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Comparative Study Of Financial Efficiency Of Metro Rail Systems In India

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***Abstract* – The metro rail systems are nothing but a high-capacity public transportation network that is used by the urban population for rapid and robust transportation throughout the city. They usually run on separate dedicated tracks which go on both underground and elevated based on the requirement. They help lot in easing congestion and pollution caused by private vehicles. Comparative study of the financial efficiency of the major metro rail systems in India i.e. DMRC (Delhi Metro Rail Corporation), BMRCL (Bengaluru Metro Rail Corporation Limited), CMRL (Chennai Metro Rail Limited), MMRCL (Mumbai Metro Rail Corporation Limited) by using the secondary data gathered from their respective annual reports for the period of five years from financial year 2019-20 to 2023-24. Financial efficiency is being evaluated by key ratios such as operating ratio, net profit ratio, ROCE, debt equity ratio, cost recovery ratio, farebox recovery ratio, EBIT margin, asset turnover ratio and current ratio. The results shows a sharp deterioration in financial performance during the financial year 2020-21 across all the operating metros, followed by slow recovery in the following subsequent financial years, while BMRCL shows significant improvement in cost recovery and farebox recovery after 2021-22,CMRL shows significant improvement toward break even point and better liquidity by 2023-24, MMRCL shows extreme and non-comparable value due to its early stages and under construction phases. This study highlights the need for stronger non fare revenue generation, cost control and prudent debt management to improve long term financial sustainability of the metro systems in India.**

Keywords: **Comparative analysis, Financial efficiency, Metro rail systems, Ratio analysis, Urban transport**

I. INTRODUCTION

Transportation plays a vital role in stimulating concentration and increasing city competitiveness. The post-industrial phase of the urban era is characterized by scattered economic and social opportunities. A robust transportation service can aid in accessing such opportunities- a crucial factor for a better quality of life (Limão & Venables, 2001).

Urban transportation plays an important part in shaping economic growth, improving accessibility and improving the overall commuting experience in cities. Indian cities are growing and developing with rapid urbanization and increase in population, putting huge pressure on public transport system and forcing to be efficient, reliable, and eco-friendly. Traditional options like buses and cars are overwhelmed by traffic, pollution and long waiting. On the other hand, metro rail systems are having high-capacity, energy efficient and better alternatives that have transformed urban commute. Over the last 20 years, India has built one of the world's largest and fastest-growing metro networks, stretching over 1000 km across more than 20 cities, easing congestion, cutting emissions, boosting productivity and making city commute better (Kuriakose, 2025)

It all started with the Delhi Metro Rail Corporation (DMRC) in 2002, which set the gold standard for execution, operation and finances. Cities like Mumbai, Bengaluru, Chennai, Hyderabad, Kolkata and Ahmedabad followed suit, building or expanding their own lines. But not all metros perform the same, factors such as city size, density, fares, ridership, government backing costs and strategies are all different. Some thrive with strong ridership and revenue, while others depend on the subsidies from the government and barely go break even. Operational efficiency is the key, things like train frequency, on-time performance, passenger flow, capacity use, energy savings, and reliability. It keeps riders happy, comfortable and controls costs. Financially, it is about handling revenues, expenses, investments, and debt metrics like operating ratios, fare recovery, cost per km, and revenue per passenger tell another story. Comparing these factors across other Indian metros helps to spot best practices, fix blind spots, and check if policies are suitable. It gives policymakers, planners, and experts the data to see what is delivering performance and what is not (Kumar Mittal et al., 2019)

Implementing operational activity, like better frequent trains, punctuality, smooth passenger flow, full capacity use, low energy waste, and rock-solid reliability boosts satisfaction and cut costs. Financially, it's juggling income, expenses, investments, and loans via ratios like operating costs vs. revenue, fare recovery, per-km costs and per-passenger earnings. A comparative look at these various metro systems reveals winners, losers, and lessons for everyone from planners to researchers. It shows if the public money is paying off to the public in real economic and social environment. This article compares top Indian metros on finance metrics, differences and fixes.

