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Glossary

AET: Agencia Estatal de Transporte (State Transport Agency)
AMM: Área Metropolitana de Monterrey
BRT: Bus Rapid Transport, a bus system with a dedicated lane and high frequency
CAT: Central Area Transit (Perth)
CETyV: Consejo Estatal de Transporte y Vialidad (State Council for transport and road management)
DLR: Docklands Light Railway
DPI: Western Australia Department for Planning and Infrastructure (now dissolved)
ERP: Electronic Road Pricing, an electronic toll collection scheme adopted in Singapore to manage traffic by way of road pricing.
GLA: Greater London Authority
IPLS: Transperth Infrastructure Planning and Land Services Division
LRT: Light Rapid Transit, fast tram is a form of urban rail transit using rolling stock similar to a tramway, but operating at a higher capacity, and often on an exclusive right-of-way
LTA: Land Transport Authority, a unified public transport authority in Singapore
LUL: London Underground Limited
MRT: Mass Rapid Transit, a rapid transit system forming the major component of the railway system in Singapore
N&I: Transperth Network and Infrastructure Division
PPP: Public Private Partnership
PTA: Public Transport Authority (Perth)
SEDESU: Secretaría de Desarrollo Sustentable (Sustainable Development Secretary)
SITME: Sistema Integrado de Transporte Metropolitano (Integrated System of Metropolitan Transport)
SITRA: Sistema Tradicional de Transporte
SINTRAM: Sistema Integral del Transporte Metropolitano (Metropolitan Integral Transport System)
TfL: Transport for London
TTO: Transperth Train Operations
WAGR: Western Australia Government Railways (now dissolved)

1. Executive Summary

In Mexico, the Federal government is not involved in public transport, which means each State administers its transport system independently. In Nuevo León, Monterrey suffers from poor coordination in the transport provision for several reasons. From 31 interviews and 382 survey responses, the following main issues appear:

- Lack of **transparency** in the transport system leads to a **politicised decision-making process**.
- Lack of **governance** means limited **accountability** and poor **segregation of duties**.
- **Fragmented processes** are translated into **limited bankability** and an **unsustainable financial situation**.
- Poor **safety perception** as well as **low quality of service** results in **reduced demand**.
- **Insufficient incentive to use** existing electronic payment systems leads to **low penetration rate**.

A benchmark exercise against London, Perth and Singapore suggests that Monterrey can gain benefit by implementing a **unified transport authority** and a **centralised ticketing system**. Following best practice, we recommend that Monterrey makes changes to Transparency and to Accountability:

1.1. Transparency

1) Tender process

The unified authority must have a transparent, independently audited tender process.

2) Performance reviews – operators

All contracts for operator must set performance targets for quality of service (including consequences for unmet targets). To enforce performance against these targets, by using accurate data, the unified authority should use a suitably independent auditing system.

3) Bankability for investors

The unified authority should set the contracts for operators long enough to allow the contractors a fair return if they invest in the system (between 5 - 10 years¹). To reduce the fare revenue risk for operators, the unified authority should set distance-based contracts. These allow operators to recover higher operating costs if they offer longer routes, or more frequent services. We also recommend that the unified authority has the power to own assets in its own right (e.g. in order to lease them out to operators, whose efficiency it must control by suitably independent audit).

4) Fare management

The unified authority should introduce a smartcard-based system, to give access to any mode of transport in Monterrey. This requires a review of fares over all modes and all journeys, in order to ensure fairness between all modes of transport, and all routes, so giving passengers more flexibility.

5) Data

In parallel to the introduction of an electronic centralised ticketing system, we recommend that the new authority creates improved systems for record keeping and analysis, to support new investment, and to improve all route planning and pricing, such as for special events, festivals and emergencies.

¹ The contract length should be considered alongside the cost of the assets, and the time period needed to depreciate /amortise them. This period may differ between various deals for lease-funding and debt-funding.

1.2. Accountability

6) Scope of bill

We recommended an amendment to the mobility bill, to widen the definition of mobility. The bill should support wider state objectives, such as urban planning and health. All public transport within Monterrey, including Metrorrey and SITRA, should be controlled by a single transport authority,

7) Segregation of duties

The legislation creating the new transport authority should set out the key functions, roles and responsibilities of every organisation involved in transport services. The new transport authority should be responsible for all mobility-related issues (including demand management by prices). The operating companies should only be responsible for operating and maintaining their assets.

8) Performance reviews – public organisations

An independent board should be created, to hold the leader of the new transport authority to account. We recommend that the board's meetings are open to the public, to foster transparency. Also, we recommend that the leader of the new authority, and all the senior management, have detailed performance targets, which are publicly available on the authority's website, and that performance against these targets is reviewed on a regular basis, and the results made available to the public.

9) Decision-making process and fare setting

We recommend that decision-making processes within the new authority are clearly documented. Both political and non-political stakeholders should take part. For fare setting, use a data-driven approach in order to set fares more objectively.

10) Environmental and safety

It is recommended that the unified authority announces its safety schemes and improvements to the general public, to improve passenger confidence. Furthermore, the authority must report data on how well it is meeting every environmental standard which affects its operations.

2. Introduction

2.1. Project Background

The State Government of Nuevo León, Mexico proposed to the local Congress a mobility bill which, if approved, will replace the current regulations in Monterrey. As part of the consultation phase, several public and non-public bodies funded Graduate students at Alliance Manchester Business School to conduct a study on the potential benefits of the bill. The study focuses on two initiatives in the proposed bill (see appendix A for further detail):

1. **A unified transport authority.** The organisational structure tends to vary from country to country, but the institution typically regulates, plans, and administers the operations of a city's mobility system, particularly public transport.
2. **A centralised ticketing system.** A technology-based platform that enables seamless use of multiple modes of public transport through a single cashless payment method, traditionally a card or smart card.

2.2. Project scope and deliverables

The first part of the project involves benchmarking how London, Perth and Singapore have benefitted from the introduction of the above two initiatives. For the purposes of this study, the areas of analysis will be:

- Legal structure
- Governance
- Finance and contracting
- Operations
- Social and Environment
- Centralised Ticketing

The project's Deliverable is a research report detailing:

1. Results of as-is assessments of market capture and benchmarking
2. General recommendations for implementing a unified transport authority, and a centralised ticketing system

3. Research Method

3.1. Outline of research methodology

Our research approach was threefold: it consisted of desktop research, interviews and surveys. The entire research project including data gathering, analysis and formulating recommendations took around 8 weeks, including two weeks conducting primary research in Monterrey, as per Figure 1 below:

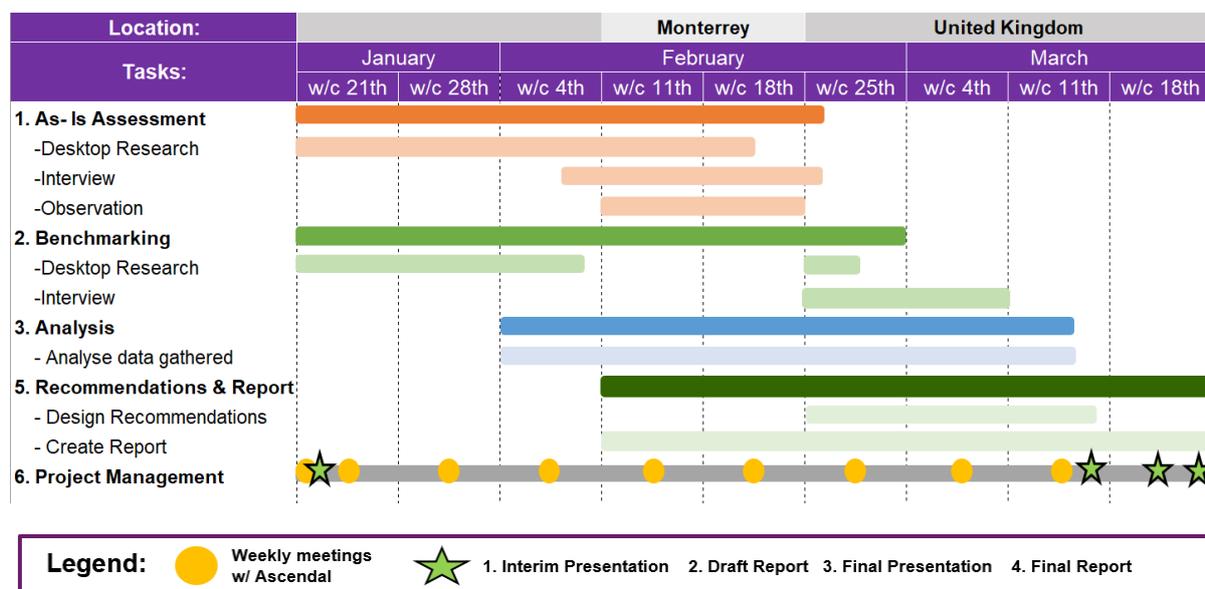


Figure 1 – Project timeline

An initial assessment of data available revealed that the data gathering for Monterrey would be heavily reliant on primary research, whilst for the benchmark cities there was plenty of secondary research information available publicly online.

First, we identified as key areas for research, the *Market Capture* (section 3.1.1. below). We then developed *Key Indicators* which would be easily comparable between the four cities, in order to draw out what the key benefits of implementing a unified authority and centralised ticketing are. Details of the key indicators can be found in section 3.1.2. below. We then developed our data collection tools including survey questions and interview outlines. More detail on the data collection can be found in section 3.2.

3.1.1. Market capture

In order to understand the as-is situation in each of four cities, we selected key areas of research. For Monterrey the areas we researched are outlined below, along with the rationale and the method for data collection:

Area	Rationale	Data collection method
City Profile	Predominately for context: to understand the flow of people around the city, what the impact of physical features are, how the population is changing and what the impact of these things are on public transport.	Interviews Desktop Research
Governance	To understand which organisations (governmental or otherwise) are involved in transport in Monterrey, how they interact with each other and exert influence, and who is responsible and accountable for key decisions.	Interviews Desktop Research

Operations	To understand how the main modes of public transport are operated, managed, maintained, financed and contracted as well as how the ticketing systems currently work.	Interviews Desktop Research
Public perception	The perception of the user is key to understand the extent to which the public transportation services are meeting user demand and requirements.	Surveys
Mobility Bill	An in depth understanding of the new mobility and comparison to the existing bill was required so that we could make a comparison to similar legislation in our benchmarking cities that created the unified transport authority.	Desktop research

For the benchmark cities, the focus areas we researched are outlined below, along with the rationale and the method for data collection:

Area	Rationale	Data collection method
City Profile	Predominately for context: to understand the flow of people around the city, how the population is changing and what the impact of these things are on public transport.	Desktop Research
Overview of public transport modes	To understand what the main public transport modes are in each benchmark city.	Desktop research
Management of public transport	To understand the legal framework, regulation of transport, governance structure, how public transport is funded and the contracting structures in place.	Desktop research Interviews
Tickets and fares	To understand the ticketing system in place and how it has impacted the public transport system.	Desktop research Interviews
Evolution of the unified authority and centralised ticketing system	To understand how the transport authority in each benchmark city was created and how the centralised ticketing system was introduced. Whether there are lessons that could be learned from when implementing in a new city.	Desktop research Interviews

3.1.2. Key indicators

To understand how a unified transport authority and centralised ticketing could benefit mobility in Monterrey, the team compiled a range of metrics that act as key indicators of public transport quality. These key indicators were used to compare the public transport systems of Monterrey with the three benchmark cities. They highlighted the areas with the largest disparity in standards, and so where there is potential for the largest improvement. Solutions in these areas should be prioritised.

The key indicators seek to create a *quantified* comparison of public transport provision from the point of view of a range of stakeholders, including the users, operators, tax payers and environmental lobbyists. In some areas, where quantification was difficult or information was hard to find, we used a scale to plot performance within a range, or a proxy measurement. For example, we used the average age of the bus fleet as a proxy for rider comfort.

The key indicators cover five major areas: the standard of **governance**; the effectiveness of **finance & contracting**; the efficiency of **operations**; **social & environmental** factors; and the quality of the **central ticketing system**.

Governance

In this section, the key indicators (Figure 2) were split into five principles of good governance—participation, fairness, accountability, transparency and efficiency—according to the World Government Assessment report (Overseas Development Institute, 2007). For *participation*, we examined the involvement of stakeholders by looking at the number of stakeholders consulted and the scale of consultation. For *fairness*, we assessed that conflict of interest was lower in the presence of an independent advisory board. *Accountability* was split into: a clear segregation of duties; and accompanying targets; and consequences for not performing. We measured *transparency* by observing the frequency, recency and depth of information publicly available, and whether it was forward looking. Finally, *efficiency* was measured by examining the coordination of powers (to reduce overlaps of responsibilities) and by the lead time to complete major capex projects, when approved.

Focus	Key Indicators	Metrics
Participation	Involvement of stakeholders	Number of non-governmental groups consulted in major decision making
		Scale (1= no consultation, 5= presence on independent advisory board)
Fairness	Conflict of interest	Presence of an active independent advisory board
		Scale (1= no/few clearly-defined roles within unified authority, 5= majority of senior managerial roles clearly defined)
Accountability	Segregation of duties	Scale (1= not available, 5 = clearly defined target)
	Goals & performance target	Scale (1 = no consequences, 5 = complete removal)
	Consequences of individuals not meeting performance targets	Scale (1 = no consequences, 5 = complete removal)
Transparency	Frequency of public reporting	The number of times a year an operational performance report is published
	Recency of KPI data	Scale (1= 3 year delay, 5 = live)
	Depth of information available	Scale (1= Not available, 5 = Information covering accountabilities and performance against targets in finance, operations, social & environmental)
	Public availability of forward looking performance targets	Scale (1= no performance targets, 5 = 3 years ahead+)
Efficiency	Speed of completion of major capex projects >USD10Bn investment	Lead time to completion
	Coordination of powers	Scale (1= no defined inter-governmental interaction model, 5 = clearly defined and actioned interaction model)

Figure 2 – Key indicators of good governance.

Finance & contracting

Within the administration of public transport, the methods of assigning public transport permits, and of influencing operators' bankability, have a significant impact on the quality of service (Figure 3). We measured the extent of a formalised, transparent tender process in each city, and whether there was pressure to maintain and improve upon high standards of service. Pressure could come from enforcing minimum standards in a concession contract, and/or encouraging improvements in a range of areas including accessibility and environmental impact through an incentive scheme. We also examined the effect of bankability on private operators, by looking at their ability to raise finance against the length of concession contract, and the percentage of capex funded by the government.

Focus	Key Indicators	Metrics
Bankability	Concession length	Scale (1= 1 year or less & 15 years or more, 5 = 5-10 year contract)
	Government financing burden	% of external funding from government
Contracting Process	Externalities enforced/incentivised in contract	Scale (1 = focus on profit only, 5 = multi-dimensional standard/incentives eg social inclusion, coverage, environment etc)
	Barriers to entry	Scale(1= none, 5 = a presence minimum standards, eg. emission standards, technological barriers, average age of fleet, cash flow financing)
	Transparency of tendering process	Scale (1= in-house tendering process, 5= publicly published tendering process)
	Consequences of operators not meeting performance targets	Scale (1 = no consequences, 5 = complete removal)

Figure 3 – Key indicators for effective finance and contracting processes.

Operations

The effectiveness of the transport operations was measured through metrics focusing on quality of service and accessibility (Figure 4). We measured user satisfaction, safety and comfort, bus reliability and the presence of a journey planning aid. We also looked at the mean distance from public transport routes to homes, This may fall if regulators subsidise less-profitable, thinly travelled routes.

Focus	Key Indicators	Metrics
Quality of Service	Customer Satisfaction	Satisfaction survey eg. Net Promoter Score
	Reliability	% On time running (OTR)
	Journey planning	Scale (1 = not available, 5 = multi-modal app trip planning)
	Perception of personal safety	% of respondents who feel safe
	User comfort	Average age of the bus fleet
Accessibility	Locality of public transport service	Percentage of city within 1km of a public transport service

Figure 4 – Key indicators of efficient operations.

Social & environmental factors

Social and environmental factors were also important to an effective public transport system. We split these considerations into: health and safety, inclusion and access, and the environment (Figure 5). Within health and safety, we measured accident incident rates and the presence of CCTV as a proxy for personal safety. For inclusion and access, we looked at female, disabled, and low-income users' accessibility to public transport. Finally, the environmental factors were measured by the presence of a congestion charge, and by measured progress against an environmental strategy.

Focus	Key Indicators	Metrics
Health & Safety	Loss of life/injuries avoided	Incidents rate
	Personal safety & security	% of services with CCTV
Inclusion & Access	Gender equality	% of female respondents who feel safe
	Disability access	Scale (1= no provision of disability access, 5 = all services accessible to disabled people)
	Low-income access	Availability of concessionary fares (list)
Environment	Congestion charge	Presence of congestion charge
	Presence of public environmental strategy	Progress against plan

Figure 5 – Key indicators of social and environmental factors.

Centralised ticketing system

Finally, the standard of the centralised ticketing system was assessed through observing the transparency of information, quality of service, and improvements to inclusion and accessibility. Within transparency, we looked at the availability of data, and the visibility of cash flows and of user account information. Quality of service was examined through the availability of multimodal ticketing and remote top-up facilities, and through the standardisation of fares. Improvements to inclusion and

access were measured through assessing affordability, and being able to plan the cost of journey through a convenient fare calculator.

Focus	Key Indicators	Metrics
Transparency	Visibility cash flow	Scale (1= no visibility, 5= real-time visibility)
	Visibility of user account information	Scale (1= no visibility, 5= real-time visibility)
	Availability of data	Scale (1= no visibility, 5= real-time visibility and high usage)
Quality of Service	Availability of multimodal ticketing (travel shifts)	Number of modes linked
	Availability of remote top-up	Yes or no
	Penetration of central ticketing system	% of users
	Fare standardisation	Scale (1= diff fares for diff players, 5= standardized by mode)
Inclusion & Access	Availability of fare calculation	Tick box
	Affordability	Cost of monthly travelcard as % of average wage

Figure 6 – Key indicators of the quality of centralised ticketing.

For the full table complete with results, please refer to appendix C.

3.2. Data collection

To assess the benefits of a unified transport authority and a centralised ticketing system, we:

- Undertook a market review of the current public transport situation in Monterrey.
- Compared the impact and implementation of these two initiatives in Singapore, Perth and London

To achieve this for Monterrey, we conducted primary research (in form of interviews with stakeholders within public transport, observations of the operation of various transport modes, surveys of current users of the service) and secondary research (desktop).

We studied the benchmark cities largely through secondary research. We supplemented this with interviews (face-to-face interviews with Transport for London representatives, and mail questionnaires to representatives of the Land Transport Authority of Singapore).

3.2.1. Secondary research

For Monterrey, there were limitations on secondary research for two main reasons: limited information available regarding public transport (e.g. how the system is funded, the different public and private operators that run the system, public data regarding satisfaction rates with the service, etc); and information found was often out of date. For Nuevo León however, the information from the government website was largely up-to-date on topics like the various governmental bodies involved in public transport and the various laws involved.

For the benchmark cities, information about public transport systems, performance reports, authorities and organograms were collected through consulting various governmental websites, such as: the Land Transport Authority and Public Transport Council for Singapore, “Transport for London” and the Western Australia Public Transport Authority, TransPerth and Western Australia Department of Transport.

3.2.2. Interviews

We identified key interest groups and positions in the governmental and decentralised organisations involved in transport, in Monterrey, London, Singapore and Perth. Each interviewee was contacted by email communication, in Spanish, in the case of Monterrey, and English, in the case of London, Singapore and Perth, to schedule a mutually convenient time. We conducted 31 interviews: 25 face-

to-face interviews in Monterrey across 18 different organisations, and two face-to-face interviews in London with Transport for London representatives. We also had four detailed e-mail correspondences with Land Transport Authority representatives in Singapore.

The list of interviewees per city is in appendix D and the schedule of interviews is in appendix E. We grouped the interviewees in three categories: Operators, Interest Groups and Government, and we prepared an interview guideline to lead the interviews in each case. However, we maintained flexibility, and were able to dive deeper in topics of interest.

In the case of Singapore, we sent a questionnaire with five open questions by e-mail to four representatives of the Land Transport Authority and they replied providing us the information needed. When the answer was not clear or we needed further details, we replied to gather the detail required.

The interviews in the benchmark cities covered topics such as: what is the governance of the transport authority system; what were the pain points when implementing the centralised ticketing system and the centralised Authority; and how does the centralised system operate. The full outline for the interview is in appendix F.

It is important to mention that we had language limitations during primary research in Monterrey. Most of the interviewees were Spanish speakers and the team had only two Spanish speakers. However, we were aware of this situation, and we planned accordingly: dividing the team in two groups of three people, with one Spanish speaker per group.

3.2.3. Surveys

In order to capture responses for all transport modes, we designed a survey to be applied in key points of Monterrey. The survey was designed to be quick to complete – in approximately 2 minutes— to gain as many responses as possible. It consisted of 10 multiple choice questions and satisfaction rankings with different aspects of the public transport system. The questions were divided in two blocks: the first was respondent information (gender, age, disability etc); and the second asked specific questions regarding their experience of using public transportation: frequency of usage, time spent using it and their perceptions regarding security, comfort, trust etc. The survey questions are in appendix G.

The surveys were conducted in peak hours, (weekday before 9 am and after 5pm), in three different bus/metro stations in the central Metropolitan area of Monterrey. These locations were said to be busy intersections in the city for public transport. See details in Figure 7.

Considering our Spanish speaking limitations, we designed an introductory phrase in Spanish for the non-Spanish speakers to approach people in the streets, and the survey description was also in Spanish, then our non-Spanish team members handed the surveys to respondents to complete themselves.

We achieved 382 survey responses in 3 days.

Where	When	How many?
San Nicolas (where Metro and trasnmetro interlink)	Monday 18 February	130
Mitras (where Metro and Ecovia interlink)	Tuesday 19 February	130
Cuauhtemoc avenue (Bus Stops)	Wednesday 20 February	122

Figure 7 – Detail of surveys

To analyse the satisfaction levels of respondents with public transport in Monterrey, we used the Net Promotor Score approach. We categorised the satisfaction levels based Bain's Net Promotor Score

methodology: responses of 9 and 10 were designated as Promoters, 5 to 8 as Passives and 1(0) to 4 as Detractors (Bain & Company, 2019).

3.3. Limitations of our approach

The methodology we designed to analyse and quantify the benefits of the unified transport authority, and of the centralised ticketing system in the benchmark cities, has some limitations, due to the different time zones between United Kingdom, Singapore and Perth.

Considering the limited budget, we planned to do the research of the benchmark cities by desktop research and by skype interviews with key people in the transport systems. However, due to differences in the time zone, and different priorities in the interviewees' agendas, it was difficult to arrange skype interviews with representatives of the Transport Authority in Singapore and in Perth. In the case of Singapore, we managed get additional information by sending an e-mail questionnaire to representatives of the Land Transport Authority of Singapore. However, in the case of Perth, we tried to contact both the People and Organisation Development Director, and the Infrastructure Planning and Land Services Director of the Public Transport Authority, and by various different channels, but did not get any response.

Additionally, we faced some challenges when comparing Monterrey with the benchmark cities, in terms of benefits of the initiatives, due to differences in the following aspects: demographic (population), political, cultural and economic.

When we applied surveys, there was a mis-understanding by the users of public transportation regarding the definition of 'bus', and of the differences between bus, Trans metro and Bus Rapid Transport. This confusion is reflected in the survey results, when asked which type of public transport they use.

4. Monterrey Findings

The structure of these findings has four sections. The first section gives an overview of Monterrey City: density, regarding population, GDP, and how the City has evolved in the last years. The second section describes the governance-structure of the State of Nuevo León, regarding Transportation and Mobility, and how the different centralised and non-decentralised systems interact among each other. The third section describes the different public and private operators that run the Monterrey's Public Transport System. Finally, the fourth section describes the New Mobility Bill, and what are the main changes from the current Transport Law. All the information detailed below has been gathered from interviews with stakeholders in Monterrey, unless reference is made to a secondary source.

4.1. City Profile

The metropolitan area of Monterrey has several definitions. For the purpose of this report, the city of Monterrey will consist of the *Area Metropolitana de la Ciudad de Monterrey* (AMM) that encompasses the municipalities of Monterrey and 11 surrounding municipalities.

The city has grown rapidly in the last 30 years from 2.5M inhabitants in 1990 to 3.9M in 2010. This growth of over 50% has put a strain on the public transportation systems within the metropolitan area. The city's low population density (1.2K inhabitants per km² against 6K in Mexico City), which has seen the city expand to a larger and larger area, has only exacerbated the strain on public transport. Figure 8 shows the shape of the city currently from satellite imagery.



Figure 8 – Satellite image of the Metropolitan Area of Monterrey with mountainous area highlighted in red.

The mountains that surround the city have constrained the city's growth and caused the formation of long corridors of urbanisation, with the concentration of business districts in the centre.

Together, the city's shape and low population density has meant public transportation has become more expensive for the state to provide. Low population density results in fewer passengers per vehicle km driven, and so lower revenues per km. While the long distances from the suburban areas to the central business districts mean fewer fares, these passengers stay on buses for longer

distances, and this also causes frequent empty return trips for bus companies, particularly on routes serving commuter corridors.

While the city is one of the wealthiest in Mexico (GDP per capita – US\$35.5K²), many suburban areas on the outskirts of the city are home to lower income families, who require public transport from the extremities to the central business districts. Altogether, 4.2M journeys a day are taken on public transport in Monterrey (Cantu, 2013).

4.2. Governance of Public Transport

4.2.1. Governmental structure

Mexico is a Federal Republic, and as such it has three layers of government: Federal, State and Municipal. Each of these layers has three different branches—Executive, Legislative and Judicial. This governmental structure is important, to understand the different powers and obligations that each layer has, regarding public transport provision.

Federal Government - The Mexican Federal Government provides the infrastructure needed to ensure communication between the different states. In this way, the national highways, so called Federal highways, are managed through the *Secretaría de Comunicaciones y Transporte* (Transport and Communications Secretary). The federal government delegates the regulation of public transport to the State governments.

