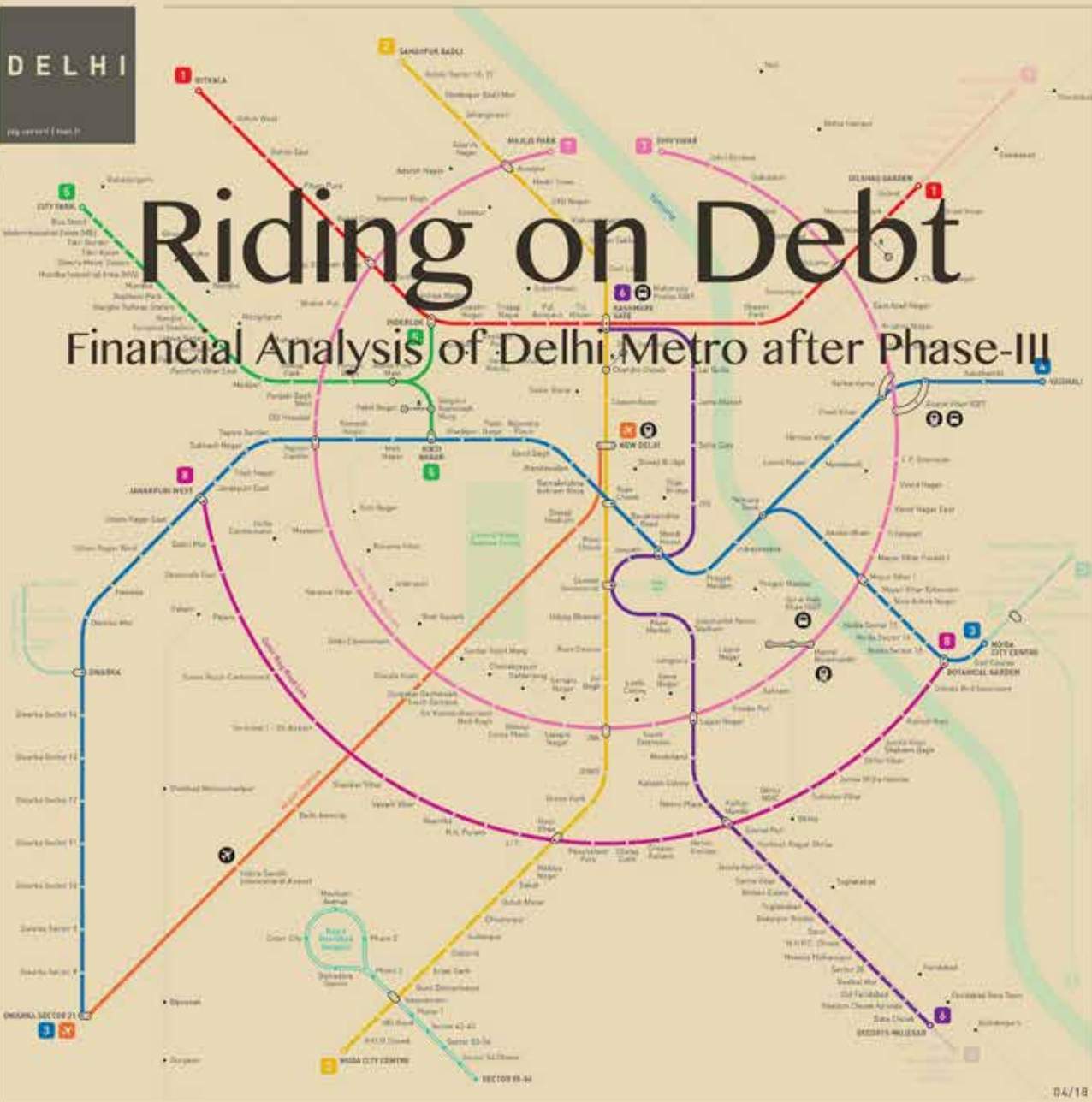


DELHI

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Nishant | Rajendra Ravi



Riding on Debt

Financial Analysis of Delhi Metro After Phase-III

by

Nishant | Rajendra Ravi



Centre for Financial Accountability



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Preface

Ha-Joon Chang, the Cambridge economist, holds that '95% of economics is common sense, made to look difficult, with the use of jargons and mathematics'. That may explain why common people engage less with matters of finance. Governments announce new projects, schemes and programs involving large spending of public money, all justified in the name of 'development' and improving lives of citizens. Very rarely questions are raised about the sources of financing, financial viability of the projects or the financial burden it can cause to public exchequer. Those are left to the 'experts'. A few instances where some of these questions were raised it was silenced by the argument of public good and progress.

Delhi Metro is one such, where not many critical questions were entertained and the glitter and the 'convenience' of Metro made it easy to make one feel all is well.

Without a critical study of Delhi Metro for its efficacy, success in decongesting the city, affordability, financial viability and comparison with other modes of transport and mobility, it is being promoted and 'replicated' in other cities.

The overall cost of any projects is beyond the financials. There are many other costs which cannot be monetized, such as the social and environmental costs. Acknowledging that, this study is looking only at the financial costs and viability of the Delhi Metro.

We thank Rajendra Ravi and Nishant for undertaking this important study and publishing the critical numbers in a manner which is comprehensible for common people, not just experts. Prof. Geetam Tiwai was kind enough to write a foreword

for this. We thank Sujit Patwardhan of Parisar, Pune and Priya Dharshini for their comments on the draft and Tani Alex in helping with the copyediting.

We hope that this study will help common people understand the financials of Delhi Metro and contribute to a healthy public debate on the 'costs' of Metro in other cities, before they are made a fate accomplish on the citizens. Going beyond, we also hope that this will help raising the fundamental questions about 'whose money' and 'how is it spent'.

Joe Athialy

Centre for Financial Accountability

Foreword

Delhi metro is the largest metro system in India, and is also considered one of the most “successful” public transport projects. After nearly three decades of construction and operation in Delhi, the demand for creating metro systems in all million plus cities has grown despite being a capital intensive project. Few scholarly articles published in the last decade which have questioned the relevance of metro system in Indian cities have often been dismissed by the policy makers, and popular media. Requirement of high investment has not deterred the demand for metro systems by the state politicians, though state support for bus based public transport systems has been questioned. This short note raises important concerns about the financing and expected benefits of Delhi metro.

Delhi metro story began in 1969 when the first plan for metro was proposed in the study of traffic and travel characteristic of Delhi. However, in 1996 new plans for a mass rapid transit system (MRTS) took life and serious discussion was initiated. For implementation and operation of the metro Project, Delhi Metro Rail Corporation Limited was registered in May 1995 as a joint venture between the Ministry of Urban Affairs and the GNCTD. It started its operation in December 2002 with an 8-km line (CAG, 2008). The MRTS, it was claimed, would alleviate the congestion problems of Delhi and reduce pollution dramatically. This note highlights the hollowness of such claims after the system has been in operation for 25 years. Due to high capital requirement of metro projects, government support is required in the form of equity shares, grants and various tax exemptions. With increasing number of million plus cities in India it needs to be evaluated whether state governments can sustain such financial burdens to run metro systems in many of its cities. As highlighted by the authors, a major part of revenue of metro

systems comes from sources other than fare-box revenue. This has a significant implication on the self-sustainability of metro systems. This leads to dependence of metro systems on real-estate development which often occurs at the cost of displacement of poor households.

Delhi metro has been planned and implemented as an independent project with very little integration with bus or other modes of transport. It has become more of a construction project instead of an integrated transport system which meets the mobility needs of the majority commuters. Metro projects which are under construction in other cities are following the same pattern. Moreover budget analysis of selected cities shows lack of investment in infrastructure required for pedestrians, bicyclists and buses.

The current note is timely and requires in-depth discussion in understanding the motivation of forces which are behind the promotion and construction of metro projects.

Geetam Tiwari

MoUD Chair Professor
Department of Civil Engineering & TRIPP
Indian Institute of Technology, Delhi

Delhi Metro

Financing Sustainability or Sustaining the Finances?

At present, metro projects with a total length of 370 km are operational in 9 cities. 26 other cities have already planned or proposed metro rail projects with a total length of 1132 km. Per km cost of a metro project varies between 200 to 300 crore rupees. What this means is that the country is going to witness 2.8 lakh crore rupees (nearly 2% of India's current GDP and more than the average annual budgetary allocation to infrastructure sector) pumped into these vanity projects across the metropolitan areas.

