

A Comprehensive Analysis of the Financial Soundness and Stability of Chennai Metro Rail Limited

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Abstract - This research investigates the financial soundness and stability of Chennai Metro Rail Limited for the five-year period 2021 to 2025. The study uses secondary data given from annual reports and financial statements. The methodology section of this research discusses the following: financial statements, ratio, trend, and DuPont analyses, Altman Z-score, and investment appraisal techniques like Net Present Value (NPV), Payback Period, and the Accounting Rate of Return (ARR), Discounted cash Flow. The findings point to significant asset growth and sustained investment in infrastructure, which demonstrates expansion. The profitability, however, is inconsistent with negative returns during the majority of the years, and a slight increase in 2024. The cash flow analysis indicates a negative operating cash flow, which suggests that the core operations of the firm are weak, however, a positive cash flow from financing activities indicates that the firm is reliant on external funding. Investment analysis shows a negative NPV in the majority of the years considered, which suggests that the firm is making low return investments. The firm is in a capital-intensive business, and therefore the findings show that the firm operates in a low return environment, and as a result of this, operational efficiency, cost control, financial planning and overall government support, the firm needs to make improvements to secure longer-term financial stability and sustainability.

Key Words: Financial Soundness, Financial Stability, Ratio Analysis, DuPont Analysis, Altman Z-Score, Chennai Metro Rail Limited.

1.INTRODUCTION

Financial performance assessment allows measuring the effectiveness of resource management and business activities, determining the return on investments over a certain period. In highly capital-intensive industries such

as metro rail transportation, financial evaluation becomes relevant since significant investments are required for construction works, equipment installation, and other expenses. The proper assessment will allow estimating the profitability and stability of the company.

In this regard, Chennai Metro Rail Limited can be regarded as an important project in urban infrastructure that seeks to enhance transport facilities in the city. Chennai Metro Rail Limited has made considerable investments in infrastructure improvement, technological modernization, and extension of services. Nonetheless, the company still faces difficulties in maintaining the level of financial performance due to capital-intensive projects and high operating costs. Conventional tools of financial evaluation provide a general picture of business performance; however, it does not reflect the dynamism and specificity of infrastructure projects. For this reason, innovative analytical tools are needed to assess the financial standing of such an entity. Financial evaluation methods include ratio analysis, DuPont analysis, Altman Z-score, and different investment appraisal tools. Thus, advanced financial evaluation methods can be used to estimate the financial standing of Chennai Metro Rail Limited. The financial statements of infrastructure projects contain certain deviations caused by high investment, irregular revenue flows, and financing by external sources. This might influence the performance of such organizations in terms of profitability and financial stability, which calls for applying sophisticated analytical approaches. Taking into account these aspects, the present study aims at assessing the financial performance and stability of Chennai Metro Rail Limited within the years from 2021 to 2025 through the use of financial evaluation tools.

2. PROBLEM STATEMENT AND RESEARCH OBJECTIVES

2.1 PROBLEM STATEMENT

As far as the rapidly developing urbanization is concerned, nowadays metro rail systems play an important role in terms of public transport in various countries. Construction of such systems demands enormous funds to be invested in order to develop and operate them successfully. At the same time, despite the obvious benefits for people and city infrastructure that can be gained from having a metro system, numerous organizations encounter difficulties regarding their financial performance management. The problem under consideration is associated with financial sustainability that is affected by poor financial evaluation that, in turn, leads to lack of financial stability. To start with, it should be emphasized that metro organizations' financial stability is negatively influenced by the fact that large projects do not generate enough profits. For instance, it was mentioned above that the company, in question, invests substantial resources into expansion and further development, but this results in low revenues that cannot compensate for expenses. Moreover, another difficulty faced by companies like Chennai Metro Rail Limited is associated with the reliance on the external sources of financing including both loans and government aid. On the one hand, additional funds provide an opportunity to expand business operations. On the other hand, this makes companies more exposed to financial risks and raises questions about the effectiveness of capital management. Besides, traditional evaluation methods might not provide full information about the actual financial situation in the company under consideration. In addition, profitability, liquidity, and investment return are some of the financial performance parameters. These indicators are likely to fluctuate throughout the period under analysis and it will be necessary to determine the causes of variations and financial performance stability. Thus, the aim of the proposed research paper is to perform financial analysis of Chennai Metro Rail Limited by means of appropriate techniques and approaches.

2.2 RESEARCH OBJECTIVES

1. To assess the financial performance of Chennai Metro Rail Limited through financial analysis.
2. To assess the financial soundness of Chennai Metro Rail Limited using DuPont analysis and Altman Z-Score model.
3. To examine the trend of income and expenditure in the organization.