State Government - For the state government to provide public transport for its citizens, it has two fundamental tasks:

1. **Public transport provision:** This entails planning, regulation and provision (with or without partnerships). Each state will have a State Law that will dictate how this provision will be tackled, by which dependency, etc.
2. **Urban development planning:** Each state will be responsible for the studies and urban analysis needed to match the needs of the population. The growth of urban and metropolitan areas has placed growing importance of the provision of public transport.

Municipal Government - The responsibilities of the municipalities are largely executive. Regarding public transport, the municipalities are responsible for transit operation and roads management. Additionally, the municipalities serve as land owners, and thus control , urban development to some extent, through assignment of land.

Of course, a high level of alignment is expected among the three layers of government.

Figure 9 summarises the public transport responsibilities of the three layers of government.

² Here, GDP per capita is purchasing power parity based, i.e. gross domestic product converted to international dollars using purchasing power parity rates and divided by total population.

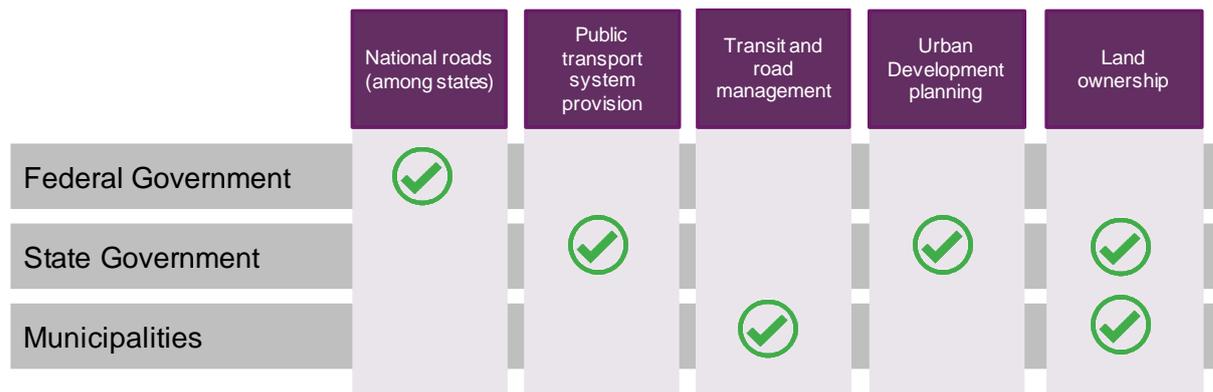


Figure 9 – Public Transport responsibilities across government branches

4.2.2. State Regulation

The regulations that empower the state of Nuevo León with mobility responsibilities are stated in the following laws:

- **Ley Orgánica de la Administración Pública para el Estado de Nuevo León:** State Law to describe State Government Structure as well as competencies of each dependency
- **Ley de Transporte para la Movilidad Sostenible del Estado de Nuevo León:** Current Mobility law aimed to be replaced by the new proposal
- **Ley del Sistema de Transporte Colectivo:** Secondary law to regulate Metrorrey
- **Ley de la Agencia para la Modernización y Racionalización del Sistema de Transporte Público de Nuevo León:** Secondary law to regulate the State Transport Agency of Nuevo Lyon
- **Ley de Planeación Estratégica del Estado de Nuevo León** Secondary law to regulate State Strategic Planning in Nuevo Lyon

4.2.3. Government Stakeholders

Based on this legal structure, the organisations that have delegated responsibilities for mobility are listed below (first with the actual name, and then translated, as will be mentioned in the report). These will be described in detail in the relevant later sections of our report:

- **Secretaría de Desarrollo Sustentable (SEDESU)** - Sustainable Development Secretary
- **Agencia para la Racionalización y Modernización del Transporte Público de Nuevo León (AET)** - State Transport Agency
- **Consejo Estatal de Transporte y Vialidad (CETyV)** - State Council for transport and road management
- **Sistema de Transporte Colectivo Metrorrey (STC Metrorrey)** - Metrorrey Transport System
- **Sistema Integral del Transporte Metropolitano (SINTRAM)** - Metropolitan Integral Transport System
- **Consejo Nuevo León** - Nuevo León Council

4.2.4. Interaction-model

Figure 10 shows the organisational structure and the interaction model among these public organisations and below is further explanation of each.

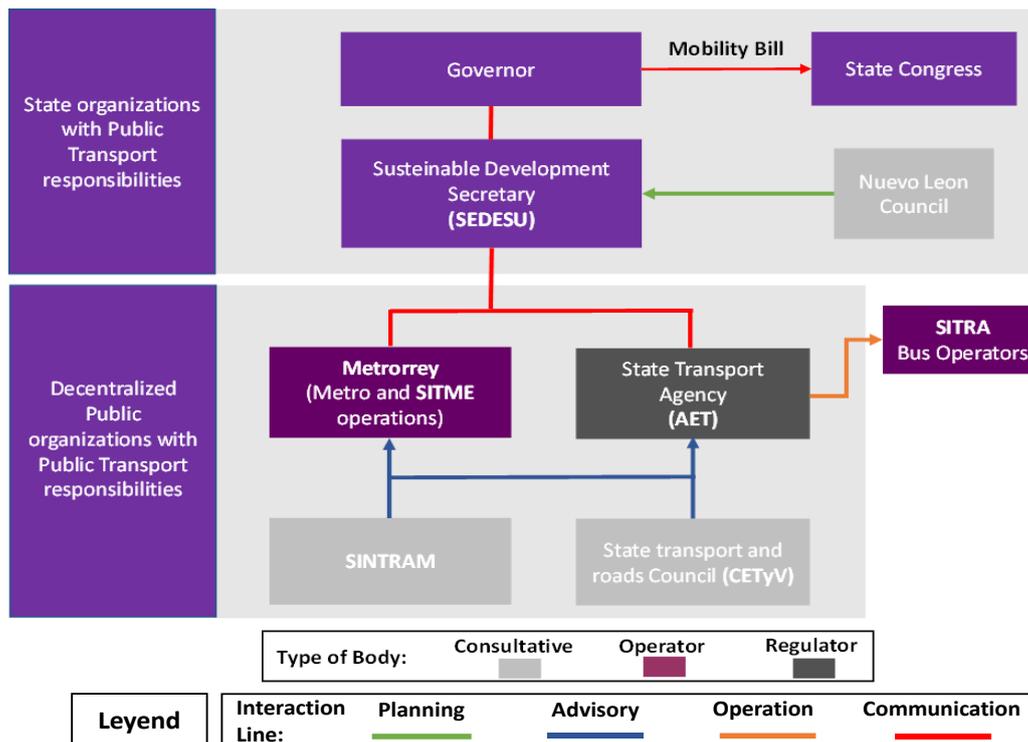


Figure 10 – Interaction model: public transport organisations in Monterrey

Sustainable Development Secretary (SEDESU) is the main governmental institution in charge of transport and mobility in the State of Nuevo León. Its Minister is appointed by the governor of the state. SEDESU is in charge of coordinating the preparation, administration, execution, evaluation, revision and modification of the State Program for Urban Development and submit it to the Governor of the State for approval (Nuevo León Government Official Site, 2019).

SEDESU is currently working on a Mobility Programme called PIMUS (Sustainable Urban Mobility Integral Programme). PIMUS' timeline is 18 months and will consist of Nuevo León's long-term urban development program, which includes mobility. According to SEDESU, this programme should guide all planning on urban mobility.

By law, SEDESU has mobility and urban development duties, and, since it is the highest ranked government institution with regards to mobility and environment, it is in charge of coordinating all actions and projects with regard to transit and public transport.

Metrorrey Transport System is the only government service provider that serves the metropolitan area of Monterrey. Even though Metrorrey is a decentralised public organisation it reports directly to the Governor. Further detail on Metrorrey is in section 4.3.

The State Transport Agency (AET) is a decentralised public organisation in charge of planning and provision of the public transport in the state. Article N.6 of the 'Organic Law for the Public Administration of the Nuevo León State' appoints the Agency AET responsible to provide the state with an efficient, comfortable, safe and reliable public transport service of world class quality. It should encourage public transport usage and reduce private automobile usage, in order to achieve sustainable urban development. To do this, the agency has power to plan, regulate, supervise and regulate public transport development and operation (State Government of Nuevo León, 2019).

The State Transport Agency works as a regulatory entity, it issues permits to individuals to provide public transport services under SITRA (bus operators, see section 4.1.1), authorizes the fares for passengers within this system, and coordinates the long-term Transportation and Road Sector Plan.

The Director of the Agency is appointed by the governor, and he is also the Director of the CETyV - Estate Council of Transport and Road.

One of the projects that the Agency is developing is the integration of SITRA public transport information with the SITME (see section 4.3) in a unified platform, where users can access information in real time (traffic control, public transport lines, buses schedule), as well as providing connectivity to enable data collection and environmental monitoring.

The AET has the authority to exercise supervision, surveillance and administration of services (Cantú, 2013). For the exercise of its functions, the AET has a technical, advisory and citizen participation body: the State Council of Transportation and Roads management (CETyV), which in practice, also supports Metrorrey and SINTRAM.

The State Council of Transport and Roads Management (CETyV) 's main function is the analysis and discussion of alternative solutions to problems related to public transport services and roads. The CETyV structure comprises a President, a Vice-president (who currently is also the Director of the State Transport Agency) and a Director.

Since the CETyV is a supportive entity, the technical studies that it produces are provided on an on-demand basis for the State Transport Agency, Secretary of Sustainable Development (SEDESU), Metrorrey, Municipalities, or any other mobility related institution. This entity cannot act, impose or execute; its influence is through opinions and recommendations, and much depends on how receptive the other entities are to adopt those recommendations.

In order to perform studies, CETyV interfaces with the different decentralised bodies to gather information and avoid duplicating efforts, this interaction is fostered through Metrorrey, SEDESU, some municipalities, SITRAM. However, some institutions are reluctant to share information. The CETyV was not involved in creating the technical demand studies for the creation and extension of roads, and the routes actually given to consortiums.

The Metropolitan Integral Transport System (SINTRAM) is a trust that was established in 2000 funded by the State Government and 7 municipalities, whose purpose is the integrated management of traffic in the AMM. It was originally designed to manage metropolitan traffic and, where appropriate, to scale the system, by adding functions, to provide priority services for specialised vehicles (public transport, among others) or for traffic management, based on environmental variables (Cantú, 2013).

SINTRAM was managed by a French company called Gertrudi until 2010. Then the contract finished and no maintenance from the provider was available, and the quality of service of the traffic lights started to decrease, due to lack of funds. Nowadays, SINTRAM only provides technical advice on demand, especially to the municipalities, for whom it also provides operation services to improve transit flow.

4.2.5. Roles and responsibilities

To summarise the current distribution of responsibilities, and the interaction among organisations, Figure 11 showcases the RACI matrix for both SITRA and SITME. The RACI matrix is a technique used to identify functional areas, key activities, and decision point. RACI is acronym that stands for R= Responsible, A= Accountable, C= Consulted, I= Informed.

- **Responsible:** Function (role) who completes the task, it is highly recommended to have only one responsible pe activity to avoid the chance of redundant tasks or clashing orders
- **Accountable:** Function with Yes/No (Approval) and veto power of Authority. There should be only one Accountable function per activity
- **Consulted:** Function to be consulted prior to decision or action
- **Informed:** Function needs to be informed after decision or action to be taken

SITME	Urban Planning			Transport Planning			Operation/Regulation		
	Technical Advisory	Policy Planning/Making	Strategic Planning	Technical Advisory	Policy Planning/Making	Strategic Planning	Tender Process	Performance Review	Fare Setting
State Governor	A	A	C	I	A	C	A	I	A
Nuevo Leon Council	C	C	C	C	C	R	I	I	I
SEDESU	R	C	R	C	C	R	I	I	C
AET	I	C	I	I	C	C	I	I	I
CETyV	I	C	I	R	C	C	I	I	I
SINTRAM	I	I	I	R	I	I	I	I	I
Municipalities	C	I	I	I	I	I	I	I	I
Metrorrey	I	C	I	R	C	C	R	R	R

SITRA	Urban Planning			Transport Planning			Operation/Regulation		
	Technical Advisory	Policy Planning/Making	Strategic Planning	Technical Advisory	Policy Planning/Making	Strategic Planning	Tender Process	Performance Review	Fare Setting
State Governor	A	A	C	I	A	C	A	I	A
Nuevo Leon Council	C	C	C	C	C	R	I	I	I
SEDESU	R	C	R	C	C	R	I	I	I
AET	I	C	I	I	C	C	R	R	R
CETyV	I	C	I	R	C	C	C	C	C
SINTRAM	I	I	I	R	I	I	I	I	I
Municipalities	C	I	I	I	I	I	I	I	I
Metrorrey	I	C	I	R	C	C	I	I	I

Figure 11 – RACI matrix for key activities to provide public transport in Monterrey

Both RACI matrixes for SITME and SITRA display inconsistencies with the definition of a well-documented process matrix. The main issue arising is the existence of multiple responsible functions for different activities, e.g. technical advisory, when it comes to Transport planning. Equally, some key activities lack a function accountable, e.g. performance reviews in the regulation umbrella or strategic planning for both urban and transport planning. There are a variety of consequences to these issues, that will be tackled further in the body of the report.

4.2.6. Legislative Process

On the back of this regulatory framework, the State Government is entitled to bring up either amendments to current regulations, or completely new law proposals. This project aims to study the new bill with regards to mobility, that was put forward by the State Executive Power. Such law needs to be approved or disapproved by the Nuevo León's Legislative Power after a consultation process.

This consultation process allows several stakeholders, including **operators, NGOs and unions**, to express their opinions with regards to the new mobility law, which must be addressed by the State Congress. (The Mobility Bill proposal will be further discussed in section 4.5). So far, several summits have taken place to gather information, and press releases and statements have been made to draw the attention of the congress to this matter.

4.2.7. Federal and state funding

Most of the **State Government** funding for the public transport system is scrutinised and approved by the State Congress in an annual budget approval exercise. It is at this point that each of the State government dependencies and Municipalities are granted a budget to execute activities or projects.

Although the **Federal Government** does not have official involvement in the state's public transport system, it does have funding influence through over special projects to some extent. These funding processes are twofold:

1. **Discretionary Investment:** The State Governments will present project proposals to the Federal Government, to improve public transport provision. Then, the Federal Government may or may not include such investment as part of the National Budget for

the next year. This budget has to be scrutinised and approved by vote by the National Congress.

2. **Federal Program for Mass Transport (PROTRAM) - Programa de Apoyo Federal al Transporte Masivo:** Through this program, the Federal government seeks to promote the public transport provision, regulation and planning within the states. This fund is a combination of resources from i) the Clean Technology Fund, ii) the World Bank and iii) the funds resulted from different local trusts and their prospects. All projects funded by this fund must help avoid environmental change.

4.3. Operations

Figure 12 shows the management structure of public transport operations in Monterrey. As shown, the state governor has ultimate control over the major mobility decisions within Nuevo León. And while SEDESU legally has control over public transport operations, in practice operations are managed by two separate public bodies:

- **Metrorrey** manages the city’s metro, Bus Rapid Transport (BRT) system and three bus feeder networks—Transmetro, MetroEnlace and Metrobus—together making up the Integrated System of Metropolitan Transport, or SITME.
- **The Agency for the Rationalisation and Modernisation of the Public Transportation System of Nuevo León (AET)** manages the remaining public transportation within the state. The bus routes it manages form the Traditional Transport System, or SITRA.

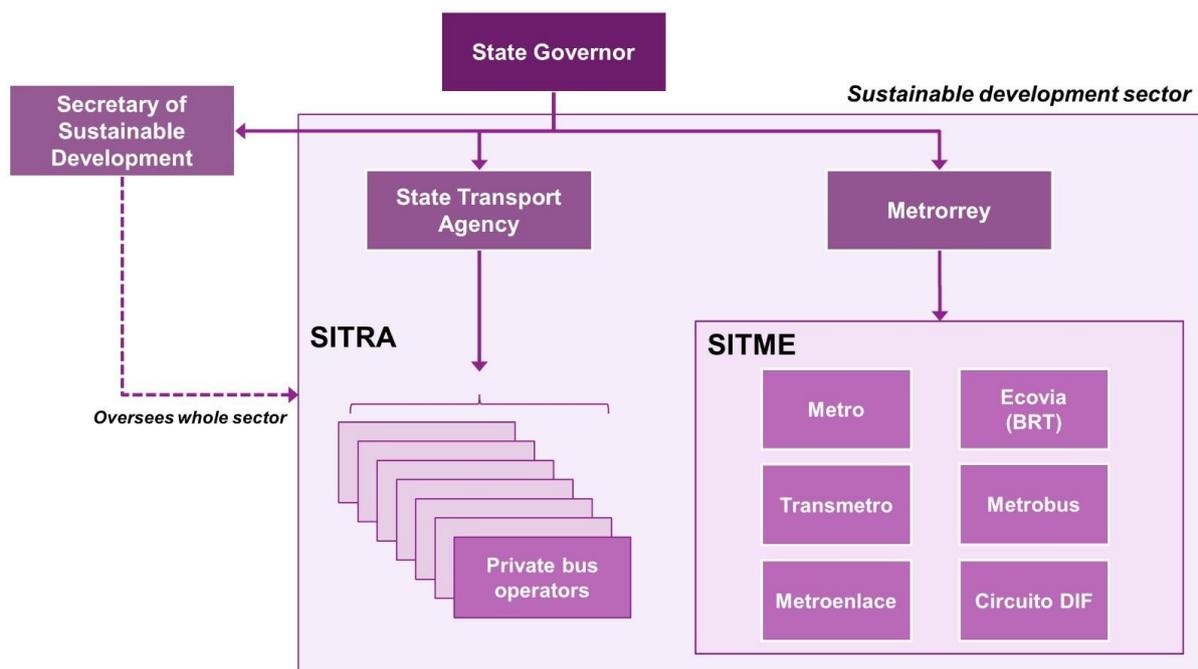


Figure 12 – Structure of public transport operations within Monterrey (Cantu, 2013).

This section discusses the operations within Metrorrey and the problems faced by private bus operators within SITRA.

4.3.1 Metrorrey

The Collective Transport System of Monterrey, known as STC Metrorrey, is a decentralised public company established to build, operate and administer the city’s metro system. Since its creation, the public body’s responsibilities have expanded to administering the metro feeder system (Transmetro),

the city's BRT system (Ecovia) and two further bus feeder networks (MetroEnlace and Metrobus). Together, these networks comprise the Integrated System of Metropolitan Transport (SITME).

Metrorrey reports directly to the State Governor who appoints the general director. Currently, the Metrorrey receives approximately MX\$350M (US\$18M) annually in state subsidies to cover the costs of operation, roughly 0.4% of the state's annual budget.

The section below discusses each mode of transport within SITME in more detail.

Metro

Metrorrey has owned and operated the city's two metro lines since 1987. The metro system was chosen as it was considered the most efficient form of mass transportation in terms of operational cost and passenger capacity. The original proposal for five lines, however, has since been hindered by the high capital costs involved. Total construction costs for a new metro line are estimated to be US\$75M per km. Construction of Line 3 that would run northeast from the city centre is currently almost complete.

The system currently transports 550K passengers per day and receives 360K fare payments a day. Fares are standardised across the system with a fare of MX\$4.5 (US\$0.2) gaining the user access to a single journey across the metro system – Lines 1 and 2 (State Government of Nuevo León, 2019).

The cost of operating the metro per passenger is currently MX\$8.9 (US\$0.45) with the operational loss being subsidised by the state government.

Changes to policies, including pricing, require the majority vote of both the Metrorrey and State Transport Council governing boards, and must be approved by the State Governor.

Trans Metro

The Transmetro is a feeder system for the metro consisting of 10 bus routes emanating from certain metro stations (Figure 13). It was designed to be an extension of the metro system free to use within 90 minutes of using the metro (State Government of Nuevo León, 2019).

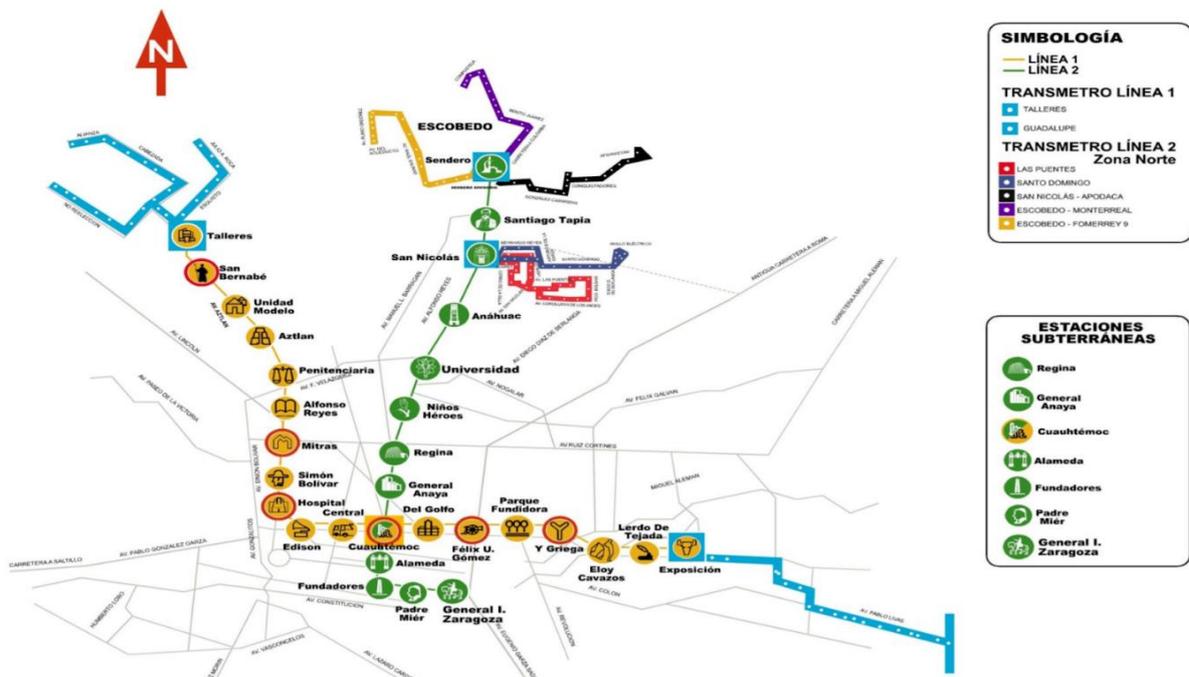


Figure 13 – Map of the Transmetro routes and their interface with the metro lines 1 and 2.

Metrorrey owns the assets of Transmetro, including the buses, bus stations and garages. However, the buses are operated by private companies. Contracts with these providers focus on providing a

seamless transition with the metro and payment in the form of a fee per kilometre travelled incentivises rapid transfers between locations.

Transmetro has expanded since its inauguration in 2002—then operating under the name “Premetro”—and now includes 2 lines servicing major hospitals called “Circuito DIF”.

As users do not pay an additional fare for using the Transmetro, its operations are wholly subsidised by the State Government of Nuevo León.

Ecovia (BRT)

Ecovia is a Bus Rapid Transport (BRT) line that operates over a single 30km route extending east to west across the city. Opened in 2014, the system was designed to be a significantly lower capex alternative to the originally planned metro lines 1a and 1c.

As a BRT system, Ecovia buses have access to a dedicated lane segregated from the rest of the road traffic to enable unhindered movement. Stations and buses are designed to be like metro systems with climate-controlled buses, universal accessibility and live arrival information screens (State Government of Nuevo León, 2019).

Ecovia is owned and operated by private companies in a Public Private Partnership (PPP) administered by Metrorrey. However, the buses are owned by a trust, which dictates that the buses cannot be removed from operation. Recently, the state has taken over operation of the Ecovia due to a perceived issue with maintenance of the service. Operation contracts for Ecovia are normally for 20 years.

Ecovia currently costs MX\$14 (US\$0.7) per trip with a concessionary fare of MX\$10 (US\$0.5) (State Government of Nuevo León, 2019).

MetroEnlace & Metrobus

Metrobus and MetroEnlace are both bus networks that feed the metro and BRT systems of Metrorrey. Unlike Transmetro, however, the assets are not owned by Metrorrey and the transfer is not always free. Instead private companies own and operate these buses in a PPP with Metrorrey through contracts of transfer. In these contracts, Metrorrey agrees to subsidise fares when users transfer from its other services. This is funded by the State Government.

4.3.2. Private bus operators

Outside of the Metrorrey-administered SITME, the remaining bus routes of the state make up the Traditional Transport System (SITRA). The State Transport Agency (AET) manages and administers transport within SITRA.

Within the metropolitan area, the bus routes under SITRA are operated and assets owned by private companies through permits from the State Government. These private companies range from individual owner-drivers through to small and large transport companies and consortia.

Permits

Permits allow operators access to service routes and are subject to certain service standards including a maximum bus age of 10 years, air conditioning on all buses, minimum bus frequency and maintenance schedules, and a maximum speed limit. However, according to operators interviewed, these standards are rarely enforced.

Permits have a duration of 12 months and are in theory able to be revoked but in practice this is difficult as private companies own the assets necessary to operate the route. They can therefore cause disruption to the continuity of public services – a heavy political price to pay. As such, some permits have been inherited over generations.

Service Quality

Services are often reported to be poorly maintained, infrequent and slow. 41% of users feel unsafe waiting for and sitting on buses, according to our survey.

The operators argue, however, that they cannot invest in service improvements. According to the private bus operators we interviewed, fundamentally, the routes are unprofitable, so operators and financial institutions are unwilling to invest.

Financial situation

In terms of **revenue**, bus companies operating under SITRA have fares regulated by state law at MX\$10 (US\$0.50) per passenger. This fare has been fixed for 3 years during a period of over 10% inflation in Mexico (Statista, 2019). The presence of concessionary fares—students, disabled people and pensioners pay half price, and children under 1.10m are free—means the average fare received per trip is MX\$9.3 (US\$0.47). However, according to operators interviewed, drivers tend not to declare all the fares they receive.