Cities which have operational metro rail network:

Kolkata, NCT of Delhi, Bengaluru, Mumbai, Jaipur, Chennai, Kochi, Lucknow, Hyderabad

Cities which have planned or proposed metro rail network:

Nagpur, Pune, Ahmedabad-Gandhinagar, Noida, Navi Mumbai, Kanpur, Vijayawada, Visakhapatnam, Surat, Nasik, Patna, Coimbatore, Guwahati, Bhopal, Agra, Meerut, Varanasi, Gorakhpur, Thiruvananthapuram, Guwahati, Bhopal, Indore, Gwalior, Chandigarh, Dehradun, Srinagar

Source: metrorailnews.in

Is this because of the myth that metro will solve the transport problems in Indian cities, or is it just because metro looks glamorous? But then, why does the metro have a glamorous appeal? Do the other transit options are inherently not as good as metro? Or, is it just a perception reinforced by dominant ideologies?

Over the years, Delhi Metro has become a role model for many things. To urban dwellers, it promises “modern” and “high-tech” public transport system. To governments, it is an easy way out to earn “development credits” along with “public welfare”. To private sector, this has clearly a lot to offer because a lot of money is at stake. This also gets goody-goody media coverage because of a strong public relations (PR) management and it is honored by variety of national and international agencies for its “achievements”. But how did this happen? More importantly, what is actually going on?

The Story in a Nutshell

Delhi Metro Rail Corporation (DMRC) Limited was established in the mid-1990s as a company owned 50 percent by the national government and 50 percent by the local Delhi government.

It was set up to oversee the construction and operation of a metro system for the city of Delhi. Delhi Metro Phase-I with route length of 55.3 km was sanctioned by the Union Cabinet in 1996. RITES Limited, which was set up to study the feasibility of Integrated Multi-Modal Mass Rapid Transit System for Delhi in 1989, prepared the Detailed Project Report (DPR) for phase-I. Construction began in 1998. The first line opened in 2002 and DMRC has been operating and implementing the Delhi Metro project since then.

The first and the second phase became operational in the years 2006 and 2011 respectively. Now it is the third phase of Delhi Metro which is expected to get completed in next few years. Total route length of Delhi Metro (including the recently opened Pink and Magenta lines) is currently 277 km with 202 stations spread across 8 different routes. Delhi Metro claims carbon credit for reducing 6.3 lakh tons Green House gases (GHGs) per year¹. In 2016-17, Delhi Metro’s total annual ridership reached the mark of 1 billion passengers².

1 DMRC

2 DMRC Press Release: http://www.delhimetrorail.com/press_reldetails.aspx

Bearing the Capital Cost

Total cost of this infrastructure giant is estimated to be 70,433 crore rupees. Major part of the cost has been met by loan from Japan International Cooperation Agency (JICA). Second important source is equity contributions by GOI and Government of National Capital Territory of Delhi (GNCTD). Other sources include property development, interest-free loans and grants.

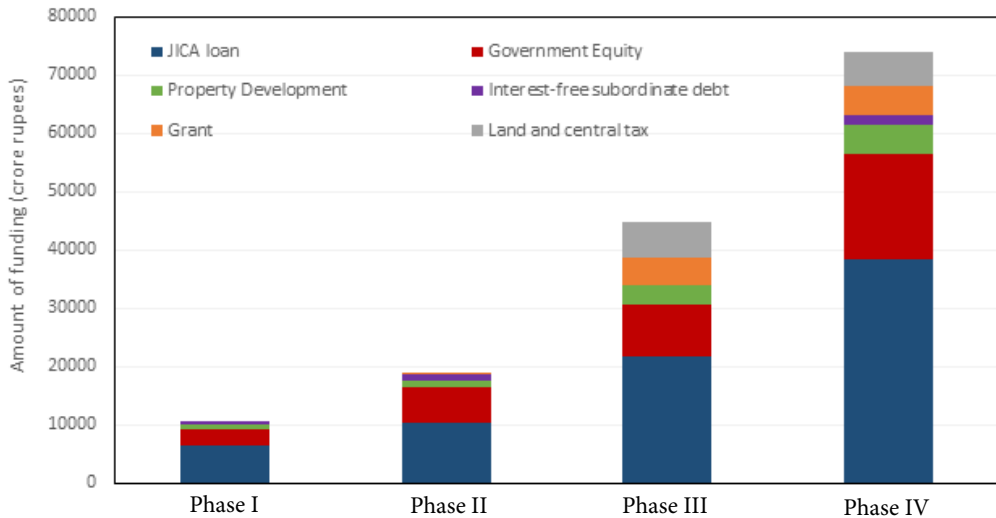


Figure 1: Sources of funding in different phases of Delhi Metro (Source: Delhi Metro)

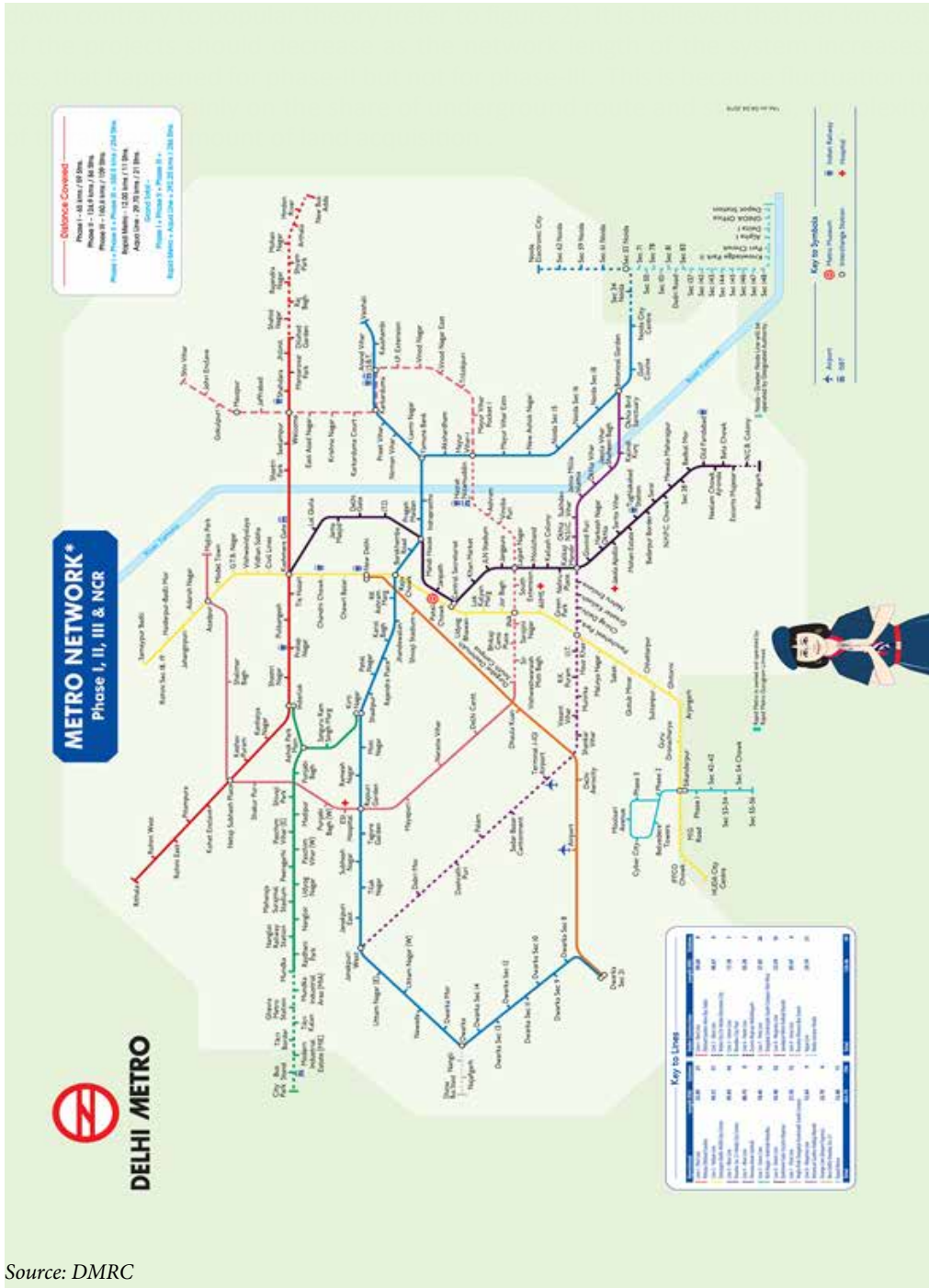
Delhi Metro is also the second largest infrastructure project funded by JICA in India³. The Japanese agency has already given “assistance” of 38,300 crore rupees to various phases of Delhi Metro at interest rates varying from 1.2% to 2.3%⁴. The lending agency has also funded other megaprojects in India such as Delhi-Mumbai Industrial Corridor, Western Dedicated Freight Corridor and more recently the Mumbai-Ahmedabad High Speed Rail Corridor (bullet train). JICA loans have funded numerous other projects across India in various other sectors like water supply, forest and agrarian management, sanitation, and biodiversity conservation⁵.

