysis

As environmental awareness has been increasing internationally, “Green Taxis” have been integrated into taxi fleets

4 “Green Taxis”

Green Taxis - Description	
<ul style="list-style-type: none"> Development of “low emission”/ “carbon neutral” taxis follows the development of environmentally friendly technologies in the car sector “Green” taxis operate fleets of <ul style="list-style-type: none"> Hybrid cars using two or more distinct power sources to move the vehicle, the most common are electric vehicles (HEVs), which combine an internal combustion engine and one or more electric motors Conventional cars with bio-fuel Offset carbon emissions from conventional fuel combustion 	
<p>Examples:</p>  <p>New Zealand</p>  <p>Devon, UK</p>  <p>Arlington, West Virginia, USA</p>	

Considerations
<p>Current state</p> <ul style="list-style-type: none"> Still few “green taxis” exist for reasons including the high costs of these vehicles In some cities regulation ordinances have encouraged hybrid vehicles (e.g. New York, San Francisco and Chicago) As local markets are often regulated (i.e. number of licenses to new entrants is capped) “green” taxis sometimes offer long distance / or charter services <p>Expected evolution</p> <ul style="list-style-type: none"> In the long term the number of hybrid taxis is expected to increase, given the pressure on environmental issues and the continue improvements in mass produced car specifications Most prototypes of innovative taxis vehicles use technologies that minimize carbon emissions

In conclusion - findings from best practices show that regulation and governance is rooted in three areas

Taxi Regulation and Governance - Key Findings from Best Practices in Taxi and Limousine Markets

Integrated Public Transport Regulator

- Integration of fixed-route public networks (bus and rail) is a policy objective in all best practices, where the FHV sector is supposed to accommodate residual demand
- Taxi and limousines may be regulated through two different models:
 - Through a dedicated regulator (Abu Dhabi, London, New York)
 - Through an integrated public transport regulator (Hong Kong)
- Regulation through an integrated public transport regulator assures optimum integration of taxi and limousines with other transport modes

Clear allocation of responsibilities

- Regulatory and enforcement responsibilities are formally allocated to the regulator through documented job descriptions and standardized processes
- In certain cases, such as fleet size regulation and fare regulation, a higher decision authority is required to approve recommendations presented by the regulator

Formalized regulatory criteria

- Regulatory criteria are formalized and often defined in contracts or license agreements
- Criteria are always formalized and standardized for fare regulation and fleet size regulation, and usually include operators' profitability, service levels and impact on other transport modes

Source: Booz & Company analysis