In terms of **costs**, a weakening Mexican peso against the dollar has meant rising costs. Fuel, spare parts and financing costs have risen substantially – the major cost areas for operators. Fuel, the largest single cost to an operator, amounting to 30-60% of operational cost, is subject to a special-purpose tax that can in theory be claimed back from the federal government. However, none of the bus companies interviewed had received rebates in recent years – amounting to millions of dollars in outstanding receivables.

In response to these pressures, bus operators have been cutting back on non-urgent spending, including reducing maintenance. Delaying maintenance, however, is a short-term solution as this practice often results in buses not being able to last for the 10 years normally anticipated. So it is not an action taken lightly by the operators. However, these actions have resulted in a worsening service experienced by passengers.

Reduced Bankability

The operators interviewed were looking to invest in new, more cost-efficient gas-powered buses. These buses would represent a 70% saving on fuel.

However, banks are unwilling to finance investment for a number of reasons:

1. **Contract duration.** State permits to operate routes are 12 months in duration. Typically, the assets that bus operators are looking to finance have an asset life much longer than 12 months – buses, for example, should have a useful life of 10 years. Banks are therefore unwilling to offer capital when the licence to operate is shorter than the loan duration.
2. **Lack of demand studies.** Banks require demand studies to show there is a need for the service, particularly for new entrants to the market. In Monterrey, operators have to carry this cost themselves. This is cost-prohibitive for operators. In other metropolitan areas, like London, governments carry surveys out, and give them to all potential operators, making finance more readily available to the operators.
3. **US dollar strength.** The strengthening dollar has meant increased financing costs for operators. This is due to a weaker peso, tending to lead to higher inflation and therefore higher interest rates.
4. **Profitability.** Without positive cashflows, banks are unwilling to lend to operators.

Where finance is available, costs have increased 160% over the past few years.

Operating Situation

Overall, according to Grupo Lobo Genius—a private bus operator, operating costs are currently MX\$19.5 (US\$1) per trip, meaning an operating loss of MX\$9.5 (US\$0.5) per trip. Subsequently, many operators are choosing not to run services, or handing back routes to the State Government.

TransRegio, the largest single-owner private bus operator in Monterrey, has handed back 4 routes in recent years and has plans to hand back another 7 routes, which would represent a halving of its routes. Currently, only 250 of the company's 4,667 buses are circulating, with the remainder up for sale. In the last three years, 7 new investors started bus operations in Monterrey but only two remain in operation.

In summary, according to the operators we interviewed, they are unwilling or unable to invest in new buses or maintenance, in the current environment, resulting in low service levels. They are unable to continue operating unprofitable routes at the required frequency, so passengers experience longer and longer waiting times. And, due to low profitability, operators are incentivised to prioritise passenger numbers rather than customer service, and so buses frequently make extra stops, outside of bus stops, resulting in a slow service.

However, authorities are unsure of the validity of these arguments, as not all private bus operators are willing to show their accounts to officials, to prove their losses .

In return, bus operators argue that the proof is that bus companies are handing back routes to the government and exiting the market altogether.

Future Plans

The State Transport Authority is carrying out a restructure to merge bus routes into consortia, with each consortium focusing on a distinct area shown in Figure 14. The consortia will avoid competition with other bus companies over similar routes, gain economies of scale, and increase accountability. Current operators would gain a proportion of ownership, based on their size within the area before the merger.

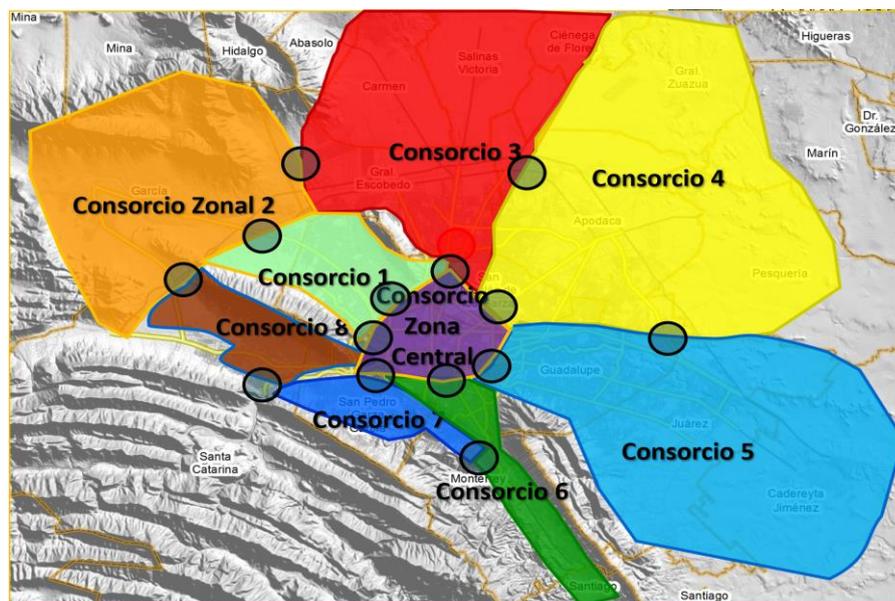


Figure 14 – State Transport Agency plan to create new bus consortia to cover distinct geographies within the metropolitan area of Monterrey.

This idea has been implemented in certain new suburban areas, far from the metropolitan area, but this represents less than 10% of bus routes.

4.3.3. Payment Systems

Within Monterrey, there are currently two payment systems:

1. **Mia card.** Used to pay for *SITME* services.
2. **Feria card.** Used to pay for *SITRA* services.

Mia Card

The Mia card is a rechargeable contactless card used to pay for any form of transport within the SITME network (all transport administered by Metrorrey). Users can top up cards at metro and Ecovia stations, allowing users to gain access to discounts and concessions depending on usage:

1. Topping up by certain amounts gains users access to bulk buying discounts for metro tickets.
2. Users can transfer between all SITME modes of transport within 2 hours for the cost of the most expensive mode of transport used.

The back-end data processing system can no longer handle the data produced by the card system. Only cashflow information is available through bank records.

The current penetration rate of the card is less than 15%; all other users pay with cash.

Feria card

The Feria card is a rechargeable card that passengers can use to pay for many of the SITRA-administered bus routes. The payment system was established as a collaboration between the workers' union (CTM), the government and other private operators. It gives passengers slightly reduced fares, than the equivalent paid in cash. Across all payment methods (cash included) the first bus fare is full price, the second half price and the third, free.

However, following recent developments (March 2019) relating to the profitability of certain routes, some operators are no longer accepting these discounts on their routes.

Ownership model

The percentage ownership of the payment system, Targeta Feria, was determined at its creation based on the number of buses each operator owned.

According to Transregio—a major shareholder, the system is transparent for operators (the owners) with clear visibility of cash flows within. However, according to minority shareholder interviewed, the system is opaque. Minority owners have no visibility of cash flows within the system and have not received any commission as a part owner.

Operational issues

There have been reports of bus drivers tampering with the validators to make them non-operational. Some drivers previously would under-report the cash they received for fares so there is a conflict of interest with the new system.

Users can only top up their Feria card at Oxxo convenience stores. Whilst there are many stores in Monterrey, there can be an inconvenience of locating these stores and queuing to top up the card, especially when a bus is imminent.

Public reception

CETyV carried out a survey of 2,000 public transport users on their opinion of the Feria card. According to the survey, the Feria card has a penetration rate of 50% with only 58% of respondents aware of the benefits of using the card. 71% said they did not find it difficult to obtain a card.

Summary

Figure 15 shows a summary table of the two payment systems in Monterrey.

	SITME	SITRA
Owner	Metrorrey	Operators – based on no. of buses owned at conception
Card name	Mia	Feria
Benefit to user	Discounts when bulk buying and transferring between SITME modes	Discounts on subsequent journeys *
Penetration rate	<15%	50%
Cash flow visibility	Metrorrey	Majority owners
Data visibility	None	Not visible to minority owners
Top-up locations	SITME stations	Oxxo convenience stores

*Many operators refusing to honour as of 12/3/19

Figure 15 – Comparison of the two payment systems in Monterrey: Mia & Feria.

4.4. Public Perception

In order to understand the public perception about public transport in Monterrey, we conducted street survey with public transport users and got 382 respondents including 5 uncompleted responses. The followings are our key findings. Survey results are found in appendix H.

4.4.1. User Demographics

Regarding to the number of users, there was no significant gap by gender; there were slightly more male users that account for 54% of the respondents as opposed to 46% for females. However, we found a significant gap on the user generations which is the high usage among people from 19 to 30 years old. They account for 45% of respondents followed by 21% for the 31 to 50-year-old group. Without considering about the natural biases caused by surveyors, it could be concluded that public transports are used by relatively young generations.

4.4.2. Usage pattern of public transport

From our survey, bus was the most popular mode of travel. 57.3% (351 respondents) used bus systems either the SITRA bus network or Trans Metro, followed by 30.5% (187 respondents) for metro and 8.2% (50 respondents) for BRT, or Ecovia.

In terms of the frequency of use, 76% of people (290 respondents) answered that they use public transport on daily basis. This high frequency of use implies that the changes in public transports can give significant impact on their life style.

4.4.3. Users' satisfaction with public transport

We found four key highlights by using the Net Promotor Scores analysis.

Firstly, public transport users in Monterrey are unsatisfied with three areas; information accessibility, safety and comfort. 42.2% of respondents are unsatisfied with the access to information and this category got the worst scores from both male and female users. For safety, female users' score shows 40.2% of strong dissatisfaction, which is 4.3% more than male users. This result shows that female users feel more anxious about security issues on public transport.

On second, accessibility to public transport modes got the highest satisfaction rate, 19% (72 respondents) among seven categories in the survey. Generally speaking, 19% wouldn't be high enough and many areas require improvements.

Thirdly, many people were categorised as Passives toward the public transport in Monterrey. They have a possibility to move to Promoter, satisfied customers, by improvements to the current situation.

In the end, we found a positive attitude towards use of central ticketing among public transport users. Based on our Net Promotor Score analysis, 85.5% of respondents show a willingness to use central ticketing, and there is strong preference from 38.3% of respondents (145 responses).

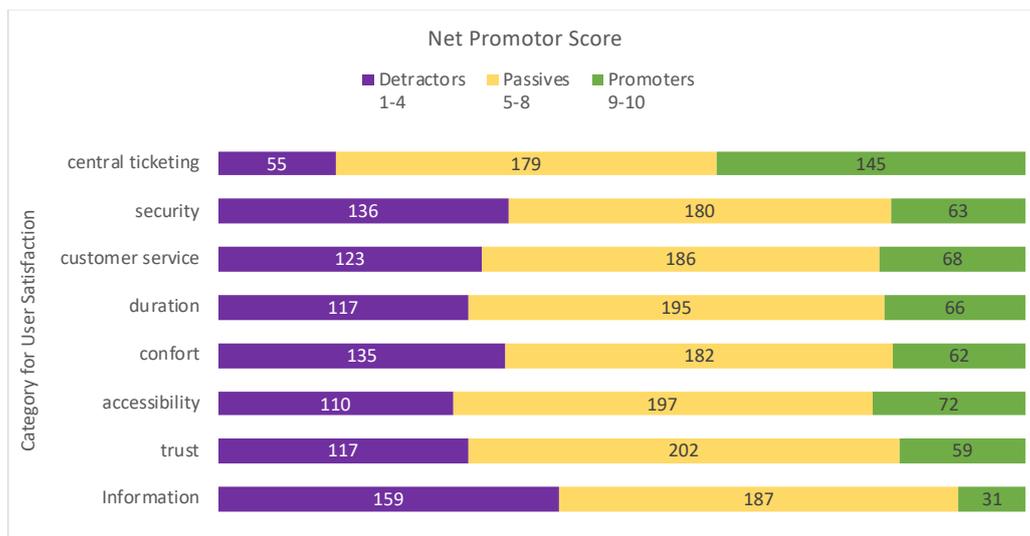


Figure 16 –Net Promotor Score from Survey results

4.5. New Mobility Bill of the State of Nuevo León

Last year, a new Mobility Bill of Nuevo León was sent to congress to enhance and reinforce Mobility matters in the state. The new Mobility Bill repeals the current Law of transport for sustainable mobility oinf Nuevo León, and also repeals and the Law of the Agency for the Rationalisation and Modernisation of the Public Transport System, dissolving this agency. The new law proposes changes to the current Organic Law of the Public Administration for the State of Nuevo León and the Law that created the Vehicle Control Institute of Nuevo León.

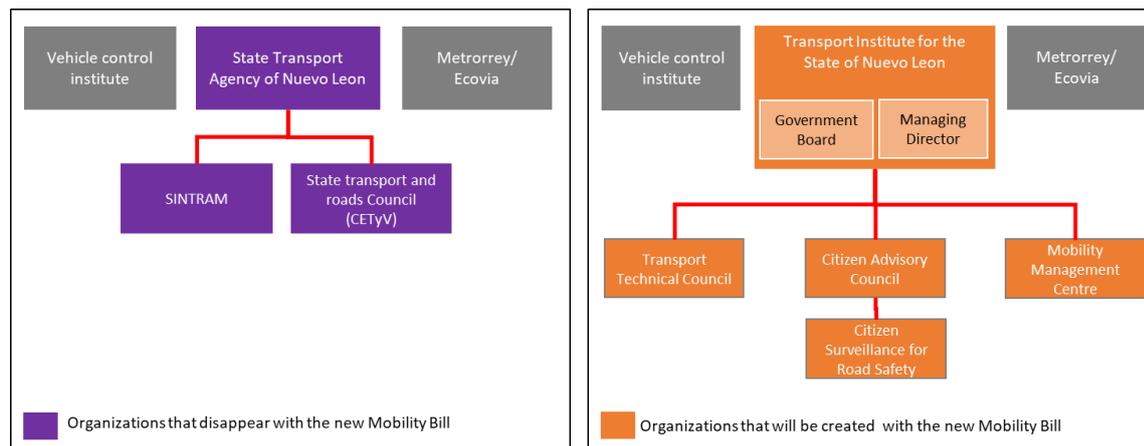
One of the main topics of the Mobility Bill is the creation of a new Transport Institute for the State of Nuevo León, this entity will be a decentralised organisation, endowed with legal personality and own patrimony, technical, administrative and economic autonomy, which will be act as the Transport Central Authority of Nuevo León. The Objective of this new body is to propose, evaluate and supervise the execution of plans and programs for the integral development of both, mobility and transportation (in its various modalities), provide public transport service and to be responsible for registering drivers and vehicles in the State of Nuevo León.

The Transport Institute will be ruled by a Governing Board, which will include the State Governor, the Finance Secretary, the General Treasurer, the Sustainable Development Secretary, the Infrastructure Secretary and the Institute's Managing Director.

Under the new Transport Institute, a new Transport Technical Council is created. This Council will include specialists, elected through a public call and given a test made by the opposition party; details of this process will be held in the secondary law, which will be designed after the approval of the Bill. The main purpose of this Technical Council is to propose the strategies for transport mobility, to

realise the technical and financial studies related with the fares and to rearrange the transport in general.

The State Council for Transport and Road Management (CETyV), entity that is currently formed by more authorities than citizens, disappears and a Citizen Advisory Council, integrated by 100% by citizens, is created under the Transport Institute. This new Council will issue public opinion to the Transport Institute regarding fares, for example, based on the technical studies that the new Technical Council may issue. The Citizen Advisory Council will be integrated, among other institutions, by the main Universities of Nuevo León, and it also will have representation of different NGO's such as the Citizen Participation for Older Adults, the State's Youth Institute, the State's



Women Institute, etc.

Figure 17: Organisational changes of the Mobility Bill

Even though, the new mobility bill presents initiatives aimed to bring mobility improvements and the way that the mass transit system is managed, the bill has been criticized by different interest groups, who think that the new bill is overlooking some key issues. Some of these interest groups include NGOs, transport experts, different chambers (e.g. chambers of commerce).

In this sense, members of such organisations and some civilians delivered a proposal consisting of ten points to build the backbone of a more comprehensive Mobility Law (Alanis, 2019).

The proposal embraces ten points that the New Mobility Bill is lacking or is not clear, such as:

- Not prioritising the most vulnerable users
- Human rights and inclusion
- Systematic vision where this can be linked with other Laws that regulate the State
- Non-motorized media
- Public spaces
- Use of technology to generate data and make it public
- Incorporate the use of clean energy to reduce air pollution
- Coordination between government orders
- Having a guarantee coordinated freight transport
- Weak transparency and accountability through the process.

5. Benchmark cities findings

5.1. London

5.1.1. City profile

The Greater London region covers 1,572 km², the population is estimated to be 8.8M and the population density is therefore 5,613 residents per square km (ONS, Ons.gov.uk, 2017). It is organised into 33 local government districts. The Greater London Authority (GLA) is responsible for strategic local government across the region (including Transport, Health, Police, Fire Services). It consists of an elected assembly, the London Assembly, and an executive head, the Mayor of London. The Mayor has responsibility to set the strategic direction for each part of the GLA, one of which is the transport authority, Transport for London (TfL). The transport strategy thus benefits from the integration with other policy areas. The day-to-day running of TfL is left to the Commissioner of TfL. Whilst TfL is held up as a world-class example of a transport system, it is not without its challenges. Currently, TfL is dealing with a four-year freeze on fares and the end of a government operating grant as well as declining passenger numbers. In FY2017/18 it was operating at a £1bn (US\$1.31) loss (which is essentially subsidised by government, see below section) but its business plan aims to turn this into an operating surplus by 2022 (TfL, Content.tfl.gov.uk, 2019).

Key characteristics of the London transport system include:

- Unified transport authority, which is led by the Mayor and allows for planning and investment at scale
- High rate of public transport usage – 44% of people commute to work by public transport compared to only 16% in the rest of England and Wales (ONS, 2011 Census Analysis – Method of Travel to Work in England and Wales, 2013).
- High numbers of bus ridership – 2,247m passenger journeys were taken by bus in 2017/18. The next most popular mode is the London Underground with 1,357m passenger journeys being taken in 2017/18 (TfL, TfL Annual Report, 2017).
- Centralised ticketing, known as an Oyster card, which can be used on all transport across the region

5.1.2. Overview of public transport modes

TfL controls all the major forms of public transport in London including buses, trains (DLR, London Overground, TfL Rail, Tramlink, Crosslink), and the London Underground.

5.1.2.1. *The London Underground*

The London Underground (or the Tube) is operated by London Underground Limited (LUL) - a wholly-owned subsidiary of TfL. The tube consists of 11 lines spanning 402km and 270 stations. Around 5 million people use the tube daily and 1.35bn annually (TfL, LU Facts and Figures, 2019). The trains are a mixture of types, each typically lasting 40 years (TfL, Rolling Stock, 2019).

5.1.2.2. *London Rail*

'London Rail' refers to the part of TfL responsible for the London Overground, London Trams, Docklands Light Railway (and, upon completion, Crossrail). It recently merged with the LUL directorate. There are additional rail services in the Greater London region which are owned by National Rail and serviced by private operators which do not fall under the TfL umbrella but TfL does work in partnership with them. Below is a brief overview of each train service.

London Overground - established in 2007 and now consists of 6 routes, covering 112 stations. The service is run on a concessionary basis. Currently, Arriva Rail London holds the contract, until 2024. The London Overground is part of the National Rail network, so Network Rail manages and maintains

most of the track and signals. TfL sets the specifications for train frequency, station facilities and overall performance, and is responsible for fares and revenue.

DLR - established in 1987, built to connect two major financial districts The City and Docklands. It is a driverless computerised system and is highly dependable, with 99% of services running on time. The DLR consists of 6km of lines and in 2017/18, 119m people used the network. There are 45 stations and 149 vehicles. TfL manages the DLR whilst the operation is concessionary – currently the franchise is held by KeolisAmey Docklands Ltd (KAD).³

London Trams - set up in 2000 by a private finance initiative and in 2008 was bought by TfL. TfL sets specifications for tram frequency and performance and is responsible for fares, revenue, maintenance and planning and funding of improvements or extensions to lines. Operations is contracted to Tram Operations Limited – a subsidiary of First Group – until 2030.

Crossrail - under construction and will be operated in a similar manner to London Overground; on a concessionary basis to MTR Corporation (Crossrail) Ltd (International, 2014). It is a new 117km railway which will serve to complement the existing infrastructure. Ticketing and fares will be integrated with the zone fare system. It is expected to open in mid-2020.

National Rail and London Rail interaction - The National Rail network provides rail services for commuters into London and provides many local rail services. TfL has formed partnerships with key organisations such as the Department for Transport (responsible for rail strategy), Network Rail (own the infrastructure) and multiple operators (who manage the services).

5.1.2.3. *London Buses*

TfL regulates its bus services in London – the only city in the UK to do so. There are 9,300 vehicles in the fleet running across 675 routes (TfL, London Buses, 2019). TfL's subsidiary company, London Bus Services Ltd set between 2 and 7-year contracts (TfL, 'London's Bus Contracting and Tendering process', 2019) with operators. This, in turn, provides the operators with a known performance-related revenue stream and encourages investment in quality buses and service (see appendix I for the list of current operators). It also plans routes, specifies service levels and monitors service quality. It is responsible for around 50 bus stations and more than 19,000 bus stops. TfL also sets the fares.

5.1.3. Management of Public Transport

5.1.3.1. Legal and Regulation

TfL was created as a result of the GLA Act 1999. TfL is responsible for the regulation of buses, trains, the Underground, GLA Roads (including Traffic signs, traffic control systems, Road safety, Traffic reduction) and taxis.

5.1.3.2. Transport for London (TfL)

TfL is chaired by the Mayor of London who is elected by the people of Greater London. The Mayor is responsible for appointing up to 16 other independent board members (currently there are 14). The 'TfL executive' is made up of the Commissioner and the head of 13 functions that report into him. Figure 18 below shows the high level organogram:

³ The franchise agreement is available at: <https://tfl.gov.uk/corporate/publications-and-reports/contracts>

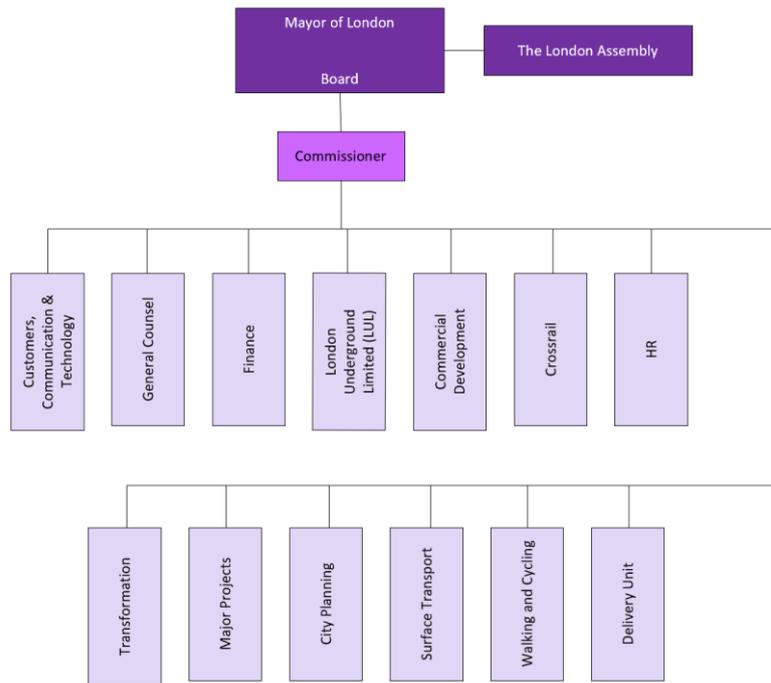


Figure 18– High level governance structure of TfL

The ‘TfL executive’ (the commissioner and the head of each TfL function) is ultimately responsible for carrying out the day to day management - and operations (in the case of LUL) - of transport in London.

TfL has a ‘Standing Orders’ document which lays out the decision-making structure and proceedings, together with the delegation of authorities to groups and individuals within TfL (TfL, TfL Standing Orders, 2019).

The Mayor appoints the TfL Board in accordance with the GLA Act 1999. He/she determines TfL’s budget for each financial year, having consulted with the London Assembly. He/she also has the power to direct TfL to do certain things.

The London Assembly holds the Mayor to account by publicly examining policies and programmes through committee meetings, plenary sessions, site visits, investigations and at Mayor’s Question Time. The London Assembly is also consulted by the Mayor before producing statutory strategies and the budget for the GLA Group (including TfL).

TfL Board - In addition to the Mayor, there are 14 board members who come from a range of backgrounds including Trade Unions, Business, Finance, Industry and Public Service.⁴ Each member must declare their register of interests and information on gifts and hospitality – all of which is made publicly available on the TfL website. The Board approves the TfL Budget, Business Plan, Annual Report and Statement of Accounts and other major and strategic issues and policies. It delegates other decisions to its Committees and to the TfL executive. The Board also is responsible for holding the TfL executives to account for delivery of the Business Plan and operational and budgetary

⁴ Short biographies of the current board members can be seen at: <https://tfl.gov.uk/corporate/about-tfl/how-we-work/corporate-governance/board-members#on-this-page-4>

performance. All the board meetings can be attended by the public and board packs and meeting minutes are available on the TfL website.⁵

5.1.3.3. Funding

TfL is currently operating at a deficit, in 2017/18 they made £645m (US\$847m) loss. However, their business plan expects breakeven to occur in 2022/23 (TfL, TfL Business Plan 2019-24, 2019). This is part of the overall strategy to become more self-sufficient, demonstrated by a 46% reduction in external funding since 2011 and a leaner operating model having created £111m (US\$146m) annual recurring savings.

TfL has four major sources of funding. In 2017/18, the total was £10.2bn (US\$13.4bn) made up of: fares (£4.8bn (US\$6.3bn) 48%), grants (2.6bn (US\$3.4bn), 23%), borrowing (£1.7bn (US\$2.2bn), 17%) and, other income (£1.1bn, (US\$1.4bn) 11%), as shown in Figure 19.

