



**Imperial College  
London**

**Railway and Transport Strategy Centre**

# **The Operator's Story**

## **Appendix: London's Story**

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# **The Operator's Story: Notes from London Case Study Interviews**

*February 2017*

## **Purpose**

The purpose of this document is to provide a permanent record for the researchers of what was said by people interviewed for 'The Operator's Story' in London. These notes are based upon 14 meetings between 6<sup>th</sup>-9<sup>th</sup> October 2015, plus one further meeting in January 2016. This document will ultimately form an appendix to the final report for 'The Operator's Story' piece. Although the findings have been arranged and structured by Imperial College London, they remain a collation of thoughts and statements from interviewees, and continue to be the opinions of those interviewed, rather than of Imperial College London. Prefacing the notes is a summary of Imperial College's key findings based on comments made, which will be drawn out further in the final report for 'The Operator's Story'.

## **Method**

This content is a collation in note form of views expressed in the interviews that were conducted for this study. Comments are not attributed to specific individuals, as agreed with the interviewees and TfL. However, in some cases it is noted that a comment was made by an individual external not employed by TfL ('external commentator'), where it is appropriate to draw a distinction between views expressed by TfL themselves and those expressed about their organisation.

## **List of interviewees**

Internal TfL views:

- Mike Binnington, Senior Principal, Commercial Finance
- Michèle Dix, Head of Crossrail 2, former head of Planning and Strategy
- Jonathan Fox, Director of London Rail
- Theo Haughton, Head of Strategy & Business Planning LUL & TfL Rail
- Andy Jinks, Head of Asset Strategy & Investment
- Dave O'Brien, Head of Risk Management, Rail & Underground
- Howard Smith, Operations Director of Crossrail, former Chief Operating Officer, London Rail
- Shashi Verma, Head of Customer Experience
- Julian Ware, Senior Principal, Commercial Finance
- David Waboso, Capital Programme Director

External commentators:

- David Bayliss, former LU Director of Planning
- Stephen Glaister, TfL board member
- David Leam, Infrastructure Expert at London First
- Tony Ridley, former Managing Director of LU and subsequently the Hong Kong MTR
- Robin Steel, former LU Head of Asset Management
- Tony Travers, Professor of Government at London School of Economics
- Mike Woods, Independent Investment Programme Advisory Group (IIPAG)

# General Summary of London Underground

GENERAL SUMMARY	
Relevance to international learning about Metro Operators	<p>This case study illustrates the following international lessons:</p> <ul style="list-style-type: none"> <li>▪ Parallel evolution of local government, national government interaction with local issues, and the technical shape of a complex metro system.</li> <li>▪ The transition of an Operator and a metro system from lagging performance (1980s) to a world leader (present) all within the context of public ownership, periods of economic prosperity and crisis, politics of a democracy, and the constraints that come with it.</li> <li>▪ Unintended outcomes of PPP initiatives. This includes both positive and negative outcomes from contracts themselves as well as the events that followed those outcomes. London’s urban rail PPP experiences are very much linked to the current shape and performance of public institutions.</li> <li>▪ The evolution of asset management both as a technical discipline and as a strategic tool for business planning and risk management. London Underground’s current asset management system was originally developed to support the Tubelines and Metronet PPP endeavors. It has subsequently become a critical business tool for LUs investment.</li> <li>▪ The role of an Operator with respect to political actors and informing their decision making process.</li> <li>▪ A transition towards viewing and assessing urban railway projects as strategic urban competitiveness initiatives rather than just railways projects. This has been particularly important to the business case that underpins the Crossrail I and II projects.</li> <li>▪ Lessons learned about managing large capital programs, both positive and negative. In particular, London has experienced several “stops and starts” in developing its metro system and also experienced periods of volatile funding.</li> <li>▪ The impact of supra-national legislation (i.e. European Union) on the governance environment for metro operations. Most notably, these impacts relate to regulatory mechanisms that apply to the London Underground.</li> </ul>
Background and history	<ul style="list-style-type: none"> <li>▪ First line opened in 1863 (Metropolitan Railway - Paddington to Farringdon with six intermediate stations)</li> <li>▪ Initial lines developed and operated under private companies and public authorities and were subsequently agglomerated in 1933</li> <li>▪ System development resumed in 1968 with the opening of the Victoria Line across central London</li> <li>▪ Jubilee line opened in 1979 and its extension was subsequently completed in 1999. The extension is particularly noteworthy because of the large cost and schedule overruns that it entailed. This experience demonstrated a need to improve the effectiveness of London Underground’s major project management functions.</li> <li>▪ At present, TfL is developing the Crossrail project which will add a further 118km of high capacity rail line across central London, although only the tunnels are new infrastructure. A north east-south west Crossrail II line has also been proposed.</li> </ul>

Key dates and why they matter	1863-1933	London's initial urban rail systems developed and operated independently under a myriad of different owners including private developers and local authorities.
	1933	Different developer / operators of urban rail lines nationalised into the London Passenger Transport Board. The LPTB was accountable directly to the Minister for Transport and was given broad geographical authority as well as authority over multiple transport modes (including roads) under the London Passenger Transport Act 1933. Much of the underground's branding dates from this period.
	1940-1941	"London Blitz" during WWII with aerial bombardment from the Luftwaffe. Tube stations serve as night-time bomb shelters and more than 1 million London homes are destroyed.
	1948	London Transport Executive formed under the same parent organization of British Railways and tasked with implementing post-war repairs / improvements to the underground system.
	1963	London Transport Board formed again reporting to the Minister for Transport directly without association to British Railways.
	1968-1969	London Underground introduces the first line in the world using Automatic Train Operation technology on the Victoria Line.
	1970	London Transport Executive formed under the Greater London Council. This placed the Tube under a local authority rather than national government but resulted in funding shortfalls and under investment. Disputes over fares compounded funding shortfalls. London's zonal fare system dates from this period.  During the late 1970s and early 1980s London experienced a general decline. The population of London actually shrank following the second world war. By 1988 London's population was 22% smaller than it was in 1939. <sup>1</sup>
	1970s	Increase in violence between the United Kingdom and groups including the Irish Republican Army and Provisional Irish Republican Army. London endured several attacks during this period, some in and around Underground stations, which were directly linked to this conflict.
	1975	A Northern City Line underground train arriving at Moorgate station fails to stop and crashes into a tunnel wall killing 43 people and injuring 74. This led to the adoption of "Moorgate Protection" which served as an automatic train protection feature aimed at preventing similar incidents.
	1981	Recession and riots affect London. In particular, the Brixton Riots evidence class divides and discontent in London's urban areas.
	1981	The "Fares Fair" policy comes into effect in London after advocating for lower public transport fares by the left-leaning Labour administration of the Greater London Council. The initial policy proposed during the Greater London Council election in 1979 was that fares would be subsidised on all bus, Underground and rail services in London through increasing local government rates. The policy was retracted in 1982 following a legal challenge. Average fares rose consistently in real terms for many years thereafter.

1984	Transport Act 1980 deregulates bus services through the United Kingdom (but not London, where private sector contracts were let).
1984	London Regional Transport reporting to the Secretary of State for Transport. This act also established the London Regional Passengers' Committee (LRPC) with a mandate to field, investigate, research, and report on transport issues affecting Londoners.
1985	London Underground established under London Regional Transport to manage the underground network. Nine other line business lines established by 1988 to manage other aspects of London's transport network.
November, 1987	Kings Cross Fire - 31 people killed and a further 100 injured from a fire at King's Cross St. Pancras tube station. This incident highlights historic under funding as a primary cause of the tube's poor condition and the pressing need to address a backlog of critical maintenance across the underground.
1992	London Underground Customer Charter launched which set out the Underground's plans to increase its accountability to its customers, and make commitments to continuing improvements to services. This represents a turning point in adopting customer focused metrics and reporting.
1998	The Government announces proposals for a set of PPP agreements to modernise the tube network. It is estimated that the PPP would unlock £16 billion (USD 20.2 billion equ.) in its first 15 years and that £4 billion (USD 5.05 billion equ.) would be saved in this time period.
1999	Completion of the Jubilee Line extension (over budget and late). This was London's largest investment in the underground system since the 1970s. The performance of this project shook confidence in London Regional Transport's ability to deliver major projects and to effectively use national government money. Experience with the Jubilee Line extension had important ramifications regarding an ongoing debate to privatise or pursue a PPP arrangement for the underground network.
1999	The primary legislation for the PPP is contained in Part IV, Chapter VII of the Greater London Authority Act 1999, sections 210-239 and Schedules 14 and 15.
2000	Mayor of London elected for the first time as provided for under the Greater London Authority Act 1999. Under the UK's parliamentary structure whereby Prime Ministers are not directly elected, the Mayor for London has the largest personal mandate of any political figure in the United Kingdom. This in effect changes the balance between London and national government.
2000	Transport for London formed under the Greater London Authority (under the Mayor for London). This resulted in the entirety of London's public transport system being directly accountable to a locally elected official for the first time in history.

2002-2003	London Underground enters into three PPP agreements for maintenance and renewal of nine lines: Tube Lines for the Jubilee, Piccadilly and Northern lines, Metronet Rail BCV for the Bakerloo, Central, Victoria and Waterloo & City lines, and Metronet Rail SSL, for sub-surface lines. The PPP contracts are specified for 30 years and include performance-related incentives and penalties, as well as milestones that need to be met. Reviews and remuneration are specified to take place every 7.5 years as a 30-year fixed price and programme was unfeasible.
2002-2003	London Buses introduces the largest single programme of bus improvements in the last 50 years. This included 300 new buses being brought into service to add network coverage, creating 15 new night routes, extending hours on weekends and increasing bus kilometres operated to 397 million km. TfL reported that bus improvements in London represented the most important achievement in the Government's 10 Year Transport Plan.
2003	London Underground Limited formed as a subsidiary of Transport for London.
2003	Implementation of the "Oyster Card" smartcard system. This entailed tap-in / tap-out fare transactions and also provided London Underground with a continuously updated dataset on tube use, origins / destinations and basic information on customer profiles.
2003	The Congestion Charge comes into effect in London, covering central London's road network. The policy aims to reduce private car usage in central London and revenue is invested into public transport; it is estimated that of £1.2bn net revenue, £960m has been invested in improving the bus network. The charge is still in effect.
July 6, 2005	London bid to host 2012 Summer Olympics successfully. Transport for London is given the task of ensuring that the Tube and other services are up to support the travel demand envisaged for 33 different venues across London. Providing sufficient capacity with very high reliability becomes a critical task to support the Games and the bid includes a pledge to make the event a "public transport Games".
July 7, 2005	Terrorists detonate two explosive devices on the Circle line along with a third device on the Piccadilly line and a fourth device on bus. London Underground subsequently adopts "Gold, Silver, and Bronze" incident command structure, upgrades communications equipment, and enhances integration British Transport Police by placing command and control units together with the TfL control centre in the same location.
2007	Metronet Rail begin the process of "Extraordinary Review", seeking additional spending to meet London Underground's maintenance and renewal demands. In 2007 the Office of the Public Private Partnership Arbiter (OPPPA) reports that it should have been possible for the Government and London Underground to foresee that Metronet's tied supply chain model did not adequately consider risk safeguards.
2008	Metronet Rail's responsibilities are transferred to TfL. Metronet Rail was responsible for maintenance, renewal and infrastructure upgrade on nine London Underground lines between 2003 and 2008. The company had under-delivered on several programmes including station and rolling stock refurbishment and was bailed out by the UK Government to continue its business activities before the business was eventually put into administration and dissolved.

	2008	Crossrail Act passed which empowers Cross London Rail Links (the implementing company under TfL now called Crossrail Ltd.) powers to construct the GBP 16 billion Crossrail project across London.
	2010	Tube Lines, the remaining PPP company in operation from the 2002-2003 agreements, is bought by TfL. Tube Lines had previously requested an additional £1.75 billion (USD 22.09 billion equ.) to cover a funding deficit for its programme. This was referred to the Office of the PPP Arbiter (OPPPA) who determined that TfL should provide an extra £460 million (USD 581 million equ.). Further grant funding to TfL was not possible to cover this, and TfL bought out the company for £310 million (USD 391.5 equ.).
	2012	London Summer Olympic and Paralympic Games held without any major incident on the transport network. More than 62 million journeys were made on the Tube, an increase of 35% from business-as-usual ridership. TfL estimate that London Underground ran 98% of scheduled kilometres during the Games, and 99% of scheduled kilometres during the Paralympic Games. There was an approximate 27% reduction in Lost Customer Hours during the Games, a measure of the impact of service disruption. The Tube's greatest ever ridership – 4.57 daily passengers – was recorded during the Games.
	2015	The Department for Transport announces it will phase out TfL's grant, which constitutes 6% of TfL's annual budget. This requires TfL to find organisational efficiencies and to generate income from existing land investments.
	2016	Mayor Sadiq Khan is elected, replacing Boris Johnson. Initial policies have focused on equity across transport and Mayor Khan's first initiative was the introduction of a "bus hopper" fare, where bus users receive a free bus transfer within one hour. Mayor Khan's campaign was fronted by a pledge to freeze fares (within his jurisdiction) until 2020, which includes all bus and tram fares, all non-season ticket fares on London Underground, all Cycle Hire charges, all fares on the Emirates Air Line (East London's cable car), and some fares on London Overground and TfL Rail. TfL will need to find major efficiencies to deliver service levels with this fares freeze, as well as becoming operationally self-sufficient by 2018 when TfL's operational grant is cut off.
	2016	The United Kingdom votes to leave the European Union in a close referendum. The UK's credit outlook was subsequently downgraded with possible long-term effects on TfL and other public bodies' borrowing potential.
	2019	Expected delivery of the Crossrail project (the Elizabeth Line) which has come to define a new approach to planning and executing major projects on London's transport network.
Current ownership and oversight		<ul style="list-style-type: none"> <li>▪ Statutory body under the terms of the Greater London Authority (GLA) Act 1999</li> <li>▪ TfL reports directly to the Commissioner for Transport who is appointed by the Mayor of London</li> <li>▪ Board, comprised of members meeting certain criteria according to the GLA Act 1999, approves matters affecting TfL, including the Budget, Business Plan and other major issues. Other Committees are held including a Finance and Policy Committee and Audit and Assurance Committee</li> </ul>

<p>Complementary public transport and non-motorised transport services</p>	<ul style="list-style-type: none"> <li>▪ Buses: London uses a Gross Cross Contracting model for its signature red buses. Under this model, private operators tender for specific route packages and receive a production-based payment that is independent of ridership. TfL ultimately assumes all demand and revenue risk under this structure.</li> <li>▪ Pedestrian infrastructure is the responsibility of TfL and the London Boroughs depending on the ownership of the road. TfL's Streetscape Guidance provides standards for London's street design.</li> <li>▪ Car sharing: London allows car sharing firms to operate including Car2Go, ZipCar, and DriveNow.</li> <li>▪ Cycling: TfL manages London's cycle path network and also oversees a bike sharing scheme which entails check-out and check-in stations for bike sharing mainly in central London.</li> <li>▪ Taxis and other ride sharing schemes: TfL license, regulate and set policies for London's iconic "black cabs" trade. More recently, black cabs have come into competition with transport services such as Uber and Lyft which offer lower costs to users.</li> <li>▪ Surface trains: TfL oversees an Overground orbital network of trains (known as the "Overground"). The Overground was launched in 2007 and has grown through TfL's incorporation of previously operated lines (including Silverlink Metro services, the East London Line and the South London Line), extensions, station construction and refurbishment. TfL set the train frequency, station facilities and performance, and collect fares and revenue while Arriva operate the network.</li> <li>▪ Trams: TfL manages 28km of tram network in South London. TfL specify frequency and performance, carry out maintenance, plan and fund improvements and collect fares and revenue. Tram Operations Limited (a subsidiary of First Group) operates the tram network until 2030.</li> <li>▪ River transport: London River Services (LRS) (a subsidiary of TfL) issues licenses and charges boat operators to use piers on the Thames.</li> </ul>
<p>Technical and operational summary as of 2015</p>	<ul style="list-style-type: none"> <li>▪ 402km under management - 44% underground, 0.9% elevated, 55% at grade</li> <li>▪ 121km of new lines under development (Northern Line Extension and Crossrail, although not all Crossrail tunneling is new)</li> <li>▪ 270 stations</li> <li>▪ 3288 train cars, 9,300 buses under management</li> <li>▪ 10,163km of bus routes managed directly</li> <li>▪ 1.35 billion passenger journeys per year</li> <li>▪ £4,258 million (USD 6,013 million equ.) in annual farebox revenues (2015/16)</li> <li>▪ £5,289 million (USD 7,469 million equ.) in total revenue per year (2015/16)</li> <li>▪ Approximately 28,000 employees</li> <li>▪ 25.5km of network length opened between 2005-2015 (taking into account London Underground, Docklands Light Railway and new Crossrail tunnelling)</li> </ul>

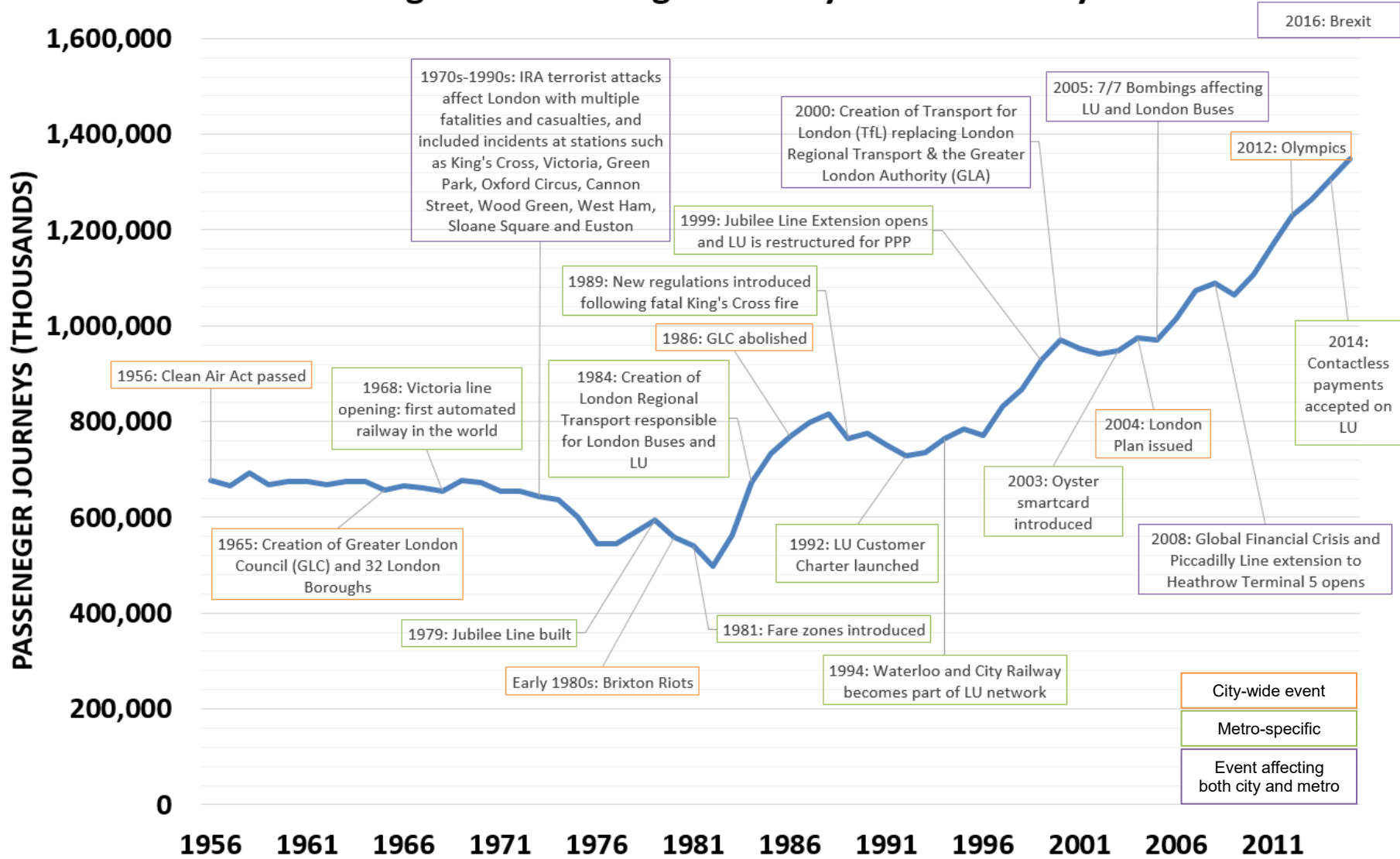


<p>Regulatory, oversight, and policy bodies:</p>	<p><u>Mayor of London and Greater London Authority:</u> Produces Mayor’s Transport Strategy including multimodal policies covering metro, buses, walking, cycling, taxis, road travel, accessible travel, etc, which Transport for London fulfil to enhance and improve London’s economic development, quality of life, safety and security, environmental sustainability and deprivation. The current Strategy forecasts transport policy, development and projects until 2031. The Mayor is responsible for setting fares. The Mayor is accountable to the London Assembly, who ensure that the Mayor’s policies and programmes are delivered as promised as well as influencing policy formulation.</p> <p><u>Department for Transport:</u> responsible for national urban transport strategy and also invest in transport infrastructure in the UK. The DfT also produce guidance for conducting transport studies.</p> <p><u>Office of Rail and Road:</u> A non-ministerial department of the Department for Transport, this body regulates the rail and road industry’s health and safety performance and is an economic regulator for suburban and national rail. ORR carry out inspections and investigations, provide advice and guidance on health and safety issues and enforce health and safety legislation on London Underground, but have no control over price and efficiency.</p> <p><u>British Transport Police:</u> responsible for policing on London Underground, the Docklands Light Railway (DLR) and Tram network.</p>
<p>Summary of legal and policy framework:</p>	<p><u>Greater London Authority Act 1999:</u> Provides for a directly elected Mayor for London and created Transport for London as a statutory body to fulfil the Mayor’s duty to provide safe, integrated, efficient and economic transport facilities and services in London.</p> <p><u>Equality Act (2010):</u> TfL must comply with this act in providing its public service regardless of protected characteristics including disability.</p> <p><u>Integrated Transport White Paper 1998:</u> This paper promoted integrated transport through easy multimodal journeys, better environmental planning, integrated land-use and transport planning and policy integration between transport and education, health and economic development. This also set policy for local transport plans, devolving more responsibility for transport to local authorities.</p>
<p>Key stakeholders:</p>	<ul style="list-style-type: none"> <li>▪ <u>Mayor of London and Greater London Authority:</u> As described above.</li> <li>▪ <u>32 London Boroughs and the City of London:</u> Plans and schemes on borough-owned streets rely on planning and consultation with the boroughs and their residents. These include, for example, metro or Crossrail-related complementary measures such as immediate accessibility and street improvements around stations.</li> <li>▪ <u>Financial Centre:</u> Arguably London’s financial centre concentrated in the City of London (the “Square Mile”) relies upon public transport to sustain its approximate 400,000 financial services workforce.</li> <li>▪ <u>Unions:</u> Transport Salaried Staffs’ Association (TSSA), National Union of Rail, Maritime and Transport Workers (RMT) and Unite Union</li> </ul>

## Growth in Passenger Journeys and Key Events in London

The following graph demonstrates London Underground’s growth in passenger journeys from 1956 – 2015 and includes selected key surrounding events that took place in London or nationally in the United Kingdom, and selected events in the history of London Underground.