Project cost per km is dramatically high for Phase-III of Delhi Metro. The per km cost for Phase-I was 162.6 crore rupees which came down to 150.7 crore rupees in Phase-II. It increased by 90% in Phase-III and is estimated to be 286.2 crore rupees. Price-adjusted real cost (Wholesale Price Index with base year 2005) reveals that per km capital cost of Delhi Metro has remained same and not gone

³ The largest funding of 88,000 crore rupees was recently announced by JICA for Mumbai-Ahmedabad High Speed Rail corridor.

⁴ https://www.business-standard.com/article/economy-policy/charting-the-rise-and-spread-of-japanese-funding-in-india-115090200120_1.html

⁵ https://libportal.jica.go.jp/library/Data/PlanInOperation-e/EastSouthAsia/054_India-e.pdf



Source: DMRC

down contrary to popular theory (refer to figure 2). It is believed that per km cost of the projects should decrease as the network length of the system increases. Yes, that happened for phase-II but not for phase-III. This is because fluctuation in cost depends mainly on the share of underground route and stations, complexity of terrain, and amount of land acquisition.⁶

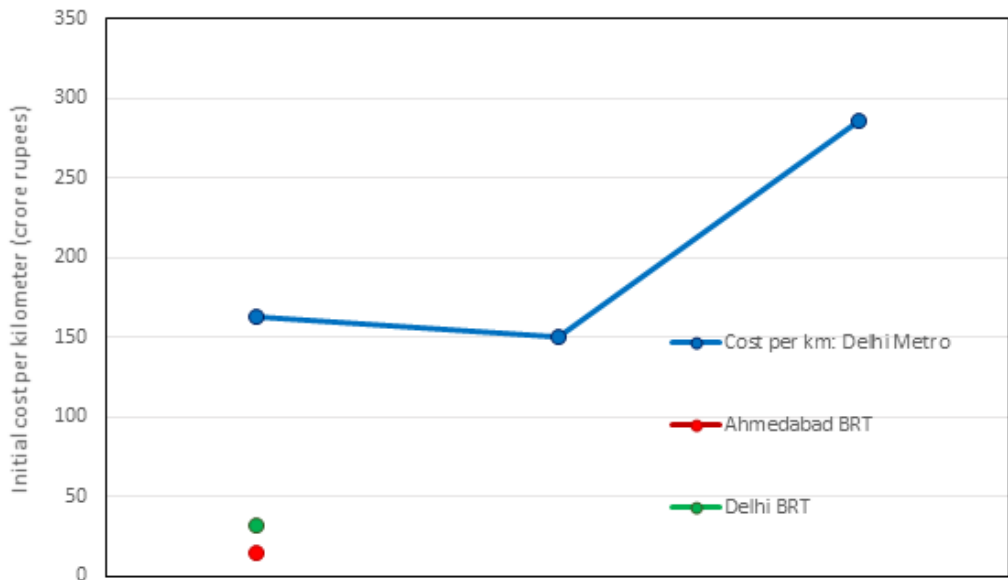


Figure 2: Initial per km cost in various phases of Delhi Metro⁷, Delhi BRT⁸ and Ahmedabad BRT⁹

How (much) Do You Earn, Delhi Metro?

Revenue generated by Delhi Metro has grown steadily but has remained well below the total expenses. According to the latest annual report of DMRC, Delhi Metro has following sources of revenue:¹⁰

- Traffic Operations
- Real Estate/Property Development
- Consultancy
- External Projects
- Other Sources such as grants and interests

6 http://vbn.aau.dk/files/14076659/Comparison_of_Capital_Costs.pdf

7 Author's calculation based on DMRC statistics

8 <https://www.indiatoday.in/mail-today/story/aap-govt-may-give-brt-a-lift-in-north-and-northeast-delhi-305821-2016-01-28>

9 <https://www.indiatoday.in/mail-today/story/aap-govt-may-give-brt-a-lift-in-north-and-northeast-delhi-305821-2016-01-28>