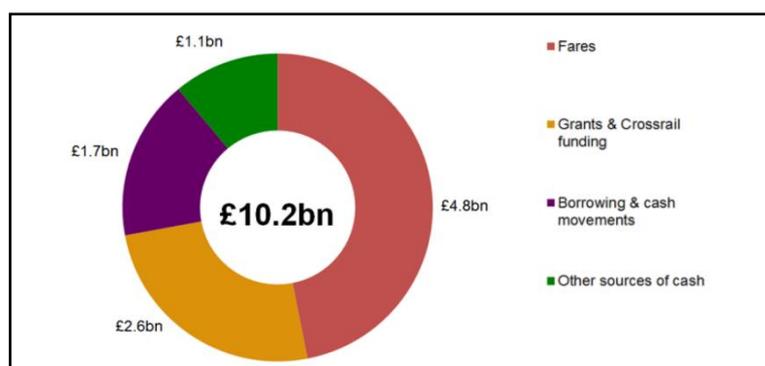


Figure 19 – TfL Sources of cash 2017/2018 (TfL, TfL How we are funded, 2019)

Fare income - the largest source of revenue and is used to cover the cost of operating and improving services. The fares are fixed for the Mayor's term.

Grant funding & Crossrail - Over the last five years TfL has lost £800 million (US\$1.05bn) in government grants from the Department for Transport. 2017/18 was the last year they received this grant. They have made up for this through increasing fare revenue and commercial revenue and increased business rates. TfL receives around £1.8bn (US\$2.4bn) in the form of business rates retention (approximately half operating expenditure and half for capital expenditure). Crossrail funding and other funding such as the GLA precept make up the rest.

Borrowing and cash movements - TfL borrow from a variety of sources using a combination of mechanisms, including bonds, commercial paper, loans for specific projects from the European Investment Bank and the Public Works Loan Board (TfL, TfL How we are funded, 2019).

Other income - Constantly looking for opportunities to develop revenue streams, TfL generates other income through: congestion charge, road network compliance charges, advertising, property rental, sales and development, commercial opportunities such as 'click and collect' at stations, Sponsorship (e.g. Santander cycle hire).

5.1.3.4. Spending

Around 87% (£6.6bn, US\$8.7bn) of total costs are attributed to operating the transport network⁶. £0.5bn (US\$0.66bn) was spent on maintenance and a further £0.5bn (US\$0.66bn) on financing costs

⁵ Ensuring this information is publicly available is in line with TfL's Transparency Strategy. See appendix N for more information on how London strives for transparency.

⁶ Based on 2017/18 figures

in 2017/18. Currently, of all transport modes, only the underground returns an operating profit (once fully established, the Elizabeth line (Crossrail) is forecast to return a profit too). All other modes of transport are heavily subsidised.

5.1.3.5. Contracting Structures

The London buses are run on Quality Incentive Contracts (introduced in 2001). They include direct financial incentives for operators linked with quality of service. There is a continuing programme of tendering with 15%-20% of the network tendered each year and routes are generally tendered individually or grouped with others in the same area to facilitate service changes. Contracts are awarded based on best value for money whilst ensuring quality and safety of service. Contract payment is based on mileage operated and overall reliability of the service. The average length of a contract is 5 years with a 2-year extension available for strong performance (TfL Bus contracting and tendering process, 2019). Each route has Minimum Performance Standards (MPS) that the operator needs to meet. If the operator outperforms or underperforms against this standard then they received an increase or deduction on the financial value of the route.

5.1.4. Tickets and fares

5.1.4.1. Fare Management

The Mayor has currently put a fare freeze across all modes of transport in London. For the tube and trains, fares are calculated according to the London fare zones system. All London Underground and London Rail stations are assigned to nine fare zones which, work outwards from the centre of London in concentric circles (see appendix J for Route map of zonal system of the railway services directly managed by Transport for London). On the Tube, fares range from £1.50 (US\$1.97) to £6 (US\$7.89) (see appendix K for full list of London Underground fares). The fare zone system enables users to plan a cheaper route (avoiding the more expensive inner-zones 1 and 2) which in-turn (theoretically) reduces congestion in central London.

On London buses, a standard adult fare is £1.50 (US\$1.97) and the 'Hopper fare' allows a user to make unlimited bus and tram journeys within one hour. London Buses do not accept cash payments. Before the flat fare was introduced in 2004, zonal fares were used on the buses too.

There are a variety of concession fares available to users of public transport in London too particularly aimed at the elderly and the young populations.

5.1.4.2. Centralised ticketing

The electronic ticketing system function across all modes of transport in London. It accepts both Oyster cards and contactless payment and requires the user to tap in and out on rail and tube journeys and tap in only on bus journeys. This ticketing system has benefitted the transport system through:

- Reducing barriers to entry (by taking away the need to research ticket options, and the time required to buy a ticket).
- Introducing a smart ticketing system has enabled it to be updated and become increasingly sophisticated – for example when it was first introduced, it only enabled single fare tickets to be used but it can now intelligently calculate journey prices using fare capping.
- Data. Real time data enables TfL to respond quickly to maintenance issues such as barriers being faulty and analyse route demand, amongst many other things.

5.1.5. Evolution

5.1.5.1. Evolution of unified transport authority

The integration of transportation services in London started in 1933 when public transport modes were first bought under the same control. Prior to this, ownership and management of transport modes was distributed amongst numerous and separate organisations – both public and private – many of which were in competition with each other. Consensus is that the evolution of the transport authorities can be split into six key phases which culminated in the creation of Transport for London (TfL)⁷. The authority responsible for transport went from being local government's responsibility to central governments (between 1984 and 2000 which was an important period as London buses became privately operated on a contracted basis, increasing competition) and finally back to local (strategic) government control when the GLA Act 1999 created TfL and put the Mayor of London as its head.

5.1.5.2. Evolution of centralised ticketing

The inter-modal travelcard season ticket was introduced in 1983, and the one-day (off-peak) travelcard was launched in 1984 to increase passenger numbers on the Underground and Buses and to speed up boarding. The Travelcard gained validity of National Rail and DLR in 1989.

The Oyster Card – an electronic smart card – was introduced in 2003 and travelcard season tickets were made available on it. In 2005, TfL stopped selling paper versions of the Travelcard season ticket. Since 2003 there has been phased increase of functionality of the Oyster card. By 2012 over 43million Oyster cards had been purchased and were being used on 80% of all London journeys (TfL, "Join in the celebrations across the capital this summer with a limited edition Summer Oyster card", 2012). In 2014 the use of contactless credit and debit cards was introduced as an alternative payment method which supplemented the Oyster card. TfL was the first transport provider worldwide to do this (TfL, "Projects and Planning Panel, Project Monitoring papers", 2014). TfL has been attributed with 'blazing the way' for contactless technology in transport and more widely (Spero, 2018). Indeed, the technology and management of the system has been so successful that TfL has sold their services as consultants it to New York, Brisbane and Boston transport authorities, creating an additional revenue stream. Two key lessons learned from the implementation of the Oyster card system are that: 1. the technology should be future proof (as far as possible), considering fixed limitations such as space in the stations, and; 2. Concessions, once given, are very difficult to take away. In London, at peak time in the morning, around 33% of journeys are taken for free due to concession tickets being used, representing a significant loss of revenue.

5.2. Perth

5.2.1. City profile

Perth is the capital city of Western Australia. According to Perth City Snapshot in 2016, the city had 14,000 businesses and 24,244 residents. Its population is forecasted to reach over 40,900 people by 2036. Perth City is also part of the larger Perth Metropolitan Region (Greater Perth) which is home to over 2 million people. In 2013, the population density in Greater Perth was 310 inhabitants per square kilometre (City of Perth, 2016)

Its status as the capital city of the state attracts people from inside and outside Australia to meet and connect for education, work, entertainment, tourism and culture. 2.4 million people visit Perth in a year and around 205,750 people visit the city each day. 34,000 people visit the Inner Perth Tourism Region each day (City of Perth, 2016).

⁷ See appendix L for more details of the six stages

5.2.2. Overview of public transport modes

Public transport in the greater Perth metropolitan region currently consists of several modes: buses, trains, ferries, and taxis. The first three of these modes are managed by Public Transport Authority (PTA) through a number of different brands based on the type of services and regions in the state they serve.

Transperth is PTA's brand and operating name in the Greater Perth area.

- **Bus services.** In 2017, Transperth operated 1483 buses that covered 282 timetabled bus routes, 293 school routes and 10 Central Area Transit (CAT) routes. As per PTA's annual report of 2017-2018, three contractors operated the bus services under Transperth which made up 15,704 standard service trips, 293 school trips and 981 CAT trips on a typical weekday. They are Path Transit, Swan Transit and Transdev. There were more than 130 million passenger boardings in the 2017-2018 financial year (Public Transport Authority, 2018).
- **Train services.** In 2017, Transperth operated 300 railcars between 72 stations across more than 180km rail network. These services are operated by PTA's internal division named Transperth Train Operations (TTO). There were more than 58 million passenger boardings in the 2017-2018 financial year (Public Transport Authority, 2018).
- **Ferry services.** In 2017, Transperth operated two ferries through a contract with Captain Cook Cruises which made a range of 60-122 trips on an average weekday along the year. There were more than 706,000 passenger boardings in the 2017-2018 financial year (Public Transport Authority, 2018).

Public transport users in the greater Perth metropolitan area can use cash and a single smartcard-based payment system to access these transport services.

5.2.3. Management of public transport

The Public Transport Authority of Western Australia (PTA) was formed on 1 July 2003. It is responsible for managing and operating public transport services in Western Australia. It operates as Transperth in the greater Perth metropolitan area, as Transwa for road coaches and rail services to regional areas, as TransRegional for town bus in regional areas and as SBS (School Bus Services). PTA currently sits under the Minister for Transport.

5.2.3.1. Legal & Regulation

PTA derives its authority from four main Western Australia state laws. They are Public Transport Authority Act 2003, Government Railways Act 1904, Public Works Act 1902 and Rail Freight System Act 2000 (Public Transport Authority, 2019).

- **Public Transport Authority Act 2003.** This act establishes PTA as an agent of the State and has the status, immunities and privileges of the State. The act also states that PTA does not have a board, but is instead governed by its chief executive officer who acts in the name of the PTA.
The PTA Act 2003 also regulates PTA accountability and financial provisions including: Submission of operational plan to minister; Minister's powers in relation to the operational plan; Who to consult and inform; Access to PTA's plan; Authority's funds and borrowing capability; and Credit extension to customers and suppliers. In addition to that, under section 70, the Minister is required to carry out review of operation and effectiveness of the act and the authority after every fifth anniversary of PTA commencement.
- **Government Railways Act 1904.** This act establishes PTA's function in managing, maintaining and controlling all government railways. It also provides the authority the powers to make various by-laws in relation to government railways and to regulate activity and conduct on government railways.

- **Public Works Act 1902.** This act grants PTA power to construct railways that have been authorised by a special act of Parliament.
- **Rail Freight System Act 2000.** This act grants PTA powers of control and management of the State's rail freight corridor.

5.2.3.2. Governance structure

Western Australia's Transport Portfolio

Transport Portfolio is the umbrella term for Western Australia's three key transport agencies. The Public Transport Authority is part of the Transport Portfolio in which together with the Department of Transport and Main Roads works together to enhance the coordination of operations and develop unified policies and regulatory functions in Western Australia (Figure 20). Department of Transport which comprises Transport Services and Policy, Planning and Investment is **responsible for strategic transport planning and policy across state's public and commercial transport system, driver and vehicle licensing, on-demand transport regulation**, marine safety and coastal protection. Meanwhile, Main Roads WA is **responsible for managing the main road network in Western Australia** which includes building major roads, traffic management and maintenance of Western Australia's major roads, bridges, borders and reserves. The Transport Portfolio is led by the Director of General Transport which reports directly to the Minister for Transport (Public Transport Authority, 2019).

- **Transport Portfolio governance council.** This council serves as the Transport Portfolio's executive committee, ensuring effective integration and coordination across the agencies. It consists of the Director General, the Managing Directors and the Chief Finance Officers from each agencies under the Transport Portfolio, and the Director of the Office of the Director General. They monthly set, monitor and make key decisions reviewing the strategic direction and priorities of the Portfolio to achieve better integration of holistic transport planning and delivery (Transport Portfolio, 2018).
- **Long-term strategic plan.** Transport Portfolio also works closely with the Department of Planning; Lands and Heritage. It ensures that the portfolio's plan is aligned with the 'Perth and Peel@3.5million', a strategic plan for land use and infrastructure provision for the Perth and Peel regions to support efficient and effective movement of people and freight that is aligned with land uses and key economic and employment opportunities (Transport Portfolio, 2018).

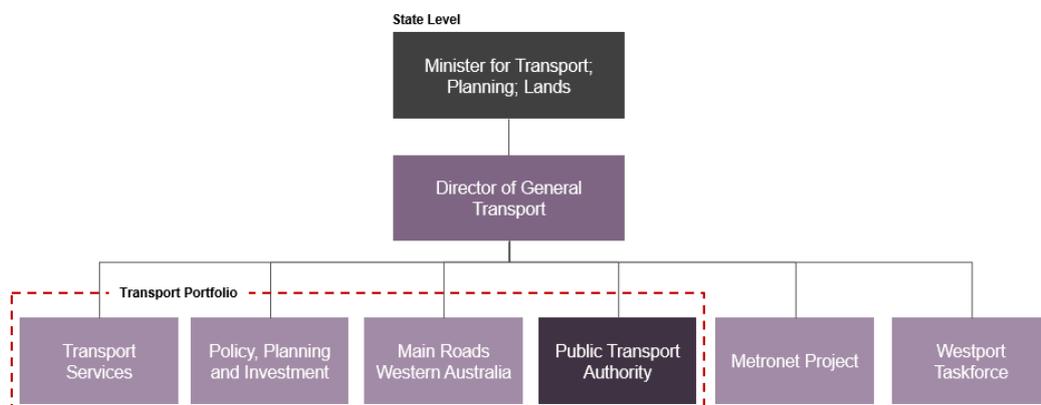


Figure 20 – Organisation structure, Western Australia Portfolio (2018)

Public Transport Authority

PTA is led by a managing director that reports to Western Australia’s Director of General Transport. PTA’s functions include public transport infrastructure and service planning, public transport infrastructure construction and maintenance, and public transport operations. PTA’s jurisdiction is within Western Australia. The managing director oversees three main organisational capability areas (Figure 21), which are:

- **Service Provisions.** This area covers: Transperth; Transwa; TransRegional; School Bus Services; and Transperth Train Operations.
- **Infrastructure Delivery.** This area covers: Network and Infrastructure (N&I) division which manages and maintains the metropolitan railway infrastructure; Infrastructure Planning and Land Services (IPLS) division which provides railway engineering support, land and environmental management; Major Projects which constructs new project by IPLS; and Safety and Strategy division which protects attainability of the State’s freight rail corridor and infrastructure with input also from N&I and IPLS.
- **Corporate Services.** This area covers Finance and Contracts, People and Organisational Development, Safety and Strategy, and the Corporate Communications, Corporate Issues, General Counsel and Investigations branches which provide non-core operation services and administrative support to facilitate PTA.

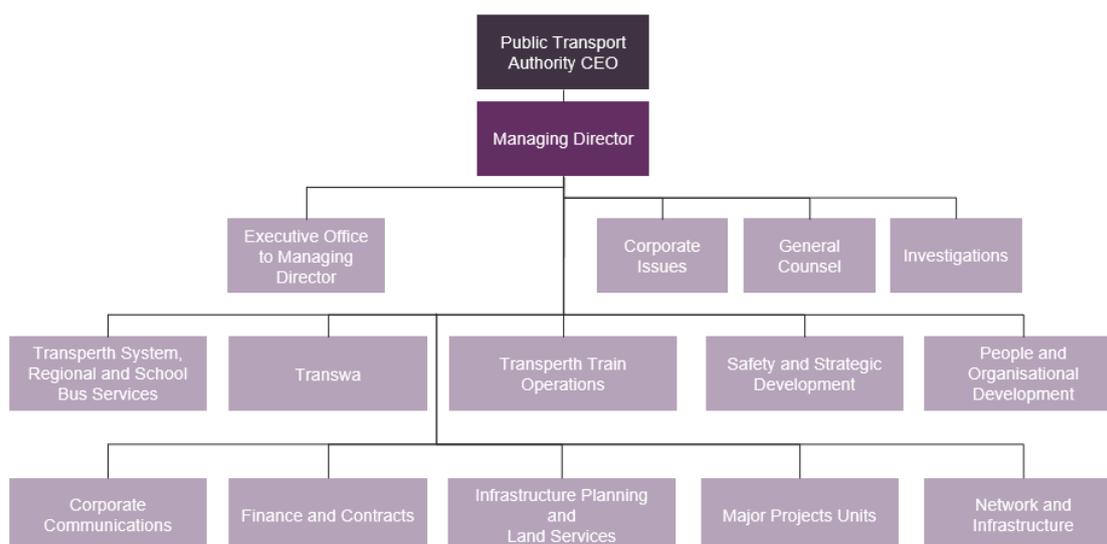


Figure 21 – Organisation Structure, Public Transport Authority, Perth (2018)

5.2.3.3. Funding

PTA operation is funded primarily by Income from State Government and supported by User Charges and Fees as well as other income (Figure 22).

Income from State Government. In 2018, PTA received income of AU\$813.24 million (US\$574.52 million) from the State Government. This income could be broken down into three main generators which are: Operating subsidy contributions; Assets or services received free of charge; and The Regional Community Services Accounts. Out of these three generators, operating subsidy contribution was the largest contributor with AU\$812.5 million (US\$ 574 million) (Public Transport Authority, 2018).

User charges and fees. This funding element is obtained mainly from provision of services by PTA. In 2018, the amount was AU\$220.86 million (US\$156.03 million) (Public Transport Authority, 2018).

Other income. Other income is obtained mainly from operating lease revenue, commonwealth grants and contributions, interest revenue, other revenue, and gains/losses. In 2018, the amount was AU\$71.69 million (US\$ 50.65 million). “Other revenue” included rents and leases, parking, advertising income, external works and SmartRider card sales (Public Transport Authority, 2018).

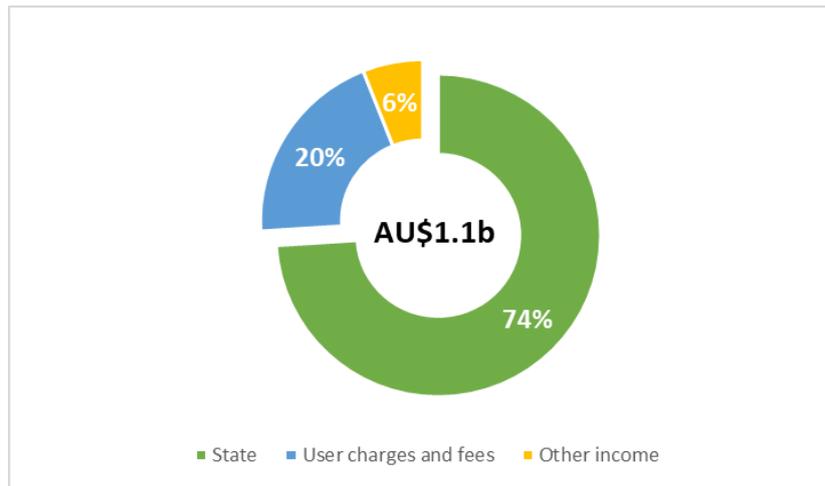


Figure 22 – Revenue Breakdown, Public Transport Authority, Perth (2018)

5.2.3.4. Spending

The three main cost areas are: Bus, ferry and regional bus operators; Depreciation and amortisation; and Supplies, services and energy (Figure 23). Payment to bus, ferry and regional bus operators accounted for AU\$400.59 million (US\$282.94 million) or 27% of the cost of services. Supplies, services and energy was accounted for AU\$310.93 million (US\$ 219.61 million) or 21% of the cost of services. Another smaller element of expenditures is: Employee benefits expense; School bus operators; and Finance costs (Public Transport Authority, 2018).

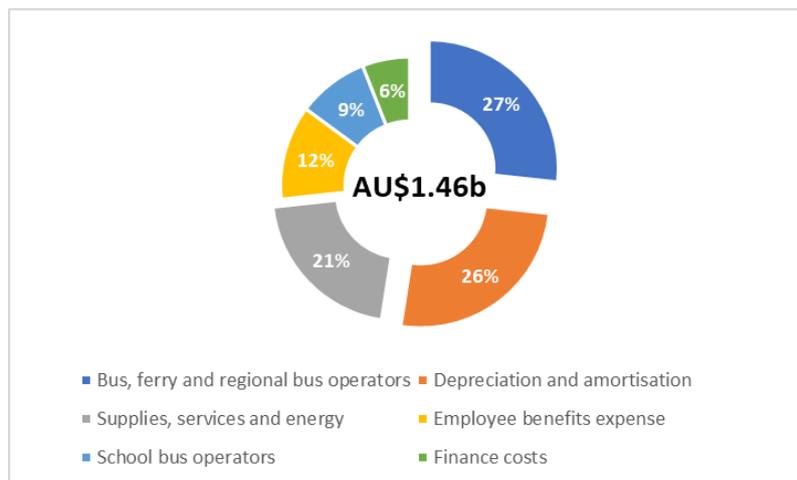


Figure 23 – Spending Breakdown, Public Transport Authority, Perth (2018)

5.2.3.5. Contracting structures

When it comes to the participation of private sector in the provision of public transport services, PTA uses a model referred as **franchising or contracting out**. According to L.E.K. Consulting, franchising is when the public transport authority contracts out operation of the service within a set period. Perth completed the move to the franchising model for its operation in 1998. The main characteristics of the franchising model in Perth are the authority retains ownership of the transport assets and retains the control over routes, fares and service levels. The reason behind retaining ownership of fleets is to **reduce barriers to entry for new operators**. (Office of the Auditor General Western Australia, 2017). Meanwhile, private companies provide employees, bus maintenance as well as depots.

This franchising model is executed by a regular tendering process in which PTA **does not allow single operators to operate more than 50%** of the contracts and so far has delivered price reductions of the contract (Office of the Auditor General Western Australia, 2017). According to PTA's annual report 2017-18, the bus network is divided into 11 geographic contract areas. The length of contract usually ranges from 5 to 10 years (Auditor General Western Australia, 1997). PTA procures goods, services and works, in accordance with State Supply Commission and Government procurement policies, and PTA procedures. PTA also uses electronic tendering as the method of communicating information about the request for tender by suppliers.

5.2.4. Tickets & fares

5.2.4.1. Fare management

Perth Transport Authority through Transperth applies a common fare structure across its integrated bus, train and ferry service network. Fares are based on a combination of **zonal system and time limits**. There are nine concentric bands emanating from central Perth. Passengers are able to transfer between transport services without extra charges within two hours on journeys of zone one to zone four and within three hours on journeys of zone five to zone nine. The normal fare ranges from AU\$2.20 (US\$ 1.56) for two sections to AU\$12.60 (US\$ 8.91) for nine zones (Public Transport Authority, 2018).

5.2.4.2. Centralised ticketing

Transperth brands its centralised smart ticketing system as SmartRider. SmartRider is a reusable smart card that can be used across Transperth transport services. It is Australia's first smartcard-based cashless ticketing system. The requirement of passengers to tag-on/tag-off the card on buses, ferries and at train stations enables Transperth to have a **complete and accurate view of the boardings and revenues**. In 2017, SmartRider was used by more than 85 percent commuters and had a 99 percent approval rating among Transperth's passengers (Public Transport Authority, 2018).

5.2.5. Evolution

5.2.5.1. Evolution of Governance Structure

1993-2000

The initiative to reform the public transport started in September 1993. The Western Australian Government announced to transfer all policy coordination, strategic planning, and delivery of bus and ferry services from Metropolitan (Perth) Passenger Transport Trust (MTT) to the metropolitan transport division of Department of Transport. This decision was taken due to the failure of MTT to meet changing public needs and to operate efficiently. The aim of the reform program was to **improve competition**, to **reduce fare evasion**, to **improve contracting structure**, and to **integrate all public transport modes-bus, train and ferry** (Auditor General Western Australia, 1997).

2001 – onward

To further integrate the public transport system and increase accountability within the system, the Western Australian government merged The School Buses and Transperth which were previously within the Department for Planning and Infrastructure (DPI) to Western Australia Government

Railways (WAGR) management system. Perth Urban Rail Development group, which was formerly also with DPI, later joined WAGR. In 2003, The Public Transport Authority of Western Australia was formed through the amalgamation of Transperth, WAGR, School Bus Services and regional town bus services and the functions of public transport coordination, planning and delivery of services which previously taken by the Department of Transport were cascaded to PTA. Meanwhile the overall transport planning was retained within the Department (Public Transport Authority, 2019).

5.2.5.2. Evolution of Centralised Ticketing

SmartRider was launched on January 14, 2007 after 5 years of development. The objective of the project was to upgrade the previous ticketing system (MultiRider), to **improve overall user convenience** and to **further reduce fare evasion** in the public transport service provisions. In concepting its new ticketing system, PTA spoke to potential major suppliers in the smartcard area as well as researched smartcard projects in other international cities such as Hongkong, Singapore, Belfast, Stockholm, Rome, Manchester and San Fransisco. Several lessons learned from the implementation of PTA's SmartRider are strong sponsorship from high-level leaderships including the Minister of Transport, sufficient research and planning with related-stakeholders, stick to core functionality of ticketing system, and staged implementation or rollout (Public Transport Authority, 2007).

- **Commitment to core functionality of SmartRider.** PTA kept it simple when developing the ticketing system. PTA did not try to create a card that can be used to buy items from local supermarkets or other type of stores
- **Staged Implementation.** PTA started its rollout stage in February 2005 with a factory acceptance test, site acceptance test, and staff training. From October 2005 to December 2006, PTA commenced controlled-group trial that involved 7000 participants and after that commenced the trial to senior passengers and students (Public Transport Authority, 2007).

The second-generation of SmartRider is currently being developed with the goals of: allowing payment by credit card, seen as ideal for tourists or occasional user; and upgrading the back-end software, storing information an account rather than a card reducing the lag between payments processing to passenger's cards. According to PTA's spokesman, David Hynes, the authority has injected AU\$33.8 (US\$23.93 million) for the project. The upgrade is expected to be ready by 2021 (Hastie, 2018).

5.3. Singapore

5.3.1. City profile

Singapore, a city-state located in the southern tip of the Malay Peninsula, which has a population of 5.6 million over 710 km². Due to the limitation of its land availability, it has a high population density of 7,915.7 inhabitants per km² (The World Bank Group, 2017).