# London Underground: Passenger Journey Profile and Key Events



## Summary of Key Views from Interviews

### Governance

The general consensus of external interviewees is that TfL is a very effective organisation.

Interviewees widely agreed that the Mayor has been key to TfL's success. The position provides political accountability aligned to TfL's geographic area, whilst leaving technical decisions to the technical experts.

Competence and morale are key – recruiting good people, building project management expertise, and motivating staff all provide a foundation to a successful operator. The cost of less competent staff is much greater than the cost of paying high salaries.

Building trust with government is an ongoing and crucial process. TfL have management systems (e.g. asset management plans) that can easily inform politicians of the consequences of their decisions and policies. This builds the credibility of the organisation, and therefore feeds in to staff confidence and morale.

### Management Systems

TfL has a comprehensive management system which in addition to safety management includes the following best practice elements:

- Asset management
- Risk management
- Stakeholder management
- Benchmarking

**Asset Management:** Good practice asset management is proactive, not just rules-based. “*There is no such thing as asset life*” – asset life can be extended indefinitely, if the economics suggest it is worth doing so. However, nominal asset lives are necessary for planning purposes. It is crucial to have a plan as a starting point, even if it is updated often. LU learned through the PPP that asset information is an asset in itself.

**Risk Management:** LU believe that they are good at managing strategic risk, and have the processes in place for project risk – but recognise that human nature sometimes leads to overly optimistic assessments. They are working on embedding risk management more closely into operational culture, to link risks more closely with future performance.

**Stakeholder Management:** London obtains central government funding for megaprojects by ensuring business and funding cases are meticulously prepared, and have wide cross-party political, public, and business support. The city chooses one project, and everyone backs it.

Political unanimity is essential to create more dependable project and public transport funding. Once a major rail project is agreed upon, it is followed through by whichever political party is in charge.

**Benchmarking:** TfL benefits from benchmarking in two ways – firstly, it helps them improve performance and outcomes. Secondly, it helps build trust with government that they are taking steps to improve and learn from global best practice.

## **Regulation**

London's experience suggests that regulation either needs to be light touch (like IIPAG) or very strong and knowledgeable. A middle solution (like the PPP Arbiter) runs the risk that the regulator may not have sufficient resources to get the necessary information to make decisions – although contractual requirements can, of course, assist with this. The level of accountability cannot be so intrusive as to lead to micromanagement – and the role of a regulator has to also take into account whether there is direct political leadership (as in London) in which case some types of regulation would be inappropriate.

## **Alternative Funding Sources for Major Projects**

Private funding sources such as business rates and contributions from property developers help protect projects from cuts. The government considered cutting Crossrail, but the government would only have saved £5Bn out of a £15Bn project – as the rest would be coming from a London-originated combination of business rates, community infrastructure levy, planning permission tax and over-station property development.

## **Funding Ongoing Operations and Renewals**

The benefits of dependable funding are twofold:

- Capital investment efficiency gains of 10-30%
- Dependable fares for customers

Non-fare revenue is no panacea to poor fares and funding. It is good business practice to maximise it, but it will not solve or prevent a funding crisis.

## **Public Private Partnership (2000s)**

Several interviewees (internal and external) expressed the view that the PPP of the 2000s, (where renewals and maintenance of assets were let to the private sectors under three 30-year contracts) was not the unmitigated disaster it is often portrayed as. It formed the basis of TfL's current success, albeit at a high price. It forced TfL to decide and specify what they wanted, and to improve their asset management systems. It also showed government how much metro reinvestment really cost, and the benefits of putting this money into the system.

## **Public Private Partnerships – Today's Operating Concessions**

According to opinions voiced, the key question on operating concessions that contract out operations and maintenance is not whether or not to do it, but how it is done and under what circumstances. TfL's experience is that short (5-7 year) O&M contracts are better – 5 years is a long time in metro operations, even more so in a new metro. In new metros a 5-7 year contract may be significantly preferable to a 25-30 year one because the level of unpredictability in the external environment is so much higher.

TfL has learned on managing contracts with the private sector over time. It has been a journey to learn what the private sector does and does not do well. Their strategy is to be an informed client, and they change their tactics for different contracts depending on how informed a client they are on any particular topic. Good practices and lessons learned by TfL include:

- Contract timeline of 7 years with potential 2 year extension – long enough to be worthwhile, longer than a political cycle, short enough to be responsive to external changes.
- Structure contracts around performance-based incentives and penalties.
- Where possible, keep the high value staff and thinking in-house: this principle taken furthest on DLR where suppliers are used as a commodity and operational/

maintenance specifications are detailed to the maximum extent of the in-house staff expertise.

- Realise that the cost of unintended changes make the spread on interest rates look comparatively negligible – i.e. changes are expensive and to be avoided.

**Risk transfer** in private sector contracts needs to be appropriate to the circumstances.

- Revenue risk requires a deep market of competing operators – not usually the case for intra-urban transport. Additionally, evidence from TfL and elsewhere indicates that metro ridership is closely tied to the general economic climate (it follows GDP), and so transferring that risk is actually a transfer of GDP risk rather than a performance incentive to contractors. Therefore, in the opinion of TfL staff, revenue risk is not usually appropriate for metro operating contracts.
- Private operators need to be able to trust the government/authority, especially when they have the ability to impose conditions that may affect cost/revenue (e.g. changing fares).
- The contract must be enforceable.
- If it is an aim to deepen the range of O&M contractors operating in your country, the contract and terms must be attractive.
- If an O&M contractor is appointed based on their reputation, steps are necessary to ensure the staff operating this contract have individual expertise to uphold the company's general reputation.

## Planning

London is experiencing a shift from transport development that responds to existing demand, towards planning-led transport in which transport projects are planned to unlock development.

- Housing is London's big constraint, and a major political issue
- Crossrail 2 is being designed to unlock housing development in areas where there is an opportunity to build, but insufficient transport to support high densities
- A lesson learned from Crossrail 1 is that in a very long-term (20yr+) planning view it may be necessary to be agile on alignment. The original 1989 Crossrail plans did not go to Canary Wharf, now one of London's greatest demand areas – but the final project that began construction 20 years after the original alignment was designed will serve Canary Wharf when it opens in 2019. However in the medium term (5-10 years) optimum alignments should be selected and kept consistent to enable effective city-wide planning.
- Crossrail 2 changed its alignment to take the opportunity of ability to unlock high density development due to current housing crisis.
- As part of the process of building city-wide support for Crossrail 2, TfL is keeping options open as long as possible and investing time investigating options with different interested parties.

## Key Quotations

### Internal TfL Staff

"It's our job to educate them"	On convincing politicians of the need for funding
<b>"Annualised funding is catastrophic for assets that need long-term care"</b>	
"People could see it with their own eyes"	On the improvements in infrastructure that grew out of PPP-era investment
"Very public sector, in a pejorative way"	On TfL pre-2000
"The ecosystem at the moment broadly works"	On the organisational setup including non-executive board, mayor and IIPAG
"We had lots of understanding but we didn't have it in one place in a consistent format"	On asset management pre-PPP
"You need an asset management plan even more if you have new assets"	
"The signalling system we installed 6-7 years ago has elements becoming obsolete"	
"Good asset management is about understanding your baseline"	On forecasting what will happen if investment does or doesn't happen
"The biggest mistake to make is to just let a load of contracts – and that's the easiest thing to do"	
"One of the biggest mistakes is not to standardise"	
<b>"Buy whole of life, don't just buy first cost"</b>	
"The safest railway is one where you don't run any trains, but that's not in anybody's interest"	
"Legislation tends to be cumulative with respect to cost"	
"I've never seen such short-termism"	On PPP contractors trying to optimise their own cost/revenue in period 1 and viewing period 2 as a separate thing
"Infrastructure is long-term and strategic; politicians are short-term and tactical"	
<b>"It takes longer to train a rolling stock engineer than a brain surgeon"</b>	On losing efficiencies as a result of stop-start investment
"If you're not responsible for both [buses and trains], [integration] doesn't happen"	
"You have to be able to balance between modes"	
"Their transport strategy is really good because it says exactly what they are going to do and exactly what they are going to spend"	On the LTA in Singapore
"Simplicity is definitely a preference"	On the best kind of PPP/PFI contracts
"You have to have skin in the game"	On the need for D&B concessionaires to have their own stake in operations (not just a JV partner), if the contract is to be DBO
"You need to come to conclusions within the context in which you're operating"	On there being no one best solution to allocation of risk in PSP contracts
"A private company under contract has to be held to account for delivering what they're paid for"	
"Nobody really understood"	On how the 7.5 year break clauses in the PPP were going to work
"If the public had had its way and fares had gone down we'd be in a dreadful mess"	On the progressive raising of fares since 2000 towards self-funding operations
"It's bonkers in a natural monopoly"	On giving metro revenue risk to an operations contractor

<b>“A mixed market gives you both an insight into the efficiencies possible from the private sector, and a sense of humility and reality as an operator”</b>	On the benefits of having some lines operated internally and others operated under contract
“Losers shout, winners don’t exist till it opens”	On the difficulties of overcoming planning objections for new lines
“It’s like turning an oil tanker”	On the difficulty of changing practices and culture in a large business
“Don’t tell me what I want to hear; I want hard, cold facts”	On the need for truthful reporting in risk management
“In many ways a leader who understands is more important than a clever process”	On the need to have metro top management who appreciate the importance of risk management
“We need to stop seeing ourselves as different and look for where we can be the same to get best value”	On the need to be open to learning from other organisations
“Their ability to invest in incremental improvements was constrained by their financial position”	On the original PPP contractor of the Croydon Tramlink
“As a city starting out for the first time, you’re not best placed to manage the rolling stock-track interface”	Suggesting that an integrated consortium is a better option than separate contracts for a new metro
<b>“Sacking a PPP is difficult because of the vast levels of capital exposure”</b>	On PPPs being a major commitment
“Mixed economy is quite a useful model”	On having both directly-operated and contracted-out operations
“It’s not something we can do by ourselves”	On the need for industry experts to manage non-fare revenue
“I don’t think it’s a panacea, it’s just good efficient management”	On maximising non-fare revenue
“The Operator cannot sit back...they must be engaged with all the key decisions – including upstream decisions”	
“You have to go really all the way upstream”	The operator’s perspective must be on the city they want to create
“Operator is just one actor among many”	Recognising the wide community involved in city development
“[Public transport] allows economic interaction to happen in a way that is productive.”	On the purpose of public transport
“Operators and operations are not an end in themselves; they’re there to support the wider economy.”	On the role of transport in the city
“In addition to being self-interested, you have to have a very strong commitment to the city.”	On the need for different operators to work together
“Never ever forget that that’s what you are here for.”	The operator must primarily serve the city, not just their own interests
“It’s not about metros, it’s about institutions”	If you get institutions right, the rest will follow
<b>“What used to be institutional arguments have now been put behind the doors of a boardroom to be dealt with as managerial issues”</b>	Benefit of TfL combining all modes
“This is an industry with natural monopoly characteristics”	If you leave it to the market, theory states that you will get an inefficient result
“It’s very clear that the mayoral election hinges to a large degree on transport”	On political accountability in London
“This is not a civil service type of job, it requires practical action day after day”	Transport cannot be managed by report-writing
“You cannot run a transport operation that isn’t at least sufficiently well-funded.... You can have all the heroics in management but without money you can’t	On the need for sufficient and stable income

get it done... Stability of income is at least as important as sufficiency of income."	
"When you look back at our success, a large part of it is down to stability of funding."	
"Nobody knew how to write a 30-year contract")	On the fundamental starting problem of the PPP
"We kept doing it relentlessly...We'd get thrown out of the building and three months later we'd be back"	On meeting with government departments to get business rate contributions for Crossrail
"We figured it all out to the extent that I could lecture people in the treasury on how their own tax worked"	On making proposals for business rate contributions for Crossrail
"We said to them: 'I can see a world in which you pay for Crossrail and you get it. I can see a world in which you don't pay for Crossrail and you don't get it. But I can't see a world where you don't pay and you do get it.'"	How TfL persuaded businesses to contribute to Crossrail
"If you get the upstream decision right, it becomes unshakeable... You have to play a role in the upstream decision."	On how Crossrail happened because TfL proactively influenced public and political opinion
"If you don't use the opportunity to reshape the city, you condemn the city to being a mess forever....Don't make the mistakes which cannot be fixed – and they're all the way upstream...The question to ask is not 'what should the metro need to do' but 'what do we want this city to be?'"	On the need to consider wider city planning and agglomeration economies when planning a metro, to get the metro lines and areas of urban density in the right places
<b>"There are only two types of metros in the world. There are metros that are empty, and metros that are full. There's nothing in between.</b> If you can enmesh yourself into the city, you want every bit of capacity you can get. And if you're not doing that, don't build a metro."	
<b>"In new metros, the power is held by civil engineers...the visionaries who see how the metro will interact with the city – they need to have some power as well. That's the magic that holds it all together."</b>	On the need for economists, operators and planners to have more influence in new metros
"If LU had kept repeating the same design over and over again, we'd be nowhere"	On the need to keep learning and implementing new ideas and technology from one line to the next
"If someone is going to raise themselves above the day to day and take on the mantle of leading this debate, it has to be the metro."	On the need for metro operators to take a greater role in city planning and transport integration



## Quotes: External Commentators

"I think where we are is about right"	On the regulatory relationship with TfL
"It's a common currency used across LU"	On use of Lost Customer Hours to value investments
"It's not enough to like-for-like"	On the need for reinvestments to incorporate progressive enhancements
"You can't make long-term decisions if you don't have stability of funding"	
"Economic analysis is important, but much more important is the upfront thinking before a single contract is let"	
<b>"It never crossed their mind that in 20 years' time they'd need a big stack of money, and they never put it aside"</b>	On underinvestment in Washington DC metro (WMATA)
<b>"For every project over-running its construction budget, there are five that over-estimate revenue"</b>	
"If you are a city, you need a mayor"	
"TfL is a very competent strategic planning authority"	
<b>"The mayor of London has the biggest personal mandate of anyone in British politics"</b>	On electoral accountability
"Politicians will always be interested in the big, the shiny, and the new"	
"TfL had to learn from central government about the process of managing electoral change"	On the need to speak to candidates and opposition, engaging with all parties
"At several stages we almost made the PPP contracts work"	
"If you can save that much on one asset, you ought to be able to save it on other assets"	On the £750m saving on escalator maintenance & replacement based on CoMET benchmarking results
"Use things like RTSC and CoMET to tap into others' experiences"	
"You have got to involve from the outset the people who have to live with those assets"	On the need for operations and maintenance staff to be involved in procurement
"Every big city in the world has a different system of government"	...as opposed to countries, which have broad commonalities
<b>"One of the things London has going for it is that it has a city-wide elected government running the transport system. The advantages that barely need explaining"</b>	
"TfL as a corporation is much, much bigger than City Hall"	On the power balance between TfL and its political masters
"There is no doubt that TfL is an apolitical institution"	
"It would be odd for something that is directly accountable to a politician to have an independent regulator"	On regulators being more appropriate for industries of national importance that are independent corporations, but not for TfL
"Here we decide on one big project and everyone lines up behind it"	On public support for transport projects in London

## Structure of Notes from Interviews

<b>1 Context</b>	<p>...is everything!</p> <p>1.2 TfL's operations</p>
<b>2 TfL and Governance</b>	<p>2.1 City administration</p> <p>2.2 TfL and its power</p> <p>2.3 Regulation</p> <p>2.4 Institutional recovery after LU lost government's confidence</p> <p>2.5 TfL finances</p> <p>2.6 Role of non-fare revenue</p> <p>2.7 Modal integration</p> <p>2.8 Attitudes within and towards TfL</p> <p>2.9 TfL performance</p> <p>2.10 TfL outlook</p> <p>2.11 Summary</p>
<b>3 Private sector role</b>	<p>3.1 Context</p> <p>3.2 PPP to upgrade the Underground</p> <p>3.3 External commentators views on PPP</p> <p>3.4 Experiences of PFI</p> <p>3.5 O&amp;M concessions</p> <p>3.6 Concessioneing for a new metro</p> <p>3.7 Procurement</p>
<b>4 Four management processes</b>	<p>4.1 Asset management (AM)</p> <p>4.2 Stakeholders, their management</p> <p>4.3 Risk management</p> <p>4.4 Benchmarking</p>
<b>5 Major projects</b>	<p>5.1 Planning</p> <p>5.2 Project development</p> <p>5.3 Innovative project funding</p> <p>5.4 Project management</p> <p>5.5 Modernising an operating railway</p>
<b>6 Other success factors</b>	<p>6.1 Key requirements</p> <p>6.2 Lessons for other operators</p> <p>6.3 Success templates are important</p>
<b>7 Conclusions</b>	

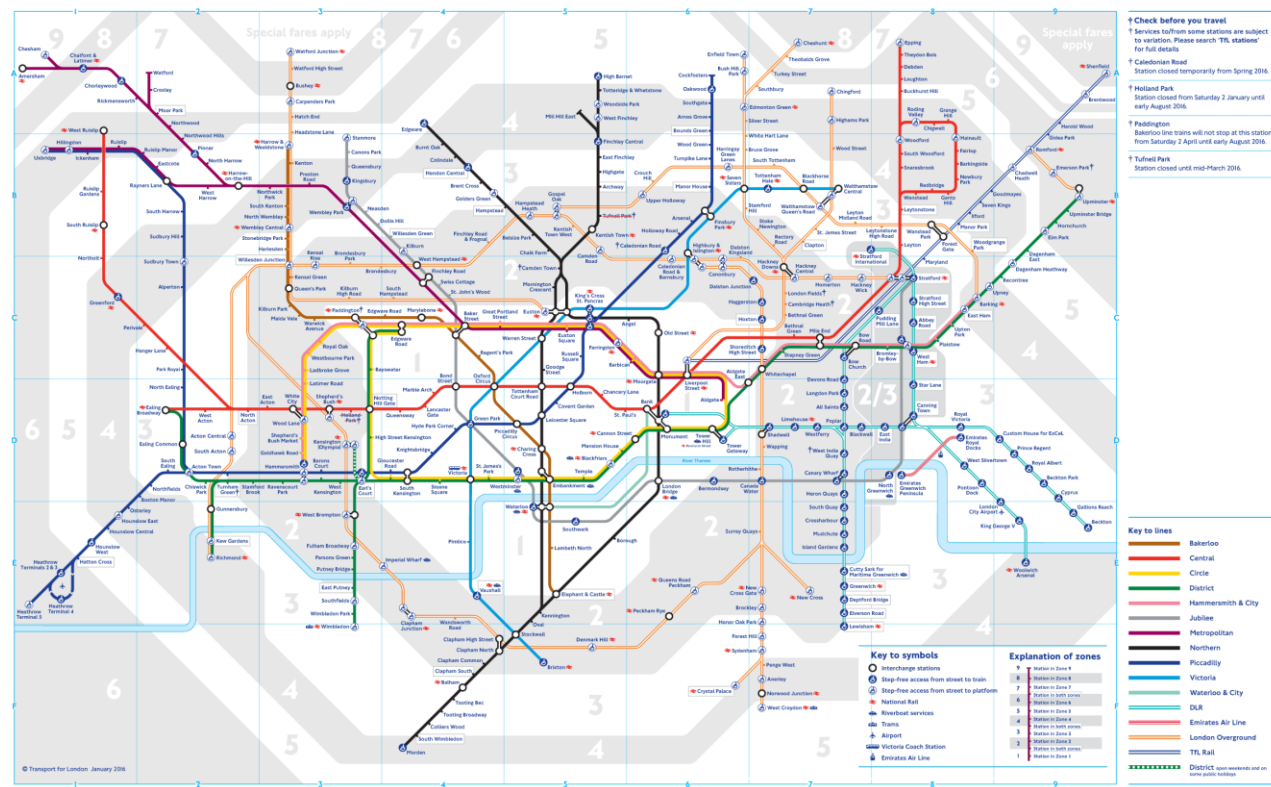
## Glossary

BCR	Benefit : Cost Ratio
CSR	Comprehensive Spending Review
DfT	Department for Transport
DLR	Docklands Light Railway
GLA	Greater London Authority
GLC	Greater London Council
HMT	Her Majesty's Treasury
JLE	Jubilee Line Extension
LDA	London Development Agency
LEP	Local Enterprise Partnership
LF	London First
LT	London Transport (precursor to TfL)
Metronet	One of the PPP joint ventures
Night Tube	24hr tube operations on Friday and Saturday nights
Oyster	London's stored value smartcard payment system
PFI	Private Finance Initiative
PPP	Public-Private Partnership
S106	Section 106 agreement: developer contributions to infrastructure
SSR	Sub-surface Railway
TfL	Transport for London
TL	Tube Lines: One of the PPP joint ventures