4. To quantify the level of profitability of the company's investment activities.

5. To suggest practical measures to improve overall financial performance and reduce operational costs.

3.0 REVIEW OF LITERATURE

PATIL (2026) According to this, many metro rail projects have not been able to achieve financial efficiency due to inadequate utilization, despite significant investments made in these projects.

LODHI ET AL. (2025) The analysis of financing options for infrastructure projects by Lodhi et al. (2025) shows that the use of multiple funds is important for increasing the financial stability of the project and relying only on government grants may not be a viable strategy.

SRIDHAR AND MAHENDRA (2025) examined the metro infrastructure projects help promote urban productivity and job creation; however, efficient financial management is crucial in ensuring their sustainability due to relatively high investment cost.

SUN ET AL. (2025) High capital expenditure and uncertainty associated with it are highlighted by Sun et al. (2025) who recommend carrying out a risk assessment and developing strategies to mitigate risks.

KHURSHEED ET AL. (2025) highlight that financial performance of metro rail projects has worsened since the pandemic outbreak as evidenced by reduced ridership and higher costs. Strategies to improve operations and increase non-fare revenue sources should be developed.

ABHIJNA ET AL. (2025) Metro projects are beneficial for urbanization according to Abhijna et al. (2025); however, efficient management of finances is also important to ensure long-term sustainability of the project.

GUPTA ET AL. (2023) As stated by Gupta et al. (2023), the development of metro rail projects results in more investment in infrastructure; however, it may also increase financial risks that can be managed through cost optimization and improved revenue generation strategies.

SINGH AND JAIN (2023) According to Singh and Jain (2023), fares paid by passengers are not enough to finance metro rail projects, and therefore non-fare revenue sources should also be utilized to ensure financial stability.

SHARMA (2022) Large-scale investment associated with metro rail projects leads to the need to manage capital

effectively, according to the study conducted by Sharma (2022). Therefore, the adoption of innovative financing options is crucial to maintaining financial stability.

PRATAP (2021) The evaluation of financial performance of metro rail projects done by Pratap (2021) shows that most of them operate at a deficit. Thus, appropriate strategies should be developed to overcome the problem.

4.0 RESEARCH METHODOLOGY

4.1 Research Design

The type of research design used in this paper is an analytical one, but there are also some descriptive features present. Analytical aspects of the research design imply analyzing financial statements and figures related to Chennai Metro Rail Limited in order to evaluate its financial performance and financial well-being. Descriptive features imply structuring the company's assets, debts, earnings, and expenditures in order to give a more detailed insight into the company's financial position throughout the selected period of time. The described research design allows the researcher to analyze financial trends related to the selected company, make comparisons of the company's performance over certain periods, assess the relationship between the examined financial variables such as profitability, liquidity, and others. It allows the researcher to assess the role of particular financial components in influencing the performance and well-being of the selected enterprise. Using the mentioned research design makes it possible to make informed decisions concerning investments, resources distribution, and other issues important in the company's work. The use of both analytical and descriptive aspects of the research design ensures a proper assessment of the company's financial performance from various angles. Such a research design ensures a better flow of information because it is based on the systematic organization of analyzed data. Such an approach makes the analysis of the company's financial performance logical and comprehensible. Moreover, such a research design implies the use of structured techniques of financial analysis, which increases the reliability and validity of the analysis.

4.2 EMPIRICAL VALIDATION

This term represents the process of testing the study's findings with the help of practical financial data collected from annual reports published by Chennai Metro Rail Limited. Instead of focusing on theoretical considerations, this research explores how financial soundness and stability of the company can be evaluated with the help of

its financial performance using actual figures available in balance sheets, income statements, and other financial documents. The financial data used in this study was collected from secondary sources, specifically from annual reports provided for the company for five years between 2021 and 2025. In order to analyze the data properly, several financial tools were used. These included ratio analysis, trend analysis, DuPont analysis, Altman Z-score, as well as Net Present Value (NPV), Payback Period, and Accounting Rate of Return (ARR). These tools helped to identify trends, relationships, variations in financial performance, and different factors influencing financial soundness and stability. For example, profitability, liquidity, solvency, cash flow position, and investment efficiency will be considered. In addition, the influence of financial decisions and financing activities will be assessed. After the analysis is conducted, results will be reviewed carefully to evaluate whether they meet the stated objectives and confirm assumptions about the company's financial soundness and stability. Overall, empirical validation plays an essential role in providing credibility to this study.