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II. PROBLEM STATEMENT

Metro rail systems in India are rapidly growing and expanding to meet the needs of public transportation and to also tackle traffic congestion and higher travel time. Even though these metro systems have huge impact on environmental and economic growth and sustainability they come with huge cost, long term planning, longer construction period and high maintenance costs. Many metro rail systems in India are heavily dependent on government grand, loans and non-fare revenue to sustain which is a concern to look after as soon as possible. Different metros in India all are varying in terms of construction cost, revenue generation, ridership aspects and mainly financial performances. However, there is only limited comparative research that evaluates these metro systems on their financial aspects and operational efficiency. Therefore, this article dives deeply into a comparative look at key Indian metro systems, analysing their operational and financial statements

III. REVIEW OF ARTICLE

Despite large investments metro accessibility remains often uneven due to cover only highly dense urban zones. Weak integration with other modes of transportation such as feeder services, buses and other modes affects overall effectiveness. Financial sustainability is another major theme discussed here, where high capital costs and fares influence lower income users. Overall, this research concludes that integrated transportation planning, institutional coordination and urban policies shapes the system better (Kuriakose, 2025).

Focusing primarily on the Mass Rapid Transit system (MRTS), it indicating that metros require a substantial capital investment, diversified revenue, long gestation period, sustainable financial planning. It highlights that farebox revenue alone is not sufficient to cover operational costs. It emphasizes the importance of Public private partnership, transit-oriented development, cost management, optimal debt and operational efficiency. Overall, it says that financial efficiency is depends on revenue diversification, cost control, strong government policies are basis for evaluation of metro systems (Lodhi et al., 2025).

Investigating on accessibility of the metro and highlights the significance of first and last mile connectivity. It further explains that the metros have high ridership only when it servers multi model transit connectivity and network. It also stresses the importance of coordinated urban planning, transit-based development, integrated ticketing system and parking. Overall, it concludes that the financial efficiency of metros is closely linked not only to fares and cost but also to accessibility, integration and last mile connectivity (Mukherjee et al., 2023).

The planning and implementation of metro projects have significantly challenged, comes with high cost, long term planning and construction periods. It states that many systems in India are over depending on farebox and government subsidies are a major concern. It shows that gap between projected and actual ridership. It also emphasizes transport integration with other modes and last mile connectivity (Dhok et al., 2021).

Highlighting the growing concerns regarding financial sustainability of Indian metros. Pratap observes the benefits of Indian metro, but it comes with high cost and investment yet most of these systems are loss making. Evidence from major metros indicates financial stress within the sector. Further he explains how fragile these systems are they have insufficient ridership, over dependence on government funding and states that farebox revenue is inadequate and recommends commercial development and advertising. Hong Kong metro model demonstrates that integrating rail development with property and commercial activities will support long term financial sustainability (Pratap, 2021).

Illustrating that the metro rails play a vital role in improving urban commute efficiency while facing huge financial and operational challenges. It states that increasing private vehicle are key factors for traffic and congestion in Indian cities. Metro can solve this issue, but it comes with high capital investment, maintenance and over dependence on government funding. It also indicates that passenger satisfaction, accessibility, affordability and service reliability have strong influence on usage and revenue generation. It concludes that improving connectivity and non-fare revenue are necessary for the long-term financial sustainability of the metro system (Behal, 2020).

The important component of public sector infrastructure that is metro rail is being examined in this study. It focused on the financial performance and stability of Delhi metro rail (DMRC). It uses financial ratios to evaluate profitability, liquidity and operational efficiency in different sectors. It analysed financial indicators such as operating margin, return on capital employed, earnings per share and return on equity. It highlights the success, growth of ridership in Delhi metro, financial stability, revenue source, policy factor and a broader understanding of cost structures to evaluate the performance of the metro system (Dr. Navneet Joshi, Sanjive Saxena and Rupal Dhyani, 2020).