## Case Study Findings

<p><b>1</b> <b>Context</b></p>	<p><b>...is everything!</b></p>	<ul style="list-style-type: none"> <li>• The Underground is an aged (150yr old) system in a leading world city. Transport is central to the city's success.</li> <li>• For 25 years London has faced a complex of problems – financial, overcrowding, performance, obsolescence.</li> <li>• The 1974 Rail Study provided the bedrock for considering growth strategies</li> <li>• LUL is unique in implementing a huge modernisation programme while growing patronage and reliability</li> <li>• A practical programme for modernisation and expansion is well underway, delivering progressive improvements.</li> <li>• London's population that dropped from 1930s until the mid-1980s is now growing robustly.</li> <li>• Its governance has changed from the GLC, to central government, to an elected Mayor + the GLA since 2000. So far, there have been two mayors, each of whom has served 2x 4-year terms: Ken Livingstone – Labour, and Boris Johnson – Conservative.</li> <li>• Like many developing cities, London's project environment is turbulent, with major change continuous and to a degree uncertain, but somewhat stabilised by its institutions.</li> <li>• London's economy drives dynamic and robust economic growth</li> <li>• <b>Enabling and managing growth</b> is today's core transport challenge</li> </ul> <p>"We've been on a bit of a journey in London." Fifteen years ago London had no mayor, shabby infrastructure, and a less reliable, less frequent service. Now chunks of the network have been upgraded, performance is up, and significant enhancements are planned.</p> <p>London's population had been declining since 1939, and growth recommenced in the late 1980s. The mind-set has now changed to planning for growth. There is greater consensus on the economic geography, and political support for growth driven by agglomerations in cities. London's growth is in financial services, tourism, and IT/social media – these jobs will be in central London and transport will be needed to enable that.</p>
	<p><b>1.1 The Metro in the City</b></p>	<p>Why are there concentrations of people and economic activity in cities at all? Hunter-gatherers (no settlements) were replaced by formal agriculture with settlements. These became cities for one reason – agglomerations are economically productive and the larger the city the greater the productivity – economically and socially. Cities create thriving places with increased incomes and quality of life. However, for cities to sustain a sophisticated economy, the benefits of agglomeration have to exceed the internal transaction costs (travel time being a crucial example) of being in the city. For example, economic activity in London is greater than that of Lagos because of the economic starting-point but also because effective public transport reduces the internal transaction costs.</p> <p>Metros, by changing the economic geography of cities enable the concentration of activities that have economies of scale. They are a major enabler of increased productivity, contributing to economic success and liveability.</p> <p>Transport "<i>allows economic interaction to happen in a way that is productive.</i>" Thus, each morning's peak hour transport operations matter because getting it right every day is what allows the city to exist. "<i>Operators and operations are not an end in themselves; they're there to support the wider economy.</i>" Being mindful of the purpose of public transport for the city is important for organisational integration and city-wide success: "<i>In addition to being</i></p>

		<p><i>self-interested, you have to have a very strong commitment to the city.”</i> There is no need for organisations to focus on self-preservation if they are focused on serving the city: <i>“Never ever forget that that’s what you are here for.”</i></p> <p>The policy issue is how best to apply city authority’s major policy tool – metro development - to secure required policy outcomes.</p> <p><b>The purpose of metros</b> - to enable a thriving liveable city, must be the Operator’s starting point and perspective. <i>“You have to go really all the way upstream”</i></p> <p>The operator must therefore have a role in upstream decisions - cannot sit back and leave these to others, because then things will not happen, or the wrong things will happen.</p> <p>This requires the operator to address difficult questions that impact city development - NOT to constrain role to ‘just operations.’ <i>“Operator is just one actor among many”</i></p> <p>So – operators should recognise their core purpose – operations, but have a wider purpose, to assist make their cities successful and “care for the city”.</p>
	<p><b>1.2 TfL’s operations</b></p>	<p>Transport for London (TfL) is a unitary transport authority responsible for most transport in London. London Underground is a department of TfL which directly operates the Tube, and TfL also manages the O&amp;M concessions for London Overground, the Docklands Light Railway (DLR), and TfL Rail (which will become Crossrail in Future. London’s buses are operated by concessions which are managed by TfL. The key roads in London (‘strategic road network’) are managed by TfL, including all bus and cycle priority lanes on those roads. Taxis and private hire vehicles are also regulated by TfL.</p> <p>The map below shows the rail services operated or managed by TfL.</p>



**2**  
**TfL and**  
**Governance**

**2.1**  
**City**  
**administration**

**Challenge – Institutional set-up that delivers implementable decisions**

“It’s not about metros, it’s about institutions” – if you get that right, the rest will follow. The institutions have to enable:

- Decision making without friction
- Getting the right decisions made
- Having decisions carried through

In London everything is within TfL, so “what used to be institutional arguments have now been put behind the doors of a boardroom to be dealt with as managerial issues”. When there are fragmented institutions, that compete one with the other, outcomes tend to be ineffective. “This is an industry with natural monopoly characteristics” – if you leave it to the market, theory states that you will get an inefficient result. In Hong Kong there is theoretically a successful approach with fragmented institutions, but in reality the state has a guiding hand even if it is not readily visible.

	<p>TfL identifies 3 key success factors:</p> <ol style="list-style-type: none"> <li>1. Recognition that transport plays a major part in people's lives and transport decisions are therefore political. Thus the transport institution needs <i>political sponsorship/ accountability</i>. This is achieved in London "<i>it's very clear that the mayoral election hinges to a large degree on transport</i>".</li> <li>2. Effectiveness requires <i>good management</i> focused on practical implementation and the customers – "<i>this is not a civil service type of job; it requires practical action day after day</i>". Transport cannot be managed by report-writing alone.</li> <li>3. <i>Resources - £££</i>. It must be well-funded. "<i>You cannot run a transport operation that isn't at least sufficiently well-funded.</i>" "<i>You can have all the heroics in management but without money you can't get it done.</i>" "<i>Stability of income is at least as important as sufficiency of income.</i>"</li> </ol> <p>History of city administration was GLC 1970-84, Central gov't 84-00, Mayor/ GLA since 2000. The underground companies coalesced into one in the early 1900s (but the Met remained separate) and the omnibus companies similarly came together. In 1933, the London Passenger Transport Board (a public body) was formed to take responsibility for the Underground Electric Railways Co, Metropolitan Railway Co, various tramways and the bus companies. The LPTB was replaced by the London Transport Executive in 1948. 1970-1984 London was run by the GLC (Greater London Council) which was weaker than the current GLA. 1984-2000, London was run by the national government, with a national government agency responsible for transport in London. Since 2000, London has been run by the GLA, a city-specific government agency which has a transport authority within it. The impact of London's system for directly electing the mayor fundamentally changed the game for TfL and its relationship with DfT / HM Treasury. <b>The mayor exercises a large political mandate and advocates in the interest of a high quality, safe and reliable railway.</b> There is a "more intimate and productive relationship" between the operator and the senior politician responsible.</p> <p>The mayor of London is critical for strong city leadership: "if you are a city, you need a mayor." Guiding principle: "<i>Concentrate political power in the place where the transport system is</i>". London's institutions substantially achieve this with a good, city-based form of city-based transport government. The citywide mayor has transport as their biggest responsibility. The fact that it's city-based is crucial – the people running the transport system are elected by and responsible to the people who use the transport system. "One of the things London has going for it is that it has a city-wide elected government running the transport system." This "has advantages that barely need explaining." Compare with Paris or New York, where the transport system is led by state or national government agencies, creating different political pressures.</p> <p>An elected Mayor has a huge impact upon what happens. Political accountability of local mayor has given TfL a champion for their improvement who has a large and politically influential mandate.</p>
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		<p>The treasury finds it harder to cut TfL's funding because of the mayor. "The mayor of London has the biggest personal mandate of anyone in British politics." The mayor is in a very strong position against central government because no individual has such a strong mandate. So to date, deals are done with the Chancellor to 'sort out' cuts and provide a buffer against centrally imposed cutbacks (TfL avoided the local authority cutbacks of 35% over 2010-2015). <u>This creates considerable stability for TfL.</u></p> <p>The UK has one of the most centralized central governments of the major democracies. 95% of taxes go to central government; the 5% that are kept locally are capped. From 2019, more tax revenues will be retained locally, and some funding is likely to be devolved to local government. TfL's grant from the DfT is likely to be at least partly devolved. This is likely to weaken the relationship with the DfT that has historically been beneficial to TfL. Increasingly TfL is answering to the mayor rather than central government. This is likely to increase due to new powers for local authority funding.</p> <p>The mayor's main responsibility is transport (65-70% of the budget). The mayor depends upon TfL for this expertise. The mayor sets PT fares + appoints the Transport Commissioner. TfL accounts for 65-75% of the mayor's budget, and police for 20%. The Mayor appoints the transport commissioner, whereas they don't appoint the police commissioner (though can get rid of one, as has happened). Likewise the Mayor sets the budget and broad strategy for the police, whereas they have a more detailed view and power over transport.</p> <p>Different mayors have led transport in different ways: the current Mayor acts like a non-executive chair, whereas the previous one acted like a chief executive. The transport commissioner is a technocratic, apolitical appointment. A single commissioner can work for two mayors of different political parties. The commissioner has at least as strong a relationship with the national government as with the GLA, so it's hard for the GLA to sack a commissioner for political reasons.</p> <p>"There is no doubt that TfL is an apolitical institution" more comparable to the civil service. Executive power is implemented by consistent technocrats, compared with in the US where the transport commissioner serves at the pleasure of the mayor.</p> <p>There are "healthy" boundaries on the extent that TfL feels political influence from the Mayor. This is largely due to the way that authority over transport cascades downwards from the Mayor via the Deputy Mayor for Transport (political post) and the Commissioner for Transport (technical post). The Mayor is incentivized to appoint the best person as Commissioner (rather than a political ally) because it would be politically catastrophic to mess up the running of TfL. TfL's non-executive board also helps balance push from the Mayor. The mix of central government and local (mayoral) funding also helps to balance the separate influences of the mayor and central government.</p> <p>TfL is rightly responsive to the Mayor of London. This responsiveness creates an inherent tension between delivering the Mayor's understandable interest in completing projects to accelerated timescales and of the requirement for TfL to deliver best value for money. IIPAG has observed that the DfT and HM Treasury are most focused on cost efficiency and value for money.</p>
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	<p><b>2.2 TfL and its Power</b></p>	<p><u>Role</u> is to implement the Mayor’s strategy + manage the transport system. The Mayor’s Transport Strategy is delegated to TfL. “It is like a local authority”</p> <p>TfL is an apolitical Authority under the Deputy Mayor – Transport. TfL is very close to the Mayor, and takes most of his budget.</p> <p><u>Management autonomy</u></p> <p>TfL is close to the Mayor/ GLA and its management has considerable autonomy to set strategy, make key decisions, implement projects etc. It is staffed by well-paid competent professionals.</p> <p>Pre 2000 it could not borrow. Now has an excellent credit rating and borrows (debt £9bn)</p> <p>Previously LUL and TfL were separate. Today they are one group, and the process of integration is an progressively taking place</p> <p>Its size (27,000 employees compared with the very modest transport expertise in the GLA and DfT) and fares revenue base gives it power that is both necessary and a threat:</p> <ul style="list-style-type: none"> <li>• Necessary to “turn the tanker around” that is TfL - : “To make changes in TfL takes a huge effort”</li> <li>• But creating an imbalance of power with the GLA/ DfT (that have small staff, modest transport expertise and budget)</li> </ul> <p><u>Power</u></p> <p><i>“TfL is more powerful than City Hall.” TfL is very powerful, because:</i></p> <ul style="list-style-type: none"> <li>• It is big and has extensive powers. Much larger and more powerful than the GLA or DfT</li> <li>• It access funding both via the Mayor from DfT and from DfT directly for major projects. <b>This dual sourcing of funding reinforces TfL’s power</b></li> <li>• Its budget is protected by the Mayor who does deals directly with the Chancellor and who acts as a buffer from centrally mandated cuts</li> </ul> <p><b>This asymmetry of power has important implications. TfL are to a considerable extent 'masters of their universe'. Though the Mayor is all-powerful, the GLA relies on TfL almost completely. And central government is not – and cannot be – in a position to fully understand how change will impact TfL. This explains in part how actions/ attitudes by key stakeholders impact the Operator – not because they do not want to know, but because they cannot.</b></p> <p>The LU part of TfL has a very powerful embedded culture, comparable to only a few other UK institutions (the NHS, the BBC, and the Metropolitan Police).</p> <p>“The truth is, TfL as a corporation is much, much bigger than city hall.” TfL is generously staffed, whereas the GLA (their regulators) have a smaller staff, who are paid less and are less senior. TfL employs more people earning &gt;£150k than any other public agency. There is a massive asymmetry of expertise.</p>
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		<p>Historically, mayors have addressed this by having a full-time transport ‘fixer’ in their team whose business it is to know TfL inside-out. Past fixers have been able to “instil fear” at TfL headquarters. TfL’s power is important for success because it can drive through changes and fight vested interests. Otherwise, the popular outcry in the city would stop anything happening, from cycle superhighways, to moving bus stops, to timetable changes. So <b>TfL needs its power to get the job done.</b></p>
	<p><b>2.3 Regulation</b></p>	<p><b>Regulation is ‘light-touch’:</b></p> <ul style="list-style-type: none"> <li>• Democratically elected Mayor ‘jumping up and down’ – but focused on own political priorities that TfL must deliver (e.g. cycleways). TfL is pressured to perform to meet these.</li> <li>• The TfL Board has non-execs. TfL is like a local authority and its Board hearings are mostly in public</li> <li>• IIPAG (Independent Investment Programme Advisory Group) provides high-level scrutiny of major projects. Appointed by the Mayor (7 members + external experts), reports to TfL Board (Finance/ Policy Committee), Mayor and DfT. Its recommendations are influential but not mandatory.</li> </ul> <p>The Independent Investment Programme Advisory Group (IIPAG) is a 6-7 person panel that reports directly to the mayor and the TfL finance committee. Their remit covers capital schemes that exceed GBP 50 million, benchmarking of costs and asset management. Their current role is part of an agreement between the Secretary of State for Transport and the Mayor of London as part of TfL’s 2010 funding settlement. IIPAG replaces the benchmarking previously undertaken by the PPP Arbiter. IIPAG has no executive powers but can make recommendations to the TfL board (e.g. to release or not release funds). They also have recourse to the UK Secretary of State, but have never used this. TfL pays for the cost of IIPAG. IIPAG members are appointed by the Mayor. IIPAG’s findings are that:</p> <ul style="list-style-type: none"> <li>• TfL is becoming a fully integrated organisation (from its many modal and inherited parts)</li> <li>• Its project focus is delivery</li> <li>• Performance has much improved over the last 5 years</li> <li>• Its weakness is not enough focus on establishing <u>priorities</u> and <u>value-for-money</u>.</li> </ul> <p>An independent regulator can help keep metro management non-political: the regulator tells the government how much to spend, and tells the operator how much to improve. At present IIPAG’s role represents a “light touch” approach with relatively minor invasiveness when compared with more classical regulators employed on the UK’s surface rail network, for example. Given the question about TfL’s efficiency (as opposed to its effectiveness) – <b>would a formal regulator improve the situation?</b> Probably not:</p> <ul style="list-style-type: none"> <li>• Metros are monopolies and unique – with limited comparators. Not like other utilities. Full regulation would require great sector expertise – and even then would they know the real story (c.f. Network Rail/ ORR – lots of gaming and obfuscation). Network Rail has demonstrated the limitations of such a regulator</li> <li>• It may be problematic having an independent regulator for an industry governed by an elected politician</li> </ul>

- Post CSR TfL will probably have to become more efficient and its impact will then be seen

There is no useful middle ground, between what exists (and making it more effective?) and a fully independent regulator. Regulators can exist somewhere along a spectrum of very intrusive to very light touch. IIPAG is probably about right given there is a good working relationship and an accountable elected official. Metro regulation is best placed at one or other end of the spectrum; **the middle ground has the worst of both worlds** due to the lack of close comparators for benchmarking that can be used in other industries, for example the UK water industry.



Intrusive
<ul style="list-style-type: none"> <li>• Requires significant resource</li> <li>• Staff need to be embedded in operator with full visibility of relevant documents</li> <li>• Risk of distracting operational and project management staff from their main role</li> <li>• Deep embedding and level of knowledge gets over problems arising from lack of direct comparators</li> </ul>

e.g. PPP arbiter
<ul style="list-style-type: none"> <li>• May be constrained by limited staffing or ability to get hold of the necessary documentation</li> <li>• Difficulties as no good direct comparators to develop price metrics (compared to water or electric company)</li> <li>• <b>Risk that expectations are for level of oversight similar to an intrusive regulator, whilst resources closer to a light touch regulator</b> - i.e. insufficient to match expectations.</li> </ul>

e.g. IIPAG
<ul style="list-style-type: none"> <li>• Suitable when accountability is with an elected official - e.g. mayor may decide to prioritise faster/better over cost, whereas regulator is focused on cost and value.</li> <li>• Concept of being a critical friend</li> <li>• Easier to keep a positive and productive working relationship</li> <li>• More visibility but less direct power (makes recommendations, doesn't set prices)</li> </ul>

One weakness of the current system is that if TfL doesn't deliver or is inefficient, the consequences are unclear. E.g. if one project overspends, will another project suffer to free the money, or will the money be supplied from somewhere else? What are the implications at Spending Reviews where future levels of subsidy and investment are set?