Given the land constraint and its growing population, Singapore has faced challenges of road congestions and thus developed mass transit systems for decades. The Mass Rapid Transport (MRT) system and buses are the main public transport modes that support mobility in the city.

5.3.2. Overview of public transport modes

MRT is a major public transport mode in Singapore and has ridership of 3 million per day (Land Transport Authority, 2019). 27.1% of resident students use public transport for their main mode of transport and 36.8% of working persons use MRT for their main mode of transport (Department of Stastics, 2015). Currently, 6 lines are in service with 3 new lines and 2 extended lines under construction expected to be completed by 2030 (Land Transport Authority, 2019).

The bus network is also a popular transport mode with a ridership of 3.9 million per day. Buses are often used to commute by students and workers (Data.gov.sg, 2016). 44.2% of students and 41.3% of

workers use buses for their main mode of transport (Department of Statistics, 2015). Trunk Buses, the major type of buses in the city, run throughout the city centre and Feeder Buses connect passengers from their residential area to MRT stations. City Direct Buses serve commuters since 2013 and now 22 lines are available (Land Transport Authority, 2019).

5.3.3. Management of public transport

Government structure in Singapore is concise due to the size of the country. The Prime minister executes policies together with the Cabinets of Singapore under the scrutiny of Parliament. There are no municipalities, which enable the government to have a more centralised approach to policy execution.

5.3.3.1. Government portfolio for Public transport

The Ministry of Transport formulates policies and facilitates outcomes for public transport. It has 9 departments within the organisation with the Land Transport Department overseeing policies on land transport including public transport and road management.

The statutory boards execute policies created by each Ministry. They are defined as "an autonomous government agency set up by special legislation to perform specific functions" (Tan, 1974).

Regarding public transport, the Land Transport Authority (LTA) and the Public Transport Council (PTC) implement the policies made by the Ministry of Transport. These agencies are operated by non-civil servants and are more independent from the government despite their responsibility to report to their respective Ministry.

The LTA has played a role as the unified public transport since its formation in 1995.

The main public bodies and related organisations that are involved in planning, constructing and operating public transport are identified as follows:

- **The Ministry of Transport** makes policies within transport under the Minister who is appointed by the President. The Minister appoints board members of LTA and PTC (Ministry of Transport, 2019)
- **The Land Transport Authority** is the main agency responsible for licensing bus and rail operation and regulating the operators. LTA owns public transport assets and replaces them or constructs new facilities. It also oversees car usage management such as the ERP (Electronic Road Pricing) system, which enables a two-sided approach to ease road congestion by limiting private car usage and improving public transports as alternatives for car users (the Singapore Attorney-General's Chambers, 1995).
- **The Public Transport Council** oversees the regulation of bus and train fares with annual formula-based fare reviews. The PTC also regulates and licenses ticket payment service providers. As an independent advisor of government, the PTC gathers public feedback on any matter relating to bus, train and taxi through surveys and other methods (the Singapore Attorney-General's Chambers, 1987).
- **EZ-Link** is a subsidiary company of LTA and responsible for the sale, distribution and management of EZ-Link cards (EZ-Link Pte Ltd, 2019).
- **Transit Link** is another subsidiary company of LTA that processes transit transactions for distance fares, concession pass vouchers, bus stop distance refunds and allocates revenues to operators (Transit Link Pte Ltd, 2019).

Regarding urban development or land use planning, other ministries and their related agencies are also considered as key players. Led by the Urban Redevelopment Authority, every 10 years these organisations work together to set and review the **Concept Plan**, a strategic plan for land use and transport over the subsequent 40-50 years. Aligned with the Concept Plan, each statutory board sets their **Master Plan** for the next 10-15 years, which is reviewed every 5 years (Urban Redevelopment Authority, 2019). The organisations involved are found in **Error! Reference source not found.**

- **The Ministry of National Development** and **Urban Redevelopment Authority** have responsibility in overall urban planning.
- **The Ministry of Environment & Water Resources** and **National Environment Agency** work to protect environment and improve public health.

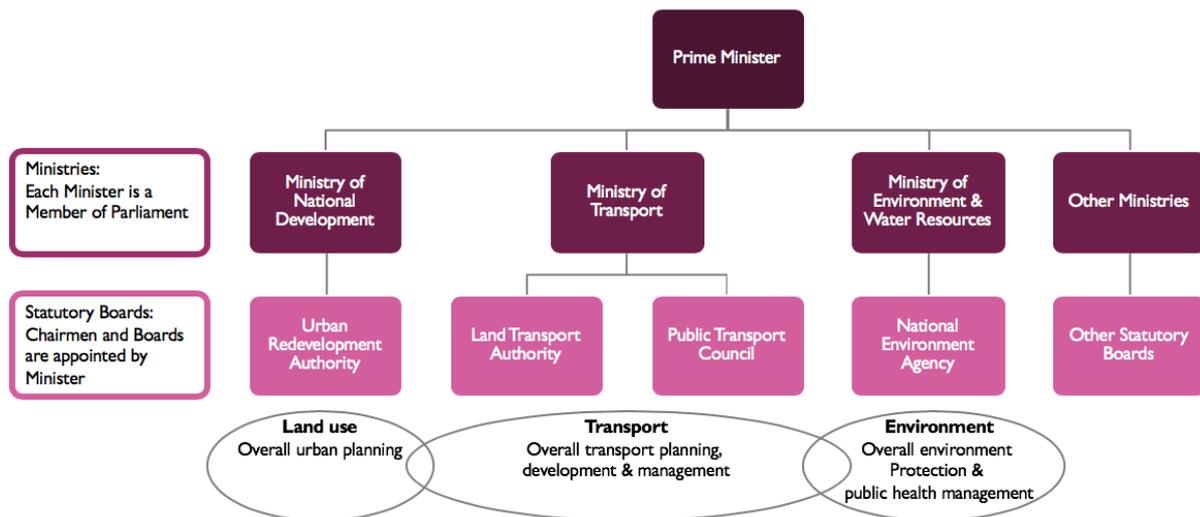


Figure 24 – Interaction among government bodies in Singapore (Kuang, 2007)

5.3.3.2. Legal & Regulation

The main laws that regulates the LTA and the PTC are;

- **Land Transport Authority of Singapore Act (1995)**. An Act to establish and incorporate the Land Transport Authority of Singapore, to provide for its functions and powers, and for matters connected therewith.
- **Rapid Transit Systems Act (1995)**. This Act provides for the planning, construction, operation and maintenance of rapid transit systems, transfers the functions, assets and liabilities of the Mass Rapid Transit Corporation to the LTA.
- **Public Transport Council Act (1987)**. An Act to provide for the establishment of the Public Transport Council, to provide for the licensing of ticket payment services, to regulate bus fares, taxi fares and train fares and for matters connected therewith.

These acts have been amended when changes are required. For example, the role of planning and management of public buses was transferred from PTC to LTA by amending the related acts.

5.3.3.3. The Land Transport Authority

The LTA board consists of 15 people, a chairman, a deputy chairman and 13 other members from a range of backgrounds (Figure 25 – Organisation structure of LTA (Land Transport Authority, 2019)5).

Members come from private companies, universities, other statutory and public agencies and unions. These board members are appointed by the Minister of Transport.

The LTA has three main divisions, 1) Infrastructure & Development, 2) Public Transport, Policy & Planning and 3) Corporate. Each division has a score card which set key performance indicators and targets to meet. These indicators are tracked and reported annually.

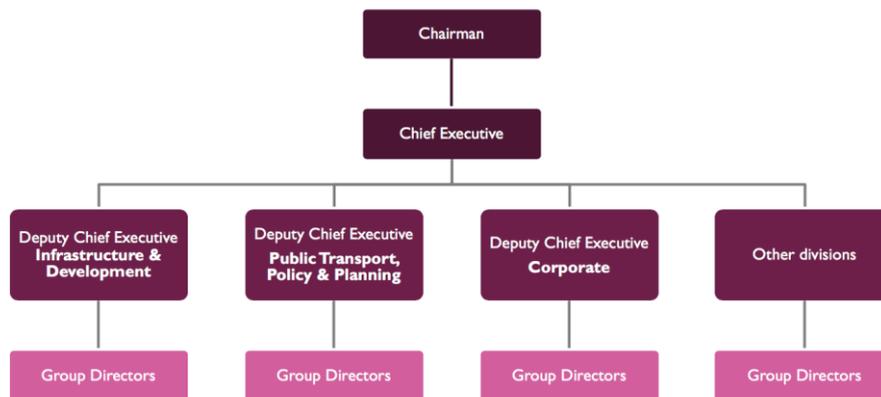


Figure 25 – Organisation structure of LTA (Land Transport Authority, 2019)

5.3.4. Funding

Self-sustaining operations are an important concept of public transport in Singapore. The government funds capital expenditure, or infrastructure costs, and operating costs should be covered with fare revenue although the government has subsidised operating deficits in reality (Land Transport Authority, 2018). To enable more flexible investment on rail infrastructure, in 2010 the LTA acquired all the assets related to rail under the New Rail Financing Framework. (Land Transport Authority, 2011)

New Rail Financing Framework (NRFF)

The LTA constructs rail lines, plans the rail system and integrates the rail systems with other existing public transport options such as buses and taxis. The LTA licenses private transport operators for 15 years and operate rail systems under their regulation.

Currently, the MRT train systems are operated by two main public transport operators in Singapore, SMRT Trains Ltd and SBS Transit. These operators are responsible for the day-to-day operations of trains and their maintenance. Operators pay a license charge every year for the right to operate the lines and this charge is used for improving operating equipment such as signalling system. However, it is the responsibility of the government to replace and enhance trains and other key operating assets.

Before the implementation of NRFF, it was difficult to plan new lines as each line was required to prove financial viability. The construction of a new line is a large undertaking, and it takes time to recover the cost. However, under NRFF, its financial viability is assessed as a part of the overall network. This means that if the new line could create passenger on-flow to other lines, the revenue increase in other lines can be considered as an outcome of the new line. NRFF has enabled Singapore to improve more connectivity in public transport.

5.3.4.1. Spending

Over the last 5 years, the operational deficits before government grants have grown from SG\$Singapore dollars in FY2013/2014 to SG\$2,012M in FY2017/2018 (Land Transport Authority, 2019).

Major expenditures for LTA are bus service fees paid for bus operators, accounting for 39.5% (SG\$1,519M) of the total operating expenditures in 2018, followed by 26.1% (SG\$1,004M) for depreciation of property, plant and equipment (Land Transport Authority, 2018). The high depreciation cost reflects the role of LTA as an infrastructure provider for the public transport system.

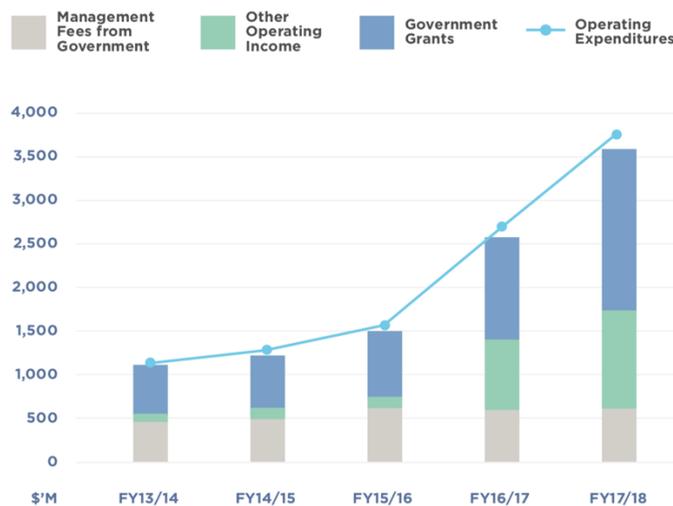


Figure 26 – 5 Year Financial Summary: Operating Income, Government Grants and Expenditure (Land Transport Authority, 2018)

5.3.4.2. Contracting structures

MRT/LRT and public buses are operated by private transport companies licensed by the LTA. The government owns the assets and leases the necessary infrastructure including bus fleets. Operators are selected through the public tendering process detailed below.

Government Contracting Model

In 2014, the LTA transformed the bus contract from a Privatised Model to a Government Contracting Model to achieve healthy competition among public transport operators. Under this model, the LTA determines the routes to be provided and the service standards, and bus operators bid for the right to operate these services.

As the government owns all bus infrastructure including fleets, depots and fleet management systems and lease them to operators, the barriers of entry are lowered for new operators, which leads to competition focused on operating the service only. As a result of this change in 2014, two new operators were selected by tendering process in addition to two incumbents (Land Transport Authority, 2014).

The operators are selected through a public tendering process. Tender proposals submitted by the operators are evaluated on quality and price with a higher weighting attached to quality. To ensure this quality-weighted evaluation, the LTA opens an envelope with a bidder's service proposal first and, after evaluating the quality aspects, opens the second envelope containing the bidder's price (Land Transport Authority, 2014).

For example, under the recent bus contracts tendered out, the service fee (the operator's bid price for the contract package) could be adjusted in order to reflect the operating circumstance by considering inflation, changes in wage standards, and fuel costs. As the operators are paid the fixed service fee on monthly basis, they can focus on improving their operation and service without worrying about the ridership of their route.

There is an incentive scheme to encourage operators to meet the service standard set by the LTA and encourage better service. If the operators meet the standards, they will receive a performance payment of up to 10% of their annual service fee. On the other hand, if they do not meet the standards, up to 10% of their annual service fee will be deducted. The five performance indicators cover the area as follows:

- On time operation;
- First and last bus punctuality to ensure that commuters can board the first and last bus of the day;
- Maintenance of the buses provided by the LTA;
- Maintenance of bus interchanges and depots; and
- Maintenance of the bus ticketing system. (Land Transport Authority, 2014)

In addition to these financial incentives, the operators can receive a 2-year extension to the 5-year contract if they perform well (Land Transport Authority, 2014).

5.3.5. Tickets & fares

5.3.5.1. Fare management

Fares are set by the Public Transport Council (PTC) formed in 1987 to regulate fares and service standards of public buses and trains. Before the establishment of PTC, the fare change was an ad hoc task for the Ministry. The current annual fare review procedure considers changes in operational costs such as fuels and wages, balance between supply and demand and external factors like inflation. Through this reviewing exercise, the LTA tries to make the public transport system self-sustainable and to reduce the government subsidies necessary to fill the gap between operating costs and fare revenues. Since 1990, bus fares have been reviewed every year resulting in both increases and decreases in fares (Public Transport Council, 2019).

5.3.5.2. Centralised ticketing

In 2010, the LTA introduced a distance-based fare system, aiming to encourage multimodal transport usage. Under this fare system, passengers are not charged for transfer penalties and can therefore be more flexible in their choice of transport modes (The Land Transport Authority, 2010).

Users can choose between a Standard Ticket, which is paper based but can store values, and a Contactless Smart Card such as ez-link card, NETS FlashPay Card and Account Based Ticketing. Contactless Smart Cards have discounts to incentivize use. In 2019, the adult fare of a trunk bus ride up to 3.2km is 150 cents in SGD for cash payment and 83 cents for card payment. As for MRT and LRT, it is also 83 cents for up to 3.2km with card payment and 150 cents with single ticket payment. (Public Transport Council, 2019) Users can receive between 20% to 45% in discount when they use cards instead of cash or single tickets. More details on the fares are available in appendix M.

5.3.6. Evolution

5.3.6.1. Evolution of Governance Structure

The LTA was established in 1995 as a statutory board under the Ministry of Transport with the merger of 4 public sector entities: the Registry of Vehicles; Mass Rapid Transit Corporation; the Roads & Transportation Division of the Public Works Department; and the Land Transportation Division of the

former Ministry of Communications. It is responsible for planning, designing, building and maintaining Singapore's land transport infrastructure and systems and oversee buses, trains and taxis as a regulator.

In 1996, the LTA published a white paper containing a new financial model to operate public transport and a scheme for car ownership and usage to achieve a world class land transport system. The LTA has tried to reduce the congestion in two ways: reducing the number of private cars through introducing Electronic Road Pricing, a type of congestion charge; and shifting car users to public transport users by improving the quality of public transport system (Land Transport Authority, 1996).

5.3.6.2. Evolution of Centralised ticketing

The centralisation of the public transport ticketing system started in 1990 with the introduction of a magnetic stored-value fare card before the formation of the LTA.

In January 2002, ez-link card, a contactless smart card was officially introduced after field trials over a number of years (Tay, 2016). In the same way as the previous magnetic card, users top-up money on the card, but do not need to insert the card. This enhances faster transition of passengers.

TransitLink started to explore the idea of contactless smart cards in 1994 and the LTA conducted the pilot test of the card to 100,000 volunteers in 2000. At the end of 2002, magnetic farecards were phased out completely. The use of ez-link card has expanded to payments for private transport such as taxis, food and retail shops, library and schools (EZ-Link Pte Ltd, 2019). In 2009, NETS FlashPay card, which has a very similar scheme to ez-link card, entered the public transport fare market to provide more choices for users. Together with the discount given by using the contactless smart cards, the smart card has a high penetration rate of 98% due to its multipurpose use.

As a more advanced fare payment scheme, the LTA introduced Account Based Ticketing, which enable passengers to use their own contactless credit/debit cards as fare cards without the necessity of top-ups. The fares are directly deducted from the user's bank account and all the travel records are found within the app (TransitLink, 2019).

6. Analysis

The analysis section outlines the comparison between Monterrey's current situation and the best practices of the three benchmark cities. This section is split into six topics as below:

- i) Legal / Regulatory framework
- ii) Governance
- iii) Finance and contracting
- iv) Operations
- v) Social & environment
- vi) Central ticketing system

Each of these sections is structured as follows:

Monterrey pain points: This section extracts key information from the findings in the shape of pain points in Monterrey. The capture of these findings is a combination of desktop research as well as primary research collected from interviews.

Pain points prioritization according to indicators: The second part of the analysis studies different sets of indicators as detailed in the methodology. In this section, a matrix with different areas of study was completed collating scores (based on different scales and measures) for the two transport systems in Monterrey (SITRA and SITME) as well as the three benchmark cities. Different indicators were selected as highest priority based on the gap between Monterrey and benchmark cities scores. This section is not present for the "Legal" topic (Section 6.1).

Best practices from benchmark cities: The final section comprises a narrative describing how the benchmark cities tackled the respective pain points in Monterrey. This part of the analysis includes case studies which aim to highlight key success factors present in the benchmark cities.

6.1. Legal

We identified two key issues regarding the scope of the new mobility bill that was put forward by the State Government in Monterrey:

6.1.1. Scope

1. **No unified transport authority.** The new bill proposes that the so-called New Transport Institute for Nuevo León adopts competencies and responsibilities previously performed by the AET, CETyV and SINTRAM. However, the new bill falls short in its unified transport authority proposal as Metrorrey is kept separate. Metrorrey, originally conceived as the heart of transportation in Nuevo León, plays a significant role when it comes Monterrey's transport as it brings mobility solutions to the city. Leaving such a relevant institution out of the scope of the new authority could ultimately hinder the New Transport Institute's impact.
2. **The bill focuses on transport, not mobility.** By definition, mobility entails more than transport modes. It also comprises topics such as public space usage, pedestrian and sidewalks regulation, non-motor vehicles, private taxi hiring, and so on. The proposed mobility bill fails to incorporate some of the aspects traditionally covered to ensure a comprehensive regulation. See section 4.5. for more details. In Mexico, subjects that are omitted from primary laws are then addressed by secondary laws. However, secondary laws do not require congressional approval and can instead be designed by the same organisation that is going to be affected by the law. In effect, organisations can write their own laws on subjects not mentioned in primary laws. This lack of further scrutiny could result in a significant conflict of interest.

The comparable legislation in our benchmarking cities **covers all the major public transport modes** in the respective cities, making the unified transport authority responsible for all mode of transport:

buses, trains and metro. The benefit of this is that there may be **communication and shared learning across all modes** of transport.

Moreover, the legislation in the benchmark cities covers **additional transport-related issues** such as roads, traffic lights and vehicles which are considered as **integral to an effective transportation system**.

We recommend that all transport modes, including Metrorrey are brought under the control of one unified transport authority.

We recommend that the bill is revised to incorporate a wider scope of mobility.

6.2. Governance

6.2.1. Overall Monterrey issues

We identified five key issues within Governance in the public transport system in Monterrey. These were:

1. Politically driven decision-making
2. No clearly documented segregation of duties or interaction models
3. No formal performance reviews of officials, causing a lack of accountability
4. Technical advisory not formally included as part of the decision-making process
5. No coherent focus on a long-term strategy

This diagnosis is further supported by comparing key indicators from Monterrey's two transport systems (SITME and SITRA) with the London, Perth and Singapore (Figure 27). The four highlighted metrics in **red** show the areas where there is the largest gap with the benchmark cities.

Focus	Key Indicators	Metrics	SITME	SITRA	London	Perth	Singapore
Participation	Involvement of stakeholders	Number of non-governmental groups consulted in major decision making	5	0	10+	Unable to find data	9
		Scale (1= no consultation, 5= presence on independent advisory board)	5	1	5	3	5
Fairness	Conflict of interest	Presence of an active independent advisory board	Yes	No	Yes	No	Yes
Accountability	Segregation of duties	Scale (1= no/few clearly-defined roles within unified authority, 5= majority of senior managerial roles clearly defined)	4	2	5	5	5
	Goals & performance target	Scale (1= not available, 5 = clearly defined target)	5	1	5	5	5
	Consequences of individuals not meeting performance targets	Scale (1 = no consequences, 5 = complete removal)	1	1	5	Unable to find data	4
Transparency	Frequency of public reporting	The number of times a year an operational performance report is published	4	0	4	2	2
	Recency of KPI data	Scale (1= 3 year delay, 5 = live)	4	0	5	4	5
	Depth of information available	Scale (1= Not available, 5 = Information covering accountabilities and performance against targets in finance, operations, social & environmental)	3	1	5	5	5
	Public availability of forward looking performance targets	Scale (1= no performance targets, 5 = 3 years ahead+)	1	1	5	1	5
Efficiency	Speed of completion of major capex projects >USD10Bn investment	Lead time to completion	25+years	N/A	13 years (crossrail)	Unable to find data	Unable to find data
	Coordination of powers	Scale (1= no defined inter-governmental interaction model, 5 = clearly defined and actioned)	1		5	3	5

Figure 27 – Key indicators on governance structure

6.2.2. Politicised decision making

Despite the fact that many of the transport public stakeholders in Monterrey are *decentralised public organisations*, the influence of political agendas can be perceived across the system. This is exemplified by the fact that some organisations with direct implication to public transport have no power nor regulation responsibilities (e.g. CETyV). In addition, final decisions are made by governmental board or by organisations whose heads are appointed by the State Executive Power (i.e. AET and Metrorrey).

Often, these practices result in a decision-making process that lacks 1) technical based inputs, 2) long-term focus and 3) mechanisms to foster inclusion in mobility. Each of these issues are further explained below:

- a. **Lack of technical inputs:** All studies carried out by the advisory/council bodies (CETyV and SINTRAM) are made on an on-demand basis. In addition, due to this advisory nature, these organisations are not entitled to enforce any guideline (See section 3.2.4 for more detail). As a consequence, their inputs are *recommendations* only and it is up to the decision makers, often appointed by the state governor with a certain political agenda, to factor them in the process.
- b. **Lack of long-term focus:** Despite being the organisation in charge of ensuring the state's long-term vision is followed by each administration coming into the office, Consejo de Nuevo León issues only a documented opinion on whether administrations are in compliance. No disciplinary or punitive measures can be applied as a result of their advisory-only nature. (See section 3.2.4 for more detail.)
- c. **Lack of mechanisms to foster inclusion in real life:** Even though citizen participation groups are enforced by law, in reality there is not a mechanism that ensures that their inputs are factored into the decisions made by the government boards (See section 3.2.6 for more detail).

In the benchmark cities, decisions retain **long-term focus** and consider **technical inputs**. In Singapore and Perth, although the head of public transport authorities need to report to the Minister of Transport—a political role, the Minister will be held accountable in the parliament for the performance of LTA and PTC. Moreover, Perth's PTA and its other 'Transport Portfolio' partners are led by a single person that is endorsed by the Premier and then later approved by the Governor of Western Australia (New Director General of Transport appointed, 2016). The reason decisions are less politicised is because the Governor role itself is an apolitical role and was designed to advocate for the State's strategic interests and capabilities only. The 'Transport Portfolio' also has an executive committee that ensures effective integration and coordination across the portfolio.

In London, The London Assembly is consulted by the Mayor before producing statutory strategies and the budget for the GLA (including TfL), which means decisions are effectively scrutinised. In addition, all the **decision-making structures and processes are clearly laid out** in the GLA Act 1999 as well as TfL's standing orders making it transparent who is accountable for a decision.

It is evident from these benchmarked cities that increasing the level of **scrutiny by external stakeholders** (e.g. advising board, government parliament, etc.), documenting the decision-making process and publishing it are success factors in ensuring a mobility decisions retain a **long-term focus and serve the common good**.

We recommend that there is clear documentation of the decision-making processes within the new authority. The involvement of both political and non-political stakeholders should also be considered.

6.2.3. Lack of segregation of duties

In every decision-making process, the presence of interaction models and documentation stating the competencies and limits of each organisation is key to promoting accountability and increasing efficiency.

In addition, for an urban development strategy to be successful, coordination and communication between the urban/infrastructure planning and transport planning departments has to take place effectively. For this reason, a clear segregation of duties is key to ensuring effective mobility planning.

1. **Lack of accountability.** From Figure 10 – *Interaction model: public transport organisations in Monterrey*, we learned that for both SITRA and SITME there is a clear overlap of activities performed among the different organisations in charge of the public transport decisions in Monterrey, duplicating efforts. At the same time, some key activities are not visibly allocated to the each institution, leading to a lack accountability without clear responsible, accountable, consulted or informed stakeholders.
2. **Lack of coordination in key mobility planning areas.** SEDESU⁸ is responsible for state-level urban development planning (See section 4.2). However, its urban planning division is seldom consulted in many projects that impact the public transport system such as routes designing and AMM growth design. Another underlying issue arises when trying to align the urban development plan with the municipalities, which have control of land allocation (See section 4.2).