The rapid increase in urbanization have paved the way for increasing demand for public transport systems, particularly metro systems. This study highlights that delays and cost overruns are the common problem, major cause for these are delay in land acquisition, shifting of utilities, lack of proper data, policy changes and delays in approval from authorities they only increase the cost and

reduce investor confidence especially in private public partnerships (PPP). It also discussed demand risk and ridership forecasting. It suggests making further study on relationship between delay factors and ridership shortfall in metro projects (Kumar Mittal et al., 2019).

The role played by the metro rail system in improving mobility and reducing traffic congestion in rapidly expanding city of Mumbai is very significant. It highlights the influencing factors that affects the ridership and performance of the metro system. It evaluates the accessibility, service frequency, fare structure, network connectivity and integration with other modes of transport. It reviews the station planning and last mile connectivity as well are identified as major factor for the success and usability of the metro system (Jasti & Vinayaka Ram, 2019).

A deep examination on The Delhi Metro (DMRC) indicates they metro systems operational efficient and success. It heavily relies on the debt financing for expansion, high borrowing level, interest obligation and repayment of loans are raising concerns about its long-term operation and financial stability. It argues that metros cannot be evaluated only based on profit indicators. It also high the economic and environmental benefits it has brought to the urban population of the capital city (Nishant & Ravi, 2018).

Application of Social Cost Benefit Analysis to evaluate metro projects demonstrates that Delhi metro (DMRC) generates huge economic returns by timesaving, pollution control and cost saving. Similar studies on Hyderabad metro have shown that despite huge capital cost and investments the system outweighs and underperforming when compared to DMRC. This literature also discusses the role of Public Private Partnership (PPP) models in financing the metro project and highlighting the importance of risk sharing, management and institutional coordination (Pilaka & Nallathiga, 2015).

Indicating that the metro rail developments influences land use patterns and promotes urban growth. Studies based on Detailed Project Reports (DPR) of various metros of India shows metro connectivity increases commercial activities, population density and mixed land use. Ramachandran says metros support sustainable urban transport and reduce environmental and economic costs associated with congestion. It also suggests that successful metros improve operational performance and long-term financial sustainability by increasing ridership and modal shift. Overall, this study says metros are vital for better transportation and metropolitan development (Sekar, 2012).

Analysing the impact of metro in the urban environment of Bengaluru as a case study. Their study says that it reduces traffic congestion, travel time and pollution while encouraging transit-oriented development and land use. According to their survey majority prefers metro transport due to their convenience and socioeconomic impact. Research on Shanghai metro reveals that areas closer to metro have higher density and increased commercial land use and urban development. In the Indian context it impacts by reduction in fuel consumption, pollution, traffic, travel cost and time (Hemasree & Subramanian, 2011).

Identifying that metro rail development is shaped not only by transport needs but also by political, social and economic factors. The Delhi metro was promoted as symbol of modernisation, efficiency and global city status which attracted huge investment and economic growth. It also highlights the gap between projected outcome and actual performance including early ridership shortfall and urban disruption during the construction. It concludes that metro functions as both transport infrastructure and symbolic urban project (Siemiatycki, 2006).

The need for metro systems in Indian cities for growing demand has been investigated in this study. It examines the metro systems by social cost benefit analysis and their environmental and economic impact. It also highlights the importance of measuring both financial and economical return by the metro systems. The study says the potential benefits are not only transportational efficiency but also long-term urban sustainability and development (Kumar, 2006).

IV. OBJECTIVES OF THE STUDY

This research aims:

- To analyse the financial performance of selected metro rail systems in India using data from their annual report.
- To compare the financial efficiency of different metro rail corporations based on key financial ratios and indicators.
- To evaluate the operating cost and revenue structure of metro rail systems, including fare and non-fare income sources.
- To examine the sustainability of metro operations by analysing operating ratio, farebox recovery ratio, and profitability measures.
- To analyse and compare the revenue, expenditure, assets, and liabilities of selected metro rail systems based on their financial statements.