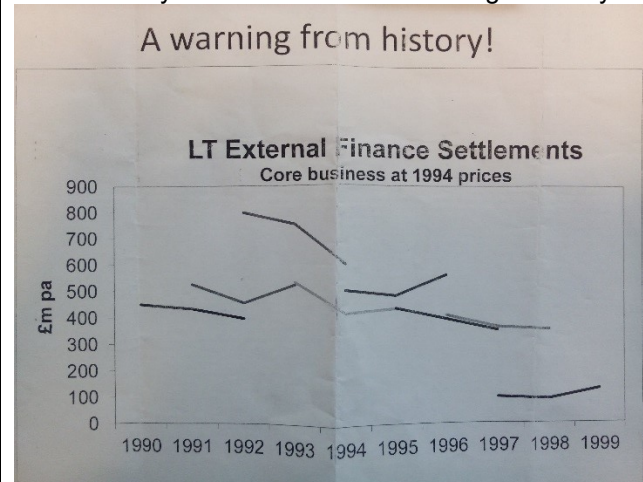
An external view: It's hard for national governments to ignore metros because they are such big consumers of money. If nothing else, the national government is usually involved in guaranteeing funds. Independent regulation is

		<p>not really appropriate for TfL in its current form: <i>“It would be odd for something that is directly accountable to a politician to have an independent regulator.”</i> Independent regulators are needed for industries of national importance that are independent corporations. It shouldn’t be needed for a public sector organization.</p>
	<p><b>2.4 Institutional recovery after LU lost Government’s confidence</b></p>	<p>The Jubilee Line was extended at the end of the 1990s. Due in part to its fixed end date (the end of 1999), the project ran into significant difficulties and faced severe budget escalations, in addition to late completion. This project had significant negative impact on London Underground’s reputation as a project delivery authority, and led in part to the establishment of the PPP as government did not trust LU with large projects and sums of money. However, TfL after its formation in 2000 rapidly regained the confidence of Government. How did it do this (lessons for others)?</p> <ul style="list-style-type: none"> <li>• London’s transport turnaround partly happened because in the mid-1980s population started to rise after falling for 30 years. This gave the government no choice but to invest.</li> <li>• The newly elected London Mayor + large funding from the PPP etc. provided the context</li> <li>• The Mayor decided London needed the best. Bob Kiley was recruited as Transport Commissioner.</li> <li>• He imported US business methods to TfL – these had a profound impact</li> <li>• And he recruited very good people at good salaries</li> </ul> <p>The result was to rapidly demonstrate competence and success and gain the confidence of DfT/ HMT</p> <p>TfL’s reputational repair came from two sources. Firstly, the money came through. Secondly, Bob Kiley’s leadership. Bob Kiley was recruited in an international competition, with a determination to pay what it costs for the best transport CEO in the world. He introduced US-style management to London Transport, spending lots of energy on contact with staff. He was very good with people, and strengthened day-to-day management. He increased measurement and record-keeping – when interviewing him, LT didn’t even know the MDBF for the tube. He made the organization more professional. He also recruited Tim O’Toole as LU Managing Director. Bob Kiley wanted to be paid £2m/year and given a house. In addition to his own salary, he was also authorized to recruit other staff at the market rate. Civil service salaries had been reducing in real terms for years, because no public sector employee can be paid more than the Prime Minister at £140,000. Whereas TfL senior staff can be (and some are) paid more than this because the GLA act gave the mayor power over executive salaries.</p> <p>On the HR front, TfL has a policy of offering market-rates to recruit top talent. <i>“TfL paid much better rates than local authorities and get all the best people.”</i> Prior to this policy being implemented around 2000 by Bob Kiley (then Commissioner), TfL had a poor reputation as an employer; it was seen as “very public sector, in a pejorative way.” Since then, employing good people has had a gravitational effect and attracted other talented staff. TfL also operates a graduate program and was able to hire approximately 150 graduates in 2015. TfL also recognises the importance of staff morale at an individual level, particularly when things have gone wrong at an institutional level. This is important for governments and authorities to get right, as well as the operator – if a</p>

		scapegoat is necessary it should be a top person, not the whole organisation – a demoralised organisation doesn't perform. <i>“Don't kick your team when they are down... It's a confidence game.”</i>
	<p><b>2.5</b> <b>TfL finances</b></p>	<p><b>Challenge – Stability of operational income</b> Every operator knows the central importance of this. London's history is:</p> <ul style="list-style-type: none"> <li>• Pre-TfL <i>annual</i> decisions by a Parliamentary process, that became every <i>2 years</i></li> <li>• Post-TfL <i>multi-year funding settlements</i>. 5-10 year settlements became the norm, but opened up if necessary to provide central government with some flexibility. <i>“When you look back at our success, a large part of it is down to stability of funding.”</i> <ul style="list-style-type: none"> <li>○ 2004: 5-year settlement, adjusted in 2007</li> <li>○ 2007: 10-year funding settlement, adjusted in 2010</li> </ul> </li> </ul> <p>Achieving this turnaround was a huge win for TfL - secured by engaging directly, repeatedly and with innovation with HMT. The timeline was:</p> <ul style="list-style-type: none"> <li>• 2001 Bob Kiley became Transport Commissioner. He had NY experience where 5-year capital program funding was the standard. HMT resisted this but through their PPP experience began to understand the importance of financial stability, and the principle became accepted, helped by the fact the PPP had a contract (albeit not a successful contract in practice: <i>“Nobody knew how to write a 30-year contract”</i>)</li> <li>• The mechanism TfL exploited was 'prudential borrowing' set out in the 2003 finance bill. In November 2004 (3 years after Bob Kiley joined) the Spending Review finally allowed TfL to issue its first bond. <ul style="list-style-type: none"> <li>○ A 7-page letter was negotiated that provided TfL with a £15.5bn funding settlement.</li> </ul> </li> </ul> <p>Achieving this required a huge intellectual effort and commitment by TfL to secure a realistic process. It took 2 weeks of continuous negotiations, and lots of supporting work on how the government could get the oversight they wanted without there being a contract. But it was finally achieved, and is now fully accepted.</p> <p><u>Background:</u> Global evidence from CoMET indicates that a farebox ratio (revenues/ direct operating costs) of 1.4 is required to fund metro operations + asset replacement long-term.</p> <p><u>Summary:</u> <i>“How to keep revenues sustainable for the long-term?”</i> The key factor is fares that are set by the Mayor. To date mayors have set fares such that LU's farebox ratio is about 1.0 (fares increasing by RPI + 1%); and TfL has had to secure funding from DfT for asset replacement and new projects. But Network Rail's regulator has just defined RPI + 0%, and the Mayor has followed suit (these formulae applying to the basket of fares). Annual budget averaged over the last 13 yrs. is £3-4bn pa plus £1-2bn on major projects. TfL has a high credit rating and can borrow money quite cheaply. However the GLA act requires TfL to have a balanced budget. They also maintain a £0.25Bn cash fund for emergencies. Budget oversight is managed by a</p>

	<p>'treasury team': director of treasury and two assistants. Any change to the principles requires signoff by the TfL board.</p> <p>Financial performance requires: spending to budget + spending what you say you will to avoid criticism</p> <p>For Crossrail they were able to borrow against future fares, because of TfL's good credit rating, high fares, and assured demand.</p> <p>One external commentator noted that TfL's financial reporting is not done in an industry standard way, which makes it difficult to understand the financial position.</p> <p><u>Fares</u></p> <p>The London Mayor has extraordinary powers to set <b>fares</b>, with no consultation required with anyone else. Ken Livingstone had known what fares policy he wanted, but Boris Johnston came with no set ideas about fares. TfL therefore engaged with him from Day 1, taking the initiative of developing options and demonstrating their impacts.....until finally he agreed to one proposal that was implemented.</p> <p>Fares are decided by proposing an increase during the business planning process. This goes to the TfL Board, of which the Mayor is the Chair. Fares therefore depend on mayoral pragmatism. TfL is careful to clearly link fares to performance and service provision, i.e. 'this is what you can buy with this increase' or 'this is the reduced performance that we can avoid if fares increase.'</p> <p>A key principle of TfL's fares is that the 'headline increase' (e.g. RPI+1%) is for the average in a basket of fares. TfL are able to tweak individual elements to manage overall demand or push demand between modes, e.g. to change the ratio between peak and off-peak fares, or between bus and metro. It is important to segment fares so that people taking the metro to the Central Business District (CBD) at peak hour pay the most, as it is them who drive marginal costs and the need for investment. A policy of London's first mayor, Ken Livingstone, was to raise LU fares and hold bus fares down, because the two modes served different demographics. This segmentation of the market was quite insightful.</p> <p>In January 2015, TfL restructured the fares to take care of part time workers. They had noticed this would be needed, and waited for political pressure to build such that there would be support for the change. When a 'part time travelcard' solution was proposed by politicians, TfL were therefore prepared to go back to them and counter-offer a more elegant solution that they had already developed to solve the problem.</p> <p>Mayoral control of fares is perhaps more superficial than it seems. Because TfL relies on funding from central government, if the mayor reduces the fares too much, the treasury will refuse to make up the deficit. Politics pushes fares down, whereas business and capacity requirements support increasing fares. Ken Livingstone made an argument to increase fares to enable an increased level of service. <i>"If the public had had its way and fares had gone down, we'd be in a dreadful mess."</i> Fare increases in recent years have been 1-2% above inflation on average, although this is diluted by increasing availability of concessions.</p> <p><u>Investment costs</u></p>
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“Politicians will always be interested in the big, the shiny and the new.” So frameworks are needed to ensure responsible day to day spending, e.g. 5 year infrastructure spending plans. Structure and governance do matter in this area. LF would like TfL have more formalized statutory spending like rail Control Periods. Metros have long and complex supply chains. Longer term planning funding horizons allows TfL to optimize its supply chain and drive cost savings of at least 10-15%. One explanation for this that suppliers are better able to manage their labour forces and sourcing decisions when TfL can provide more certainty over the volume of work it will let. There are also internal efficiencies if TfL can keep the same skilled workforce to manage projects: a constant pipeline is needed to retain staff talent and increase knowledge. The alternative is a peaky workflow where staff are hired and fired according to project needs, and there is less institutional learning. In 1997 the new Labour government studied the problem with London Transport and eventually diagnosed that there were two problems: the average level of funding was too low, AND variation was a problem. When central government messes with funding, efficiencies reduce dramatically. This is happening now on National Rail. This led to the setup of the PPPs to fund a 30 year program of work based on formal contracts. This was a good principle. In the past when TfL had annualized funding, they had to bid as much as possible and then spend it as underspends would be deducted from future years. This provided no incentive towards efficiency. Automated ticketing for the tube (i.e. gating and Oyster) was the first time that funding was approved more than 12 months in advance, because in that case the need to build a whole system was obvious. The ‘seagull graph’ below illustrates how even 3-year settlements were changed from year to year, and so effectively constituted annualized funding.



Since 2000 there has been a commitment to long term funding. The treasury understood that if they want cost efficiency, funding has to be long term. In 2007 there was a funding agreement for 15 years. But the government recently broke it because of cuts due to the financial crisis. Government spending review cycles are 2-3 years, but there is increasingly acknowledgement that the Underground needs a longer (5 year) settlement due to investment lead-times. This is possibly led more by the Treasury than by the Department for Transport.

		A mixed partially-national and partially-local funding package helps insulate projects from political change. In 2010 the government was cutting spending, and scrutinized Crossrail for cuts. The mixed funding package meant that cutting this £15Bn project would only have got £5Bn back for central government – so it was not worth cutting.
	<b>2.6 Role of Non-farebox revenues</b>	<p><u>Advertising</u> This is large for bus and metro operations</p> <p><u>Property development</u> It is important to understand the local context – what is acceptable there given all that is known? Redevelopment of/ over stations can be useful (Canary Wharf station on Crossrail was funded with 4 levels of retail above). But timing may be problematic – infrastructure + property development needs to be coordinated</p> <p>Property as non-fare revenue is very city-specific. Both in terms of the inherent value of property, and also what is and isn't acceptable. Hong Kong and Singapore both have specific circumstances because the state owns the land so they can capture the value. London Underground has an existing property portfolio, so the question is what can you do with it? TfL have to resist political pressure to fire-sell all property to keep fares down. Property at stations needs to be publicly acceptable. A portion of money from over-station development has to be invested back in the station, e.g. in step-free access. Previously, station retail contracts included the ability to evict the tenant at any point, which kept the rents down. They are now offering increased security, so tenants invest in their space and the quality of retail (and rent income) is going up. They are also using unused staff space, e.g. at Canary Wharf Jubilee Line station. Canary Wharf Group has a specific retail policy. They identify the types of shop that need to be there to meet expectations, e.g. sandwich shop, a bank, mini-supermarket. On non-fare revenue: "I don't think it's a panacea, it's just good efficient management." TfL is now developing an in-house resource, which is advised by an external panel of experts, the Commercial Development Advisory Group, to focus on maximizing value from property portfolio. They are paying good money to get good people – the salaries are not equivalent to the best in the industry but the staff get to work on the largest property portfolio in London.</p>
	<b>2.7 Integration</b>	<p>The two biggest leaps forward in London's public transport integration weren't physical:</p> <ol style="list-style-type: none"> <li>1. Establishment of paper interoperable tickets and the London Travelcard in 1986. This was achieved by the GLC agreeing to manage the integration and allocation of fares: they agreed to subsidise LU slightly vs. National Rail.</li> <li>2. Launch of the Oyster card. Oyster provides "untold benefits" to passengers (quicker entry into stations, no need to stop and buy a ticket, no need to plan journey destination in advance to decide what type of ticket to</li> </ol>



		<p>buy, auto top-up of balance removes need to visit ticket offices), as well as better origin-destination data for the operator. The most important factor in London Overground’s success was bringing it into the Oyster system.<sup>ii</sup></p> <p>Fares integration need to be driven by someone who has a far-sighted vision of the benefits. In London it was driven by a long-term view of costs and benefits, such that there was willingness to pay the price in the short term to reimburse operators that would lose income as a result of fares harmonization. Thus <b>fares were integrated on the principle that some operators gain, and no operators lose.</b></p> <p>Oyster was launched with lower fares than paper tickets, and resulted in a yield cut of 5%. The National Rail Train Operating Companies (TOCs) refused to participate voluntarily and so did not initially participate. Later, a deal was agreed that brought all rail services within London onto Oyster.</p> <p><u>Integrating suburban rail operations</u></p> <p>Bringing the lines that comprised London Overground under TfL management was relatively easy because there was a willing buyer and a willing seller. The line and trains was decrepit, with the lowest CSS in the country. It was not difficult for DfT to decide to hand the lines over to TfL.</p> <p>There is customer demand for some lines operated by the Southeastern franchise to be transferred to TfL because of the popularity of the Overground – but DfT currently wants to keep these lines under their control.</p>
	<p><b>2.8</b> <b>Attitudes within and towards TfL</b></p>	<p>Business people get an impression of the city and its government from the transport system. In the 1990s one would go overseas and think that London looks shabby, now London looks positive in international comparisons: “<i>New York doesn’t have the edge on us in any element of infrastructure.</i>”</p> <p><u>The embedded LU culture remains in some areas.</u> TfL is addressing this and seeking to change the culture for operations practices and procuring new assets “<i>We must stop seeing ourselves as different, and ask ‘How can we be more the same?’</i>”</p> <p><u>For the GLA and DfT/HMT</u></p> <p>GLA is reliant on TfL for transport expertise, and has little such expertise itself.</p> <p>DfT/ HMT also have limited expertise when faced with the complexities of a metro and TfL’s specific complexities. This means it is very difficult (impossible?) for them to know how to bring about change or to know the consequences on TfL of its actions. The actions of these major stakeholders may not imply an attitude problem, but be the result of the asymmetry of power that exists. Having said this there is a natural tendency for central government to wish to ‘interfere’ when it has the power to do so.</p> <p>Treasury staff do not necessarily understand the consequences of cutbacks because information asymmetries work against government officials. They only know what TfL tells them, so it’s hard to know if they can trust the information. Hence third party assurance would be helpful for all. An economic regulator could be positive or</p>

		<p>negative for London. It might help mitigate political risk by balancing mayoral policy, e.g. recommending against irresponsible fares policy by a mayor.</p> <p>One of the benefits of the current planning regime is that it allows TfL to map out consequences of different options relating to investment, fares, operating strategies, etc. This is particularly useful for showing political actors the consequences of their choices.</p> <p><u>Labour relations:</u></p> <p>A key question facing London / the UK as well as other governments is whether or not to classify a metro as an “essential service” that would prevent organized labour (e.g. drivers) from implementing strikes.</p> <p>Toxic labour relations evolve over time, as unions look for jobs and pay whilst modern metros have to reduce labour costs with respect to output. There is potential for win-win by improving jobs and pay whilst also improving output. For new metros, setting up an agreement about strikes and productivity from the beginning could be very valuable. It should be modelled on a productive industry, not the historic public sector. For example in the automotive industry, staff expect a constant ratcheting up of productivity.</p>
	<p><b>2.9 TfL performance</b></p>	<p><b>Accomplishments within the last 15 years:</b></p> <ul style="list-style-type: none"> <li>• TfL has become a respected, authoritative and <b>effective</b> organisation that has provided demonstrable success and provided confidence in its major stakeholders,</li> <li>• The transport system has been transformed, with the underground well on the way to being upgraded and major projects being completed (Crossrail to open in 2018)</li> <li>• Reliability has increased 40% in recent years, even whilst major modernisation projects are ongoing</li> <li>• There is a strategy backed by major stakeholders + clear proposals to enable and support future growth - Crossrail 2 being the major project.</li> <li>• TfL is experienced in many forms of private sector involvement and in procurement / contracting</li> </ul> <p><b>TfL is effective:</b></p> <ul style="list-style-type: none"> <li>• Customer experience – has steadily improved and is good (benchmarked)</li> <li>• Major projects success – is generally good (there has been a major problem with the re-signalling project)</li> <li>• IIPAG confirms the above</li> </ul> <p><b>Is TfL Efficient?</b> At what cost are the above delivered? An external commentator’s view: <i>There is no evidence about how good value for money TfL is. It could be 99% or 30%. You can’t do the type of comparison you’d do between local governments.</i> It is not known whether TfL’s effectiveness is achieved at a good cost. “Not very?” was the overall assessment, while recognising that no-one can know – because there is no way of benchmarking such a huge, complex organisation.</p>

		<p>There are examples of where IIPAG has observed that TfL was not making commercially efficient decisions. One example concerned plans to locate a Piccadilly Line signal control room in an existing TfL property in South Kensington where land is extremely expensive. The nature of this facility enables it to exist in another location where land is less commercially attractive, which would free up the land in South Kensington to be revenue-generating.</p> <p>London First assessment: “TfL is a very competent strategic planning authority.” It understands the challenges, constraints, and options for the next 20 years – and this is all backed up by data. TfL is generally a good delivery authority (notwithstanding some issues, e.g. the cancelled SSR Bombardier contract) and operational performance is improving. It is impossible to know how efficient it is. LU have certainly increased efficiency, but neither they nor the government have any real way to know if their efficiency is optimal. LF would like more formal third party assessment of TfL’s cost/efficiency, but the rail regulator hasn’t done a good job doing this for the national rail network so it’s harder to argue against TfL’s current setup with IIPAG.</p> <p><u>Reliability:</u> Improvements to reliability have come through a combination of upgraded kit, better specifications, and not least changes to culture within TfL. In particular this required cultural change among TfL’s project managers, and pushing the supply industry.</p>
	<p><b>2.10 TfL Outlook</b></p>	<p>There are considerable uncertainties in the immediate future because of announced central government policy changes:</p> <ul style="list-style-type: none"> <li>• <b>The Gov’t Comprehensive Spending Review (CSR)</b> requires TfL (part of a non-protected department) to assess the impact of 25% or 40% cutbacks in non-project revenues. Central government wishes this to result in a <u>permanent</u> reduction in size of the state. This is expected to pressure TfL to ‘do more for less’ – requiring an increasing commercial focus.</li> <li>• <b>Devolution</b> of funding authority to city authorities and changes to the sources of funding threaten the funding dominance of London. <b>The power of the Mayor may increase, and of DfT decrease</b>, and this could impact TfL importantly.</li> <li>• <b>Future cuts in funding raise strategic questions for TfL</b> e.g. will the Tube upgrading continue to be funded?</li> </ul> <p><b>The result</b> is likely to force substantial efficiencies on TfL. One change that is recognised is to streamline the existing structure which has grown large after the PPP’s were taken back in house.</p>
	<p><b>2.11 Summary</b></p>	<p>London’s transport system has seen a major turnaround in the last 15 years</p>

		<p>TfL has become an <i>effective</i> agency, increasing its effectiveness visibly. This arises because it has a clear governance framework and considerable management autonomy to set strategy and make things happen. It is focused on enabling future growth for the city and managing its transport consequences.</p> <p>Its <i>efficiency</i> is necessarily a question-mark – no-one can know how efficient it is. There are indications that it could do more for less.</p> <p>The consequences of the CSR and devolution plans raise major uncertainties, and will require TfL to demonstrate increased efficiency.</p>
<b>3 Private sector role</b>	<b>3.1 Context</b>	<p>Pre-TfL (2000), London Transport was administered by the Department for Transport. PFI was government policy for financing new projects.</p> <p>TfL by contrast can borrow, has an excellent credit rating and a debt today of £9bn. It therefore has a choice over how to finance new projects, while still being required to meet central government financing/ procurement guidelines.</p> <p>When the Hong Kong MTR was built, there was a 2-year pause between the initial design completion and the start of construction, to discuss and fully understand the implications of various funding methods, and the mechanisms available to let contracts. “Economic analysis is important, but much more important is the upfront thinking before a single contract is let”</p> <p>The system for UK National Rail set up in 1993 relied on shareholder equity for discipline, but now shareholders have no equity, so there isn’t any discipline. They are underwritten by government and essentially used as a credit card. As of September 2014, Office of National Statistics re-classified NR as a public body to comply with an EU Directive. So the Treasury now has responsibility for NR’s debt, and they have effectively become a government department.</p>
	<b>3.2 PPP to upgrade the Underground</b>	<p>The PPP approach was imposed by Central Government (HMT) on a very reluctant TfL</p> <p>Its rationale was:</p> <ul style="list-style-type: none"> <li>• It was necessary to overcome the political failure over decades to fund asset upgrading/ enhancement. The result was a critical infrastructure for which upgrading had become essential</li> <li>• There was (post JLE fiasco) little confidence at all in LU or its cost estimates.</li> </ul> <p>Private sector participation provides funding certainty. With PPP, once the contract is in place, funding is a “given commitment” and would be difficult to reduce in a government spending review. With the ending of PPP, this level of certainty is no longer available for TfL. Funding is still far from the worst case scenario of being annualized, but nor is there certainty that there won’t be a comprehensive spending review that changes things. Asset management requires 20 year plans, and “you do plan differently if you don’t have certainty.”</p>