10 DMRC Annual Report (2017-18)

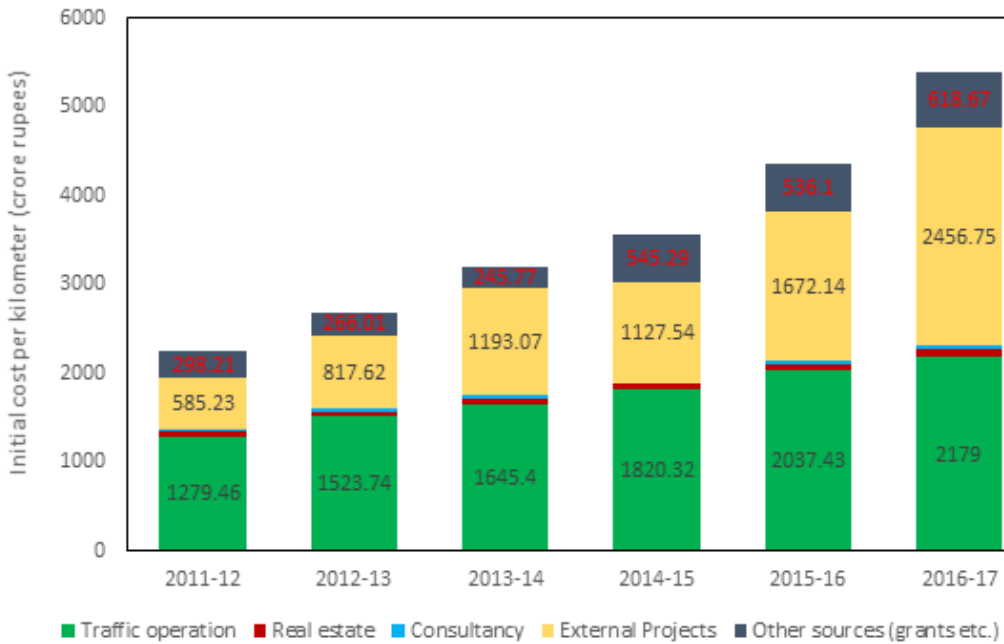


Figure 3: Share of different revenue sources in DMRC's total income

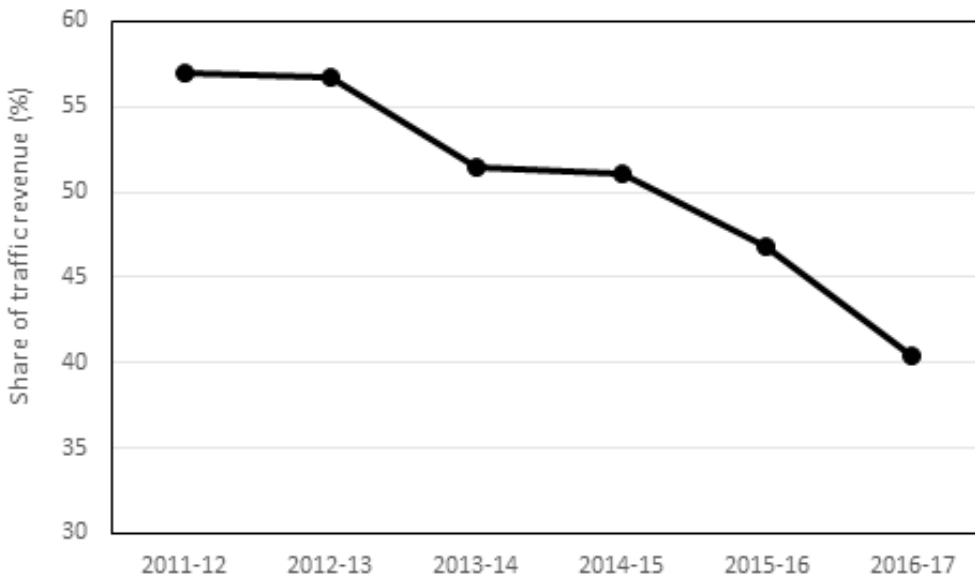


Figure 4: Share of traffic revenue in total income of DMRC

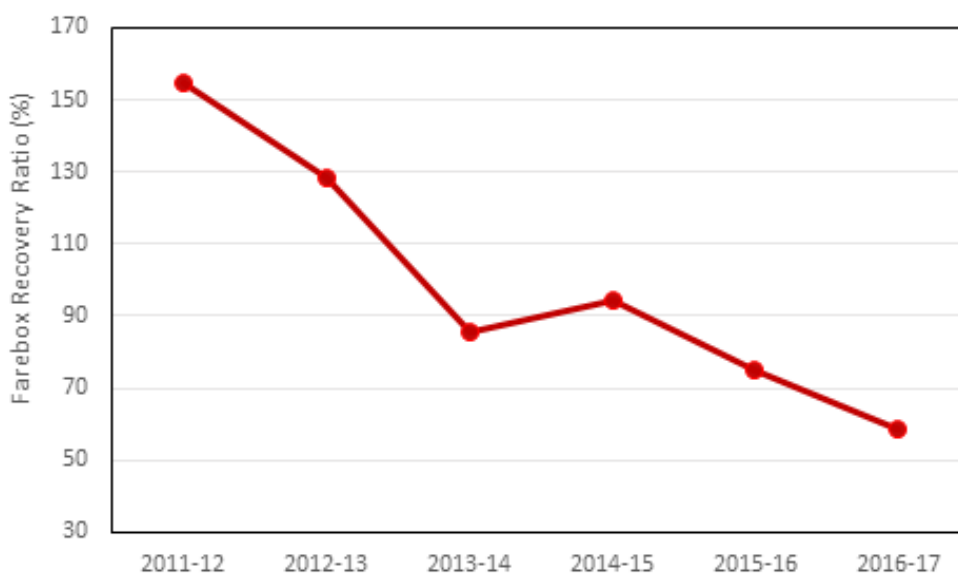


Figure 5: Decline in farebox recovery ratio of Delhi Metro

Year-wise variation in total income and shares of different revenue sources in total income of DMRC is charted in figure 3. From figure 4, it is clear that share of traffic revenue in total revenue has sharply decreased rather than increasing in last few years. This is because the revenue from operations has remained nearly stagnant, and the increase in overall income is driven by income from external projects.

It seems that the Delhi Metro will increasingly rely on real estate and external sources to meet its cost. As the trend shows, financial health of Delhi Metro is most likely to remain contingent on its role in the birth of other metro projects. This would indirectly promote the current race for metro in each Indian city. If revenue stream relies too heavily on real estate development, it can lead to permanent restructuring of the city and related consequences¹¹.

Farebox recovery ratio, defined as the percentage of operating expenses met by fare collection, has also dipped (see figure 5). This raises serious doubts on the identity of Delhi Metro as a public transport service provider.

Contrary to the promise of economically self-sustaining public transit, Delhi Metro has remained a loss-making entity since its inception. Figure 6 shows the variation in annual losses of DMRC. Though ridership has increased over these years, average daily ridership per km per day has remained stagnant (see figure 7).

¹¹ Goel, R., & Tiwari, G. (2014). *Promoting Low Carbon Transport in India: Case Study of Metro Rails in Indian Cities*.

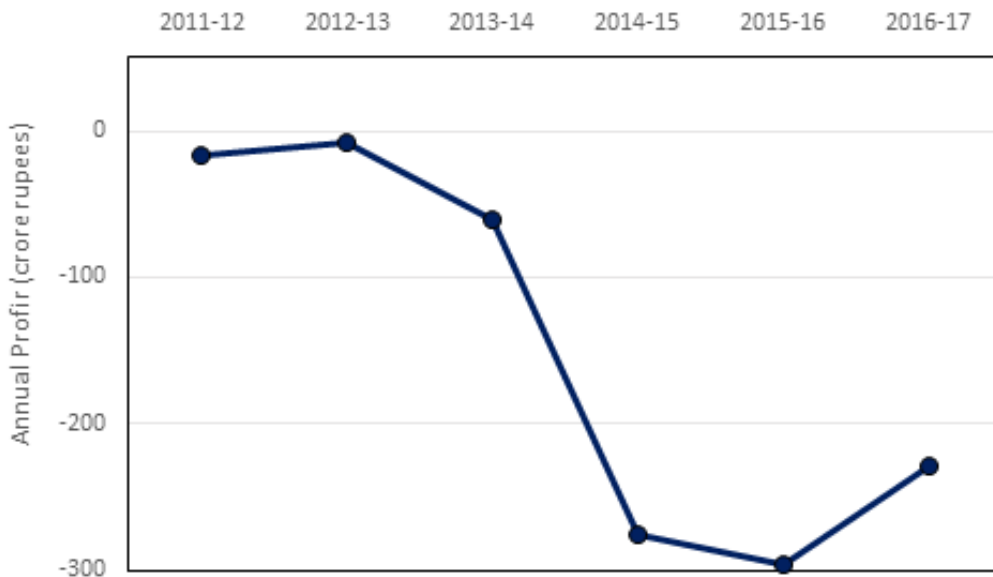


Figure 6: Annual profit (loss) in Delhi Metro over the years

If these indicators do not support the enthusiasm for Delhi Metro, why is Delhi Metro still branded as a success story?

DMRC evaluates its annual performance by 'operating profit', DMRC's own "indicator of progress". Rather than calculating farebox recovery ratio, a standard metric in the field of public transport operations, DMRC has consistently used 'operating profit' in its financial highlights to claim success. While farebox recovery ratio is percentage of operating expenses met by fare income, operating profit (as defined by DMRC) is income from traffic operations minus expenditures against that, not operating expenses. This little trick has helped DMRC continue to weave a success story.

Fare Fixation: Fixing What is Fixed?

Fares for passenger services in Delhi Metro can be revised according to the recommendations by Fare Fixation Committee constituted by the Central Government. This process is guided by the Delhi Metro Railway Act, 2002. Four such FFCs have been constituted since the inception of DMRC. All of these committees have been chaired by a retired judge of High Court with one member representing Ministry of Urban Development, Government of India and another member from Government of NCT of Delhi. Revisions in Delhi Metro fares are shown in figure 8.

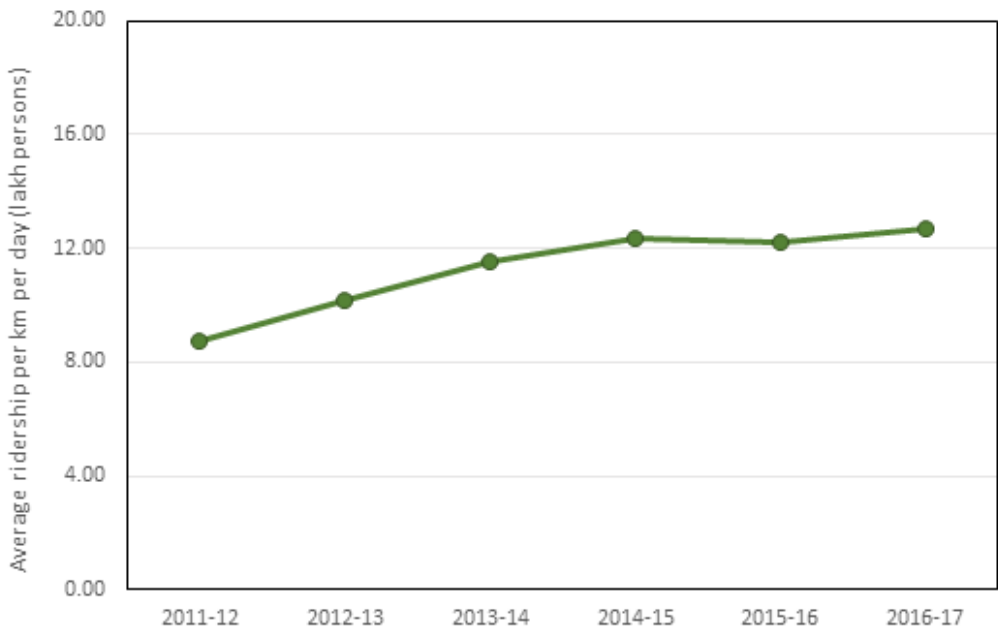


Figure 7: Average ridership per km per day (lakh persons)