V. RESEARCH METHODOLOGY

Research Design: This study adopts a descriptive and comparative study to evaluate the financial efficiency of major metro rail system in India. The research focus on analysing the financial performance and efficiency of

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metros using standardized financial indicators to identify and evaluate the level of efficiency among the major metros in India.

Sampling And Method Size: This study will include selected metro rail systems in the country such as Delhi metro, Mumbai metro, Chennai metro, Bengaluru metro and Kolkata metro. The selected metro will be evaluated based on the data available on the annual reports.

Data Collection Method: The study is based on the secondary data collected from the annual report published on the official website of the respective metro rail systems. The data will be collected for a specific period of five years to ensure consistency and uniformity.

Tools Used For Analysis: Financial efficiency will be measured using these key financial ratios and indicators such as

- Operating ratio
- Net profit ratio
- Return on capital employed (ROCE)
- Debt equity ratio
- Cost recovery ratio
- Revenue per Passenger
- Farebox Recovery Ratio
- EBIT Margin
- Asset Turnover Ratio
- Current Ratio

VI. RESEARCH ANALYSIS

Operating Ratio

Table No:1

METRO	2019-20	2020-21	2021-22	2022-23	2023-24	Average
DMRC	85.20%	272.83%	119.99%	85.86%	66.20%	126.02%
BMRCL	80.80%	389.59%	171.50%	63.00%	63.98%	153.77%
MMRCL	115.65%	290.23%	255.38%	887.50%	2,217.22%	753.20%
CMRL	90.51%	215.05%	132.55%	97.45%	98.91%	126.89%

Source: computed data

The operating ratio indicates how efficiently metro systems cover operating expenses through operating revenue, where a lower value means a better handling and a ratio above 100% shows an operational deficit. All metro shows a sharp deterioration in 2020-21, where DMRC (272.83%), BMRCL (389.59%) and CMRL (215.05%) rising steeply, implying a major revenue shock while costs remained largely fixed. In the post-pandemic period, DMRC & BMRCL improved strongly, reaching 66.20% and 63.98% in 2023-24, showing better cost recovery and operational stabilization. CMRL remains comparatively stable and close to break even in recent years (97.45% to 98.91%). In contrast, MMRCL reports exceptionally high ratios (average 753.20%, peaking at 2217.22% in 2023-24), it shows very low operational revenue compared to expenses, since it was in expansion phase.

Net Profit Ratio

TABLE NO:2

METRO	2019-20	2020-21	2021-22	2022-23	2023-24	Average
DMRC	-6.95%	-90.54%	-70.30%	-7.07%	-4.76%	-35.92%
BMRCL	-121.73%	-1,101.06%	-230.07%	-78.64%	-34.50%	-313.20%
MMRCL	-21.53%	-197.96%	-155.38%	-796.48%	-2,159.19%	-666.11%
CMRL	-182.88%	-410.01%	-200.22%	-115.20%	-63.67%	-194.40%

Source: computed data

The net profit ratio is negative for all metros across the period of 5 years, this data showing that each system has reported net losses compared to its revenue. The worst performance is in 2020-21, where losses are for DMRC (-90.54%), BMRCL (-1101.06%) and CMRL (-410.01%) indicating a huge fall in income due to covid pandemic. After 2021-22, DMRC recovered and close to break even by 2023-24, with improved revenue generation and cost control, BMRCL and CMRL also improved a little but still loss making in 2023-24 (-34.50% and -63.67%). But, MMRCL shows extremely high negative ratios, with worst at -2159.19% in 2023-24, this is due its current expansion phase.