In Singapore, Perth and London clear division of roles and responsibilities are laid out. In London, for the senior levels, the job descriptions and the decision-making structure are available publicly on the TfL website. The benefit of this clear segregation of duties is that directorates or functions within the Transport Authority can cooperate in order to produce the best outcome for the transport network. Each directorate and indeed individual can also be held to account for their individual responsibilities and it avoids the creation of a 'blame culture'. At a more granular level, performance targets against key responsibilities are created against which individuals can be monitored and reviewed.

It is recommended that the legislation creating the new transport authority stipulate the key functions, roles and responsibilities that each organisation will play in the transport strategy and execution.

In addition, once created, it is recommended that each individual within the authority has clearly laid out roles and responsibilities down to its senior management level and these are publicly available online.

The unified authority should be responsible for all mobility-related issues (including demand management). Operators should solely be focused on running and maintaining the assets.

6.2.4. Lack of performance reviews

Even though several regulations were put in place to boost transparency in recent years in Monterrey, there is still room for improvement. Despite information regarding public officials and governmental institutions being publicly available, information about performance against targets is still unavailable (Sistema Estatal de Transparencia Nuevo León, 2015). The mechanisms to enforce transparency are only successful when they explicitly state **potential consequences** (Goetz & Jenkins, 2005).

Compared to the benchmark cities, the performance review requirement is **clearly documented** and made **transparent** to the legislative branch of government and to the public. In London, the London Assembly holds the Mayor to account. It publicly examines policies and programmes through committee meetings, plenary sessions, site visits, and investigations. The board of TfL is also required to include a **public presence in its meeting**. There is a public viewing gallery and all the

⁸ Sustainable Development Secretary

documents pertaining to the board meetings (e.g. board pack and minutes) are made publicly available.

In Perth, the Public Transport Authority Act 2003 regulates the requirement for the Minister to conduct review of operation and effectiveness of the authority every 5 years. It also regulates that the Minister must prepare a report based on the review and present it to the House of Parliament.

From these benchmarked cities, it can be concluded that making the performance review targets, meetings and results more transparent can improve the scrutiny process by the public and provide enough pressure to the public transport authorities to improve their performances.

We recommend that an independent board is introduced to hold the leader of the new transport authority to account.

We recommend that the board meetings are open to the public to foster greater transparency.

We recommend that the leader of the new authority and all the senior management have detailed performance targets which are publicly available online and that there is a review against these targets on a regular basis, also made publicly available online.

6.3. Finance and contracting

6.3.1. Overall Monterrey issues

Through our research, we identified five key issues within finance and contracting processes in Monterrey. These were:

1. Lack of a formalised, transparent and independently audited tender process for SITRA permits
2. Lack of enforced minimum standards or performance incentives for private operators
3. Difficulties in raising finance for investment for private operators
4. Limited state capex funding/subsidies
5. Limited focus on generating new income streams

Upon further analysis, we believe **improving the process for issuing permits** to be the highest priority due to its impact on operator bankability and service quality, and its ease of implementation.

This prioritisation is further supported by comparing key indicators from Monterrey's two transport systems (SITME and SITRA) with the London, Perth and Singapore (Figure 28). The two highlighted metrics in **red** show the areas where there is the largest gap with the benchmark cities:

1. The tendering process for neither SITME and SITRA permits is published nor independently audited. This is common practice in the benchmark cities studied.
2. Further, permits are issued for 12 months within SITRA and 20 years for Ecovia within SITME. Short contracts result in issues in bankability for the private operators and extended contracts tend to raise questions around competition and performance incentives.

Focus	Key Indicators	Metrics	SITME	SITRA	London	Perth	Singapore
Bankability	Concession length	Scale (1= 1 year or less & 15 years or more, 5 = 5-10 year contract)	2	1	5	5	5
	Government financing burden	% of external funding from government	Metro - 100% Transmetro - 100% Ecovia - 0% Metrobus/metro enlace - 0%	0%	Metro - 100% Bus - 1%	100%	100%
Contracting Process	Externalities enforced/incentivised in contract	Scale (1 = focus on profit only, 5 = multi-dimensional standard/incentives eg social inclusion, coverage, environment etc)	3	1	5	Unable to find data	5
	Barriers to entry to ensure high standards	Scale (1= none, 5 = a presence of multiple enforced minimum standards, eg. emission standards, technological barriers, average age of fleet, cash flow financing)	3	1	5	5	5
	Transparency of tendering process	Scale (1= in-house tendering process, 5= publicly published tendering process)	1	1	5	5	5
	Consequences of operators not meeting performance targets	Scale (1 = no consequences, 5 = complete removal)	5	1	5	5	4

Figure 28: Key Indicators of Financial and contracting process performance

6.3.2. Lack of tender process

A well-managed tender process increases competition, improves standards and reduces costs. Transparency of the process, including how the permits are awarded and the standards required, is important as it incentivises new entrants to the market and results in a fair mechanism for changing operators.

Currently, neither SITME nor SITRA have a transparent, independently audited tender process for awarding public transport permits. SITRA⁹, who issue the majority of private permits in Monterrey, award contracts on a yearly basis through a process that operators, themselves, do not fully understand. This results in a number of issues:

1. **Low quality transportation service.** As operators are not certain that high standards of service will result in being awarded more routes or even a renewal of their contract, they are incentivised to maximise short-term profit. Further, the concession contracts do not encourage high performance as the minimum standards laid out are not regularly enforced and there are no incentives for exceeding expectations.
2. **Limited competition.** A transparent tender process, where potential operators are certain of the standards required, the time taken to complete the process and the fair consideration of their offer, encourages new entrants. This increased competition results in higher service standards and lower costs. An important addition is that a transparent tender process is a fair mechanism for transferring services away from underperforming operators. The team have heard reports of death threats to new operators from existing operators unhappy with the decision to change. This behaviour significantly reduces the competition for routes.
3. **High financing costs.** Banks are typically unwilling to lend to private operators who require debt financing for longer than their concession contracts. The 12-month SITRA concession contracts mean that all SITRA bus operators are experiencing higher financing costs (discussed further in section 6.3.4 Bankability).
4. **No incentive to improve social or environmental factors.** Without social or environmental incentives in the concession contracts, operators have little motivation to invest in low emission buses, provide disabled access or service routes in low density areas for example. These incentives should be written into the contracts and regularly assessed to improve performance.

In benchmarking cities, tender information such as requirements, bidders, bidding prices and results of **the tender are publicly available**, and the tender process itself is **structured** and has **clear criteria** to choose an awarded bidder. In Perth, Singapore and London, tender information is announced the website and the process is completed electronically so that not only operators but also citizens have access to the information.

⁹ Integrated Transport System (Monterrey)

Regarding the process, London has a pre-qualification questionnaire phase, in which potential suppliers have to **meet certain minimum standards** including financial stability of the company, health and safety and previous experience in the transport or services sector. This process ensures the service level of the bidders before receiving their proposals. Similarly, in Singapore, tender submissions are divided into two envelopes and evaluated by quality and price factors with greater weight on quality aspect. The **price envelope is only opened and assessed after the completion of quality assessment** in order to get the best value-for-money proposal without compromising on the quality of service (Land Transport Authority, 2015).

In addition to the tender process, **incentive schemes** in the contracts play an important role to maintain and increase operators' service levels. For example, in Singapore and London, bus operators receive financial rewards or penalties depending on their performance. Also, they receive a 2-year extension of contracts as a consequence of high operational performance, based on the KPIs set out in the contract.

We recommend the implementation of a transparent, independently audited tender process by the unified authority which takes into account both, price and quality. This is considered to be an easy win because there is limited cost involved.

6.3.3. Bankability

Bankability is the ability for private operators to raise capital in a Public Private Partnership (PPP). If these operators find it difficult to raise finances, their costs will rise and these higher costs will ultimately be paid for by users through higher fares or the state through subsidies.

In Monterrey, private operators under SITRA are finding it difficult to raise capital. They have a strong incentive to invest as there are potentially large cost savings available. Many operators we interviewed wanted to invest in gas-powered buses, for example, but were finding it difficult to gain financing due to a number of factors:

1. **Contract length.** The 12-month concession length within SITRA means that banks are unwilling to lend against assets with a useful life longer than the contract length. Banks are concerned that operators' ability to pay back debt may be impacted if a concession is not renewed beyond the one-year term.
2. **Profitability.** According to operators, most of the SITRA bus companies in Monterrey have not been profitable in recent years. This is due to a 3-year fare freeze and rising costs linked to a strengthening dollar (namely fuel, spare parts and debt). Without positive cash flows, banks are unwilling to lend to operators.
3. **Requirement for demand studies.** Particularly for new entrants to the market, banks require demand studies to show there is a need for their public transport services. In Monterrey, operators have to carry these demand studies out themselves. This is cost-prohibitive for operators and an unproductive barrier to entry. In other metropolitan areas, such as London, governments carry out demand studies on behalf of operators, creating a level playing field for all potential operators.
4. **Strengthening dollar and higher US interest rates.** A weaker peso against the dollar leads to higher inflation within Mexico and so higher interest rates through monetary policy.

With respect to contract length, all benchmarking cities have between **5 to 10-year contracts** for their bus services, which lowers the financing costs for the operators. **Stable income** is also key for operators to improve their quality of operation and service. In London, operators get paid based on the length of routes and Singapore adopts monthly fee payment scheme for bus services. Hence, their revenue is not affected by the number of passengers. Operators can instead focus on improving service levels to meet the standards set by the regulators, not on increasing profitability as we saw in Monterrey.

In contrast to SITRA in Monterrey, bus operators in Perth and Singapore don't need a large capital investment as the operating assets such as bus fleets are owned by governments and leased by operators. Operators can instead use capital on service improvements and maintenance, leading to a higher quality service.

As for demand studies, we found that these are carried out by authorities not by each operator. In Singapore, when new bus routes are created, the LTA projects the demand of the routes based on the data from fare system and also from field surveys to gain first-hand insights (Land Transport Authority, 2013).

We recommend that the unified authority considers setting an appropriate contract length for operators (between 5 to 10 years¹⁰) which is priced according to a distance-based fee, instead of a revenue contract model. This will stabilise operators' finances, easing funding by ensuring operating costs are met.

The unified transport authority should enhance bankability of operators by providing demand studies from data collected through the centralised ticketing system.

We also recommend the unified transport authority controls the operating assets, including buses and garages, to ensure the authority retains control of public transport operations and financing costs are reduced. Control does not necessarily mean ownership of the assets. Third parties could own the assets ceding control to the authority and leasing the assets to the operators/authority.

6.4. Operations

6.4.1. Overall Monterrey issues

Through our interviews and research, we identified two key issues within public transport operations in Monterrey. These were:

1. Politicised fare setting
2. Lack of performance review

Comparison of the key indicators shown in Figure 29 supports this finding. The metrics highlighted in red show there is a large gap between Monterrey's quality of service, specifically customer satisfaction, perception of safety and user comfort, and that of the benchmark cities—a consequence of the key issues above.

Focus	Key Indicators	Metrics	SITME	SITRA	London	Perth	Singapore
Quality of Service	Customer Satisfaction	Satisfaction survey	61%	68%	88%	94%	95%
	Reliability	% On time running (OTR)	Metrorrey not aware	Transregio - 250/4667 buses operating	98%	92%	Mean km travelled between 5 mins delay: 574,000km
	Journey planning	Scale (1 = not available, 5 = multi-modal app trip planning)	1	1	5	5	5
	Perception of personal safety	% of respondents who feel safe	65%	59%	70%	93%	91%
	User comfort	Average age of the bus fleet	4	6-8	5	8	6
Accessibility	Locality of public transport service	Percentage of city within 1km of a public transport service	73%	67%	90%	85% within 500m	75% for metro

Figure 29: Key indicators of public transport operations performance.

6.4.2. Depoliticising fare setting

If fares are set through an independent committee, the price of public transport is balanced between the needs of the citizens and the needs of private operators to be profitable. The process should be

¹⁰ The contract length should be considered alongside the cost of the assets and associated depreciation/amortisation period and the ownership structure of the assets.

equally balanced between the two to encourage the widest possible usage and continued operation of the services by private operators.

Without this independent committee, as in Monterrey, the fare setting becomes a political issue. Fares have been fixed for 3 years while costs have risen due to the strengthening dollar. Without receiving any state subsidy to make up for the shortfall, operators have made cost reductions, resulting in:

1. **Poor service comfort.** Operators cut maintenance in their vehicles as a first response because it does not affect revenue generation in the short term.
2. **Reduced driver safety.** To boost revenues without a fare increase, operators can increase the number of passengers they pick up per journey. This results in drivers attempting to maximise passengers through at times dangerous behaviour, including frequently stopping outside of specified bus stops and stopping for an insufficient period of time, causing passengers to rush to get on and off.
3. **Infrequent and unreliable services.** When routes become unprofitable, operators choose to reduce the frequency that they run the service and, in some cases, stop running the route entirely. Public transport users therefore receive a substandard, unreliable service.

According to our study, all benchmarking cities have an **annual fare review** by either the unified transport authority or other governmental organisations so that economic changes such as inflation and increase in operational cost can be accounted for. In London and Perth, the final decision of fare changes is given to the head of the authority – an elected leader. However, in Singapore, the fare adjustment is carried out solely by the Public Transport Council based on a cost formula. The result is **publicly announced** with details. As the PTC has diversified board members, the decision is less likely to be affected by certain dominant stakeholders and/or political wills.

Fare setting is a controversial topic and key for a sustainable public transport system. In order to set reasonable fares for both operators and users, we recommend either an objective fare setting mechanism, utilizing a data-driven approach for a more objective fare setting, or an independent organisation in charge of fare setting.

6.4.3. Performance reviews of operators

When operators are given clear KPIs and the data gathered to monitor them is transparent, the private companies can be rewarded for good performance and fined or removed for poor performance. This mechanism encourages adherence to the concession contract and a gradual progression of standards across the network.

In Monterrey, SITRA permits, which form the majority of PPP permits, do have certain minimum standards. However, they are not enforced according to all operators interviewed. In an environment where profit margins have been squeezed, operators are looking to cut costs and so service standards fall, resulting in:

1. **Higher emissions.** The permits state that buses should be no older than 10 years but this is currently not being enforced.
2. **Poor user comfort.** Minimum maintenance schedules are not being adhered to so ride comfort deteriorates.
3. **Infrequent & unreliable services.** The minimum frequency for bus services on unprofitable routes is not being followed.

We found two main characteristics in operators' performance reviews which enable the unified transport authority to enforce the KPIs: **tracking metrics regularly** by using real time data and **auditing and publishing the result** of the performance review externally.

Singapore has two metrics (schedule mileage and accident rate) to ensure the reliability of operation and safety both for bus and rail. They also set additional KPIs to incentivise bus operators to enhance their service as mentioned in the contract section. In London, TfL releases quarterly data of all bus

operators such as bus mileage by day and routes and the result of quality service indicator acquired through electronic systems. These data can be used by bus operators to **benchmark against other operators**, encouraging healthy competition on service quality. Similarly, PTA in Perth has a real-time tracking system for all Transperth bus services that highlights early and late running buses. These data allow bus operators to manage reliability.

In London, TfL uses an **external organisation** to audit results in order to enhance transparency and objectivity of the review process. London Buses is part of the International Bus Benchmarking Group (IBBG) facilitated by Imperial College London, an international knowledge sharing network of bus companies. Every year, a review of the performance monitoring is evaluated internally and presented to TfL's Independent Investment Programme Advisory Group (IIPAG) by Imperial College London to justify expenditure and to ensure quality of service.

In order to ensure that minimum standards are met, we recommend that performance targets relating to quality of service are integrated into the contracts with transport operators and that there is a penalty and incentive scheme in place for not meeting or exceeding these minimum standards.

To enforce the KPIs for service standards, the unified authority should consider an external auditing system based on accurate data.

6.5. Social & Environmental

6.6.1. Overall Monterrey issues

We identified two key issues within Social and Environmental factors in the public transport system in Monterrey. These were:

1. No regulation enforced regarding environment
2. Poor safety along the transport network

This diagnosis is further supported by comparing key indicators from Monterrey's two transport systems (SITME and SITRA) with the London, Perth and Singapore (Figure 30). The two-highlighted metrics show the areas where there is the largest gap with the benchmark cities.

Focus	Key Indicators	Metrics	SITME	SITRA	London	Perth	Singapore
Health & Safety	Loss of life/injuries avoided	Incidents rate	No deaths	Not aware	0.0002%	0.002%	Unable to find data
	Personal safety & security	% of services with CCTV	Low - not aware	Low - not aware	90%	98%	Unable to find data
Inclusion & Access	Gender equality	% of female respondents who feel safe	63%	55%	72%	Unable to find data	Unable to find data
	Disability access	Scale (1= no provision of disability access, 5 = all services accessible to disabled people)	4	2	4	5	4
	Low-income access	Availability of concessionary fares (list)	Student, old person, children, disabled	Student, old person, children, disabled	12	11	11
Environment	Congestion charge	Presence of congestion charge	No	No	Yes	No	Yes
	Presence of public environmental strategy	Progress against plan	No	No	Yes	Yes	Yes

Figure 30 – Key indicators of social and environmental performance

6.6.2. Limited environmental regulation

Environmental policy is top of the agenda in Monterrey in recent years. A long list of environmental issues arising in the area urged the State government to take action. The transport system is a key element driving public health in the state, and for this reason a strategy on public policy and also regulation around Mobility in general is key.

Even though there are documented initiatives (Consejo Nuevo León, 2016) to improve the environmental situation in Monterrey, practices violating such initiatives can be seen in Monterrey. For instance, buses over ten years old are allowed to operate in the city.

This results in high **pollution**. Despite having a smaller population than Mexico City, Santiago, Sao Paulo, Lima or Buenos Aires, Monterrey is the most polluted Latin American city in terms of air quality (Lamadrid, 2016). Low population density and a sprawling urban conurbation are the main factors triggering the issue.

All three benchmark cities have a **separate environmental strategy** and reports to manage the environmental aspect of the public transport service provision. Several environmental reports produced by these benchmark cities cover initiatives like yearly report of carbon emissions, water efficiency, installation of the latest technology to reduce energy consumption and emission standards for fleets. Singapore's LTA also consults with environmental groups when building its transport infrastructure. In London, environmental strategy covering environmental targets and plans that apply to London public transport come from the Major's office and place a high importance on TfL to improve the city's environmental performance.

From these benchmark cities, it can be concluded that having a dedicated environmental strategy and plan is important as a guideline in improving the environmental side of public transport. Moreover, having a centralised public transport authority makes it easier to **consolidate the plan across the modes** as well to monitor the achievement.

We recommend that a comprehensive environmental strategy is created that outlines KPI's for all modes of transport.

6.6.3. Safety

We learned from surveying people in Monterrey that only 68% of people feel safe in SITME transports whereas a 59% do in SITRA systems. When isolating these figures to only to female responses, the percentage of women who feel safe is even lower: SITME 65% and SITRA 55% when compared with the benchmark city scores. The consequences of an unsafe transport system are:

1. **Reduced usage.** A poor safety perception among the public might lead to a low penetration rate. If people do not find the public transport to be safe, private car usage will tend to increase.
2. **Limited inclusion.** As we can see from the survey's result, a poor safety perception impacts the genders differently.

Compared to the benchmark cities, all three public transport authorities put safety as one of their main priorities when it comes to the service provision itself. Deployment of Closed-Circuit Television Camera (CCTV) has been included in the minimum standards in addition to other safety related initiatives. Across these cities, most of the **safety initiatives are proactive** rather than reactive. In Singapore, one example of this initiative is safety education campaigns to educate the public about railway safety. Similarly, Perth's PTA asks external auditor to audit its bus depots for their safety management at least once a year in addition to site visits. PTA also provides 28 mobile patrols to high risk bus routes and stations as quick response and 98% of PTA's trains have security presence after 7pm.

From these benchmark cities, it can be concluded that proactive safety is one of the success factors in improving customer satisfaction to the public transport.

Since safety is perceived as a barrier for using public transport in Monterrey, we recommend that the new authority advertises the safety schemes and improvements that it has so far introduced. Moreover, we recommend that the authority collaborates with interest groups in order to further improve the perceived safety of public transport.

6.6. Centralised ticketing

6.6.1. Overall Monterrey issues

Through our research, we identified two key issues with the two card payment systems in Monterrey. These were:

1. Lack of transparency in cash flows
2. Lack of data collection

The key indicators in Figure 31 further support this finding, showing a large gap in **red** between Monterrey and the benchmark cities for cash flow visibility and data accessibility.

Focus	Key Indicators	Metrics	SITME	SITRA	London	Perth	Singapore
Transparency	Visibility cash flow	Scale (1= no visibility, 5= real-time visibility)	2	1	5	4	4
	Visibility of user account information	Scale (1= no visibility, 5= real-time visibility)	2	5	5	4	5
	Availability of data	Scale (1= no visibility, 5= real-time visibility and high usage)	1	1	5	4	5
Quality of Service	Availability of multimodal ticketing (travel shifts)	Number of modes linked	25%	75%	100%	100%	100%
	Availability of remote top-up	Yes or no	No	Yes	Yes	Yes	Yes
	Penetration of central ticketing system	% of users	15%	50%	85%+	75%	98%
	Fare standardisation	Scale (1= diff fares for diff players, 5= standardized by mode)	5	5	5	5	5
Inclusion & Access	Availability of fare calculation	Tick box	N/A	N/A	Yes	Yes	Yes
	Affordability	Cost of monthly travelcard as % of average wage	1.4%	3.2%	9.0%	4.3%	2.7%

Figure 31: Key indicators of public transport operations performance.

6.6.2. Fare Revenue Management

Currently in Monterrey there are two card payment systems for public transport: one for SITME; and one for SITRA.

- SITME's Mia card is owned and operated by Metrorrey with the cashflows visible to Metrorrey only.
- SITRA's Feria card system is partially owned by the bus operators within SITRA with ownership proportional to the number of buses each operator owned at conception. The visibility of the cash flows and the commission generated by the system seems to be dependent on the proportion of ownership. This means minority owners have no visibility of cash flows and receive no commission.

A centralised ticketing system where cashflows are transparent to all stakeholders would avoid the following issues currently experienced in Monterrey:

- **Under-reporting of passengers.** When customers transact in cash, there is an opportunity for drivers to under-report the number of passengers and not present the full revenue from the bus route. With a card-based system, this cash-handling step is removed.
- **Reduced bankability.** With access to transparent, fully reported cashflows, banks may feel more comfortable lending to private operators.
- **Transparency.** Currently, minority shareholders in the Feria card system do not fully trust the distribution of cashflows as they have limited visibility of the system. This results in operators discouraging usage of the system.

In the benchmark cities, fare revenue goes into one 'fare box', which makes cashflows easier to trace. Indeed, the prevalence of electronic ticketing across all modes also means that revenue recognition to mode and route is instantly allocated which ensures **passengers are reported accurately** and increases **transparency**. Previously, when paper tickets were in use, timely surveys were carried out to capture this information. This data informs demand and route planning and frequency of services. The consistency and reliability of reporting on fare revenue is high and is published regularly on their websites. This enhances the credit rating agencies' ability to properly assess the financial position of the authority and make informed judgments on their **bankability**. Furthermore, in all three benchmark

cities, fare evasion is uncommon since there are regular spot checks where the electronic card is scanned.

In summary, the introduction of electronic centralised ticketing in the benchmark cities has improved the quality and amount of data available on passengers, routes, and fares and increased transparency, allowing higher levels of bankability for operators.

We recommend that a smartcard-based centralised ticketing system is introduced as a priority (in turn reducing the need for cash) across multiple modes of transport in Monterrey and that there is a review of fares across all modes to standardise them.

In conjunction with the introduction of a transparent tender process, we also recommend that routes are contracted based on distance to take away the incentive for operators to misrepresent their fare collection totals.

6.6.3. Lack of data

When there is a single payment system for public transport, a vast amount of data is available that collates exactly how users move about the city. That data can be used for a number of applications including planning transport routes and predicting surges.

With the two card payment systems in Monterrey, it is difficult to gain the full picture on how people move through the city. Further, there is no data currently gathered by the Mia card and the data from the Feria card is not shared equally amongst all SITRA operators.

This data therefore is not currently being used to gain improvements in mobility like the following examples:

- **New route planning.** With data on how people use public transport, it is possible to understand where new, more efficient bus routes could be established to increase bus revenues, reduce the number of changes required and expand the size of the network.
- **Demand forecasting.** Predict surges in demand using historical data.

In the three benchmarking cities where there is centralised (electronic) ticketing in place, there is vast amounts of data that can be collected; every time a ticket is touched on the reader, information is captured. Each authority has a dedicated data management system, team and policy in place to ensure that the data is managed properly and used in an optimal way to inform the provision of transportation services.

The implication for the user is that they can keep track of their movements; in Singapore, London and Perth, users can check their journeys online or via an app. This visibility increases the trust that the user has in the system as it matches journeys taken with the cost.

Similarly, the authority collects all this data which can be used to develop **demand models** and plan **new routes** accordingly. Moreover, the data collected by TfL is made available for free via their website to app developers. These apps are further enhancing the transport experience of users (for example through dynamic journey planning, real time status updates) and creating cost savings for TfL.

In summary, the electronic ticketing systems in the benchmark cities capture vast amounts of data that can be used to inform new route planning and demand forecasting, amongst other things.

We therefore recommend that the new authority implements a data management system and has a dedicated data team to manage and report on the vast amounts of data that will be collected through the introduction of electronic centralised ticketing.

7. Conclusion and recommendations

This section brings together our conclusions and recommendations which are loosely grouped into two themes, transparency and accountability, although some overlap both.