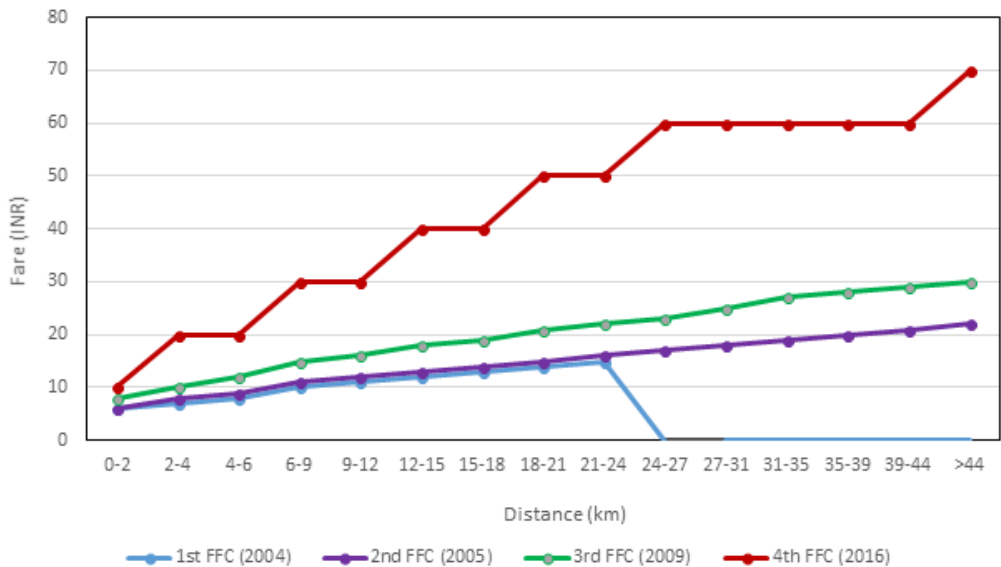


Figure 8: Revisions in Delhi Metro fares

Delhi Metro boasts of more than 25 lakhs average daily ridership. But, when the Fare Fixation Committee decided to conduct a survey to collect the opinions of its passengers, they could gather only “498” responses- a meagre 0.02% (or, 2 per 10000) daily rides. Among these small number of respondents, almost three-fourth people said they wanted the fares to increase! This might have been because the last FFC met way back in 2009. Well, that itself is a question- why did none of the previous FFCs prescribe for regular fare revisions in agreement with general public? Why was a fresh FFC not constituted between 2009 and 2016?

FFCs have been constituted only four times in Delhi Metro’s history of more than a decade. There was a major lapse of 7 years between the third FFC (2009) and the fourth FFC (2016)- possibly because there was no rule before 2016 to guide the Government of India about when to constitute a fresh FFC.

Fare collection is not only important for generation of sufficient revenue, but it is also instrumental in shaping people’s travel behavior. Access to the transport system is denied if the fares are not consistent with the prices that its potential users can afford. This is the dichotomy of urban rail finance. Share of fare-box revenue, i.e. revenue coming from fare collection, is the principal component of total income but it also has to be attractive enough so that the potential users do not shift to available alternatives.

Fare fixation formula

The Fourth Fare Fixation Committee (2016) has recommended the following formula for annual revision in Delhi Metro fares.

For each slab -

% Increase in fare = $\{[WE(FEN - FE0)/FE0] + WS[CPIN - CPI0]/CPI0 + WM[AMCN - AMCO]/AMCN]\} * 100$

Where:

WE, WS and WM are respectively the weights for energy, staff cost and maintenance & other expenses based on audited accounts of previous financial year
FEN and FE0 are average unit costs of energy at the time of current fare revision and previous fare revision, respectively

CPIN and CPI0 are the consumer price index at the time of current fare revision and previous fare revision, respectively

AMCN and AMCO are per-km maintenance and other costs at the time of current fare revision and previous fare revision, respectively.

If the fares are increased beyond a certain value, people might shift to other cost-effective modes of transport. Or in a worse case, people who can't afford high fare prices would not be able to travel to the destinations of their choice. According to the official reports, monthly ridership of Delhi Metro had plunged significantly to a four-year-low when the fares were revised in October 2017¹². At the same time, daily ridership of DTC and DIMTS buses had increased by almost 2 lakh and crossed the 40 lakh mark¹³.

Generating sufficient revenue to meet the expenses - capital, operations and maintenance (O&M), and financial - has remained a challenge for urban rail (metro) systems throughout the globe. Only few Metro operators worldwide have been successful in generating enough revenue through fares to meet the operational expenses. Hong Kong and Singapore have maintained exceptionally high farebox recovery ratio, i.e. percentage of operational expenses met by fares¹⁴. Generally, a capital-intensive project like metro rail network cannot be sustained by fare-box revenue alone. Moreover, fare cannot be fixed keeping in view only the operational costs. A sustainable transport system should also consider variety of factors including affordability, equity and social responsibility¹⁵.

Optimistic Projections or Lies

Delhi Metro ridership has remained well below the estimates claimed in the detailed project report despite multiple corrections in predicted ridership by DMRC. This has been the case since the Phase-I of the project which the CAG had lambasted for recording less than 30% of the revised projection¹⁶.

Is it a surprise that actual demand has continued to defy the ridership predictions? Why is a “popular” and “speedy” transit system not being able to attract the desired volume of trips while remaining operational for the last 15 years? Is a technical error of some kind responsible for this flaw in planning of Delhi Metro? Or, is there something more systematic behind this?

Extensive research on megaprojects planning has shown that the problem is not specific to Delhi Metro. Flyvbjerg (2007) studied cost escalation in 258 transport infrastructure projects and found that urban rail projects had average cost escalation of 45% and average ridership shortfall of 40%¹⁷. Thus, urban rail projects are risky in terms of not only their cost but also their revenue prospects.

12 Goel, R., & Tiwari, G. (2014). Promoting Low Carbon Transport in India: Case Study of Metro Rails in Indian Cities.

13 <https://www.siasat.com/news/ridership-delhi-metro-falls-buses-1332699/>

14 <https://www.theatlantic.com/china/archive/2013/09/the-unique-genius-of-hong-kongs-public-transportation-system/279528/>

15 <https://www.theatlantic.com/china/archive/2013/09/the-unique-genius-of-hong-kongs-public-transportation-system/279528/>

16 <https://www.ndtv.com/india-news/cag-raps-delhi-metro-for-shortfall-in-ridership-398252>

17 <https://www.ndtv.com/india-news/cag-raps-delhi-metro-for-shortfall-in-ridership-398252>

This is ‘systematic underestimation of risks’ and this is routine practice in planning of infrastructure megaprojects¹⁸. Projects are made to look good on paper and the cost-benefit analyses involve grossly inaccurate assumptions and lack methodological rigor. Projects worth thousands of crore of public money are sold by institutionalizing lies.

Metro Rush: State Governments Getting Starved of Funds

Metro projects are expensive and irrelevant. While other low-cost alternatives to sustainable mass transport are available, development of metro in only one city is enough to create exceedingly high fiscal burden on state governments. Yet, metro is a charming delusion which continues to be exploited by demagogues across the political parties for achieving petty electoral gains. Political masters’ preoccupation with metro is bound to harm the economies of state and municipal bodies¹⁹.

Example of Delhi Metro shows that metro projects in other Indian cities will require Central and State governments to not only provide the capital funding but also subsidize the operational costs for a very long time, or possibly for ever. On top of that, metro rail projects are funded by huge amounts of foreign debt (not interest-free) and governments will find it hard to pay back the interest and loan amount. Poorer metro corporations are very likely to end up into ‘debt trap’ creating a situation for public money to be used for their rescue.

After All It’s Our Money!

As discussed, Delhi Metro has been receiving central and state governments’ assistance in the form of equity as well as grants. Approximately 25,000 crore rupees (18.1 thousand crore in form of equity, 4.9 thousand crore in form of grants, and 1.8 thousand crore in form of subordinate debt) have been allotted to DMRC by the Centre and the State Governments towards its three phases. JICA loans worth 38.3 thousand crore rupees at an average annual interest rate of 1.8% are sovereign backed which means that ‘public’ money has guaranteed the payback.