		<p><u>The key characteristics of the contracts let were that:</u></p> <ul style="list-style-type: none"> <li>• There was not effective competition – allowing Metronet’s costs to escalate in the final stages of bidding for example</li> <li>• The private firms had to provide minimal equity while</li> <li>• Debt was late in the day guaranteed by Government.</li> <li>• No funds were allocated for the huge contract management task</li> </ul> <p><b>This financing structure meant the contracts could never be enforced.</b> They were assessed by the PPP Arbiter on the basis of their efficiency (did they follow efficient industry practice?), but as no-one knew much about the state of the assets, little could be concluded. During the period when the Metronet and Tube Lines concessions were still outside TfL it was difficult to see the gaps in the concessionaires’ cost estimates. A problem with the PPPs was that they were on brownfields; TfL didn’t always know what equipment was there and what needed doing (an asset management issue). The Office of the PPP Arbiter had limited ability to determine whether the concessionaires were efficiently executing the capital program, partly because the original contract did not require the contractors to supply all the information that was found to be needed for effective contract management. It was proposed that the 2<sup>nd</sup> Review Period would have substantially increased the requirements for Tube Lines (the sole remaining contractor) to supply information. To some extent, this information asymmetry persists today, but IIPAG’s position as a body reporting to the Mayor and TfL Board gives it access to information and understanding that was not available to the Arbiter.</p> <p>The result - – the private companies faced little adverse consequences for non-performance. <b>PPP demonstrated the danger of imposing contractual arrangements that could not in practice be enforced (“too big to fail”)</b>. In a PPP context, even if risk is transferred to the private sector, failure always transfers risk back to the public sector. So there are limited consequences for the private sector. E.g. with Network Rail – whenever funding is cut, they de-scope rather than increasing efficiency.</p> <p>TfL has also observed that <b>there is a fundamental mismatch between 30-year PPP agreements, the assets they concern, and the natural career horizons of people who prepare and procure them.</b> This creates less than optimal incentives for all involved. This is one reason TfL has sought to pursue shorter term, finance-light models that focus on operations rather than development and management of capital assets.</p> <p>TfL has learned lessons about some of the fundamental difficulties that come along with PPP. In particular, long term PPP contracts with fixed scope can prove problematic in the face of external changes. For example, laws may change during the contract period (e.g. relating to disability access). An external change which added cost was the Rail Vehicle Accessibility Regulations (RVAR) which specify how train cars should be fitted out to provide access for disabled people. These were introduced halfway through the PPP contract, so introduced retrospective costs as non-compliant trains had already been procured. “Legislation is cumulative with respect to cost”</p> <p><u>The consequences of the PPP are not the simple story of failed contracts:</u></p>
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		<ul style="list-style-type: none"> <li>• “PPP forced LU to know what it wanted and to measure it.” It concluded improved reliability was the core requirement; and lost customer hours was the measure to use.</li> <li>• TfL came to realise it did not know as much as it should about its assets, neither did it have a process for managing them that would inform investment decisions. It had to establish an Asset Management process and data collection system</li> <li>• The PPP experience assisted LT in becoming an ‘intelligent client’ - knowledgeable about what the private sector could provide, and about contracting</li> </ul> <p>What happened:</p> <ul style="list-style-type: none"> <li>• Metronet (won 2 of the 3 contracts) was a dysfunctional JV that allocated all work to its shareholders. This avoided unwelcome competition. They also failed to keep to cost/ timetable. The end result was that it became bankrupt when its claims were rejected by the PPP Arbiter, and was brought back in-house by TfL</li> <li>• Tube Lines was much more successful. It let contracts competitively. However despite many good things it ran into problems of frequent and late possessions inconveniencing passengers and becoming politically unacceptable. It was bought out and brought back in-house (TL JV partner Amey still maintains equipment for LT under contract).</li> </ul> <p>Aftermath:</p> <ul style="list-style-type: none"> <li>• By this time the PPP had succeeded in securing large central government investment in the Tube.</li> <li>• Also there was increasing confidence in UK’s (including TfL’s) ability to deliver major projects, demonstrated by repeated success – securing further funding for such projects</li> <li>• Central Government had become increasingly convinced of the link between PT investment, accessibility, density and productivity – such that <b>high levels of central funding continued.</b></li> </ul> <p>Although ultimately unsuccessful, some good points arose from the PPP: (i) they were the genesis of TfL’s asset information system; (ii) they helped ‘lock in’ long term funding from the DfT/HM Treasury; (iii) they revealed costs of upgrading LU assets in a way that LU could not have credibly done at that time; (iv) they necessitated an ex-ante plan / investment program that required LU to describe what it wanted to achieve and work out a way to measure it; (v) over time they brought recognition that infrastructure investment has a huge economic payoff: as investment increased reliability and capacity, “<i>people could see it with their own eyes.</i>” In particular, the PPP fundamentally “shifted the centre of gravity” in terms of understanding what the cost would be of upgrading the metro. This was underpinned by the fact that the private sector, not TfL, had done the costing.</p> <p>LU spent £10m to improve and to consolidate asset knowledge to reduce the extent to which contractors needed to price risk into their bids. The increase in asset knowledge was one success of the PPP. The PPP Contractors were required to build comprehensive ‘Asset Catalogues’ of the assets they managed within the first 2- 4 years of the start of the Contracts. The asset management arrangements were defined before ISO55001 or PAS55. After 7.5 years the PAS55 specification for asset management existed and accreditation to it was a new requirement built into the Tube Lines contract revision. PAS55 and ISO55001 say what you should do, but not how to do it.</p>
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		<p>TfL's goals are now communicated in terms of generalized journey time and customer delay, each of which has a specific metric to measure it ('journey time metric' and 'lost customer hours') which were developed for the PPP. Lost Customer Hours are one of the really good things to come out of the PPP. They allow business case development and enable prioritization of investment between projects that wouldn't otherwise be directly comparable, e.g. investments in signalling resilience vs. increasing escalator reliability. A few years ago TfL reprioritized between two line upgrades, promoting the Piccadilly above the Bakerloo in the timeline because the benefit : cost ratio is better for the Piccadilly. They are now moving to prioritizing between modes.</p>
	<p><b>3.3 PPP – External commentators' views</b></p>	<p><u>History and politics</u>  The PPP looked from the outset like a flawed, complex, expensive model – but it was the only option the Treasury would allow. The Treasury doubted London Underground's ability to manage major projects based on a previous track record of overspending and time overruns notable for the Jubilee line extension project. Private Sector expertise was felt to be the answer. Prior to the PPP London Underground possibly tended to be very optimistic in its cost and time estimates for major investments as a means of even getting consideration of a project in the constrained funding circumstances.</p> <p>The PPP was designed by central government as a partnership. TfL and the Mayor wanted to manage it like a traditional contract, but it was not designed that way. It was TfL and the Mayor who first changed the Partnership rules. The LU MD was (correctly) obsessed with performance, and kept raising the bar. It was the right thing to do for passengers and in the grand scheme of things, but it didn't work within the setup and performance targets of the contract.</p> <p>Once the contracts were under way TfL kept asking for increasing specification. E.g. for station refurbishment and modernization, TfL asked for all the possible bells and whistles. The Metronet infracos didn't push back, just carried on work to meet TfL's demands and failed spectacularly to monitor the cost impacts. There was no sense of value for money within the TfL clients pushing for the bells and whistles. Metronet was spending 3-4 times what should have been spent based on the Business Case Development Manual, because of constant reworking. No-one at Metronet was saying no to rework because it meant more money for the contractors. Metronet ultimately asked for more money via an Extraordinary Review by the PPP Arbiter was called. The review concluded that 2/3 of the deficit was down to Metronet, and 1/3 was down to LU "pushing willing lemmings over the cliff" by constantly asking for rework. This settlement was enough to effectively bankrupt Metronet.</p> <p>Problems and regular political interference with management of the bidding process vastly increased the price of the contract and reduced its usefulness. The Mayor was put temporarily in charge of negotiations prior to the general election to neutralize his opposition for the duration. Negotiators had almost achieved an input-specification deal recommended by the Mayor's adviser, but the Mayor said it was unworkable and walked away at the last moment. The National Government took over again and said the new deals would go ahead with the already-assigned preferred bidders, who were then free to significantly increase their prices in the absence of competitive pressures. Bombardier's bid had already been excluded as too expensive. Then they took over the Metronet rolling stock provider and the price increased.</p>

		<p><u>Asset knowledge</u>  The PPP contracts required TfL to set out:</p> <ul style="list-style-type: none"> <li>• What was needed</li> <li>• What was common sense</li> <li>• LU's experience</li> </ul> <p>This covered both improvement and renewal of the system and performance of the assets to match increased demand and also to eliminate a substantial backlog of investment in the assets, as well as the need to ensure that asset stewardship over the 30 year contracts represented an economic and efficient whole life approach to managing the assets, regardless of when in the contract period decisions needed to be made.</p> <p>The PPP infracos had to provide annual and overall asset strategies. TfL engineers had to approve them, but were attached to old methods. It was a difficult issue managing the people to get them to approve the plans. At a political level London Underground's Directors were wary of formally approving the PPP Contractors' plans as it risked the loss of a key element of contractual leverage in the very hostile political climate in which the contracts were being managed. <i>"At several stages we almost made the PPP contracts work – but political considerations got in the way."</i></p> <p><u>Efficiency</u>  It's been calculated that LU was underfunded by £1.5Bn over the 20 years prior to the PPP. Prior to the PPP there were 31 separate initiatives to upgrade 7 stations on the south end of the Northern Line (e.g. next train indicators, gating, repainting, and mirrors for blind corners). Combining them into one scheme would have saved 30%, but LU couldn't commit to this level of funding and the longer overall project timescales because they had annualized funding.</p> <p>Before the PPP when TfL had less money and only annualized funding, it spent the money available more carefully – notwithstanding other efficiency constraints due to the stop-start nature of funding. Now there is enough money, people have lost sight of real value for money especially on maintenance. TfL is not as good at spending efficiently as it was before the PPP, but may have to re-discover how to if the level of funding is reduced following current Central Government spending reviews.</p> <p>Tube Lines used performance and condition monitoring data analysis and teamwork with the operator to hugely improve MDBF for Piccadilly line trains through reliability-centred maintenance. Prior to the new Victoria Line fleet being introduced, these 1973 trains had the best MDBF on the Underground (having been the worst). This bought the ability to postpone their replacement for 10 years whilst new technology became available for the next generation train.</p> <p>Business sponsors had been introduced prior to the PPP to build investment and expenditure business cases and their role within the PPP was then to ensure that the Contractors continued to adopt "efficient and economic good industry practice." London Underground uses long established and sophisticated investment business case analysis based on passenger benefits but this is not always friendly to the investment needs of fixed Infrastructure assets. In maintenance, LU is making big efforts to become more efficient but not necessarily economic. They are improving in executing the plans, but not always at checking that the plan itself is right. Business sponsors are good at making</p>
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		<p>the case for Investment funding, but not always focused enough on maintenance plans and wider opportunities to save money.</p> <p><u>Tube Lines</u>  The Tube Lines PPP didn't fail, but at 7.5 years it was a good time to end it. TL didn't fit the PPP Advisers' pre-conceived wisdom of what a PPP JV would look like. They had Amey for facilities management and Bechtel for project management. They brought their own management control, and then bought in best industry expertise. They were twice rejected and twice reinstated during the bidding process. They benefited from a very strong internal management team, who did what was in the contract – no more and no less, pushing back on the demands that Metronet acceded to. LU accepted TL work even without the extras – albeit with some reluctance.  At the 7.5 year break point the contract was ended alongside problems with the Jubilee Line upgrade. As early as the bid stage, Tfl had worried about TL's ability to manage this and other 'brown field' upgrades.  At 7.5 years they were happy with Amey's maintenance performance. So they rewrote the contract based on lessons learned and continued it. The contract provided significantly less money for escalator asset management based on the escalators benchmarking study.  At 7.5 years the Bechtel part of the contract was taken in house, by mutual consent.  The strengths of the Tube Lines consortium were as follows:</p> <ul style="list-style-type: none"> <li>• Project managers were not a pushover when changes were requested</li> <li>• Good analysis</li> <li>• Better asset information system than the Metronet one</li> <li>• Embraced asset management</li> <li>• Prepared to go and buy the best (compared to Metronet who were a consortium of suppliers and used only their own products)</li> <li>• Less constrained in thought by 'the way we've always done things'</li> </ul> <p><u>Another view from outside Tfl:</u>  The PPPs were a disaster in practice. They got into contractual problems from the beginning due to vertical separation between Operations and Maintenance. "A private company under contract has to be held to account for delivering what they're paid for." When a contract is so enormous it is hard to hold the contractor to account: the contract can't be cancelled, and there is no-one else to step in. There was zero money in the contract for contract management. The PPP Arbiter was feeble, and couldn't hold the contractors to account.  The PPP's parent companies were not linked in. Almost all the funding came from debt, and the chancellor guaranteed the debt at the last minute. So the shareholders didn't have equity risk. Good practice PPPs must make sure that shareholders have equity risk.</p> <ul style="list-style-type: none"> <li>• Tube Lines was run by Bechtel, who took a reputational hit</li> <li>• Metronet was a consortium of Bombardier, Thames Water, Atkins and Balfour Beatty. They didn't take a reputational hit, and the government didn't make them suffer. The contract was a guaranteed rate of return</li> </ul>
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		<p>unless they worked inefficiently. The PPP Arbitrator was supposed to decide if they had been inefficient, but didn't have the asset information they would have needed to decide.</p> <p>It was necessary to define the rules of the game for 30 years, at a commercial contract level of precision. For example, some payments were dependent on Lost Customer Hours (LCH). If a dog was on the line, whose fault was it? "Nobody really understood" how the 7.5 year break clauses were going to work.</p> <p>Variations that were not envisaged in 2000 include the need to rebuild stations for Crossrail, and the mayoral commitment to 24-hour tube operations.</p>
	<p><b>3.4 Experiences of PFI</b></p>	<p>Prior to the creation of TfL, LT couldn't borrow so borrowing had to be done through a PFI or nothing at all. They inherited several PFIs from before TfL. Since the creation of TfL in 2000, only two new PFIs have been created, and TfL borrowing has increased from 0 to £9Bn. A PFI is planned for the new Silvertown tunnel.</p> <p>One way to assess PFI is comparing the cost vs. on balance sheet lending. Pre-2008 the margin was 1%, whereas after 2008 it was 3%. Now it has returned to closer to 1% - these relative costs make a big difference. TfL has a very strong credit rating so PFI has looked expensive. However if there were no financing perhaps they would go back to PFIs.</p> <p>In creating PFIs, you can't assume nothing is going to change. When pre-TfL PFIs were awarded, the creation of the mayor was not envisaged. E.g. Croydon Tramlink was supposed to set its own fares. Now the mayor sets fares across London, so they had to restructure the concession and compensate the contractor. The concession was originally for 99 years with 90 years of compensation payable if the project company had not been acquired by TfL. Restructuring the Tramlink concession has enabled improvements such as rolling stock increase and double tracking that would not have otherwise happened, as the PFI contractor's "ability to invest in incremental improvements was constrained by their financial position."</p> <p>Up to 2002, privately finance projects by LT and/or the predecessors to TfL moved towards the right of the diagram below, to larger PPPs. They have found that the mid-sized, system PPPs can be difficult because of lots of interfaces.</p> <div data-bbox="696 981 1839 1268" data-label="Diagram"> </div> <p>One lesson learned from the ticketing PFI (called 'Prestige') is to avoid IT content in long-term PPPs because the technology will advance in a 25 year period. In the case of Oyster, its lifetime will be less than expected because contactless payment developed so Oyster is no longer the sole principal electronic ticketing solution. PFIs are best for new builds.</p>

		<p>Lessons from successful PFI schemes paved the way for the PPP. The PFIs related to: (i) power supply infrastructure; (ii) facilities for British Transport Police; (iii) ticketing and barriers; and (iv) communications (train, depot and station radio)</p> <p>TfL inherited several PFI concessions:</p> <ul style="list-style-type: none"> <li>• DLR Lewisham Extension</li> <li>• Croydon Tramlink</li> <li>• Underground communications</li> <li>• Accommodation for British Transport Police</li> </ul> <p>TfL considers <b>the success factors for PFI</b> are:</p> <ul style="list-style-type: none"> <li>• A clear scope</li> <li>• Few interfaces – critical because:</li> <li>• <u>There must be confidence there will not be unexpected changes.</u> These always require renegotiation and are problematic. Yet the Authority will often wish to make changes. Thus Croydon Tramlink’s 99-year concession was overtaken by massive changes, including the creation of GLA and a single ticketing system.</li> <li>• <u>No timing-critical interfaces.</u> A private concession was ruled out for the Crossrail RS/depot contract, because it was essential this was delivered when the infrastructure was ready.</li> <li>• A strong concessionaire JV preferably backed by parent companies (that will not fall apart)</li> </ul> <p>There are few projects that meet those criteria in London because PT is very integrated. Unexpected changes and desire to integrate modes have driven PFI contracts being taken in-house – including Croydon Tramlink that had unsustainable finances (including major cost overrun and dysfunctional JV).</p> <p>The DLR was intended to be a self-financing railway. The PFI was initially useful to bring in expertise in managing whole-life cost and project management. However in the long-term it is important to develop in-house expertise and then stop paying a private company to do the same work, otherwise you’re paying for the expertise twice plus the finance costs. Ultimately, fares did not cover the operating cost and PFI payments, and the government had to provide £50m to cover the gap.</p> <p>Three DLR extensions were completed under Private Finance Initiatives (PFIs) for build and maintenance with values £140m-£300m. In each case there was a single Operator for the whole of the DLR, but separate DBM contracts for:</p> <ul style="list-style-type: none"> <li>• DLR Lewisham extension</li> <li>• DLR City Airport extension</li> <li>• DLR Woolwich extension</li> </ul>
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	<p><b>3.5 O&amp;M Concessions</b></p>	<p>In TfL, rail (and DLR) are outsourced whereas LU is insourced – this is mainly for historical reasons. LU unions wouldn't countenance change, whereas DLR was a new build system opening during a time of strong pro-private sector ideology. London Overground took over a private sector TOC. New lines are having franchised operations – this is the direction of travel. The combination of insourced and outsourced is a good thing: <i>“Mixed economy is quite a useful model.”</i> <i>“A mixed market gives you both an insight into the efficiencies possible from the private sector, and a sense of humility and reality as an operator.”</i> The mixed market follows accepted best practice in the road haulage industry, where hauliers split fleet ownership into 1/3 owned, 1/3 leased, and 1/3 spot hired to meet demand.</p> <p>DLR was purchased by the government for £1 to get it away from London Transport at a time when London Transport was not seen as effective. The national government brought in new management and set up the O&amp;M concession which was initially with Serco. DLR management was brought back alongside LU when TfL was set up in 2000. TfL is an informed client because it does operations itself via LU, so has a better understanding. TfL has come to appreciate that delivering with a “thinner” organization (i.e. using outsourcing more) requires staff to be of a higher calibre. “You can't outsource strategy or what you can't understand.”</p> <p>The London Rail operating contracts are subtly different for the different networks:</p> <ul style="list-style-type: none"> <li>• DLR is “have the train set and use it” – maintenance including trains, staff and run the railway</li> <li>• Overground contract is for maintaining stations and driving trains. Trains are supplied and maintained by Bombardier under a contract, which the concessionaire manages. Infrastructure maintenance is divided between National Rail and TfL.</li> <li>• The Crossrail contract will be similar to the Overground one. The operator, MTR will have a systems integrator role as the “glue that binds the whole together.” MTR have rights to manage Bombardier (rolling stock supplier/maintainer) as TfL's agent.</li> </ul> <p>Operations are what's left to contract out, as TfL want to sell fares on an integrated system-wide basis, and want to control infrastructure in the long-term. O&amp;M Franchises bring wide experiences of running railways in the rest of the country, increasing performance and savings. DLR contracts-out operations despite having the expertise themselves because the private sector offers expertise in labour cost control including rostering, and in procurement. Franchising does not prevent strikes – this is clear on the National Rail network. As staff T&amp;Cs are transferred to the new operating company, it takes a long time to move away from the public sector type employment contract.</p> <p><u>Revenue Risk</u></p>