7.1. Transparency

Tender process

- Currently there is no tender process in Monterrey for SITRA transport operators.
- In Benchmark cities, there is a transparent, well-documented and publicly available tender process in place.
- *We recommend the implementation of a transparent, independently audited tender process by the unified authority which takes into account both, price and quality. This is considered to be an easy win because there is limited cost involved.*

Performance reviews – operators

- In Monterrey, performance standards are not enforced within SITRA, which results in a poor quality of service.
- In benchmark cities, performance of all operators is regularly reported publicly and even benchmarked.
- *In order to ensure that minimum standards are met, we recommend that performance targets relating to quality of service are integrated into the contracts with transport operators and that there is a penalty and incentive scheme in place for not meeting or exceeding these minimum standards.*
- *To enforce the KPIs for service standards, the unified authority should consider an external auditing system based on accurate data.*

Bankability

- Currently operators in Monterrey struggle to raise finance as they do not have long term visibility of revenues, their cashflow is unstable due to exchange rate fluctuations, and there is a lack of demand-driven forecasts.
- In benchmark cities the contract length for operators is at least 5 years and their revenue is not affected by passenger numbers.
- *We recommend that the unified authority considers setting an appropriate contract length for operators (between 5 to 10 years) which is priced according to a distance-based fee, instead of a revenue contract model. This will stabilise operators' finances, easing funding by ensuring operating costs are met.*
- *The unified transport authority should enhance bankability of operators by providing demand studies from data collected through the centralised ticketing system.*
- *We also recommend the unified transport authority controls the operating assets, including buses and garages, to ensure the authority retains control of public transport operations and financing costs are reduced. Control does not necessarily mean ownership of the assets. Third parties could own the assets ceding control to the authority and leasing the assets to the operators/authority.*

Fare management

- In Monterrey, cash transactions provide an opportunity for under-reporting of passengers

whilst existing electronic payment systems do not report openly or fully to all stakeholders on fare revenue.

- In the benchmark cities, the centralised ticketing systems which adhere to stipulated standards allow for immediate revenue recognition across modes and removes the risks associated with cash handling.
- *We recommend that an smartcard-based centralised ticketing system is introduced as a priority across multiple modes of transport in Monterrey and that there is a review of fares across all modes in order to standardise them.*
- *In conjunction with the introduction of a transparent tender process, we also recommend that routes are contracted based on distance to take away the incentive for operators to misrepresent their fare collection totals.*

Data

- In Monterrey there is limited to no data available on the transport services publicly.
- In benchmark cities, data is collected via the centralised ticketing systems every time a card is touched in or out and is used to inform demand planning, maintenance requirements and line status reports.
- *In parallel to the introduction of an electronic centralised ticketing system, we recommend that the new authority implements a data management system and has a dedicated data team to manage and report on the vast amounts of data that will be collected through the introduction of electronic centralised ticketing.*

7.2. Accountability

Scope of bill

- The current Mobility Bill does not incorporate key areas of mobility nor contain sufficient detail on entities and their interactions.
- The legislation in benchmark cities encompasses a greater level of detail and a broader scope which means that it is a document to which the authority can be held to account.
- *We recommended that the bill is revised to incorporate a wider definition of mobility and that the bill is critically assessed against the wider objectives such as urban planning and health.*
- *More specifically, we recommend that all transport modes, including Metrorrey are brought under the control of one unified transport authority.*

Segregation of duties

- In Monterrey, there is currently no clear segregation of duties across the multiple organisations involved in Transport which has led to duplication of efforts and lack of consultation or involvement of certain parties.
- In the benchmark cities, clear division of roles and responsibilities are laid out and made publicly available so the organisations, functions within the organisations and the senior individuals can be held accountable to them.
- *It is recommended that the legislation creating the new transport authority stipulate the key functions, roles and responsibilities of each organisation that will play a part in the transport strategy and execution.*
- *Unified authority should be responsible for all mobility-related issues (including demand management). Operators should solely be focused in running and maintaining the assets.*

Performance reviews (for governance)

- In Monterrey, some information regarding public officials and governmental institutions is publicly available, but information on performance against targets is not. Indeed, evidence of evaluation against target could not be found.
- In the benchmarking cities, targets and reviews against targets are made available to the public online.
- *We recommend that an independent board is introduced to hold the leader of the new transport authority to account.*
- *We recommend that the board meetings are open to the public to foster greater transparency.*
- *We recommend that the leader of the new authority and all the senior management have detailed performance targets which are publicly available online and that there is a review against these targets on a regular basis, also made publicly available online.*

Politicised decision making

- In Monterrey decision are often taken as a result of political will instead of data and there is not robust mechanism in place to hold this behaviour to account.
- In the benchmarking cities, decisions are based on technical, data-driven inputs and are aligned with an overall long-term strategy that outlives political cycles.
- *We recommend that there is clear documentation of the decision-making processes within the new authority. The involvement of both political and non-political stakeholders should also be considered.*

Politicised fare setting

- In Monterrey, fares have been frozen for the last three years. Transport operators have as a result suffered from squeezed margins due to increasing costs, which has ultimately resulted in a poorer quality service.
- In benchmarking cities, whilst the final decision is still a political one, the fares are set based on data driven models and assumptions.
- *Fare setting is a controversial topic and a key for the sustainable public transport system. In order to set reasonable fares for both operators and users, we recommend either an objective fare setting mechanism, utilizing a data-driven approach for a more objective fare setting, or an independent organisation in charge of fare setting.*

Environmental and safety

- Monterrey lacks mechanisms to enforce environmental and safety regulations already in place
- In benchmark cities, environmental targets are incorporated as part of transport plans that are consolidated by the unified authority. In addition, benchmark cities' safety strategy is actively targeted, with safety education campaigns playing a central role to communicate improvements.
- *We recommend that a comprehensive environmental strategy is created that outlines KPI's for all modes of transport managed by the unified authority.*
- *Equally, we recommend that the new authority advertises the safety schemes and improvements that it has so far introduced.*
- *Moreover, we recommend that the authority collaborates with interest groups in order to further improve the perceived safety of public transport.*

Based on our findings and recommendations, it is evident that the journey to establish a transparent and accountable public transport authority requires several initiatives. The practices across the benchmarked cities, now seen as successful institutions, have evolved over decades and have experienced lots of change. Therefore, if the state government of Nuevo León decides to move forward with the establishment of a unified public transport authority, a staged-approach is a logical step to take. A roadmap that defines milestones along the journey is key to a successful implementation. We recommend a first iteration of an indicative approach to prioritise the recommendations and milestones (see appendix O).

This indicative approach only considers high-level dependencies among the recommendations and relative initiative impact per milestone. Hence, as a next step toward implementation, the responsible authority needs to further develop and clarify the approach especially to consider: complexity among the recommendations; funding availability; delivery capacity; and the ability to absorb changes by the impacted stakeholders.

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9. Appendix A: Client brief

Funding parties: Several public and non-public organisations in Mexico

Project Title: Benchmarking metropolitan transport authorities and centralised ticketing systems – Determining the benefits for the metropolitan area of Monterrey, Mexico.

Business Sector(s): Transportation and Infrastructure Investment and Operation.

Summary

Monterrey is Mexico's 2nd largest city by economic output and 3rd largest by population. With 5 million inhabitants, one of the key challenges facing the city is to revamp its transport infrastructure, focussing on its service level and capacity. This remains key to driving prosperity and equal opportunity within the region, while unlocking widespread social and economic benefits. With public transportation widely accepted as the ultimate solution for improving the flow of a city, Monterrey continues to struggle to adopt world-class practices and innovations to enable them to thrive. Its current transport offering links together the following seven different modes of transport:

- A small but growing Metro rail system: METRORREY. The state government has ambitious plans for increasing the size and capacity, is in the process of buying both new and second hand carriages and inaugurating a brand new line.
- TransMetro, the bus feeder service to the Metro;
- ECOVIA, the city's first and very controversial BRT. A case study for transport projects in itself across Mexico from a finance and engineering point of view. The state government is making plans to refresh and revamp this service, before expanding into 2 more new lines.
- Urban bus network;
- Private Taxis.

Monterrey is in dire need for structural change; world class, tried and tested solutions to tackle the problems and inefficiencies that its public transport network faces.

Situation

Recently, the state government of Nuevo León (of which Monterrey is the capital city) has submitted a legislation bill for a new mobility law for the state, focusing mainly in the metropolitan area of the capital city where more than 80% of the state's population live. Among many other things, the bill promotes the creation of a single, metropolitan transport authority and a centralised ticketing system. These elements have been highlighted by several international transport consulting companies that have analysed the existing mobility situation in the greater metropolitan area of the city.

Being a federal republic, Mexico has 3 systems of government: federal, state and municipal. Each level has 3 branches of government – executive, legislative and judicial. There are distinct competences, jurisdictions and attributions at each level and branch, enshrined in primary, secondary and tertiary pieces of legislation. In the city of Monterrey, transport competences mostly exist at the state level in the executive branch, while some urban development and permit capabilities exist at the municipal level. Monterrey's metropolitan area is composed of 13 municipalities.

Transport-related competences and attributions by law, however, are split. At the top sits the Ministry of Sustainable Development (top ruling body and regulator). Below this Ministry, the Metro of the city (or METRORREY) is a decentralised public body which directly owns, manages and operates the city's mostly overground metro system. Metrorrey also regulates (within the framework set by the Ministry of Sustainable Development) the bus feeder routes and the city's only BRT, ECOVIA. It is

worth mentioning that, at the moment, Metrorrey also operates the BRT as a result of a requisition of the route from the government to the previous operator.

Also below the Ministry sits the State Transport Agency that regulates urban bus routes, taxis and all forms of on-demand transportation. The Agency supplies permits for operators of urban bus routes and taxis, unlike Metrorrey that tenders concession contracts. Lastly, the State Transport Council is a technical body providing advisory and support to the previously mentioned entities.

Monterrey's bus system comprises of both a regulated and deregulated offer. A minority of bus-based public transport within the city is regulated, with journeys served by Transmetro and Ecovia. The city's deregulated public transport offer consists of around seven (7) large private companies and a large number of owner-drivers, resulting in an over-supply of both buses and routes. Key characteristics of the current public transport structure of Monterrey include:

- The oversupply of buses within the market results in a high-level of competition for passengers, rather than competition for routes, resulting in infamous "penny-wars". As local companies competitively fight against each other, service levels remain unacceptable, offering limited accessibility to key segments of the public, including the most vulnerable groups. The overall public transport offer in Monterrey is, hence, poorly regarded by the public.
- Serious cross-sectoral coordination issues have been developed due to the existence of multiple institutions that hold responsibility for coordinating the bus transport network. Even when these institutions have (independently) worked in a relatively efficient manner within its own domain. Planning for the wider metropolitan area, integrating transport services, setting technical and quality standards and fostering transparency across the system, to name a few, are some of the challenges which the current administration faces, created by this complex situation.
- When it comes to the deregulated public transport offer, the lack of concession contracts linking regulator and operator fails to give either of the parties any commercial or legal protection. Furthermore, the current mechanism of distributing licenses to operate, hinders the system's ability to create the correct environment to reach operational efficiency and allow financially sound administration of the network.
- The bus fleet provision has always been the responsibility of the operator to procure, which fails to secure safe and comfortable travel for the community. Individual vehicle owners, who find in their bus the means to their subsistence, do not have the solvency required to invest in modern buses or green technology, resulting in an ageing bus fleet. These obsolete engine technologies heavily contribute to the increasing levels of carbon emissions (including nitrogen dioxide, particulate matter and sulphur acids) and are seriously damaging Mexico City's air quality.
- Another side effect is an impaired ability to create integrated passenger tariffs under one means of payment. While the State Government is close to tender a mobility masterplan and tariff integration study, the question still remains on how to foster an automatic, cashless fare collection system which works across different modes of transport (e.g. metro, urban bus routes, BRT, etc.) Currently, different transport services have different payment options. This too creates planning, coordination and financial difficulties for the authority, operators and users.

All these factors, combined with the lack of incentive to provide a quality service, leaves the public in Monterrey trapped in a deadly spiral of poor, low quality, expensive and inaccessible transport.

In order to set the groundwork to solve this critical situation at a structural level, the current state administration has put forth a Mobility Law bill to the state's local congress. This bill encompasses best practice gathered from different transport systems researched by the Ministry of Sustainable Development, including London, Hong Kong and Singapore. Aside from an array of other features, two significant elements of the bill are: the creation of a Metropolitan transport authority and a centralised ticketing system through electronic means of payment.

Being at the top of the city's public agenda, the bill has sparked stimulating debate in the state's legislative branch through different political factions, the media, workers unions, NGO's, the private sector and the public in general. Several stakeholders have requested support for technical input and professional advice to support public discussion and avoid a polarising, partisan environment. International donor organisations, think tanks, academia and private sector companies have been invited to participate in working sessions of the bill to bring technical expertise and professionalism to the debate.

The request is for a research project into the benefits of using metropolitan transport authorities and centralised ticketing systems for public transport; i.e. how these elements add value and facilitate the planning, regulation, bankability, expansion and improvement of a city's public transport system. One of the overarching themes should be to analyse if these two (2) initiatives foster transparency and accountability across the system and how it has done so, if at all, in other latitudes.

10. Appendix B: List of Key Indicators

Performance indicators for unified transport authority

Areas	Focus	Key Indicators	Metrics	SITME	SITRA	London	Perth	Singapore	Comments
Governance	Participation	Involvement of stakeholders	Number of non-governmental groups consulted in major decision making Scale (1= no consultation, 5= presence on independent advisory board)	5	0	10+	Unable to find data	9	
				5	1	5	3	5	
	Fairness	Conflict of interest	Presence of an active independent advisory board	Yes	No	Yes	No	Yes	
	Accountability	Segregation of duties	Scale (1= no/few clearly-defined roles within unified authority, 5= majority of senior managerial roles clearly defined)	4	2	5	5	5	
				5	1	5	5	5	
				1	1	5	Unable to find data	4	
	Transparency	Goals & performance target	Scale (1= not available, 5= clearly defined target)	4	0	4	2	2	
				4	0	5	4	5	
				3	1	5	5	5	
1				1	5	1	5		
Efficiency	Speed of completion of major capex projects >USD10Bn investment	Lead time to completion	25+years	N/A	13 years (crossrail)	Unable to find data	Unable to find data		
			1		5	3	5		
			2	1	5	5	5		
Bankability	Government financing burden	% of external funding from government	Metro - 100% Transmetro - 100% Ecovia - 0% Metrobus/metroenlace - 0%	0%	Metro - 100% Bus - 99%	100%	100%		
Contracting Process	Externalities enforced/incentivised in contract	Scale (1= focus on profit only, 5= multi-dimensional standard/incentives eg social inclusion, coverage, environment etc)	3	1	5	Unable to find data	5		
			3	1	5	5	5		
	Barriers to entry to ensure high standards	Scale(1= none, 5= a presence of multiple enforced minimum standards, eg. emission standards, technological barriers, average age of fleet, cash flow financing)	1	1	5	5	5		
			5	1	5	5	4		
Quality of Service	Customer Satisfaction	Satisfaction survey	61%	68%	88%	94%	95%	Calculated for Monterrey based on NPS methodology where scores of 9 or 10 (promoters) and 5-8 (passives) were counted as "satisfied"	
	Reliability	% On time running (OTR)	Metro/monrey not aware	Transregio -250/4667 buses operating	98%	92%	Mean km travelled between 5 mins delay: 574,000km	For Monterrey, certain routes not meeting minimum frequency and reports of strike action disrupting services	
	Journey planning	Scale (1= not available, 5= multi-modal app trip planning)	1	1	5	5	5		
	Perception of personal safety	% of respondents who feel safe	65%	56%	70%	93%	91%		
	User comfort	Average age of the bus fleet	4	6-8	5	8	6		
	Accessibility	Locality of public transport service	Percentage of city within 1km of a public transport service	73%	67%	90%	85% within 500m	75% for metro	For Monterrey, survey response to the question of 'accessibility' was used
Health & Safety	Loss of life/injuries avoided	Incidents rate	No deaths	??	0,0002%	0,002%	Unable to find data		
	Personal safety & security	% of services with CCTV	Low - not aware	Low - not aware	90%	98%	Unable to find data		
Inclusion & Access	Gender equality	% of female respondents who feel safe	63%	55%	72%	Unable to find data	Unable to find data		
	Disability access	Scale (1= no provision of disability access, 5= all services accessible to disabled people)	4	2	4	5	4		
	Low-income access	Availability of concessionary fares (list)	Student, old person, children, disabled	Student, old person, children, disabled	12	11	11		
Environment	Congestion charge	Presence of congestion charge	No	No	Yes	No	Yes		
	Presence of public environmental strategy	Progress against plan	No	No	Yes	Yes	Yes		
Usage	Passenger density	Passengers per kilometre	Not reliably available	Not reliably available	1,14	5,61	4,15		

Performance indicators for centralised ticketing system

Areas	Focus	Key Indicators	Metrics	SITME	SITRA	London	Perth	Singapore	Comments
Governance	Transparency	Visibility cash flow	Scale (1= no visibility, 5= real-time visibility)	2	1	5	4	4	
		Visibility of user account information	Scale (1= no visibility, 5= real-time visibility)	2	5	5	4	5	
		Availability of data	Scale (1= no visibility, 5= real-time visibility and high usage)	1	1	5	4	5	
Operation	Quality of Service	Availability of multimodal ticketing (travel shifts)	Number of modes linked	25%	75%	100%	100%	100%	
		Availability of remote top-up	Yes or no	No	Yes	Yes	Yes	Yes	
		Penetration of central ticketing system	% of users	15%	50%	85%+	75%	98%	
		Fare standardisation	Scale (1= diff fares for diff players, 5= standardized by mode)	5	5	5	5	5	
Social & Environmental	Inclusion & Access	Availability of fare calculation	Tick box	N/A	N/A	Yes	Yes	Yes	
		Affordability	Cost of monthly travelcard as % of average wage	1,4%	3,2%	9,0%	4,3%	2,7%	Where monthly travelcard not available, we assumed two journeys a day, 5 days a week. INEGI average wage of MX\$13,239 used.

11. Appendix C: List of Interviewees

Monterrey's Interviewees

Name	Organisation	Role
Carlos Orozco	Secretary of Sustainable Development	Director of Urban Development and Mobility
Jorge Longoria	State Transport Agency	General Director
Katia Cuevas	State Transport Agency	Director of Urban Development and Mobility
Carlos Placencia	Nuevo Leon Council	Director Mobility
Elizabeth Garza	CETyV	Director
Jose Ignacio Rincon	SINTRAM	COO
Dip. Carlos de la Fuente	State Congress of Nuevo Leon	Political Party: PAN
Dip. Ramiro Gonzales	State Congress of Nuevo Leon	Political Party: Morena party
Dip. Luis Donald Colosio	State Congress of Nuevo Leon	Political Party: Movimiento Ciudadano
Dip. Mariela Saldivar	State Congress of Nuevo Leon	Political Party: Movimiento Ciudadano
Municipalities		
Javier Leal	San Pedro Graza Municipality	Head of Mobility
Hector Castillo	Santa Catarina Municipality	Mayor of Santa Catarina
Elisa Estrada	Guadalupe Municipality	Planning Institute
Operators		
Jaime Barajas	Grupo Transregio	Chairman
Jose Alberto Almaraz	Grupo Transregio	Director General
Eduardo Cavazos	Grupo Lobo Genius	Chairman
Marcelo Cavazos	Grupo Lobo Genius	Chairman
Juan Lozano	Grupo Logo	Chairman
Jorge Rivas	Monterrey Metro	COO of bus services
Lorenzo Aguilar	Monterrey Metro	Ex- Head of Metrorrey
NGO'S		
Martha Cecilia Reyes	State's Women's Institute	Director
Luis Petersen	Milenio (Media Company)	Director
Patricio Garza,	Capital Natural and One Development	CEO
Moises Lopez	Research and Transport Consultant	
Francisco Fabela's Deputy	Universidad Autonoma de Nuevo Leon	Urban Planning Director

London's Interviewees

Name	Organisation	Role
Leon Daniels	Transport for London	Ex-Managing Director of Surface Transport
Tom Page	Transport for London	Head of Business Strategy

Singapore's Interviewees

Name	Organisation	Role
Poon Joe Fai	Land Transport Authority	Policy and International Relationships
Eu Jin Toh	Land Transport Authority	Deputy Director at Land Transport Authority
Henry Wong	Land Transport Authority	Organization and People Development
Wee Kee Ling	Land Transport Authority	Organization and People Development

The above interviewer has agreed for their names to be disclosed. There were also additional interviewees who would like to remain anonymous.

12. Appendix D: Interview Schedule

Date	Time	Interviewees	Interviewers
30th of January	Questionnaire	Poon Joe Fai	Yurie Sato
30th of January	Questionnaire	Eu Jin Toh	Yurie Sato
30th of January	Questionnaire	Henry Wong	Yurie Sato
30th of January	Questionnaire	Wee Kee Ling	Yurie Sato
12th of February	09:00 - 11:00	Carlos Orozco (SEDESU)	Gregorio Pillado, Maria Kcomt, Hirasdo Julius
12th of February	12:00 - 14:00	Jorge Longoria, Katia Cuevas (State Transport Agency)	Gregorio Pillado, Maria Kcomt, Hirasdo Julius, James Tharian, Yurie Sato
12th of February	18:00 - 19:00	Javier Leal (San Pedro Garza Municipality)	Gregorio Pillado, Maria Kcomt, Hirasdo Julius, James Tharian, Yurie Sato
13th of February	09:00 - 12:00	Carlos Placencia (State Council)	Gregorio Pillado, James Tharian, Lucy Dwyer
13th of February	12:00 - 14:00	Elizabeth Garza (CETyV)	Gregorio Pillado, Maria Kcomt
13th of February	16:00 - 17:30	Juan Lozano (Grupo Logo)	Yurie Sato, James Tharian, Lucy Dwyer, Hirasdo Julius
14th of February	11:00 - 12:00	Dip. Carlos de la Fuente (Congress)	Gregorio Pillado, Hirasdo Julius, Yurie Sato
14th of February	12:00 - 13:00	Dip. Ramiro Gonzales (Congress)	Gregorio Pillado, Hirasdo Julius, Yurie Sato
14th of February	12:00 - 13:30	Hector Castillo (Santa Catarina Municipality)	Maria Kcomt, Lucy Dwyer, James Tharian
14th of February	10:00 - 12:00	Martha Cecilia Reyes (Women Institute)	Maria Kcomt, Lucy Dwyer, James Tharian
14th of February	15:00 - 16:00	Dip. Luis Donald Colosio (Congress)	Gregorio Pillado, Hirasdo Julius, Yurie Sato
14th of February	16:00 - 17:30	Luis Petersen (Media Company Milenio)	Maria Kcomt, Lucy Dwyer, James Tharian
15th of February	10:00 - 12:00	Patricio Garza (Capital Natural)	Maria Kcomt, Lucy Dwyer, Hirasdo Julius
15th of February	10:00 - 12:00	Eduardo Cavazos, Marcelo Cavazos (Grupo Lobo Genius)	Yurie Sato, James Tharian, Gregorio Pillado
15th of February	12:00 - 13:00	Dip. Mariela Saldivar (Congress)	Gregorio Pillado, Maria Kcomt, Hirasdo Julius
15th of February	14:00 - 15:30	Jaime Barajas, Jose Alberto Almaraz (Grupo Transregio)	Yurie Sato, James Tharian, Lucy Dwyer
18th of February	09:00 - 10:30	Jose Ignacio Rincon (SINTRAM)	Gregorio Pillado, Maria Kcomt
19th of February	11:30 - 12:30	Moises Lopez (Consultant)	Gregorio Pillado, Maria Kcomt, Lucy Dwyer
19th of February	12:00 - 13:00	Francisco Fabela's Deputy (UANL)	Gregorio Pillado, James Tharian
19th of February	16:00 - 18:30	Lorenzo Aguilar (Metrorrey)	Yurie Sato, James Tharian, Lucy Dwyer
19th of February	17:00 - 17:30	Jorge Rivas (Metrorrey)	Gregorio Pillado, Maria Kcomt, Hirasdo Julius
20th of February	17:00 - 19:00	Elisa Estrada (Guadalupe Municipality)	Gregorio Pillado, Maria Kcomt
04th of March	10:00 - 11:30	Leon Daniels (Transport for London)	Lucy Dwyer, Yurie Sato
05th of March	09:30 - 11:00	Tom Page (Transport for London)	Lucy Dwyer, Yurie Sato

13. Appendix E: Outline of the Interviews

Benchmarking metropolitan transport authorities and centralised ticketing systems			
AMBS International Business Project – Secondary data collection			
Date		Location	
Interviewee Details			
Name		Company	
Role		Stakeholder group	

State Government Interviews:

Topic	Question
Governance	1. Could you describe the organisational structure in your organisation?
	2. How would you describe the regulatory framework with regards to the mobility in Nuevo León?
	3. What is the main objective of your organisation in terms of mobility?
	4. Can you elaborate on how your organisation interface with the rest of organisation when it comes to mobility?
	5. Could you describe the role of your organisation in the decision-making process when it comes to Nuevo León mobility?
Changes from New Mobility bill	6. How will your organisation be impacted as a result of the new mobility bill that was put forward last year?
	7. Will the scope of your responsibilities will change?
Operational and Financial Situation	8. What is the process for funding public transport system projects looks like? Could you provide an example?
	9. What is the influence/role of your organisation when it comes to contracting models?
General View	10. What is your general view on the current public transport system situation in Nuevo León?

Operators Questions:

Topic	Question
Mobility bill	1. Are you aware of the recent mobility bill pending to be approved by the congress? 2. How would you describe the changes that it will urge to your business/operation?
Transparency	3. How many regulator bodies does your operation have to deal with to operate your service? 4. How would you think that dealing with one unified authority will impact your business/operation?
Contract Structure	5. Could you describe the current contract structure by which you provide your services? 6. How would you describe the tendering/concession processes the current authority runs to select the providers? 7. Do you think that the criteria to select the providers is fair and comprehensive?
Financial Situation	8. What is the partnership between private and public investment?
Quality of service/ Environment	9. Based on the current regulation, what is the process to foster improvements in the service your organisation deliver in terms of: <ul style="list-style-type: none">• Quality of service?• Environmental issues?• Safety?• Inclusion?• How is it going to change with the implementation of the new bill?
Centralised ticketing system	10. How would this initiative impact your business/operation in terms of: <ul style="list-style-type: none">• Cost-Efficiency?• Service demand?• Crime rate reduction?• Use of technology?
General View	11. What is your general view on the current public transport system situation in Nuevo León?