Thus, whether it comes directly through allocations in annual budget or it comes from a foreign borrowing, it is fundamentally the public money that is being offered to the metro projects. Indirectly offering the public money in form of loans to finance these projects is more harmful than direct budgetary allocations. This channel of funding, called ‘debt financing’, serves the interests of the multilateral

¹⁸ Bent Flyvbjerg; Survival of the unfittest: why the worst infrastructure gets built—and what we can do about it, Oxford Review of Economic Policy, Volume 25, Issue 3, 1 October 2009, Pages 344–367, <https://doi.org/10.1093/oxrep/grp024>

¹⁹ Bent Flyvbjerg; Survival of the unfittest: why the worst infrastructure gets built—and what we can do about it, Oxford Review of Economic Policy, Volume 25, Issue 3, 1 October 2009, Pages 344–367, <https://doi.org/10.1093/oxrep/grp024>

financial institutions and it puts the national economy of the borrowing country under the weight of interest payment.

India is global leader in receiving cross-border funding from international agencies. India accounted for 38 percent of overall 'fintech' investment in Asia during 2010 to 2015²⁰. According to the official data, India currently has to pay more than 50 thousand crore rupees per year as interest of external debt. Major portion (more than 50%) of this government debt is held by local banks in India²¹.

Such enterprises may be additionally instrumental for the economic and geopolitical interests of the patrons of these financial institutions. Domestic economy of these developed countries is undergoing stagflation and it is in the interest of their economy to earn through debt financing. This explains the desperate search for new markets where they can sell their technology irrespective of the need.

20 Bent Flyvbjerg; Survival of the unfittest: why the worst infrastructure gets built—and what we can do about it, *Oxford Review of Economic Policy*, Volume 25, Issue 3, 1 October 2009, Pages 344–367, <https://doi.org/10.1093/oxrep/grp024>

21 Gopinath S (2007). Development of Local Currency Bond Markets: The Indian Experience. Mimeo, Federal Reserve Bank of India.

Airport Express Line: A Love Story Turned Tragic

Airline travel has increased rapidly in India during the 21st century. Statistics show that daily passenger traffic on Delhi Airport averaged 1.8 lakhs in the year 2017-18 while it was merely 10.5 thousand passengers per day in 2002-03 and less than 1 lakh in 2012-13. Delhi Metro Airport Express Line was planned due to increasing demand of public transport services to and from airport. This was supposed to deliver two key benefits- cutting the travel time to reach Delhi Airport, and reducing congestion on routes joining Delhi Airport with rest of the city. The Delhi Metro Airport Express is 22.7 km long – 16 km underground and 7 km elevated – with 6 stations. It is currently being operated and maintained by DMRC. But, it wasn't planned this way.

History

Delhi Metro routes in its Phase-I and Phase-II did not provide network connectivity to the airport. Considering the high demand, DMRC proposed high speed metro line joining New Delhi and IGI Airport. DMRC also offered the project as Public-Private Partnership (PPP) in which DMRC was responsible for all the civil works and private concessionaire for operations. Delhi Metro's Airport Express line was awarded to Reliance-led consortium in 2008. This arrangement was implemented through a special purpose vehicle (SPV) – the Delhi Airport Metro Express Private

Limited (DAMEPL). The civil works were carried out by the Delhi Metro Rail Corporation (DMRC), while the operations infrastructure was supplied, installed, operated and maintained by DAMEPL. It was decided that DAMEPL will operate the line for 30 years.

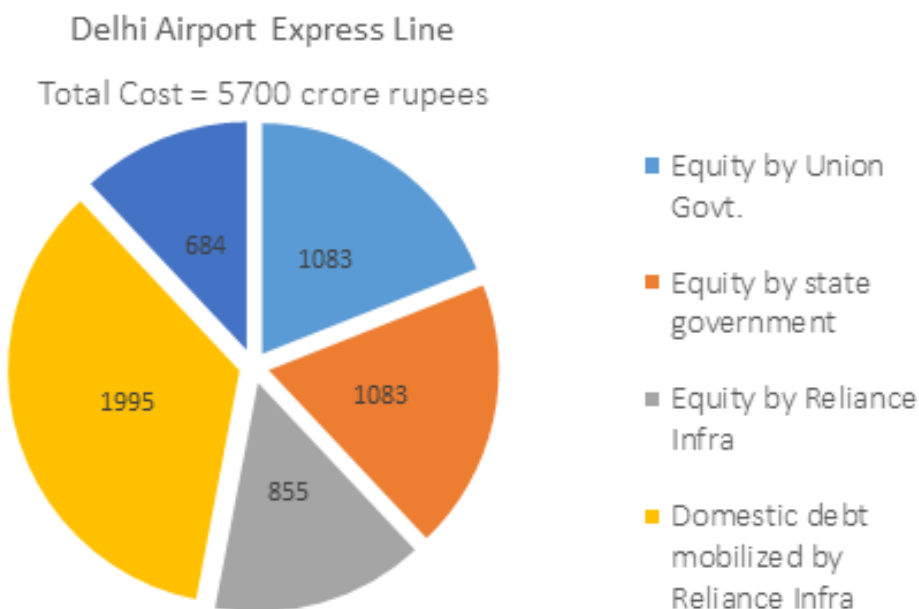


Figure 9: Source of funding in Delhi Airport Express Line

The total cost of project was 5700 crore rupees and it was financed through a mix of debt, equity and grant. Reliance Infra. Ltd. paid 2800 crore rupees of which 980 crore rupees were mobilized as domestic debt and the rest was equity contribution. Airport operator paid 680 crore rupees as grant towards civil works inside the airport. See Figure 9 for the distribution of funding from different sources.

The project was to be commissioned by October 2010 i.e. before the Delhi Commonwealth Games. However, construction took longer and the operations could start only in February 2011.

Dispute and The Legal Case

Almost a year after the line became operational in February 2011, DAMEPL noticed defects in bearings and girders in May 2012 and informed DMRC about it²². Operations were temporarily shut down by DAMEPL due to public safety

²² <https://www.frontline.in/static/html/fl2923/stories/20121130292304500.htm>

concerns. Joint Inspection Committee (JIC) reported that 91% bearings were defective and 7% of the girders had cracks.

This led to blame game between DMRC and DAMEPL. While DMRC alleged that Reliance was planning to step out of the agreement, DAMEPL blamed DMRC for shoddy work in civil construction.

Central axis of this debate was possibly only a tip of the iceberg. Low ridership and failure of retail development plan were two major challenges that Reliance had to struggle with. DMRC had forecast that average daily ridership would be 46000 soon after commissioning and it was predicted to increase up to 86000 by 2020. However, at the time of temporary closure, average daily ridership was slightly more than 11000 passengers per day, less than 25% of the predicted volume.

In June 2013, Reliance officially sent a notice to terminate the contract which the DMRC rejected. The matter went into arbitration. DMRC-nominated arbitration panel awarded DAMEPL (Reliance Infra.) a compensation of 2950 crore against DMRC in May 2017²³. Note that Reliance had invested 2800 crore rupees from equity and domestic debt.

That Magic Stick Named 'PPP'

Dispute in Delhi Airport Express Line was a high-profile case because it was the first PPP in urban rail project. The love story could not live up to expectations and the ownership got transferred to DMRC in July 2013. Yet, the charm of PPP does not seem to vanish. Why is it so?

Infrastructure projects like Metro follow one of these broad models of ownership:

1. Government-owned project
 - a. Central government has full ownership
 - b. State government has the full ownership
 - c. Joint ownership of Central and State governments
2. Privately-owned project
3. Public Private Partnership (PPP)

Most of the metro rail projects being planned or proposed in Indian cities are government-owned projects. Exceptions are Mumbai Metro line-1 and Hyderabad Metro (PPP) and Rapid Metro Gurgaon (privately owned by DLF). Government-owned projects are following 50:50 equity formula in which Central and State government form a Special Purpose Vehicle (SPV) to contribute equity and interest-

²³ <https://www.financialexpress.com/industry/reliance-infrastructure-wins-rs-2950-cr-arbitration-award-against-dmrc/664367/>

free debt for capital expenditure. Money also gets poured in from international financing agencies such as JICA, ADB, EIB, KFW in the form of Official Development Assistance (ODA).