Return on Capital Employed (ROCE)

Table No:3

METRO	2019-20	2020-21	2021-22	2022-23	2023-24	Average
DMRC	2.41%	-0.56%	-3.40%	2.47%	2.95%	0.77%
BMRCL	0.37%	-2.59%	-0.40%	-0.79%	-0.34%	-0.75%
MMRCL	4.71%	-0.12%	-0.11%	-0.13%	-0.13%	0.84%
CMRL	-2.25%	-2.27%	-1.17%	-0.90%	-0.75%	-1.47%

Source: computed data

ROCE shows how efficiently each metro generates operating returns from the capital employed, here higher positive values indicate better capital productivity. DMRC records mostly positive, recovering from 2020-21(-0.56%) and 2021-22 (-3.40%) to 2.95% in 2023-24, giving a small positive average (0.77%). BMRCL remains weak in most years with lowest -2.59% in 2020-21 and an average of -0.75% showing poor ROCE. MMRCL shows high ROCE in 2019-20 (4.71%) but turns negative from there (around -0.12% to -0.13%), resulting in a marginal positive average of 0.84%. CMRL stays negative throughout the period with lowest average of -1.47%, shows underutilization of

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capital. Overall, DMRC is the best in capital efficiency while CMRL and BMRCL faced difficulty in returns on capital employed

Debt–Equity Ratio

Table No:4

METRO	2019-20	2020-21	2021-22	2022-23	2023-24	Average
DMRC	0.92	0.89	0.91	1.02	0.91	0.930
BMRCL	1.92	3.20	2.09	2.08	0.49	1.956
MMRCL	0.81	3.36	2.81	3.29	1.84	2.422
CMRL	2.45	2.78	3.74	2.50	2.44	2.782

Source: computed data

The debt-equity ratio reflects the metro projects which are financed through debt compared to equity. Here higher values indicate greater leverage and financial risk. DMRC remains the most stable and moderately leveraged system, staying close to 0.9 – 1.0 throughout the period with average of 0.93, showing a balanced capital structure. BMRCL shows high leverage in most of the years, peaking at 3.20 in 2020-21, but drops suddenly to 0.49 in 2023-24, indicating a significant improvement in equity position or decrease in debt. MMRCL shows strong improvement, rising from 0.81 in 2019-20 to above 3.0 in 2020-21 and 2022-23, before decreased to 1.84 in 2023-24, indicating heavy reliance on debt during the expansion phase. CMRL stays consistently high (2.44-3.74; average 2.78) showing significant dependence on borrowings. Overall, DMRC is more financially conserve, while others indicate higher leverage and repayment pressure

Cost Recovery Ratio

Table No:5

METRO	2019-20	2020-21	2021-22	2022-23	2023-24	Average
DMRC	1.17	0.37	0.83	1.16	1.51	1.008
BMRCL	1.24	0.26	0.58	1.59	1.56	1.046
`MMRCL	0.86	0.34	0.39	0.11	0.05	0.350
CMRL	1.10	0.46	0.75	1.03	1.01	0.870

Source: computed data

The cost recovery ratio shows how operating revenue covers the operating costs, here value above 1 shows cost recovery and below 1 shows shortfall. DMRC performs the best, recovering from the pandemic period in 2020-21 (0.37) to exceeding 1 in most of the period reaching 1.51 in 2023-24 with an average of 1.008. BMRCL shows similar results with decline in 2020-21(0.26) and 2021-22 (0.58) but recovers in 2022-23 & 2023-24 (1.59 & 1.56) with highest average of 1.046. CMRL remains moderate declining to 0.46 in 2020-21 but recovers and stabilized around 1 in 2022-23 and 2023-24 (1.03 and 1.01) with overall average of 0.87. But MMRCL stays below 1 and declined to 0.11 and 0.05 in the last two years shows the inability to covers cost through operating revenue (average 0.350). Overall DMRC and BMRCL shows best recovery, CMRL is near break-even and MMRCL is highly dependent on external support