Public Servants questions:

Topic	Question
Governance	<p>Could you describe the organisational structure in your organisation? What is the main objective of your organisation in terms of mobility? How does your organisation fit in Monterrey's mobility regulatory framework? Can you elaborate on how your organisation interface with the rest of organisation when it comes to mobility in the following aspects?</p> <ul style="list-style-type: none">• When proposing amendments to current bills?• When implementing a new bill?• When enforcing the active laws? <p>Could you describe the role of your organisation in the decision-making process when it comes to Nuevo León mobility?</p>
Accountability	<p>How often are the goals of the organisation set? To best of your knowledge, is there any scope overlap between this and any other organisation? In your opinion, how clear is the segregation of duties between your organisation and the rest involved in public transport regulation?</p>
Transparency	<p>How often does your organisation issues public reports? What would be the process by which citizens could have access to information from the organisation?</p>
Changes from New Mobility bill	<p>How will your organisation be impacted as a result of the new mobility bill that was put forward last year? Will the scope of your responsibilities change?</p>
Operational and Financial Situation	<p>What does the process for funding public transport system projects look like? Could you provide an example? What is the influence/role of your organisation when it comes to contracting models with the different transport modes operators?</p>
General View	<p>What is your general view on the current public transport system situation in Nuevo León?</p>

Interest Groups Questions:

Topic	Question
Participation in Regulatory issues	1. Is your organisation involved in consultation regarding transport regulation? If yes, could you describe how this involvement?
Inclusion and Access	2. How important is public transport to the daily lives of people within your interest group? What are the main issues your group faces with regard public transport? 3. What is the process to capture the issues related to public transport from your interest group? 4. What is the process of escalating these issues to the public transport authorities?
General View	5. What is your general view on the current public transport system in Monterrey?

14. Appendix F: Street Survey

We are conducting a study regarding the transportation system in Monterrey and we would like your feedback on using the current service. All data collected is anonymous. The survey will take around 5 minutes to complete.

Demographic information

1. Gender

a.	Female
b.	Male
c.	Prefer not to say

2. Age

a.	18 or younger
b.	19 to 30
c.	31 to 50
d.	51 to 64
e.	Older than 65
f.	Prefer not to say

3. Do you have any disability?

a.	Yes
b.	No
c.	Prefer not to say

4. Do you live in the Monterrey area?

a.	Yes
b.	No

Public transport

5. What type(s) of public transport do you use most regularly (more than one can apply)?

a.	Metro
b.	Bus (Urban Bus Network)
c.	Trans Metro
d.	Ecovia (BRT)
e.	Other

6. How often do you use public transport in Monterrey?

a.	Every day
b.	2 – 4 times per week
c.	Once per week
d.	2 – 3 times per month
e.	Once a month
f.	Less than once a month

7. What is the average length of time you spend on public transport when you use it?

a.	Less than 30 minutes
b.	From 30 to 60 minutes
c.	More than one hour

Satisfaction

8. How satisfied are you with the public transport provision in Monterrey? (Mark the scale where 1 is highly unsatisfied and 10 is highly satisfied)

- a. Reliability (how confident are you that your service will run on time)

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----
- b. Service information (availability of information on issues or status of the service)

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----
- c. Accessibility (proximity of stations, ease of transit)

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----
- d. Comfort (general condition of the transport mode: cleanliness, quality of seats, comfort of ride, over or under-crowding of the service)

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----
- e. Travel time (length of journey time)

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----
- f. Customer service (how satisfied are you with the communication or interaction with public transport staff?)

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Safety

9. In general, how safe do you feel using public transport in Monterrey?

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

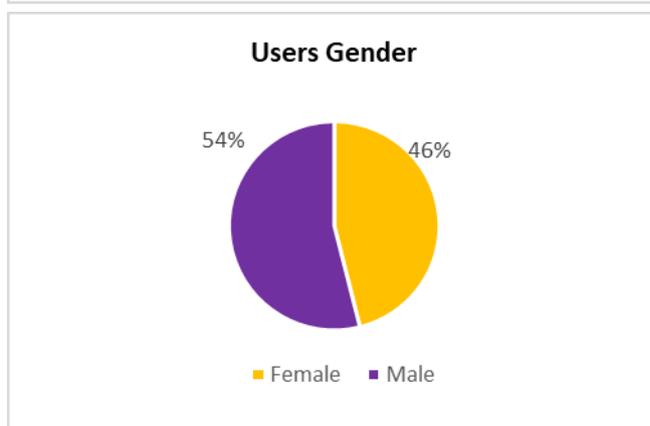
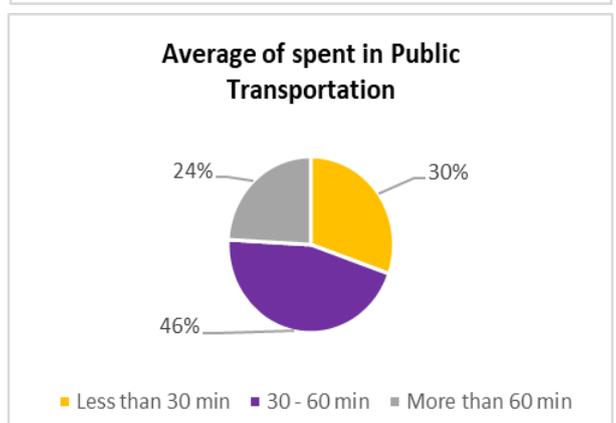
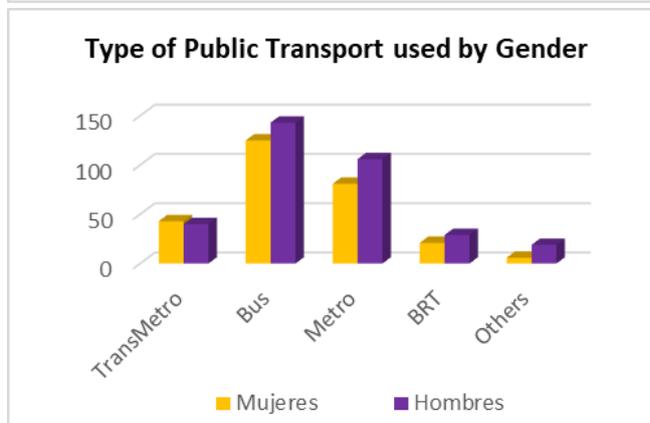
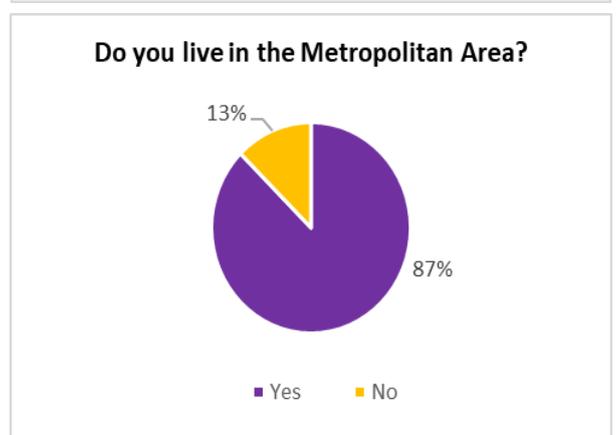
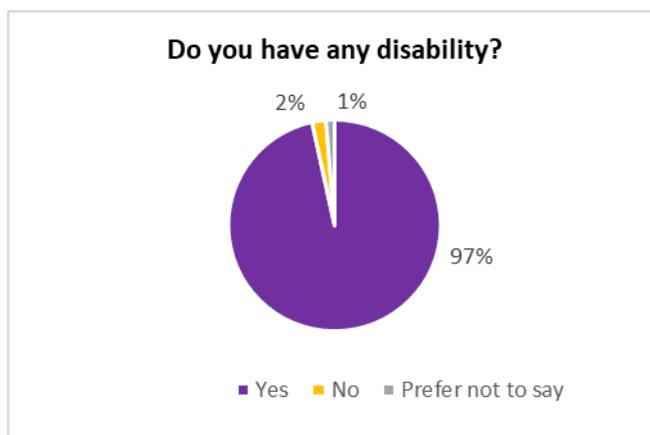
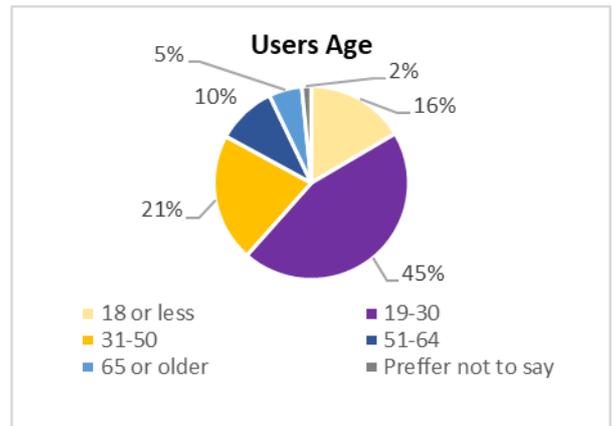
View of central ticketing

10. If a ticket was introduced that enabled you to use all transport modes in Monterrey, at no extra cost to you, how likely are you to use this? Mark the scale where 1 is the least and 10 the most likely.

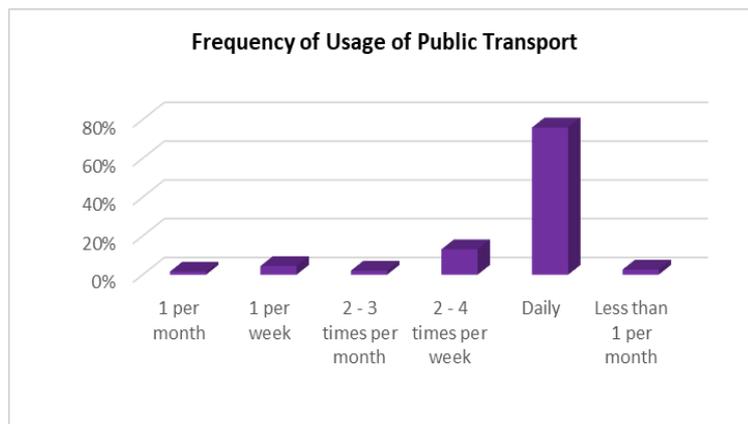
1	2	3	4	5	6	7	8	9	10
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Thank you for taking the time to respond to this survey.

15. Appendix G – Survey Results



Score range		Category for User Satisfaction															
		Information		trust		accessibility		confort		duration		customer service		security		central ticketing	
Detractors 1-4	Female	80	46.0%	61	35.3%	54	31.0%	65	37.4%	59	34.1%	58	33.5%	70	40.2%	23	13.2%
	Male	79	38.9%	56	27.3%	56	27.3%	70	34.1%	58	28.3%	65	31.9%	66	32.2%	32	15.6%
	Total	159	42.2%	117	31.0%	110	29.0%	135	35.6%	117	31.0%	123	32.6%	136	35.9%	55	14.5%
Passives 5-8	Female	79	45.4%	92	53.2%	92	52.9%	84	48.3%	87	50.3%	87	50.3%	80	46.0%	86	49.4%
	Male	108	53.2%	110	53.7%	105	51.2%	98	47.8%	108	52.7%	99	48.5%	100	48.8%	93	45.4%
	Total	187	49.6%	202	53.4%	197	52.0%	182	48.0%	195	51.6%	186	49.3%	180	47.5%	179	47.2%
Promoters 9-10	Female	15	8.6%	20	11.6%	28	16.1%	25	14.4%	27	15.6%	28	16.2%	24	13.8%	65	37.4%
	Male	16	7.9%	39	19.0%	44	21.5%	37	18.0%	39	19.0%	40	19.6%	39	19.0%	80	39.0%
	Total	31	8.2%	59	15.6%	72	19.0%	62	16.4%	66	17.5%	68	18.0%	63	16.6%	145	38.3%



16. Appendix H: The list of current operators in London

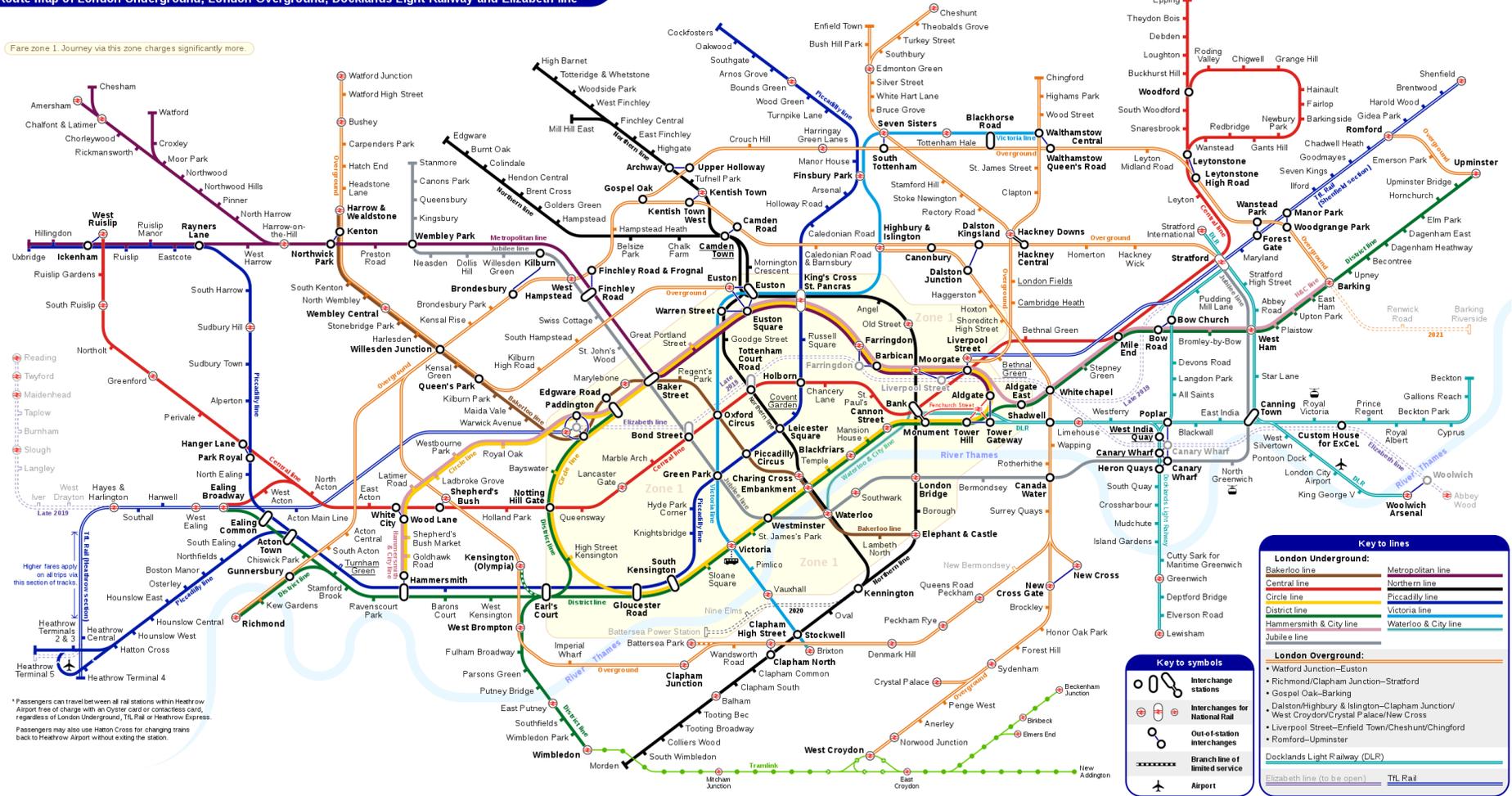
The table below shows the private bus operators in London, and in which area:	Private bus services in East and South London
Abellio London	Abellio, part of the Abellio Group, operates bus services in Central, South and West London
Go Ahead	Provides bus services in London
London Buses	London Buses manages bus services in London. It plans routes, specifies service levels and monitors service quality. Its site provides useful information on bus services in London
London United	Part of RATP Dev London, London United operates a fleet of over 600 buses on 60 routes within central, West and South West London and Surrey
Metrobus	Provides bus services in South London, Kent, Surrey and Sussex
Metroline	Provides bus services in North and West London, including Central London and the City
Stagecoach London	Provides bus services in East and South-East London
Sullivan Buses	Provides bus services in North London
Tower Transit	Provides bus services in London

Table of bus operators in London – taken from
http://www.londontravelwatch.org.uk/links/bus_operating_companies

17. Appendix I: Route Map of zonal system of the railway services directly managed by Transport for London

Route map of London Underground, London Overground, Docklands Light Railway and Elizabeth line

Fare zone 1. Journey via this zone charges significantly more.



18. Appendix J – London Underground Fares

LONDON UNDERGROUND FARES 2019				
Zones Travelled	Single Journey Ticket		Oyster / Contactless Payment Card~	
	Adult	Child†	Peak*	Off Peak
Zone 1	£4.90	£2.40	£2.40	£2.40
Zone 1 & 2	£4.90	£2.40	£2.90	£2.40
Zone 1 To 3	£4.90	£2.40	£3.30	£2.80
Zone 1 To 4	£5.90	£2.90	£3.90	£2.80
Zone 1 To 5	£5.90	£2.90	£4.70	£3.10
Zone 1 To 6	£6.00	£3.00	£5.10	£3.10
Zone 2 To 6	£5.90	£2.90	£2.80	£1.50

No return fares.
† Children travel free if under 11 year old or are between 11 and 15 years with an Oyster 11-15 Photocard
~ Children's fares (11-15 yrs old) on Oyster for any trip within zones 1 to 6 are £0.75 off peak, £0.80 peak
* Peak fares apply Monday to Friday between 6.30am and 9.30am and 4pm to 7pm, except public holidays

<https://www.londontoolkit.com/briefing/underground.htm>

19. Appendix K: Six stages of TfL evolution

Source: 'Institutional Labyrinth: designing a way out for improving urban transport services: lessons from current practice', The World Bank / Australian Aid

1933-48: London Passenger Transport Board (LPTB)

Multiple transport services in London were bought together for the first time as a result of the London Passenger Transport Act of 1933: tram services from multiple local government organisations, UERL (underground), buses from the Metropolitan Police.

1948-63: London Transport Executive (LTE)

The LTE was taken into public ownership and became part of the British Transport Commission. London Transport and British Railways were brought under the same control for the first and last time.

1963-70: London Transport Board

Reported directly to the Ministry of Transport; direct association with managing British Railways ceased. Investment in public transport during this period was low and the motorcar increased in popularity.

1970-84: Greater London Council (GLC)

The LTE served as the executive agency. Legislation authorising the GLC was passed in 1963, but control did not pass to the new authority until January 1, 1970.

1984-2000: London Regional Transport

London Regional Transport was under direct central government control, reporting to the secretary of state for transport. The Act of the same name led to the setting up subsidiary companies:

- In 1985 London Underground Limited (LUL) was established to manage the tube network;
- In 1988, ten business units were created to manage the bus network and London Buses Limited was created to advance the privatisation of bus services.
- The former bus-operating interests and assets of London Regional Transport were split into twelve essentially private business units under the banner of London Buses. The units competed for contracts with private operators beginning in 1984 and were all sold off by 1994/95, becoming private operators themselves.

2000 Onward: Transport for London (TfL)

The Greater London Authority, a replacement authority for the GLC, was set up in 2000 as a result of the GLA Act 1999. TfL became the transport executive taking control as the lead agency for transport.

20. Appendix L: Bus and Train Fare in Singapore

Adult Fares for Trunk Service (Bus)

Distance	Fare Per Ride (cent in SGD)		
	Card	Cash	Discount rate by using card
Up to 3.2 km	83	150	45%
3.3 km - 4.2 km	93	170	45%
4.3 km - 5.2 km	103	170	39%
5.3 km - 6.2 km	113	170	34%
6.3 km - 7.2 km	122	190	36%
7.3 km - 8.2 km	129	190	32%
8.3 km - 9.2 km	135	190	29%
9.3 km - 10.2 km	139	210	34%
10.3 km - 11.2 km	143	210	32%
11.3 km - 12.2 km	147	230	36%
12.3 km - 13.2 km	151	230	34%
13.3 km - 14.2 km	155	230	33%
14.3 km - 15.2 km	159	230	31%
15.3 km - 16.2 km	163	240	32%
16.3 km - 17.2 km	167	240	30%
17.3 km - 18.2 km	171	240	29%
18.3 km - 19.2 km	175	240	27%
19.3 km - 20.2 km	178	250	29%
20.3 km - 21.2 km	181	250	28%
21.3 km - 22.2 km	184	250	26%
22.3 km - 23.2 km	187	250	25%
23.3 km - 24.2 km	189	260	27%
24.3 km - 25.2 km	191	260	27%
25.3 km - 26.2 km	193	260	26%
26.3 km - 27.2 km	194	260	25%
27.3 km - 28.2 km	195	260	25%
28.3 km - 29.2 km	196	260	25%
29.3 km - 30.2 km	197	260	24%
30.3 km - 31.2 km	198	260	24%
31.3 km - 32.2 km	199	260	23%
32.3 km - 33.2 km	200	260	23%
33.3 km - 34.2 km	201	260	23%
34.3 km - 35.2 km	202	260	22%
35.3 km - 36.2 km	203	260	22%
36.3 km - 37.2 km	204	260	22%
37.3 km - 38.2 km	205	260	21%
38.3 km - 39.2 km	206	260	21%
39.3 km - 40.2 km	207	260	20%
Over 40.2 km	208	260	20%

Adult Fares for MRT and LRT

Distance	Fare Per Ride (cent in SGD)		
	Card	Single Trip Ticket	Discount rate by using card
Up to 3.2 km	83	150	45%
3.3 km - 4.2 km	93	170	45%
4.3 km - 5.2 km	103	170	39%
5.3 km - 6.2 km	113	170	34%
6.3 km - 7.2 km	122	190	36%
7.3 km - 8.2 km	129	190	32%
8.3 km - 9.2 km	135	190	29%
9.3 km - 10.2 km	139	210	34%
10.3 km - 11.2 km	143	210	32%
11.3 km - 12.2 km	147	230	36%
12.3 km - 13.2 km	151	230	34%
13.3 km - 14.2 km	155	230	33%
14.3 km - 15.2 km	159	230	31%
15.3 km - 16.2 km	163	240	32%
16.3 km - 17.2 km	167	240	30%
17.3 km - 18.2 km	171	240	29%
18.3 km - 19.2 km	175	240	27%
19.3 km - 20.2 km	178	250	29%
20.3 km - 21.2 km	181	250	28%
21.3 km - 22.2 km	184	250	26%
22.3 km - 23.2 km	187	250	25%
23.3 km - 24.2 km	189	260	27%
24.3 km - 25.2 km	191	260	27%
25.3 km - 26.2 km	193	260	26%
26.3 km - 27.2 km	194	260	25%
27.3 km - 28.2 km	195	260	25%
28.3 km - 29.2 km	196	260	25%
29.3 km - 30.2 km	197	260	24%
30.3 km - 31.2 km	198	260	24%
31.3 km - 32.2 km	199	260	23%
32.3 km - 33.2 km	200	260	23%
33.3 km - 34.2 km	201	260	23%
34.3 km - 35.2 km	202	260	22%
35.3 km - 36.2 km	203	260	22%
36.3 km - 37.2 km	204	260	22%
37.3 km - 38.2 km	205	260	21%
38.3 km - 39.2 km	206	260	21%
39.3 km - 40.2 km	207	260	20%
Over 40.2 km	208	260	20%

Public Transport Council, 2019

21. Appendix M: Transparency at TfL in London

TfL has a robust approach towards transparency. Their webpage <https://tfl.gov.uk/corporate/transparency/#on-this-page-4> outlines the main things that TfL has in place to ensure transparency and accountability. Below is an excerpt from this page. They also have a Transparency Strategy in place (also available to view at the above webpage) which is reviewed on an annual basis.

“With responsibility for billions of road and public transport journeys every year and an annual budget of around £11bn, we have a duty to spend that money as efficiently as possible and account for every penny.

We publish a huge amount of data on a range of subjects including contracts, expenditure, how reliable our services are, customer satisfaction, journey data, and our financial performance. This data helps people understand how we run London's transport network, and how we spend the money raised through fares and taxes.

The Strategy explains our commitment to transparency, which starts with a presumption that all our information should be made publicly available (and, in the case of data, provided in machine readable form), unless there are legitimate reasons why not - for example, disproportionate cost, personal data or information which would harm our ability to maximise value for money for customers and tax payers.

Openness and transparency is helping to transform the way we operate. It strengthens our relationships with customers and stakeholders, and raises awareness of how we work with local communities and businesses to improve our services.

This information enables innovation in the way our customers travel, with our open data feeds leading to the development of hundreds of smartphone apps to help people get around the Capital. Transparency also helps us drive efficiency across the business.

Being open and accountable:

- Enables our customers and stakeholders to hold TfL to account
- Contributes to better decision making
- Delivers better value for money
- Engages businesses, non-profit organisations, academics and others to make transport in London better

We publish information in line with the Local Government Transparency Code issued by the Department for Communities and Local Government in February 2015”.

22. Appendix N: Indicative approach to prioritise the recommendations

Analysis				Roadmap
Recommended Initiative	Impact ¹	Effort ²	Total Score	
Regulation on public transport authority	3	3	6	 Horizon 1 Foundational
Unified public transport authority	3	3	6	
Governance and organisation design (function, roles-responsibilities)	3	3	6	
Process enhancement and standardisation (planning, execution, monitoring)	3	3	6	
Fare standardisation across all modes	2	2	4	 Horizon 2 Stabilisation
Performance Metrics (internal and for operators)	2	2	4	
Independently audited tender process	2	2	4	
Contracting management	2	2	4	
Smartcard-based centralised ticketing system	1	2	3	 Horizon 3 Excellence
Dedicated environmental initiatives	1	2	3	
Dedicated safety initiatives	1	2	3	
Data management for better planning, execution, monitoring	1	1	2	

Impact¹: 1-Excellence, 2-Stabilisation, 3-Foundational

Effort²: 1-Dependency to >3 initiatives, 2-Dependency to 2-3 initiatives, 3-Low to no dependency