		<p>Revenue risk cannot be transferred because the mayor sets the fares, and might desire to transfer modal share between modes. This is different from the National Rail franchises where revenue risk is transferred as standard. Revenue risk allocation works for mainline rail because there is genuine competition with cars and airlines.</p> <p><b>Revenue risk should not be allocated to concessionaires in an urban context.</b> <i>“It’s bonkers in a natural monopoly.”</i></p> <p>Oyster data and big data analysis capability make it easier to allocate fares accurately between NR TOCs and LU. But allocation is seen as a risk by concessionaires. The benefits of a single ticketing system is not as obvious to individual operators, although it is still there.</p> <p>The DLR concessions have progressively excluded revenue risk.</p> <ul style="list-style-type: none"> <li>• In 1997 the first DLR franchise was modelled on national rail concessions and included revenue risk. However it became clear that revenue was proportional to London’s GDP output, and was more affected by government than by bid price or concessionaire performance.</li> <li>• In 2006 the second DLR franchise reduced the revenue risk to 10% of revenue being kept by the concessionaire. This 10% was included to incentivize revenue protection and marketing.</li> <li>• In 2014 the third DLR franchise removed revenue risk altogether. This was done on the basis that if customer service metrics are tough and sharply incentivized, there is no point keeping revenue risk. At the same time, marketing and promotion was taken in-house to achieve economies of scale and message control across TfL. The margins for the concessionaire are small because the contracts include no revenue risk.</li> </ul> <p>The progressive reduction of revenue risk and increasingly tight specification of what needs doing are a response to local conditions – in particular DLR’s growing expertise as an informed client. These approaches may not work everywhere: <i>“you need to come to conclusions within the context in which you’re operating.”</i></p> <p><u>Performance</u></p> <p>Customer service metrics in the O&amp;M concessions are based on both customer satisfaction surveys (subjective measures) and mystery shopper surveys (somewhat objective measures). In addition to customer service metrics there are also steep incentives for punctuality. Penalties in the contracts are of the following orders of magnitude:</p> <p>Overground:</p> <ul style="list-style-type: none"> <li>• £50/minute (estimated) for a delay due to the operator’s fault.</li> <li>• £5/minute (est.) for a delay caused by a Bombardier train</li> <li>• £0/minute for a delay due to National Rail (infrastructure manager)</li> </ul> <p>Crossrail’s contract will allocate to the systems integrator a greater level of risk for issues caused by rolling stock manufacturer and network rail, the logic being that although an issue may not have been caused by the Crossrail operator (MTR), it is their job to manage it and they must be incentivized to do so. This approach will be incorporated into the next Overground contract. The Crossrail penalties are also larger than on the Overground, as follows:</p> <ul style="list-style-type: none"> <li>• £250/minute for a delay due to the operator’s fault.</li> <li>• £25/minute for a delay caused by a Bombardier train</li> </ul>
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		<ul style="list-style-type: none"> <li>• £25/minute for a delay due to National Rail (infrastructure manager)</li> </ul> <p>The higher penalties, particularly for delays caused by external parties, do result in a higher contract cost because of risk pricing. However, at the margins all can be managed by the operator, and a large incentive is required to ensure this happens. For example, driver behaviour can significantly affect the duration of a rolling stock failure.</p> <p><u>Allowing for change</u> Operators now bid on what it will cost to provide the required level of service and/or an enhanced service level. You have to know and agree what predictable changes from the contract will cost. Costs are set up to be scalable, to avoid the classic problem of contractors bidding low then exploiting contract changes. So costs are indexed to a per train-km increment, and operation of any extension or service increase will be paid at this rate.</p> <p>Contract lengths are set up to be able to respond to differing political priorities as different mayors have different appetites for transport or areas of focus. Bidders know that long contracts will include political changes, so they make money on contract variations. Contract extensions are used as an incentive for good long-term maintenance regimes. The usual contract on the DLR is 5 years with an option for a 2-year extension. On London Overground it is 7+2.</p> <p>If London Underground escalator maintenance had been contracted out, Night Tube would have required an expensive renegotiation. They would have had to renegotiate the contract with no maintenance access on Friday or Saturday night. The cost would have been very significant.</p> <p><u>An external view:</u> The best contracts in TfL are those with the bus operators. They are 5-year contracts, taken route by route. If the provider is incompetent, they can cancel and re-let. There are contractual provisions for changes such as when the mayor made a pledge to withdraw articulated buses and replace them with the New Bus for London. There is good evidence that the bus contracts are very efficient. The unit cost per bus mile has halved with tendering. The bus unions are not strong.</p>
	<p><b>3.6 Concessioneering for a New Metro</b></p>	<p>Many cities (including developing cities) wish to implement metros but do not have the up-front funding to do this. How could they proceed? TFL's suggestion, based on their experience (albeit not implemented in this form) is as follows.</p> <p>The questions which should be asked are the following:</p> <ul style="list-style-type: none"> <li>• How to ensure whole-life decisions are taken when developing the project (in particular how to ensure Operator influence during project development), and</li> <li>• How to plan for network extensions (all systems expand) without providing an exit for the project JV, and frustrating the requirement for a long-term perspective and sustainability?</li> </ul> <p>There are two entirely different reasons for including operations in a DBO:</p> <ul style="list-style-type: none"> <li>• Use operations to finance capex</li> <li>• Bring operator on board to ensure design considers operations</li> </ul>

	<p>It is critical to know which of these you're doing. The length of the 'operating' part of a DBO contract usually depends on the timeline for financing infrastructure, not on what is best for operations – 30 years doesn't necessarily fit the ideal operating model. The logic of putting Operations into D&amp;B contracts seems to be a largely unquestioned assumption. They can be done separately, but the O and D/B teams have to understand each other. Joint venture intra-team dynamics are a risk. In Copenhagen, Serco (operator) was part of the Ansaldo consortium. But the joint venture fell apart because Ansaldo had power over Serco and set up a master-slave relationship. Separate Operating contracts work better on an existing railway where the operations are established.</p> <p>The solution proposed by TfL (but not applied by them) would be to separate out DB and O. It was proposed in Dublin, for a metro that was ultimately not built, but could be a useful concept in other environments:</p> <ul style="list-style-type: none"> <li>• Let 2 linked contracts, one to put in place the project and maintain it, and one for operations. Thus: DBFM + O</li> <li>• The Operator had to be part of the same consortium as the DBFM contractor (i.e. consortia competing for appointment had to each include the first operator), but the ability to re-compete the operations after 10 years was built in.</li> <li>• The contracts to have different lengths (30 years for the DBFM and 7-10 years for the Operator)</li> <li>• Payments to both consortia would be started on the same day, when operations started: they would have to build and put the system into operation before payment.</li> <li>• Concessionaires compete for the package</li> <li>• If the Operator part of the concessionaire does not perform they can sacked (others are available)</li> <li>• When it is required to extend the system, separate DBFM contracts can be let + competition for the Operator</li> </ul> <p>A potentially very neat solution to the common problems encountered. The Dublin model enables the operator to be replaced without having to buy out the build costs: <i>"Sacking a PPP is different because of the vast levels of capital exposure."</i></p> <p>As a government, it is difficult to take on a new responsibility when there is no established capability. It is tempting to take on an international brand because of their reputation. But <b>the people who built up the concessionaire's reputation are not necessarily the individuals who would be working on your contract.</b> For example, MTR in the UK have a very good reputation – but there is no-one waiting in the UK to run contracts, London has to compete against Chinese cities for MTR's best staff. The Crossrail contract incentivized MTR to bring good people from overseas. However, railways are inherently the products of nationally-specific operating environments, so local experience can count for more than the global reputation of the operating company. The new DLR franchise has handcuff clauses whereby five key people named in the bid cannot be moved by the company within 2 years. If any of these individuals named in the bid and approved by DLR left because they were moved by the company, there would be a £60,000 penalty. (If the person resigns of their own accord to move to another company, the penalty is not applied.)</p>
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	<p><b>3.7 Procurement</b></p>	<p>TfL starts by being realistic about what the private sector brings to the party:</p> <ul style="list-style-type: none"> <li>• For operations it is labour cost control</li> <li>• Question: where on the range: Body-shop.....to Systems integrator does it lie?</li> <li>• What in practice do overseas Operators bring? It is in practice very difficult to discern differences between operators.</li> </ul> <p>TfL's practice that has found to be effective is:</p> <ul style="list-style-type: none"> <li>• Competing companies/JV's are short-listed to ensure they are feasible partners</li> <li>• TfL define feasible performance outcomes as a range (multi-criteria)</li> <li>• Bids are requested for a base level of performance, for which there will be a base payment.</li> <li>• Companies are sked what additional payment they require to deliver additional levels of performance within the range.</li> </ul> <p>Contracts can define output measures and standards (e.g. run at 60kph). Bidders cut corners on maintenance. Therefore "If we know what to do – we specify it". If something needs doing 4 times/ week, state this.</p> <p>Role of revenue risk transfer:</p> <ul style="list-style-type: none"> <li>• "The Mayor sets the fare" – therefore revenue risk transfer as part of a contract is necessarily limited (what will the next Mayor do?)</li> <li>• Big data through Oyster card makes revenue-sharing easier.</li> </ul> <p>Most acquired lines come with franchised operations. For these O+M franchises are awarded.</p> <ul style="list-style-type: none"> <li>• when the environment is predictable</li> <li>• under short-term contracts (Overground will soon be re-bid) typically of 7 years</li> </ul> <p>Note HK-MTR outsources one-third of its RS maintenance both to provide a benchmark and keep its in-house maintenance team on their toes.</p> <p>Overground's franchise was successful and is about to be re-bid, probably for 7-9 years.</p> <p><u>Specification</u> The attitude of DLR is "<i>we know what we want</i>" so can specify it clearly. This even includes some maintenance frequencies, where the desired level is known and can be specified. "If we know what we want, we specify it." DLR is a very informed client: because they have their own maintenance capability, they can specify maintenance input factors (e.g. maintain this widget 4 times per month), and have done so since the 2014 DLR franchise. <b>By setting maintenance in the contracts, they trade off cost against assured quality: there is less room for maintenance innovation, but also less room for skimping and under-maintaining.</b> More work and insight is needed to specify at this level, and most new authorities don't yet know what they want.</p>

		<p><u>Bid assessment</u></p> <p>Awarding of contracts has a pre-qualification process which pre-qualifies bidders who pass a threshold of technical competence. After that there is a process to trade off of quality vs. price. LU recognize there is no point paying for 100% reliability, and equally if performance is poor (but cheap) the customers won't want it. So there is a cap-and-collar approach which sets upper and lower limits for the performance promised in bids. The incentive mechanism is designed to encourage good performance and be affordable.</p> <p>For its O&amp;M concessions, TfL has to work out how much it is willing to pay for each level of performance. To assess bids against this, they set a certain base level of performance. Bidders bid a 'base payment' at that level of performance. As part of the bidding process, TfL publishes an incentive structure for performance above or below that performance. Therefore, whilst bids are assessed based on the cheapest at the base level of performance, bidders can decide to target another level, and factor the incentives into their financial models.</p> <p>A problem with fixed duration 5-7 year maintenance concessions is it makes it hard to get longer-term overhauls done effectively. One way is to only contract day-to-day maintenance and do overhauls in-house. Another is to let a 35 year contract: London Overground and Crossrail have this for rolling stock. One benefit of this is that maintenance is priced into the initial price, so the contractors compete over the whole-life cost.</p>
<p><b>4</b></p> <p><b>There are four management processes</b></p>	<p><b>4.1</b></p> <p><b>Asset management (AM)</b></p>	<p><b>TfL has developed an effective AM process following pre-PPP awakening. The significance of this is much greater than appreciated. VERY important:</b></p> <p><b>CORE MESSAGE – Asset Management is essential from day 1 of major projects.</b> This is completely different to most current metro practice. Whole life maintenance has to be considered from day 1. You <i>“have got to involve from the outset the people who have to live with those assets. The counterpart is they may have to think differently.”</i></p> <p>Manufacturers usually don't have experience maintaining what they make. You have to talk to other metros. CoMET identifies opportunities, it's sensible to follow them through and explore in depth. Always have a long term plan for each asset and know what you'll have to do with it, no matter how vague the plan is. This is the basis for starting to minimize future 'surprises' and also for smoothing the profile of asset re-investment expenditure – particularly for the first major wave of asset renewals of assets that will have aged simultaneously from the launch of a new metro line / system. By definition, there must be efficiencies available. Always overtly look to make changes. The best place to start is with a mental blank sheet of paper.</p> <p>The idea of 'asset life' may be a false one – assets don't have a 'life' other than the need to trigger a review of what needs doing. Best practice metros are always looking at the case for extending the life of the assets, via subsystem analysis and stress tests which can assure safety regulators. Hong Kong MTR are a prime business example of this approach – perhaps partly because it is 'their own' money that they are spending. Good asset forecasting is essential to be able to trade-off maintenance budget vs. capital investment to get best value and performance. Establish and monitor the value of assets. Residual life and book value are two measures. LU's Business Case</p>

		<p>Development Manual contains depreciation rules provided by the Treasury, but these do not always work well alongside whole life cost analyses.</p> <p><u>How to conserve/ improve the value of the metro assets such that they are fit-for-purpose?</u></p> <ul style="list-style-type: none"> <li>• The context - 64% of LU expenditure is on maintenance. Renewals</li> <li>• Focus should be on information about asset quality – to inform maintenance/ investment decisions. This requires surveys, subjective assessments and modelling. <b>“get the right information to make decisions”</b></li> <li>• Then decisions across assets can be taken ‘on a level playing field’.</li> <li>• AM provides confidence to external stakeholders that TfL knows what it is doing and will do what it says, often reducing costs</li> </ul> <p>TfL’s AM approach:</p> <ul style="list-style-type: none"> <li>• TfL is ISO-55,000 accredited (the second metro to achieve this) – demonstrating its competences</li> <li>• There is a 10 yr. Line Asset and Network Plan + Life-cycle Strategy. “Always have a plan and be willing to change it”.</li> <li>• “AM decisions should be based upon condition evidence not rules (replace in x years)”</li> </ul> <p>There are 3 AM groups:</p> <ul style="list-style-type: none"> <li>• Small asset management consultancy</li> <li>• Asset strategists for each asset – with a 20+yr vision</li> <li>• Group focused on professionalization of the Sponsor Role, who needs to interface effectively with the Delivery Director</li> </ul> <p><b>Importance of AM – an example: LU escalators</b></p> <p>9% of all operating costs are devoted to maintaining LU’s 400 escalators. An in-depth study by RTSC concluded that <u>£0.75bn</u> could be saved over 40 years by changing to procuring available escalators from suppliers (rather than London-specific specs – and applying condition-based maintenance.</p> <p>TfL’s planning regime starts with an overall business plan. This cascades down to Line Network Asset Plans which set out for each line and asset type what investment will be made, what performance that will result in, and what the risks are. The risk in turn feed back into the business plan: if funding is to increase, it considers how to prioritise spending; if funding is to decrease, it considers how to protect core assets.</p> <p>Key recent accomplishments include ISO 55000 accreditation and PAS 55. London is the second metro in the world to achieve this (after Hong Kong). The ISO accreditation does not provide the asset management processes;</p>
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but rather certifies that LU have them. An important benefit is to show external stakeholders that LU can be trusted not to waste money.

The broad dissemination strategy for TfL's asset management publications follows a two pronged approach of both "managing upwards" to provide confidence to key stakeholders (DfT, mayor, HM Treasury) and "managing downwards" to push asset management principles into the entire organization. TfL has implemented an asset management training program with learnings designed for different levels of the organization. This program does not aim at making everyone an asset management specialist. Rather, the aim is to provide an understanding for why asset management is important and what role individuals need to play in making it successful.

The broad methodology for TfL's asset management planning is top-down according to the following steps:

- Undertake baseline assessment to determine condition;
- Model asset life;
- Gauge required investments against available / envisaged funding; and
- Undertake engineering validation.

Asset lifecycle plans and ten year plans are initially unconstrained in order to encourage broader thinking. In addition to the above, maintainers can also propose specific investments for consideration on an ad-hoc basis. TfL's organizational approach to asset management takes in three types of staff, as shown below. This approach developed from the way that Metronet PPP projects were supervised.

The system includes professional "sponsors" who work with asset managers and serve as "strategic / critical friends." Sponsors vet proposed plans to challenge business cases and the approaches that asset managers propose. They are responsible for ensuring the project requirements are clear at the start, commissioning feasibility studies, and for owning the change control process to ensure decisions are made with a full perspective of costs and benefits. Prior to the professionalization of project sponsorship, the financial director or asset director would have this responsibility. This role has required a shift in power from project managers to sponsors, and has resulted in improvements in project delivery.

Asset management internal consultancy / centre of excellence

Competence frameworks across TfL

Benchmarking, sometimes with other utility providers

Work with institute of asset management

Link training material with accreditation

Asset strategists

Set strategic vision for each asset area: track, civils, electric, mechanical, depots, lifts, signalling, comms

20-80 year planning horizon linked with organisation's strategic vision

Translate to 10year plan balancing cost, risk, performance and work. Set outcome for capital expenditure in renewals

Project sponsors

Critical friend providing oversight

Professional client

Open doors including escalation if needed

Ensure project lifecycle plan adhered to

A key challenge on the underground has been aggregating TfL's vast individual knowledge of the assets. Traditionally, this has been kept by senior individuals in the form of their own knowledge of when and how assets fail. The limitations of this approach made it difficult for TfL to compare across different potential investments (i.e. where is the marginal money best spent?). A more centralized and complete view on assets enables greater rationality in the allocation of resources across the business. TfL has invested heavily to survey assets consistently to gain better understandings for condition: "we had lots of understanding but we didn't have it in one place in a consistent format." Surveys have helped ensure the comparability and completeness of information. Increasingly, TfL recognizes that asset information is itself an asset.

Over the last 10 years LUL has focused on addressing its backlog of maintenance / renewals and plotting a return to steady state. For example if an asset has a 40 year life, ideally 1/40<sup>th</sup> should be replaced each year, i.e. 2%. Following underinvestment, a higher rate of replacement is needed, say 5%, which is more difficult to achieve without disruption. LU's reinvestment plans aim to return to that 2% steady state in the long run.

The Asset Management Directorate has developed a Line Asset Network Plan (LANP) which serves as an important external communications tool. The LANP articulates the consequence of underfunding to policy makers as well as the trade-offs with respect to whole life cost for different renewal options.

TfL has broad strategies for managing different classes of assets such as track, civils, rolling stock, lifts, escalators, communications, signalling etc. These identify 10 year priorities along with strategies for renewals and lifecycle

management. The planning horizon for different assets varies. In the case of track, the planning horizon is out to 2027.

Key things for Governments to get right:

Protect existing reliability and control costs;

- It is essential to understand the relative benefits between different options. This requires properly applied tools and data; and
- Some approach to accommodating limited or inconsistent information / data. For example, how to compare the benefits of 1 GBP in stations vs. 1 GBP in track given the different functions and lack of direct comparability between these assets.

Quotations:

- “[Now] we know what we want for the network.”
- “Asset lifecycle is also a function of what you renew with.”

Reinvestment funding is key. Oil companies deal with replacement and renewal of oil rigs by keeping a reinvestment fund aside – compare this with government attitudes which are frequently that ‘we’ll deal with it as/when it arises.’ Regarding the example of WMATA in Washington, “*It never crossed their mind that in 20 years’ time they’d need a big stack of money, and they never put it aside.*” Financing for metro build projects shouldn’t be provided unless there is a clear plan and financial provision for renewals and enhancements 20 years into the future. Reinvestment funding needs to provide more than just depreciation because of increases in capacity above the ‘like-for-like’ baseline. **It is good metro management practice to anticipate enhancements when buying long-term assets.** Reserves for renewal must be protected. In 1969, London Transport (LT) was £265m in debt. This was written off, and they were told to put £10m/year into a reserve fund for exceptional renewals. After the third year, the Greater London Council (GLC – then London-wide local authority) had financial difficulties and dipped into the fund. Any new metro scheme needs to pass an acid test of how to fund renewals.

Mistakes TfL has made in the past and learned from:

- Not standardizing;
- Buying for least upfront cost instead of optimal whole life cost;
- Not specifying high availability at procurement – it costs little extra at the time of procurement but is hugely expensive to add on afterwards.
- Not specifying for security needs. E.g. necessary to consider how guideway will be protected from intrusion – not just people crossing at-grade tracks but vagrants or terrorists in underground sections.
- Failing to specify adequately for local conditions. A theoretical example that may apply elsewhere in the world (not in London): if domestic electricity supply is unreliable, there is a risk that people could tap into the network and steal electricity from the railway, so in that circumstance it could be preferable to specify diesel propulsion.