Revenue per Passenger

Table No:6

METRO	2019-20	2020-21	2021-22	2022-23	2023-24	Average
DMRC	₹65.47	₹135.54	₹113.24	₹71.00	₹66.84	₹ 90.418
BMRCL	₹28.09	₹18.39	₹27.70	₹31.37	₹37.08	₹ 28.526
MMRCL	₹324.05	-	-	-	-	₹ 64.81
CMRL	₹85.16	₹159.98	₹71.80	₹54.12	₹68.11	₹ 87.834

Source: computed data

Revenue per passenger reflects the average earnings generated per passenger and is influenced by other factors. DMRC shows normal level in 2019-20 and 2023-24 (₹65.47 and ₹66.84) but unusually high in 2020-21 and 2021-22 (₹135.54 and ₹113.24) due to lower ridership. BMRCL remains the lowest overall but improves from ₹28.09 (2019–20) to ₹37.08 (2023–24), showing stable ridership. CMRL is comparatively high peaking at ₹159.98 in 2020–21 and stabilized around ₹54.12–₹68.11 in 2022-23 to 2023-24. MMRCL was under construction. Overall, DMRC and CMRL recovered closer to pre pandemic level, but BMRCL shows only slight growth .

Farebox Recovery Ratio

Table No:7

METRO	2019-20	2020-21	2021-22	2022-23	2023-24	Average
DMRC	98.93%	22.55%	64.95%	89.40%	94.86%	74.14%
BMRCL	111.38%	18.88%	49.25%	158.75%	156.29%	98.91%
MMRCL	86.47%	-	-	-	-	17.29%
CMRL	79.72%	27.32%	61.22%	83.87%	83.29%	67.08%

Source: computed data

Farebox recovery ratio shows how ticket revenue alone can cover the operating costs. Here >100% means tickets cover the full operating costs and has a surplus. <100% means it depends on non-fare incomes or subsidies. DMRC is near full recovery in normal years but collapsed in 2020-21 (22.55) due to covid pandemic showing the ridership shock. BMRCL is the best overall, it is above

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100% in 2019-20 (11.38%) and rises very high in 2022-23 and 2023-24 (158.75% and 156.29%), shows strong farebox recovery. CMRL stays below 100% throughout the period and improving from 27.32% in 2020–21 to 83% in 2022–23 and 2023–24 but not full coverage. MMRCL has only data for 2019-20 since it was under construction. Overall, this ratio highlights post and pre pandemic differences in DMRC and BMRCL, CMRL is very dependent on non-fare support.

EBIT Margin

Table No:8

METRO	2019-20	2020-21	2021-22	2022-23	2023-24	Average
DMRC	15.61%	-12.61%	-35.59%	23.59%	18.80%	1.96%
BMRCL	16.43%	-971.59%	-66.72%	-51.11%	-15.53%	-217.70%
MMRCL	45.97%	-184.97%	-151.68%	-787.50%	-2,115.91%	-638.82%
CMRL	-137.78%	-319.08%	-127.96%	-60.63%	-29.81%	-135.05%

Source: computed data

EBIT margin shows operating profitability before any interest and tax; positive value means operating surplus and negative value means operational deficit. DMRC fluctuates from healthy 15.61% (2019–20) to loss in 2020-21 (-12.61%) and 2021-22 (-35.59%) then, recovers to 23.59% (2022–23) and 18.80% (2023–24) with only average of 1.96% due to losses. BMRCL shows extreme loss in 2020-21 (-971.59%) and remains negative up to 2023-24 (-15.53%) with a weak average of -217.70%. MMRCL declines the worst from 45.97% (2019–20) to -2,115.91% in 2023–24 with lowest average of -638.82%. CMRL stays negative throughout the period but showing improvements -137.78% (2019–20) to -29.81% (2023–24) reducing operational loss. Overall only DMRC has positive operating profit and others remain loss making.