Metro Rail Policy and PPP

Union Cabinet approved the new Metro Rail Policy in August 2017²⁴. This Policy has made Private partnership compulsory for the new metro proposals. Central assistance in financing the project mandates private participation. The Policy makes it clear that-

“Private participation either for complete provision of metro rail or for some unbundled components (like Automatic Fare Collection, Operation & Maintenance of services etc.) will form an essential requirement for all metro rail projects seeking central financial assistance.”

The objective of the Policy was to ‘enable the realization of growing metro aspirations’ of many cities in India. The Policy document has acknowledged the ‘huge resource demand’ in metro projects. To ensure financial viability of metro rail projects, the Policy has mandated value capturing by Transit Oriented Development (TOD). It demands the States proposing metro projects to maximize the non-fare revenue through commercial development at stations, advertisements, lease of space etc. According to the Policy, metro projects are not ‘urban transportation’ projects but ‘urban transformation’ projects. Thus, the Policy reinforces the fears of permanent restructuring of the city.

The Policy also asks the States to ‘promote dense urban development along metro corridors’. Indian cities already have very high population density. Promotion of density is certain to make living conditions worse, not better, for the urban residents. Then, is the Policy in tune with realities of urbanization in India?

24 <http://pib.nic.in/newsite/PrintRelease.aspx?relid=170009>

If Not Metro: Opportunity Cost of Delhi Metro

Delhi Metro involves huge economic costs. The benefits of Delhi Metro are well documented and popularized. However, the discussion on the opportunity cost of Delhi Metro has been set aside. There is a possibility that better outcomes in terms of accessibility could have been achieved by spending much smaller amount of money in alternative manner. Bus-based regular and rapid transit systems are most obvious cost-effective choices against metro rail transit. Thus, any discussion on economics of Delhi Metro is incomplete without a comparative analysis of DTC and Delhi Metro.

DTC and DMRC: Is there a Level Playing Field?

Not a single bus has been added to the DTC fleet since 2011. Delhi Government has repeatedly said that procurement of buses has been the major issue. It alleges that manufacturing companies have not shown interest in supplying buses. However, some manufacturing firms disagree²⁵. Manufacturers claim

²⁵ <http://www.thehindu.com/news/cities/Delhi/why-is-no-one-bidding-for-dtc-tenders-for-low-floor-buses/article24018430.ece>

that no tender was floated and maintenance cost was not settled.

DTC also says that sufficient parking facility is not available. This must be treated as another excuse. DTC currently has 43 bus depots which are under capacity. Even when these depots work at full capacity, there is possibility to expand the capacity by building multistorey bus depot.

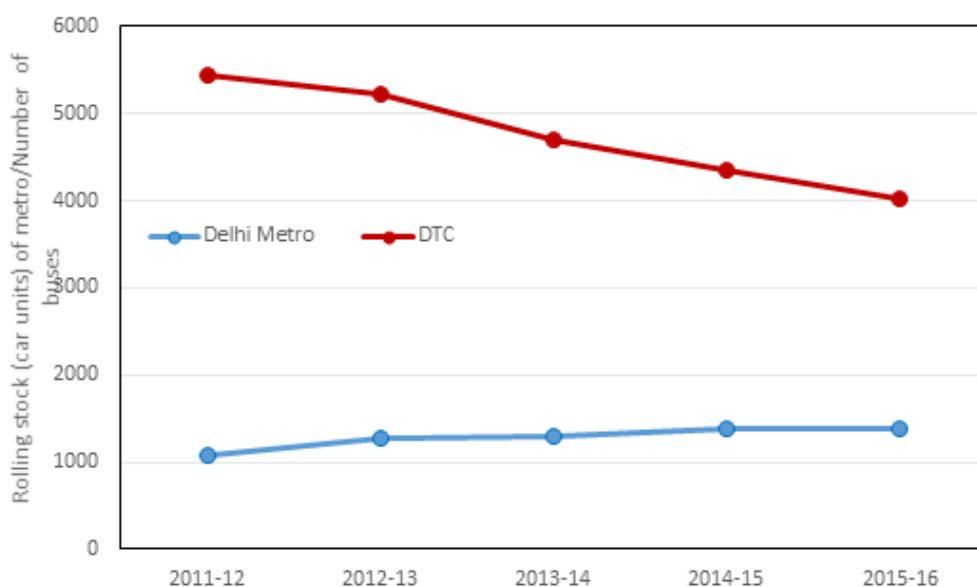


Figure 10: Year-wise changes in rolling stock of Delhi Metro and fleet size of DTC

DTC has not been able to upgrade their system capacity for more than a decade. But their trouble has aggravated as it has not been able to maintain whatever capacity it had. DTC's fleet size has sharply reduced over the years (see figure 10) while DMRC has been able to procure new rolling stock every year.

It is not surprising that ridership of DTC has declined over the years (see figure 11). However, the chart also makes it clear that decline in the ridership of DTC has coincided with increase in the ridership of Delhi Metro. Yet, more people travel in DTC buses than in Delhi Metro. This underlines why the importance of bus transit systems in a city like Delhi cannot be undermined.

Apart from the bus transport operators - DTC and DIMTS²⁶ – Indian Railways runs a

²⁶ DIMTS also operated the Delhi BRTS before it was dismantled by Delhi's Aam Aadmi Party government, despite the Delhi High Court's decision to preserve and improve the BRTS.

ring rail corridor in Delhi. This is a 35km-long circular network which started operation in 1975 and the suburban passenger train service were started during 1982 Asian Games²⁷. Since then the frequency has dropped to five trains per day with huge delays. Some stations don't even have ticket counter and there is no ticket-checking on the route. Daily average ridership has dropped to 3700 and people cite delays, lack of feeder service and presence of anti-social elements as the reasons of not using this service²⁸. This service would have provided a large population with a less costly mode of commute if this service could have been maintained and operated without delays, and a feeder network of Intermediate Public Transport (IPT) were allowed to flourish.

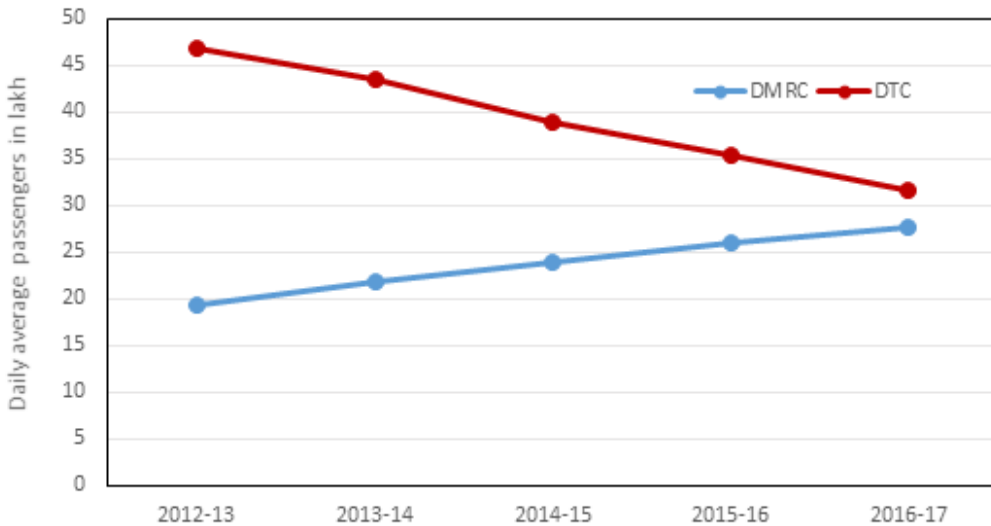


Figure 11: Daily average ridership in DTC and DMRC during last five financial years

Modal share and network utilization (passengers per km per day) statistics show that urban rail transportation systems play a very limited role in most of the large cities of the world²⁹. Cox (2004) has argued that metro systems are appropriate for the cities such as New York and Tokyo which have single dense central business district with high concentration of employment opportunities. It is not suitable for polycentric urban agglomerations such as NCT of Delhi, Hyderabad and Bangalore. Therefore, extensive bus network has to play the central role in urban mass transit.

27 <https://indianexpress.com/article/cities/delhi/ring-railway-in-an-ever-expanding-delhi-a-ghost-railway-service-lingers/>

28 <https://indianexpress.com/article/cities/delhi/ring-railway-in-an-ever-expanding-delhi-a-ghost-railway-service-lingers/>

29 Mohan, Dinesh. 2008. "Mythologies, Metros & Future Urban Transport." *Economic and Political Weekly*, no. January: 41–53.