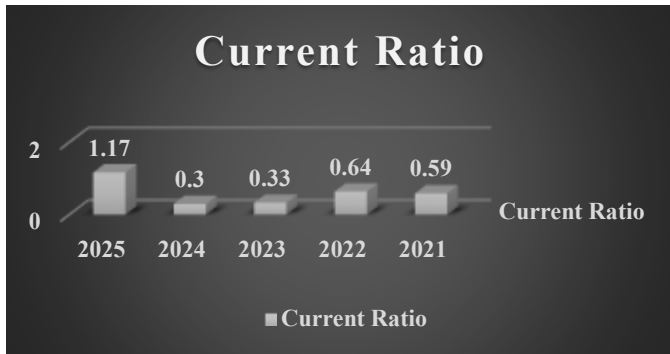
5.0 RESULTS AND DISCUSSIONS

5.1 CURRENT RATIO

5.1 Table Showing Comparison of Current Ratio for Five Years 2021 to 2025

Years	2025	2024	2023	2022	2021
Current Asset	818432 .13	146906 .97	219701 .64	331733 .27	192981 .96
Current Liabilities	700756 .12	488430 .48	660102 .95	519197 .87	325763 .22
Current Ratio	1.17:1	0.30:1	0.33:1	0.64:1	0.59:1

5.2 Chart showing comparison of current ratio for five years 2021 to 2025



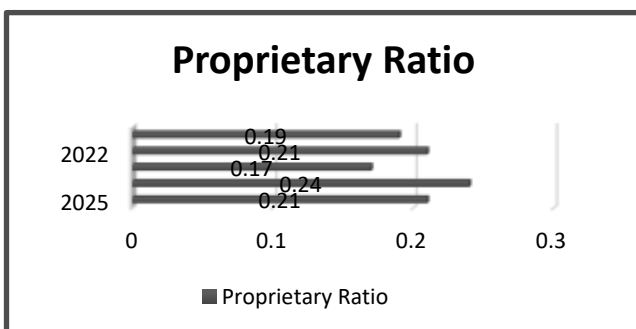
The Current Ratio for Chennai Metro Rail Limited demonstrates inconsistent liquidity for the years 2021 to 2025. From 2021 to 2024, the ratio remained below one, indicating weak short-term solvency, with 2021 recording the lowest ratio of 0.59:1 and 2024 recording the highest ratio of 0.30:1. A significant positive shift was observed in 2025, with the ratio becoming 1.17:1, indicating an improvement in liquidity and short-term obligations.

5.2 PROPRIETARY RATIO

5.2 Table Showing Comparison of Proprietary Ratio for Five Years 2021 to 2025

Years	2025	2024	2023	2022	2021
Shareholders' Equity	12118	95583	57315	59674	44870
Total Assets	57647	40218	33683	28261	23856
Proprietary Ratio	0.21:1	0.24:1	0.17:1	0.20:1	0.19:1

5.2 Chart Showing Comparison of Proprietary Ratio for Five Years 2021 to 2025



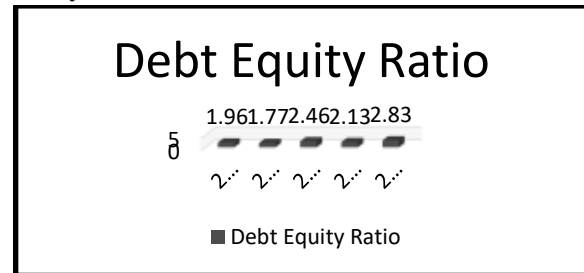
The Proprietary Ratio of Chennai Metro Rail Limited varies slightly between 2021 (0.19:1) and 2025 (0.21:1). It fell to 0.17:1 in 2023, which means that it is less dependent on the funds of shareholders, but in 2024, it rose to 0.24:1. In 2025, it marginally declined to 0.21:1, where it is moderately stable.

5.3 DEBT EQUITY RATIO

5.3 Table is Showing Comparison of Debt Equity Ratio for Five Years 2021 to 2025

Years	2025	2024	2023	2022	2021
Total Debt	23706	16883	14119	12737	12708
Shareholders' Equity	3	17	42	86	54
Debt Equity Ratio	1.96:1	1.77:1	2.46:1	2.13:1	2.83:1