Asset Turnover Ratio

Table No:9

METRO	2019-20	2020-21	2021-22	2022-23	2023-24	Average
DMRC	0.08	0.02	0.05	0.06	0.08	0.058
BMRCL	0.019	0.0026	0.0053	0.013	0.019	0.012
MMRCL	0.068	0.0006	0.0006	0.0002	0.00006	0.014
CMRL	0.012	0.006	0.007	0.012	0.021	0.012

Source: computed data

Asset turnover ratio shows how each metro uses its assets to generate revenue efficiently. Here higher value means better utilization of assets. DMRC shows most stable performance (0.08 in 2019–20 and 2023–24; average 0.058) showing best performance in revenue generation with only declining in 2020-21 with 0.02. BMRCL remains low throughout the period with the average of 0.012 by declining in 2020-21 and recovering to 0.019 by 2023-24 show improvement but its slow. CMRL is also low but improved steadily from 0.012 (2019–20) to 0.021 (2023–24) increasing utilization of assets over time. MMRC is highly inefficient collapsing from 0.068 (2019–20) to almost zero by 2023-24 (0.00006; average 0.014). overall, DMRC used its asset the best, CMRL is improving, BMRCL is moderate and MMRC is the worst.

Current Ratio

Table No:10

METRO	2019-20	2020-21	2021-22	2022-23	2023-24	Average
DMRC	0.35	0.29	0.28	0.41	0.28	0.322
BMRCL	0.57	1.67	10.96	0.50	0.61	2.862
MMRCL	0.46	0.67	0.63	0.29	0.16	0.442
CMRL	0.74	0.56	0.64	0.95	1.04	0.786

Source: computed data

The current ratio shows short term liquidity i.e. the ability to meet current liabilities using current assets, here a ratio around 1 or above is good. DMRC stays low (0.28–0.41; average 0.322) show rigid liquidity and dependent on short term liquidity. BMRCL is highly uneven with sudden increase to 1.67 in 2020–21 and unusually high 10.96 in 2021–22 with an average of 0.442 shows weak short-term solvency. CMRL shows comparatively better liquidity, increasing from 0.74 (2019–20) to 1.04 in 2023–24 with average of 0.786 showing safer short-term solvency. Overall, CMRL is the most efficient, DMRC, MMRCL are showing persistent constraints and BMRCL is uneven by a one-year spike.

VII. CONCLUSION

Overall, this five-year ratio analysis shows the financial efficiency of these selected Indian metro systems for the purpose of this research article, shows that its all widely differ and strongly disrupted in 2020-21, and later most of have slowly stabilized. DMRC has emerged the most financially resilient metro, showing strong post-pandemic recovery in operational performance and efficiency, better cost recovery, better EBIT margins and comparatively stable leverage and asset utilization. BMRCL shows a quick improvement in cost recovery and farebox recovery in the last two years, but its profitability is remaining weak and its liquidity it very uneven. CMRL improves steadily and goes closer to breakeven point and showing better shot term liquidity by 2023-24, yet the overall profit is still in negative figures. MMRCL performs the worst mainly because it is in the expansion and early stages with comparatively very low revenue and high cost and large

asset base, it making the ratios appear less comparted to others. In conclusion, the study indicates that long term sustainability requires not only ridership recovery but also stronger non fare revenue, cost control and balanced debt management.

VIII. LIMITATION OF THE STUDY

This research encountered the following hindrance:

- Uses only secondary data from annual reports.
- Different accounting polices reduce comparability.
- Covid-19 lockdown distorts normal performance.
- Under construction metro have missing value.
- Only financial ratios are considered, not operational factors.

IX. IMPLICATIONS OF THE STUDY

- Helps identify which metros are financially stronger and which need urgent support.
- Support policy decisions on subsidies, fare revision and non-fare revenue planning.
- Highlight cost control areas to improve operating efficiency and cost recovery.
- Guides debt and capital planning by showing leverage and liquidity risk.
- Provides a base for future benchmarking across metros and over time.