Opportunity Costs

Per km construction cost of Delhi Metro has reached 286 crore rupees in phase-III. In comparison to this, at-grade BRTS would have cost not more than 10-15 crore rupees per km. Operating expenses of Delhi Metro have grown from 4.3 crore per km in 2011-12 to 13.8 crore per km in 2016-17. Existing mass transit operators – DTC and DIMTS – have equivalent operations cost per km³⁰.

Metro project requires fresh acquisition of land. Constant push for PPP and fully private metro projects shows that Metro is becoming a for-profit (but not profitable) enterprise. Delhi Metro has become more like a real estate project³¹ rather than transport infrastructure.

In contrast with this, DTC is not for-profit. DTC owns large area that remains underutilized. Therefore, land acquisition is not an issue. Lot many people in erstwhile villages of Delhi had given up their lands for DTC depots and terminals because they were promised accessibility benefits and social welfare. Isn't DTC responsible to deliver what it had promised?

In fact, DTC does not even claim the ownership of bus stop area. While Delhi Metro controls the entry, exit and presence of citizen on its compound with the help of CISF and Delhi Police, we are not aware of any measures taken by DTC to ensure safety and comfort of its users inside the buses and waiting at the bus stops.

New Metro Policy is mute over the concerns of environmental and social accountability³² which form the core principles of sustainable urban transport. The Policy pursues a narrowed focus on financial viability and commands the States on how to get more MRTS running in new cities. It ignores the environmental and social cost that these future projects will incur. Huge amount of urban land acquisition will be the prime agenda under the metro programs. This will not only force thousands of people out of their current residences but it will also exclude vast majority of citizens from accessing their right to the city.

Obsession with metro rail has led to great push for “innovative” financial management in Delhi Metro and other expensive metro projects while some basic measures and timely actions could have reinstated the financial self-sustainability of DTC.

Despite that DTC has suffered rapid degradation over the years, it has not dismissed

30 <http://shaktifoundation.in/wp-content/uploads/2018/05/Role-of-Bus-Aggregators-in-improving-city-bus-services-in-India.pdf>

31 Hazards Centre (2006), “Delhi metro Rail - A New Mode of Public Transport”, Hazards Centre, a unit of Sanchal Foundation, New Delhi.

32 <http://urbanmobilityindia.in/Upload/Conference/479674d4-8fe6-4e4b-aeb6-19a3c037a4d4.pdf>

the social responsibility and obligations. It has kept its institutional structure intact. DTC continues to provide concessions to senior citizen, school transport services and transit passes. Police personnel do not pay for journey on DTC buses despite that they are given travel allowance. These are the social benefits that DTC incurs and Delhi Metro doesn't. In a response to the question on discount to elderly, DMRC told the 4th FFC that Delhi Metro is a different system and it is not possible to provide transit passes or discount to particular sections of society.

The point is precisely that. Delhi Metro is immune to the concerns of social justice. Blanket concessions provided to smart card holders or for traveling at specific times (non-peak, Sundays and national holidays) have single purpose- attracting more people to travel. Delhi Metro should have provided the concession passes to elderly, children, women, disabled, people from BPL households and other people from disadvantaged socioeconomic groups.

It is also not obvious if Delhi Metro can be called a public space. Certain things and certain kinds of actions which are otherwise legally sound are not permitted inside the Metro compound. For example, Delhi Metro prohibits eating, photography and even carrying matchboxes³³. It certainly does not allow hawkers and vendors.

Delhi Metro and the Claims that Never Got Achieved

One of the most publicized claims of Delhi Metro was reduction in road traffic. Thus, it promised to solve some of the biggest urban issues of our time- traffic congestion, air pollution and traffic fatalities. The situation is perceptibly opposite and the road traffic has continued to grow. This is not accidental at all. In fact, this phenomenon, 'induced demand of travel' as it is called, has now been acknowledged to work almost like a law. When a new system like metro or a new flyover adds to the existing capacity of transport network, it reduces the traffic by redistribution but temporarily. Very soon, new traffic is "induced" to enter into the system and the system becomes congested again. Thus, the demand for further capacity expansion is regenerated and the cyclical dumbness of wasteful planning continues.

Second claim was about reduction in pollution levels. But the pollution levels in Delhi have not come down and have rather increased. The mechanism at play here is same as explained before. Because of continuous neglect of bus services, number of people in car, hired taxi/auto and other motorized vehicles have increased on Delhi's roads. Increasing number of automobile ownership is another evidence that Delhi Metro has failed to create an inclusive and appropriate public transport system which can bring people out of cars and other types of personal motor vehicles.

³³ <https://www.financialexpress.com/india-news/travelling-by-delhi-metro-this-is-what-you-cannot-carry-anymore-with-you/868698/>

Third, overall levels of accessibility could have been improved drastically by prioritizing regular and rapid bus transit system over rail-based MRTS. As discussed earlier in this report, most people in Delhi travel quite small distances in their regular travel. Thus, a closer-to-home public transport service could have achieved exceedingly high accessibility benefits at much lower capital and operations cost.

Therefore, the opportunity cost of investment in Delhi Metro looms large when its non-achievement in response to these claims is considered.

Delhi and Its Metro: Now What?

No Further Expansion

Elevated and underground urban rail systems are too expensive for Indian cities and previous experience suggests that such projects struggle for economic self-sustainability³⁴. Therefore, no further expansion of Delhi Metro should be undertaken.

Correct the Investment Priorities

Extent and equity of access to transit can not be realized by a transportation system dominated by metro network. Different surveys in Delhi have consistently shown that most people cover short distances in their regular journeys. According to the Census of India data on work travel, more than 25% workers walk to work and more than 10% workers ride a bicycle to work. A study of Delhi Metro found that more than 80% Metro trips were longer than 10 km while the trips longer than 10 km are merely 17% of all trips in Delhi³⁵. This underlines the mismatch between priorities of investment and real demand of transportation infrastructure. Whatever technology we need to end the urban transport crisis is right before us—bicycles. Despite finding place in National Urban Transport Policy (NUTP), promise of infrastructure for non-motorized modes of transport (walking, bicycle, cycle-rickshaw) has remained mere rhetoric.

34 Mohan, Dinesh. 2008. "Mythologies, Metros & Future Urban Transport." *Economic and Political Weekly*, no. January: 41–53.

35 Goel, R., & Tiwari, G. (2014). *Promoting Low Carbon Transport in India: Case Study of Metro Rails in Indian Cities*.

Bring the Focus Back on BRTS

There is need to bring focus back on planning a Bus Rapid Transit System in Delhi. BRTS is not only “rapid” but it is also more accessible to every section of society. Experiments in other Low-Middle Income Countries (LMIC) show that BRT systems face great amount of resistance in their beginning because they break the hegemony of cars and private vehicles on roads. Yet, a well-planned BRTS increases the equality of access to opportunities without taking heavy toll on environment and communities.

Invest in Integrated Transportation

It is the need of the hour to think of urban transport systems as an integrated whole. The objective of transport system should be to ensure access for every citizen without creating unsustainable impacts on the environment. This requires that the needs and the roles of every mode of transport, whether it be non-motorized (pedestrians, bicycles, cycle rickshaw and others), intermediate public transport (aka IPT such as auto-rickshaw, tempo, taxi), bus transit (BRT and regular bus transit), rail-based mass transit (suburban railway and metro/mono rail), or private motorized vehicles (motorcycles, scooters and cars).

Investment priorities must be set according to their ability to satisfy the needs of maximum number of passengers and not as per the interest of investors. All the statistical records indicate that modal share of pedestrians is the highest among the passengers of Delhi’s intra-urban transport. Walking is also the main way to access the metro and bus network nodes (stations, stops etc.). Therefore, ensuring the best infrastructure for walking should be the top priority. Buses already carry major fraction of public transport users but they also have untapped potential because their resources remain underutilized in a hostile policy environment. Buses and bicycle infrastructure should also be on the top priority when investing public money. IPT has a key role in Delhi’s transport situation as they act as feeder mode to not only the metro rail but, in some instances, also the bus network. Therefore, investment decisions must be taken while considering the needs of this sector.

Investment priorities must demote the use of private vehicles to the extent possible. Pouring huge public money in road expansion and flyover construction is detrimental to the objective of transport set in the beginning of this section.

These recommendations must be taken seriously and a new policy viewpoint must be adopted when deciding on financing the transport projects.

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