	<p><b>4.2 Stakeholders, their management</b></p>	<p><b>TfL devotes major resource into engagement with its key stakeholders – because they should and do influence what it does.</b> TfL is mature at managing briefings to mayoral candidates: “TfL had to learn from central government about the process of managing electoral change.” This included speaking to candidates and opposition, engaging with all parties. It is important to brief candidates early so they understand the consequences, before they become too populist and crowd-pleasing. It is important to get politicians supporting high-priority projects. Even though they are a consumer voice, London First said they would probably argue against fare cuts because they recognize the need for long-term sustainability. In London, media and politicians use public transport themselves which is important because they know it as consumers.</p> <p>The government is more receptive to lobbying from the business community compared with the planning authority. <b>London First</b> (LF) has a major influence. It represents the London business community, being big business – contractors, consultants, academics, developers. Formed after the failure of the first Crossrail Bill in the early 1990’s its objective is: “<i>Making London the best city in the world to do business</i>”. Senior business leaders got together to create a ‘stronger voice for London.’ Crossrail only happened in the end because it was co-promoted by the business community. They support anything that supports London’s competitiveness, e.g. airport capacity. It achieves this by providing high-level strategic arguments, sometimes better than TfL can.</p> <p><u>For Crossrail</u> LF engaged with TfL in planning and funding –crucially helping convince Central Government that it should support the project. The planning paradigm is the following:</p> <ul style="list-style-type: none"> <li>• Do good planning, in part by engaging with stakeholders – including LF</li> <li>• These stakeholders do and often should influence the project</li> <li>• When they are convinced of the benefits to them, they become willing to part-fund the project</li> <li>• Their commitment and lobbying is difficult for government to resist. Put another way <b>Government is far more confident of supporting a project that us actively supported – and part-funded by – the business community.</b></li> </ul> <p><u>Crossrail 2</u> build on the first Crossrail co-funding template.</p> <p><u>Summary</u> - London First is assists TfL in identifying strategically important projects for the business community, and securing Government commitment for them. It is also a lobby against cutbacks, providing a buffer between central government and TfL.</p> <p>Political unanimity (cross-party support) is key to get metro projects built. Getting everyone of all political shades to rally behind one project is crucial. In Toronto, for example, every time the politics changed, the scheme changed – and so nothing ever gets done. Crossrail has city-wide support because it joins the 4 main business centres: Canary Wharf, the City, the West End, and Heathrow Airport. Crossrail 2 is not a business scheme in the same way, but the principle of capacity is now understood to be important.</p>
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		<p>“Here we decide on one big project and everyone lines up behind it.” The downside is that there is less money for the small-but-important projects.</p> <p>The Tyne and Wear Metro was a good example of alignment between political parties. The metro company chair was a Labour party member; the city council leader was a Conservative. They put aside personal differences for local benefit and worked together to get funding for a Labour-focused organization from a Conservative central government. Croydon Tramlink is another example. LT told the local politicians they were happy for politicians to take the credit if they smoothed the way for the project. They agreed with the opposition leader that if elected they would continue along the same path.</p> <p>New projects are becoming more stakeholder-led. TfL is overcoming the tendency to keep planning close to the chest. Instead they invite the business community to review and sense-check plans. This gets stakeholder ownership, co-promoters, and ensure the business community accept that project benefits don't come for free. London's business community now accept that transport capacity is essential and mixed funding is necessary.</p>
	<p><b>4.3 Risk management</b></p>	<p><u>Summary:</u></p> <p>LUL has had a good RM system. The 2012 Olympics was a wake-up call for TfL – they could not fail. How good is it today? Their assessment is realistic. On a scale where 5 is best practice, he rates the quality of risk management at TfL as:</p> <ul style="list-style-type: none"> <li>• 4/5 for Strategic risk</li> <li>• 3/5 for Operational risk. Risk management has only been embedded in operations for a year, and the culture is still developing. They are developing leading risk indicators which look at how future performance may be affected by risks.</li> <li>• 4/5 for Project risk. The processes are there, but project risk can sometimes be too optimistic because people want to hear good news. A more dispassionate approach needs to be developed. The disaster of the signalling contract that was transferred from Thales to Bombardier and will be 5 years late is a specific problem. There needs to be a culture of people saying “don't tell me what I want to hear, I want cold hard facts,” and all employees recognizing that their primary responsibility is to the company, not to the project. It is important that staff are unafraid to say there are bad signs that the project could be going wrong. IIPAG is useful for providing an unemotional second opinion and recommendations, which TfL usually take on.</li> </ul> <p>What strategic risks face TfL? In no order:</p> <ul style="list-style-type: none"> <li>• London population growth (“a new Birmingham every 5-10 years”): a huge opportunity, with downside risks</li> <li>• Financial: Government spending review,</li> <li>• Mayoral election 2016 see the end of RPI+1% fare increases</li> <li>• The efficiency programme - £16bn over 6-8 years to 2021</li> </ul>



		<ul style="list-style-type: none"> <li>• Union resistance to change – LU is a very traditional industry with numerous historic terms &amp; conditions and in some areas a great reluctance to change them, e.g. Night Tube has been delayed due to industrial action.</li> <li>• New improvements committed – the Night Tube, closing ticket-offices (ongoing)</li> <li>• Modernisation projects – New Tube for London, Northern Line Extension</li> <li>• Undertaking upgrades while continuing to operate the railway.</li> </ul> <p>Rail political risk tends to be long-term and expensive (e.g. Crossrail took 20 years to be funded and approved), whereas for surface transport political risk tends to be short-term and cheap (e.g. mayoral decision to prioritise/hugely increase cycle superhighways).</p> <p><b>The future approach is:</b></p> <ul style="list-style-type: none"> <li>• <b>For RM to increasingly drive the Board agenda</b></li> <li>• To embed an understanding of RM and RM processes by extensive training, developing a sustainable capability.</li> <li>• With a focus on more quantification</li> </ul> <p>Until recently LUL and TFL were separate. Today they are one group, and the process of integration is an ongoing challenge. Today there exists a single:</p> <ul style="list-style-type: none"> <li>• Risk Policy</li> <li>• RM process – across the whole organisation</li> </ul> <p><b>Tube Lines - Example of culture change</b>– a combination of Terry Morgan’s leadership and a huge change management programme changed the 2,500 inherited LU staff from not wanting to be there, to being proactive/passionate employees. Many incentives were introduced.</p> <p><b>External checks</b> – IIPAG have helped and most of their recommendations have been implemented</p> <p><u>The details</u></p> <p>A key turning point for TfL was the Kings Cross fire of 1987. This shocked the organization and set in motion changes that would help bring TfL to where it is today. One of TfL’s most important achievements is its improved safety record. Aside from the obvious benefits, improved reputation for safety prevents shocks to the organization and allows it to carry on with other business. For instance, a major safety incident usually results in management shakeup, so safety issues present a corporate risk as well as the inherent moral risk. <i>“The safest railway is one where you don’t run any trains, but that’s not in anybody’s interest”</i></p> <p>LU’s strategic corporate and operational risks are managed by two teams, ‘corporate’ and ‘operational.’ Project risks are managed by risk staff embedded in project teams. Project staff tend to have a greater understanding of risk management whereas the operational staff tend to focus on the day to day activities.</p>
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LU is building a sustainable risk management (RM) capacity to support operational staff to identify and manage risk. Operational risk managers work with local operational managers developing risk management plans. Embedded risk management is a key element of PAS55 asset management accreditation. The aim is for everyone in the business to know what risk management is for, even if they don't do it themselves. 280 managers across TfL have already been on a risk awareness training course with a similar amount planned for the future. The aim is not to turn people into risk managers or focus on processes, but to educate them, raise their awareness, and get them interested in the management of risk. The focus of the training is on why manage risks and for the benefits of delivery. There is also an e-learning tool that is available to all staff. Senior staff now additionally have risk management included in their executive training.

The MD Finance is the board member responsible for risk (role is covered by CFO when MD Finance unavailable). There is also a strategic risk management panel chaired by the Chief Finance Officer (CFO). The panel includes all financial directors from the business, as well as the leaders from the risk management team. They use the panel to ensure risk management processes operate across all of TfL rather than operating in silos. There is an ongoing process of integrating risk management across the different parts of TfL. TfL is more like one company now, whereas in 2000 it was maybe more clearly separated into LU and operational businesses. The risk management integration started with a review of processes across Rail & Underground (R&U). The review found that risk management was more of a 'tick box' exercise with not enough resources, so collaboration between business units was established to ensure any new resources or procedures (e.g. the new Risk Policy) were harmonized in outline across TfL. This also prevented the problem of LU and TfL risk plans passing risks across to each other.

The Olympics were a key moment in developing TfL's risk management culture. The event brought risk management to the forefront of everyone's mind because there was a massive desire not to mess it up. The event pushed the organization up to the next level. [And the transport was a great success; athletes had access to transport in priority lanes but still a number still chose to travel on the Tube as it was the best way to move round London.]

LU operations are split into three line groups: JNP, SSR and BCV. Each group covers operations and asset performance and has a director leading it. In the Strategy & Service Delivery division there is a team of asset managers, with one manager per asset type. Each operational risk manager covers one line group and is the focal point for one class of asset, so the asset manager doesn't have to speak to three separate people about each issue. There are regular meetings between asset managers, risk managers, and operations managers, to identify risks and decide on solutions.

		Operations manager		
		JNP	SSR	BCV
Asset manager	Track	→		
	Civils	→		
	Signalling	→		

When recruiting risk managers, TfL does not only look for risk skills. Rather, the focus is on people who are good with people, can communicate, and can see the big picture. TfL is currently building a framework for people in risk to attain qualifications and manage their careers.

Metros need a leader who understands risk management. Recruit a COO who understands RM and it can set the tone throughout the organization. If the person at the top is committed, the rest will fall into place. They'll ask about key risks and mitigation, and demand to be kept updated. "In many ways, a leader who understands and supports risk management is more important than a sophisticated risk process.

There needs to be a culture of escalating problems, not just a lot of processes. "It's about making sure that people challenge each other". Risk management should add value, challenge managers, and increase their awareness of their position of the wider business.

The processes themselves are not that important as long as there is leadership from the top, managers understand responsibilities, and there are effective external checks. In London's case, IIPAG and an annual check on strategic risks do this.

The annual risk audit and assurance identifies key audits to confirm that risks are being adequately managed. The audit results are reported to the Value Programme Board, who will take a view on how TfL are controlling key risks.

The TfL board includes as non-executives political appointees, people with technical experience, and unions. Board meetings are largely held in public. Currently there are too many board papers for 'noting' or 'updates.' A future plan is to combine these into a risk management 'pulse check' for the whole business which could drive the board agenda.

**4.4  
Benchmarking**

Benchmarking is not really a separate management process, but an integral part of asset management and risk management.

	<p>It is separately addressed, because few outside those with experience of benchmarking understand what it is and its potential. This must be spelt out in our Report.</p> <p>Benchmarking is one of the central ways of metros succeeding. They may be seen to have 3 opportunities to succeed</p> <ul style="list-style-type: none"> <li>• Developing an opportunistic strategy for the Metro</li> <li>• Improving its day-to-day operations. How to do this? Learn from other metros/ benchmark</li> <li>• Developing major projects successfully. How to do this? Learn from other metros/benchmark</li> </ul> <p>TfL's benchmarking team initiative includes 12 people. It was established to replace the PPP Arbiter capability after Tube Lines was brought in-house in 2010 and the Arbiter role was ended. The Benchmarking team is doubling as an internal management and change consultancy using lessons gleaned from benchmarking. One key challenge they face however is disseminating the learning from benchmarking throughout the rest of the business.</p> <p>The CoMET escalator specification &amp; maintenance benchmarking study showed that LU and one other metro were spending lots more than anyone else on new escalators, refurbishments, and maintenance. LU spent £100,000 as part of the 7.5 year Tube Lines PPP Contract Review to fund a detailed follow-up benchmarking study including travelling with LU engineers to see other escalators in the rest of the world. The study convinced the LU Directors and key engineers that change was possible and a complete revision of LU's escalators asset strategy ensued. The study identified problems including bespoke specifications with 'bells and whistles', only two suppliers made this specification in the UK, they were being maintained only in-house and only at night, with major works being done too frequently on a rules-based periodicity. Seeing other metros (some busier than LU) enabled a change to off-the-shelf (but heavy metro duty) designs, with 4 manufacturers able to bid, and whole life maintenance contracts. A contract to maintain 110 Jubilee Line escalators placed by Tube Lines under the PPP contracts was half the cost compared with TfL in-house, but still costly in world-wide comparative terms due to LU's onerous Standards requiring maintenance at unnecessary frequencies and also work to be undertaken only in engineering hours. Escalators account for 9% of London Underground's asset spending. By spending £100k on this study and making changes based on world practices, LU enabled savings on 400 escalators over 40 years' worth at least £750m, plus further savings predicted on 100 Crossrail escalators. An initial contract for the purchase and whole life outsourced maintenance of 50 'off the shelf' heavy duty escalators already demonstrates savings in this order for this first tranche of London Underground's total escalator fleet.</p> <p>"If you can save that much on one asset, you ought to be able to save it on other assets." The key was accepting that LU was not so 'different' and could adopt COTS solutions and properly analysed criticality and risk-based major intervention cycles and maintenance. You have to prove your way out of a rules-based approach, and benchmarking is one way of doing it. Benchmarking can be a useful short-cut for data gathering and analysis. It is however vital for strategy changes of such magnitude to actually see how the different approaches work in practice at other metros and to take sceptical engineers along with you in addition to just exchanging data.</p>
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		<p>Metros must avoid getting entrenched in old practices. E.g. there is a risk that people from Indian Railways (IR) embed IR practices in new metros where they are not necessarily the best practice. “Use things like RTSC and CoMET to tap into others’ experiences.”</p>
<p><b>5</b> <b>Major project development</b></p>	<p><b>5.1</b> <b>Planning</b></p>	<p><b>Challenge – avoiding mistakes that cannot be rectified</b></p> <p>Metro systems require many decisions. Some if poor can be rectified by retrofitting the metro system. But others cannot be, and it is important to be clear what these are and how mistakes can be avoided. Examples of the latter are a failure to integrate the metro with land use changes; and a failure to plan for high capacity. <i>“If you don’t use the opportunity to reshape the city, you condemn the city to being a mess forever.” “Don’t make the mistakes which cannot be fixed – and they’re all the way upstream”</i></p> <p><i>“The question to ask is not ‘what should the metro need to do’ but ‘what do we want this city to be?’”</i> In the UK, agglomeration benefits are well understood. But they are not considered anywhere else in the world.</p> <p><i>“There are only two types of metros in the world. There are metros that are empty, and metros that are full. There’s nothing in between. If you can enmesh yourself into the city, you want every bit of capacity you can get. And if you’re not doing that, don’t build a metro.”</i></p> <p><i>“TfL is a very competent strategic planning authority.” It understands the challenges, constraints, and options for the next 20 years – and this is all backed up by data.</i></p> <p>Planning in London is led by the mayor. The key document is the <a href="#">Mayor’s Transport Strategy</a> (MTS). This sets out what is needed, unconstrained by cost. It is linked with the London Economic Development Plan and the London Plan which is the spatial plan for London. It has recently been supplemented by the 2050 Infrastructure Plan which attempts to specify and cost all infrastructure needed to 2050. The TfL business plan takes the (unconstrained) MTS and translates it into what is possible and funded.</p> <p>The mayor ensures that different modes are planned together. For example, once the Overground was operating, bus routes were adjusted. Similarly when Night Tube starts, night buses will be amended. Only the LTA in Singapore has comparable multi-modal planning power.</p> <ul style="list-style-type: none"> <li>• <i>“If you’re not responsible for both, [integration] doesn’t happen”</i></li> <li>• <i>“You have to be able to balance between modes”</i></li> <li>• <i>“[Singapore LTA’s] transport strategy is really good because they say exactly what they’re going to do, and exactly what they’re going to spend.”</i></li> </ul> <p><b>TfL’s planning role is to identify how to achieve the Mayor’s goals, defined in:</b></p> <ul style="list-style-type: none"> <li>• The London Plan setting out spatial development strategy (finalised after public consultation)</li> <li>• The Economic Development Strategy (produced by the GLA and LDA)</li> <li>• 2050 Infrastructure Plan – that looks ahead to assess all infrastructure needs/ costs and what may be justified – this sets the context for....</li> </ul>

		<ul style="list-style-type: none"> <li>• The Transport Strategy 2030 – this is delegated by the Mayor to TfL. Currently being revised to 2040. It defines ‘what we need’ – there are no affordability constraints</li> </ul> <p>London has seen an evolution in the planning of major metro and metro-like investments. Crossrail is an example of this as it resembles more of a broad urban development project rather than just a concept for an operating railway. <b>The focus is on catalysing/ managing London’s growth.</b> Transport projects are to enable this by impacting land use/ densities. The Jubilee line extension was the first example of economic development leading metro investments. The original plan had been to stay south of the Thames and go to Lewisham, but the plan was altered in response to emerging development at Canary Wharf. The importance of river crossings for agglomeration was also being recognized, and the new route gave “three river crossings for the price of one”.</p> <p>The £15bn <b>Crossrail</b> under construction is a capacity expansion project. A key piece of thinking behind Crossrail is how it contributes to London’s wider transport network, not simply seeing it as a standalone line. It is crucial to realize that the city-wide transport network is the key outcome (not the project, per se). The solution to the tendency for everyone to focus on their own projects and modes is to start with the market and see what demand is there. Engineers working on Crossrail are thinking about the whole project, not just the railway. The vision is to make it a unique and better integrated line than any rail so far in London.</p> <p><b>Crossrail 2</b> is the next major project, <u>at the Initiation/ Sponsorship stage</u>. Its objectives are to :</p> <ul style="list-style-type: none"> <li>• Open up the Lea Valley (200K new homes)</li> <li>• Capacity expansion to support employment growth in the centre</li> <li>• Reduce overcrowding on lines south-west of London</li> </ul> <p>Its ‘strap line’ is “<i>to enable 200,000 new homes + 200,000 jobs in the centre, providing transport between them</i>”.</p> <p>The core paradigm for job growth is:  <i>Improved PT accessibility &gt;&gt; increased density &gt;&gt; higher productivity &gt;&gt; more jobs/ wealth creation</i></p> <p><u>A package approach</u> is planned, comprising the project + complementary policies and investments. Land use changes and transport provision will go hand-in-hand.</p> <p>The <u>planning approach</u> involves:</p> <ul style="list-style-type: none"> <li>• Public and stakeholder engagement – including working with Network Rail and key lobbyists London First / LEPs</li> <li>• Extensive alternatives analyses - alternative ways to meet the Mayor’s strategy goals</li> <li>• Consideration of ‘regional’ and ‘city’ schemes</li> <li>• Safeguarding the preferred corridor – while recognising many changes may yet be necessary as a result of stakeholder engagement. <b>ONGOING ENGAGEMENT is the core process</b></li> </ul> <p>The focus <b>for the next Development/ Design stage</b> is how to secure good ideas from others</p> <ul style="list-style-type: none"> <li>• The programme is tentatively Hybrid Bill 2017, Construction start 2020</li> </ul>
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		<p>conceptually somewhat similar to a long-term aspiration of a southwest-northeast line, it was adjusted to optimize its benefit in current conditions.</p> <p>Options development was pursued rigorously. Orbital trains and DLR routes were looked at, as well as two options for Crossrail 2: a shorter 'metro' type scheme and a longer 'regional' scheme. These were tested by peer review and the latter two selected and put forward for public consultation, achieving 90% public approval, and revealing a preference for the regional scheme. Key to the project has been ongoing consultation to ensure the scheme continues to have public support. TfL is working with the business group London First to get businesses interested and supporting the project.</p>
	<p><b>5.2 Project development</b></p>	<p><u>Starting principle</u> - "Involve from the beginning the people who are going to live with the assets".</p> <p><i>"In new metros, the power is held by civil engineers."</i> It might extend to mechanical or electrical engineers, but insufficient influence is given to economists, operators, planners, and <i>"the visionaries who see how the metro will interact with the city – they need to have some power as well. That's the magic that holds it all together."</i> It is understandable that metro projects are dominated by civil engineers, but not good. Having spent all the money on capex, it's necessary to spend the small extra amounts on systems investment to squeeze the maximum value out.</p> <p>The TfL <u>project development process</u> 'PATHWAY' and Network Rail's 'GRIP' satisfy HMT/ OGC's gated project development requirements.</p> <p>The impact of upgrades and new projects on existing operations has become increasingly critical. This requires in-depth planning to manage adverse impacts upon customers. Winning hearts and minds is the objective. "Raw reliability" issues must be addressed before funders (i.e. line ministries and politicians) can have confidence to support more ambitious schemes.</p> <p>Re-signalling projects are recognised as hugely complex globally. 3 projects have been completed and contracts let for a further 4 (the 4 lines upgrade of the subsurface railway).</p> <p>TfL has incentivised contractors to propose innovative designs, for which they are recompensed if not successful in bidding. This identified a new concept at Bank station.</p> <p>Crossrail is a very well-defined project. The project documents include sponsor's requirements and project requirements. The sponsor's requirements set out in 40 pages exactly what the sponsor wants from the £15Bn project and 1000 project staff, keeping operations in mind. The document strikes a balance between being definitive enough to provide clear direction, but also remaining high level enough not to become legalistic.</p> <p>Crossrail required a pragmatic decision at the point where the bill was going through parliament, to chop out one proposed operational branch (to Richmond/Kingston) which had significant public opposition. The decision was made to remove this branch from the proposal to ensure the project got started. The issue with public objections is that there are always winners and losers, but "losers shout, winners don't exist till it opens." There is a related risk</p>