X. SUGGESTION OF THE STUDY

- Strengthen non fare revenue to reduce dependence on tickets or fares.
- Improve ridership through better feeder connectivity, last mile services and services frequency optimization.
- Control operating costs using energy saving measures, preventive maintenance and efficient staffing.
- Plan fares scientifically with periodic revisions linked to inflation and service quality.
- Mange debt carefully by restructuring high-cost borrowing and improve cash flow planning.

REFERENCES

1. Behal, D. (2020). Planning for Equity in Public Transit: A study of Mass Transit in Delhi. International Research Journal of Engineering and Technology, 3405–3418. www.irjet.net
2. Dhok, D., Gadepalli, R., & Nandy, R. (2021). Performance of Indian Metro Systems: Lessons for Upcoming Urban Rail Projects. 1–10. https://cms.uitp.org/wp/wp-content/uploads/2022/01/Knowledge-Brief-November-2021.pdf
3. Hemasree, R., & Subramanian, C. V. (2011). Understanding the Impacts and Influences of Metro Rail on Urban Environment-Case Studies and the Bengaluru Scenerio. 2, 1–19.
4. Jasti, P. C., & Vinayaka Ram, V. (2019). Integrated and Sustainable Benchmarking of Metro Rail System Using Analytic Hierarchy Process and Fuzzy Logic: A Case Study of Mumbai. Urban Rail Transit, 5(3), 155–171. https://doi.org/10.1007/s40864-019-00107-1
5. Kumar, K. (2006). Munich Personal RePEc Archive Social Cost-Benefit Analysis of Delhi Metro. (14465).
6. Kumar Mittal, Y., Kumar Paul, V., & Scholar, R. (2019). Metro Rail Infrastructure Projects in India: Challenges and Way Forward. JETIR1901220 Journal of Emerging Technologies and Innovative Research, 6(1), 140–144. www.jetir.org
7. Kuriakose, P. N. (2025). ScienceDirect Developing Metro Rail-Based Accessibility in India : Existing Challenges and Prospects. Transportation Research Procedia, 82(July 2023), 640–659. https://doi.org/10.1016/j.trpro.2024.12.064
8. Limão, N., & Venables, A. J. (2001). Infrastructure, Geographical Disadvantage, Transport Costs, and Trade. 15(3), 451–479.
9. Lodhi, A. S., Jaiswal, A., Sharma, S. N., & Dehalwar, K. (2025). Strategies and Opportunities for Urban Finance for the Mass Rapid Transit System. Journal for Studies in Management and Planning, 8(11), 53. https://doi.org/10.26643/jsmap/2025/1
10. Mukherjee, A., Muruganantham, S., Balachandran, A., Maiti, S., & Kumar Ganesh, P. (2023). Improving Metro Access in India: Evidence from Three Cities. World Resources Institute, (July), 1–40. https://doi.org/10.46830/wriwp.23.00009
11. Nishant, & Ravi, R. (2018). Riding on Debt.
12. Pilaka, N., & Nallathiga, R. (2015). Technical Analysis of the Hyderabad Metro Rail Project. International Journal of Technology, 5(2), 304. https://doi.org/10.5958/2231-3915.2015.00040.1
13. Pratap, K. V. (2021). Are We Creating Outcomes Similar to Power Sector by Proliferating Metro Rail Across Cities in India? Vikalpa, 46(1), 7–12. https://doi.org/10.1177/02560909211015455
14. RESEARCH ARTICLE DELHI METRO : DOES SOUND RATIOS REFLECT FINANCIAL STABILITY Dr . Navneet Joshi , Sanjive Saxena and * Rupal Dhyani. (2020).
15. Sekar, S. P. (2012). Contributions of Metro Rail Projects in the Urban Dynamics of Indian Metro Cities : Case Study of Chennai and Bangalore. Congress, 1–10.
16. Siemiatycki, M. (2006). Message in a Metro: Building urban rail infrastructure and image in Delhi, India. International Journal of Urban and Regional Research, 30(2), 277–292. https://doi.org/10.1111/j.1468-2427.2006.00664.x