		<p>that if lines have too many branches for political purposes (to provide many areas with one-seat rides), the railway becomes inoperable.</p> <p><u>Involving operations</u>  One thing that helped the early Hong Kong metro was to hold ½ hour meetings each morning during planning and construction, with the heads of all major functions. During this meeting, all problems were to be aired without negative consequence so that a collective solution could be found. No major decisions got taken without the operations director’s knowledge.  The whole organization needs to “make sure operations and project management are integrated” so that “project managers don’t just build and go home, and leave it on operations.” Projects must serve operations – so it’s crucial to get the requirements upfront and to make sure operations people engage in the project, not just focus on running the existing railway.  If there is no operator appointed, it is crucial to have an experienced operator act as a proxy for the eventual operator during project development. Don’t touch the job until a full plan is made.  Make sure the people planning the project understand metro operations. A prominent member of the Institution of Civil Engineers once said: <i>“we love creating infrastructure. We rarely think about what it’s for.”</i>  In implementing the DLR it was difficult to get alignment between project objectives and the project procurement strategy (which was PPP on account of the UK Government’s policy decision). The project had been planned as an engineer’s contract prepared by LU, and the decision to go with D&amp;B was made at the last minute by the minister who funded the project. The client hadn’t been prepared to deal with that procurement method, and it made it difficult to manage changes. For example, rolling stock were equipped with bus-like doors which planners knew to be deficient for speedy boarding and alignment. However, once the D&amp;B contractor made this decision, it would have cost £3.5m to change, so the fixed budget locked this technology and its inherent problems into the scheme.  <i>“Don’t do half a job [in project preparation]”</i>  <i>“The biggest mistake to make is to just let a load of contracts – and that’s the easiest thing to do”</i>  <i>“It takes longer to train a well-rounded rolling stock engineer than a brain surgeon.” (15 years)</i></p> <p><u>Developing Crossrail 2</u>  High Speed 2 (HS2) formed a company and did detailed work early on, which later had to be amended. Instead, Crossrail 2 is trying to consult systematically to avoid re-work later. Getting public buy-in is important in getting funding approved. They have identified some parts of the project that are good projects in their own right and could be started in advance of the main Crossrail 2 package:</p> <ul style="list-style-type: none"> <li>• 4-tracking along the Lee Valley (northeast) section to improve services and enable more fast as well as stopping services to Stratford</li> <li>• Some level crossing changes in the southwest section could tie in with Network Rail plans to change level crossings to improve safety and reliability</li> </ul>
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	<p><b>5.3 Innovative project funding</b></p>	<p><u>Summary:</u></p> <ul style="list-style-type: none"> <li>• Taxing development gain through S106 is useful - £50mn collected so far</li> <li>• Stamp duty accrues over time from inflated property values</li> <li>• A low tax supplement on the business rate can raise more – will raise £4bn for Crossrail<sup>iii</sup></li> </ul> <p>The principle should be that beneficiaries pay for the benefits they receive. So the planning process should be:</p> <ul style="list-style-type: none"> <li>• Who are the beneficiaries</li> <li>• (How) can they be persuaded to pay – by engagement (as with London First)?</li> </ul> <p>For Crossrail some of the largest increases in property values are in places where no funding is being raised (e.g. Ealing). And for Crossrail 2 this will be even more of an issue.</p> <p>There is increasing acceptance that major urban rail schemes have beneficial outcomes. E.g. the BCR for the JLE was marginal or &lt;1, but anyone can see it has not destroyed value. In London there are lots of attractive opportunities for building metro – although it's hard to prove it's not taking investment or growth from somewhere else.</p> <p>The idea that London has had its turn and national government spending should go to the north of the UK is a risk for London. LF try to avoid the idea of a zero sum game, and try to support other cities including their counterparts in the 'Northern Powerhouse.' Some people in TfL thought that winning Crossrail funding would cut off funding for the tube modernization but that hasn't been the case. The key to making Crossrail 2 work is showing that London is contributing money. They are trying to ensure that at least 50% of the funding comes from London, including non-government contributions from business that other UK regions couldn't get.</p> <p>For Crossrail 1, the public sector will buy £95m of land, and get back £500m from over station development. A problem has been earlier promises to put back the townscape as before. For example at Tottenham Court Road</p>

		<p>there was a promise to put back the theatre that was demolished, not a tower that would better fund the project. These lessons have been learned for Crossrail 2; it is planned to intensify development around stations where appropriate.</p> <p>TfL recognise concern from the rest of the country about megaproject investment in London (Crossrail, airport expansion). To make Crossrail 2 and other megaprojects happen, TfL believe it is important for London to 'pay its own way' as far as possible. The 'beneficiaries pay' approach is its response. The 'beneficiaries pay' approach is supported by 3 key questions:</p> <ul style="list-style-type: none"> <li>• Who are the groups that will benefit?</li> <li>• Is it reasonable to ask each group to contribute?</li> <li>• What is the right mechanism to extract funding?</li> </ul> <p>This includes the use of mechanisms available now AND potential development of new mechanisms for devolved funding. TfL has identified who benefits, and how they could contribute as follows:</p> <ul style="list-style-type: none"> <li>• <b>Passengers:</b> will contribute through fares</li> <li>• <b>Businesses:</b> will contribute through business rates (Crossrail 1 has been partially funded by a 2p in the pound increase to London's business rates, which will raise £4Bn for Crossrail). Taxation-like mechanisms can capture value from land you don't own. A broad tax-based structure at relatively low % has produced lots of money for Crossrail. E.g. £4Bn contribution of business rates – this was done as an alternative to PFI. The business levy (for Crossrail 1) is 2%. Small businesses are exempt. Retailers didn't like it. However it is basically invisible for big business, but very useful for TfL. Similarly, so far, Section 106 contributed £50m, planning permission tax contributed £150m against a target of £200m + £300m for March 2019. Crossrail Canary Wharf station is being built by the private sector. TfL did the finance, Canary Wharf did equity and risk. This arrangement was made because the Canary Wharf Group (CWG) was keen to retain control of over-station development. Otherwise TfL would have had to do a compulsory purchase, build the station, and then sell back to Canary Wharf. TfL were confident that CWG could competently construct the station because they had successfully built most of the Canary Wharf Estate. Partial devolution of tax revenue from 2019 will provide an incentive to grow the tax base quickly. The Battersea power station development is effectively a prototype for this, and how building intensification may increase investment in London's infrastructure.</li> <li>• <b>Property developers:</b> Community Infrastructure Levy (CIL). High housing densities planned (200k new homes) will increase CIL contributions. A package approach will be used such that the go-ahead for the line is directly linked to property development, i.e. as accessibility is improved, so densification will be enabled. The Northern Line Extension (NLE) to Battersea Power Station is being planned this way. The scale of density needed for return on investment at the Battersea Power Station site is beyond that which could be served with buses or existing trains. So the development is linked to the NLE. The NLE will be part-funded by CIL paid by developers, business rate increments (as business rates increase, the increment funds NLE), and planning contributions ('Section106') from Battersea Power Station. Funding includes £200m from Battersea Power Station and £60m from other development sites.</li> </ul>
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		<ul style="list-style-type: none"> <li>• <b>Homebuyers:</b> Crossrail 1 focused on land value in the centre, but actually the biggest % increase in land values have been in established suburbs like Ealing – and there is no mechanism to capture that (no development tax, council tax at 1990 rates, stamp duty is slow to respond)<sup>iv</sup>. For Crossrail 2 they predict a similar phenomenon will occur in established SW London suburbs between Chelsea and Kingston, and are trying to work out how to capture it. Otherwise the public sector is paying to give people a property value gain they haven't paid for. The aim is for property transaction taxes (stamp duty) collected around Crossrail 2 route to be ring-fenced for London. It is projected that this could raise £5Bn from 200,000 new homes, and £15Bn from turnover and incremental increases in house prices. This projection is supported by evidence of Crossrail 1 already having a discernable effect on house prices (it opens in 2018). Stamp duty retention has not yet been used to fund transport projects, Crossrail 2 is the first to make the argument for doing this. This approach relies on the project having widespread support in the city. In London there is a strong business consensus that productivity will benefit from improved transport connectivity, as well as land for much needed homes being unlocked.</li> </ul> <p><b>Challenge – major capital investment</b></p> <p><i>Crossrail</i> was the core challenge. In the early days the Mayor was Crossrail's only friend. TfL realised that “simply” producing a compliant appraisal, that demonstrated good value for money and quantifying the funding gap that central government would need to fund was simply a non-starter (‘laughable’ in retrospect, albeit an approach still widely followed). There were many competing demands for funds, many outside London and this approach would result in <b>no project</b>. Instead what was needed, and was therefore put in place was a combination of:</p> <ul style="list-style-type: none"> <li>• A <b>compelling narrative</b> that demonstrated Crossrail’s critical role in creating an economically successful London, and</li> <li>• A <b>funding strategy</b> that was acceptable to all. The key issue was to engage with the <u>business community</u> that would reap the benefits from large changes in land values and to secure their willingness to provide significant funding via changes in business rates (council tax was considered but discounted as it is a huge political sensitivity – has caused riots in the past).</li> </ul> <p>Securing changes to the <b>business rate</b> arrangements required huge endeavour by TfL and engagement with the Treasury (HMT)/ DfT/ ODPM – “<i>we kept doing it relentlessly</i>”:</p> <ul style="list-style-type: none"> <li>• TfL initially had to understand fully the complexities of business rates, and ended up knowing everything there was to know - and probably more than HMT. “<i>we figured it all out to the extent that I could lecture people in the treasury on how their own tax worked</i>”</li> <li>• First businesses had to be made to understand the implications of ‘no Crossrail’ for them, and that if it was to happen they <u>must</u> contribute to it. Moreover many had already contributed to the planning work and their sunk investment would be lost if the project did not go ahead.</li> </ul>
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	<p><b>5.4 Project Management</b></p>	<p><u>Competence breeds confidence</u>  Investment in Jubilee Line Extension and the Channel Tunnel in the 1990s suffered due to insufficient project management expertise and capacity. Failures made it easy for the treasury to say not to further funding, whereas now proven success means there is less excuse. Thus being able to say “we’ve shown we can manage projects well” is vital to be able to get politicians and customers on board for the journey, to provide funding and tolerate disruption. For example, the operational performance of Heathrow Airport before Terminal 5 was built was poor. This contributed towards airport expansion not being approved in the 1990s – dissatisfied customers don’t support expansion. LF were initially worried that Crossrail 2 would be perceived as too ambitious, but Crossrail 1 is going so well that people now think it’s the natural next step.</p> <p>Major project expertise builds over time. This is evident in incrementally improved experiences since the Jubilee Line extension. TfL’s projects now follow the Pathway gateway process with externally published milestones. If milestones are missed, it could erode central government’s confidence and impact funding. But over the last few years milestones had largely been achieved, central government’s confidence has therefore gone up, and so funding has increased.</p> <p><u>Lessons learned</u>  Though a complex project with hard deadlines, several very good things came out of the Jubilee Line extension: (i) new approach to schedule risk; (ii) recognition of need to build skill and experience to deliver; (iii) evidence for the latent potential of transport investments to drive further development of London – it was a success in the end.</p>

	<p>Schedule risk is now managed by working out all risks, assuming 50% happen, then adding a few months to the publicly announced 'end date' of the project. As a result, recent projects such as the East London Line and Northern Line upgrade finished 'early.'</p> <p>For capital works, TfL is now tracking more than spend to budget. Projects also get evaluated based on the accuracy of initial forecasts. There is an increasing focus on getting forecasts to be accurate in time as well as in total spend, i.e. in which month the money will be spent.</p> <p>IIPAG notices that individuals are good at learning from previous similar projects, but there isn't a rigorously enforced culture of ex-post evaluations (e.g. benefits, EFC, accuracy of original reports) and capturing of lessons learned.</p> <p>TfL are trying to involve contractors early in the design process, which the contractors keep saying they want – but they then haven't been able to give details about what they want. It is good for designers to have construction people as part of the planning team to highlight potential construction issues avoid re-work or cost escalation later. IIPAG sees itself as a 'critical friend' which provides scrutiny of capital projects at key project gate moments, e.g. tender, bid award. They provide a 2-3 page report highlighting issues, and the project manager has to write a response. Types of issues highlighted include:</p> <ul style="list-style-type: none"> <li>• Project interactions with Network Rail, which have historically been problematic</li> <li>• Attitude to risk: there used to be a culture that risk/contingency money was there to be spent, whereas there is now a culture of delivering to Expected Final Cost (EFC) unless there is a really good reason. Estimate that cultural change saved ~£1Bn.</li> </ul> <p>One of IIPAG's views on TfL is that their commercial management in capital programme delivery is less strong than their operational delivery. This implies that while TfL may be highly effective at delivering major investments and operating a safe, timely, and high quality railways service they may not necessarily be delivered at lowest whole-life cost.</p> <p>TfL is now more conscious of the concept of the project "complexity cliff" at which projects suddenly become much more difficult to manage. Key features that drive this in some upgrade projects include the project being:</p> <ul style="list-style-type: none"> <li>• Multinational</li> <li>• Involving cultural/operational rules</li> <li>• Involving software</li> <li>• Taking place on an operational railway</li> </ul> <p>The presence of these issues in a project inform the advertised schedules and level of contingency planned.</p> <p>An external view: TfL is generally a good delivery authority (notwithstanding some issues, e.g. the cancelled SSR Bombardier contract) and operational performance is improving. It is impossible to know how efficient it is. LU have certainly increased efficiency, but neither they nor the government have any real way to know if their efficiency is optimal.</p>
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	<p><b>5.5 Modernising an operating railway</b></p>	<p>Line closures are highly disruptive and detrimental to customer perceptions of service quality and reliability. The PPP contracts did not specify or control the number of closures. There was no obligation to bundle works or even to use the closure (e.g. if the supply chain didn't deliver and the closure therefore wasn't needed that weekend). Public dissatisfaction with closures during the Jubilee Line upgrade led partly to the ending of the Tube Lines contract, as the contract needed to be taken in-house in order to re-engineer the contracts with the supply chain to avoid closures.</p> <p>TfL has devoted considerable effort to managing closures more effectively and maximizing the utilization time when the railway is not operating. Three key metrics include: (i) hand back on time; (ii) % of work done to plan. Planning is done to the nearest metre, the original target being 80% but 90-95% now being achieved; and (iii) how much work is taken out of weekend closures and achieved at night instead.</p> <p>In procuring works TfL has also placed value on minimizing closures. For example, the procurement of the contract to increase the capacity of Bank station placed a value on minimizing closures such that innovations by contractors that would minimize closures would be formally valued during the bid evaluation.</p> <p>TfL has also developed working procedures to enable work to continue without closures. For example, this may include posting lookouts to allow working on parallel tracks whilst one line is in operation. The lookouts warn workers of approaching trains and direct them to move back prior to trains passing close to the worksite. Similarly it is now permitted to work on a platform at a station with trains passing through if there are platform-edge barriers and a speed restriction on passing trains. TfL has also encouraged the use of new technologies and offsite working (e.g. test tracks) that reduce the need for closures.</p> <p>The use of adjacent line working had to be agreed with the (very risk-averse) safety regulator. LU had to carry out a proper risk assessment to demonstrate people can be safe, and go through a formal process to adjust the safety case for working on the line. The safety case was underpinned by the fact that there are 3-4 different ways to know that a train is coming.</p> <p>TfL has also made extensive use of night working in order to minimize the need for closures during busy hours. The logistics of night working are daunting and include managing the following within a thin 4 hour window: Managing ≈ 1,500 people across different sites (30-40 per worksite): Booking on and off via smartphones is being used to speed up this process;</p> <ul style="list-style-type: none"> <li>• Power shutdowns / restarts: starting shutdown exactly on time is crucial;</li> <li>• Management of access points to get plant and materials to work locations: LU are increasing the number of places they can get equipment onto the tracks as this can save up to 1hr at either end of the access window;</li> <li>• Quality management across different works and sites: Ensuring there is an approved plan and signed off designs in advance; managing approvals in real-time during the night by swiping QR codes, reducing the time required for distributing hard-copy approvals.</li> </ul>

<p><b>6</b> <b>Miscellaneous Dos and Don'ts (success factors)</b></p>	<p><b>6.1</b> <b>Key requirements for governments to get right</b></p>	<p>The key requirements for governments to get right are:</p> <ul style="list-style-type: none"> <li>• Long-term funding certainty (or something approximating to it) “you can't make long-term decisions if you don't have stability of funding”;</li> <li>• Clear objectives – this helps focus the business (e.g. mayoral election commitment to reduce delays by 30%)</li> <li>• Holding both the organization and its personnel to account for delivery.</li> <li>• Contractual arrangements that can be enforced. PPP concessionaires could not in practice be held to account.</li> <li>• Any new metro scheme needs to pass an acid test of how to fund renewals.</li> <li>• Political unanimity behind a metro scheme is critical. Engaging the opposition along aligned interest is important for success of a metro.</li> <li>• Managing morale – especially during any down times when things are not going well. Blame and ridicule do not help staff or improve outcomes. If a scapegoat is necessary, it should be a top person not the whole organization, as a demoralized organization doesn't perform;</li> <li>• Split any opex subsidy from capex and watch for potential raiding of the capex budget; and</li> <li>• Good approach to continuous improvement and enhanced efficiency.</li> </ul>
	<p><b>6.2</b> <b>Lessons for other operators</b></p>	<p>TfL is at one extreme of world metro Operators. Indeed it is more than an Operator, being also a Transport Authority. It demonstrates best practice in large part because of this institutional arrangement. It follows that it provides <b>lessons for both Operators and Authorities</b>. Many cities have different institutional arrangements, with Authority and Operator separate, and the Operator may be a private concessionaire. TfL's experience highlights something not always recognised – that Operators' concerns need to be wider than 'just operations' even when they are 'just operators'. This is because the decisions of others (their Authority/ regulator) impact upon them and these decisions are often taken without understanding the consequences for operations, resulting in unintended adverse consequences.</p>
	<p><b>6.3</b> <b>Success templates are important</b></p>	<p>Success breeds success, and demonstrating success repeatedly is critically important. A success template applied once may well have future application, for example:</p> <ul style="list-style-type: none"> <li>• HS1 and the Olympics provided central government that the UK could deliver to time and budget</li> <li>• Crossrail 1 provided a co-financing template with beneficiaries contributing to funding. This worked and can be replicated</li> <li>• Crossrail 2 is developing a holistic approach to land use transport planning, developing a project to catalyse the Mayor's strategy, through a package approach</li> </ul>



		<p>This process builds TfL's capacity, enabling it to become increasingly effective – something it has done in many areas.</p> <p>Continuity of funding and projects is essential. “Don't stop-start – keep learning/ doing”</p> <p>Political unanimity is essential for major projects, that take many years to develop/ implement</p> <p>Be supportive of the organisation when things go wrong. Fire the Head, do not sully the organisation – esprit de corps is very difficult to create and readily lost.</p> <p>New metro – don't appoint a General Consultant and let loads of contracts. Stay in control.</p> <p>The Authority must take responsibility for systems integration, take the long-term view and develop long-term relationships with suppliers</p> <p>Avoid multiple infrastructure maintainers!</p> <p>Standardise</p> <p>Think ahead about possible legal/ regulation changes that could impact the project during implementation. Flush out changes before contract award.</p> <p>Buy on the basis of whole-life performance + ensure support from the supplier</p> <p>Always think – safety, security, terrorism</p> <p>“You can't outsource strategy, or IT”</p> <p>“Society breaks down when there are strikes – it should be an essential service”</p> <p>Multi-year budgeting essential, to provide some predictability.</p>
<p><b>7 Conclusions</b></p>		<p><b>Metros need a farebox ratio of 1.4 for long-term financial sustainability – but few have this. So there is a need for public investment &gt;&gt;&gt; and regulation with efficiency targets +some predictability of funding</b></p> <p>TfL has achieved much in recent years:</p> <ul style="list-style-type: none"> <li>• Become increasingly integrated</li> <li>• Increased focus on delivery, less on post appraisal and closing down projects</li> </ul> <p>TfL has become an excellent Operator that now needs:</p> <ul style="list-style-type: none"> <li>• To also become commercially focused on value-for-money and prioritisation across the business</li> <li>• To become expert at dealing with property developers</li> </ul>

		<ul style="list-style-type: none"> <li>Probably needs to streamline its structure</li> <li>and needs to become more efficient</li> </ul>
<b>8 TfL's wish list</b>		<p>Even greater certainty of funding – perhaps under a regulatory regime similar to that of a utility. One risk of this is the potential for TfL to become complacent and non-responsive, as political influence currently ensures responsiveness to London's needs. Increasing the power / influence of customers may be one way of preventing this.</p> <p>Increased ability to raise revenue and capture financial benefits to fund schemes. This could include compulsory purchase, powers to buy land for property development joint ventures and / or some explicit means to capture increased stamp duty revenues.</p> <p>Increased integration with surface rail network and suburban services. This could come about through greater devolution of powers and revenue raising abilities</p>

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<sup>i</sup> Mitchell, B. 2003. Jubilee Line Extension: from concept to completion. Thomas Telford, London

<sup>ii</sup> In the five years from the launch of London Overground on previously non-TfL lines, ridership increased 360%, from 33m to 120m  
<http://www.economist.com/news/britain/21587223-how-one-railway-line-helped-change-way-londoners-commute-loop>

<sup>iii</sup> Crossrail Funding Summary, <http://www.crossrail.co.uk/about-us/funding#> accessed 7/3/2016

<sup>iv</sup> Crossrail Property Impact Study, GVA Grimley, October 2012