5.3 Chart showing comparison of debt equity ratio for five years 2021 to 2025



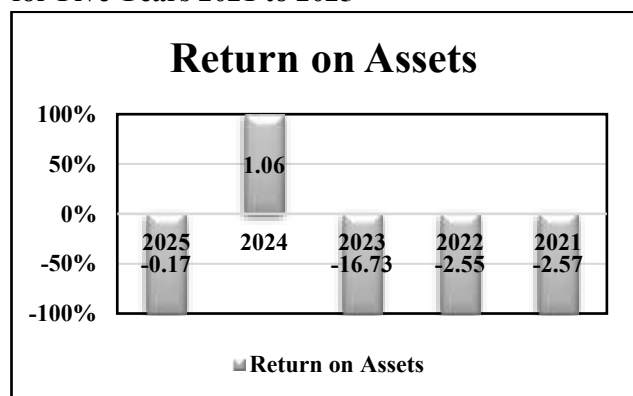
Chennai Metro Rail Limited has exhibited a falling Debt-Equity Ratio from 2021 (2.83:1) to 2024 (1.77:1), suggesting a declining financial leverage and growing reliance on equity. Nonetheless, the ratio values were noticeably high for 2022 (2.13:1) and 2023 (2.46:1), indicating proportionately greater reliance on debt. 2025 also saw a slight increase to 1.96:1 signifying a limited use of debt. The overall trend suggests improving the capital structure.

5.4 RETURN ON ASSETS

5.4 Table is Showing Comparison of Return on Assets for Five Years 2021 to 2025

Year s	2025	2024	2023	2022	2021
Net Inco me	-10056 .64	42676.7 4	-56736 .50	-72297 .52	-61337 .25
Tota l Asse ts	576476 4.33	402188 6.64	336837 8.50	282614 4.14	238567 6.22
RO A	-0.17%	1.06%	-16.73 %	-2.55%	-2.57%

5.4 Chart is Showing Comparison of Return on Assets for Five Years 2021 to 2025



The Return on Assets (ROA) for Chennai Metro Rail Limited indicates inconsistent performance for the period 2021 to 2025. For 2021 and 2022, the ratio was negative (-2.57%) and (-2.55%) respectively. In 2023, the ratio sharply declined to (-16.73%), indicating the worst asset utilization. In 2024, the ratio turned positive to (1.06%) indicating improved efficiency and though there is a slight decline in 2025 to (-0.17%) indicating a marginal setback.

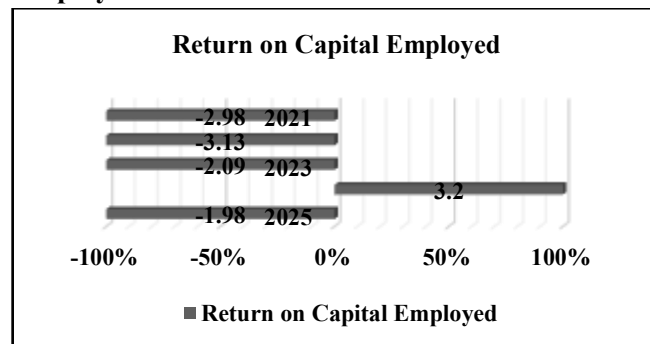
5.5 RETURN ON CAPITAL EMPLOYED

5.5 Table Showing Comparison of Return on capital employed for Five Years 2021 to 2025

Years	2025	2024	2023	2022	2021
EBIT	-100277 .78	113070 .50	-56673. 28	-72297. 52	-61337. 26
Capita l	506400 8.21	353345 6.16	270827 5.55	230694 6.27	205991 3.00

Emplo yed					
ROC E	-1.98%	3.20%	-2.09%	-3.13%	-2.98%

5.5 Chart Showing Comparison of Return on Capital Employed for Five Years 2021 to 2025



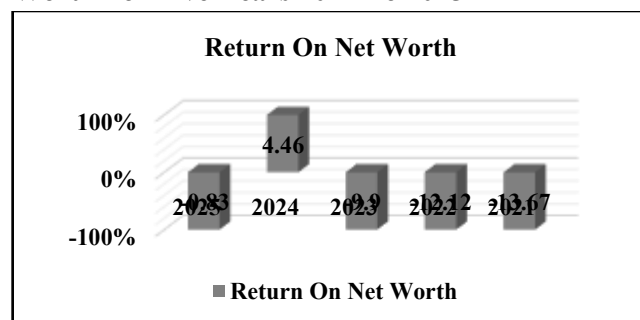
From 2021 to 2023, the Return on Capital Employed stayed negative, going from -2.98% to -2.09%. This means that capital was not being used well. The ratio became positive (3.20%) in 2024, which showed that things were getting better. But in 2025, it dropped again to -1.98%, which was a step back. Overall, the trend shows that capital use is not always good.

5.6 RETURN ON NET WORTH

5.6 Table Showing Comparison of Return on Net Worth for Five Years 2021 to 2025

Years	2025	2024	2023	2022	2021
Net Income	-10056. 64	42676. 74	-56736 .50	-72297 .52	-61337 .25
Sharehol ders' Equity	121189 2.17	95583 5.82	57315 9.08	59674 3.27	44870 6.77
RONW	-0.83%	4.46%	- 9.90%	-12. 12%	-13. 67%

5.6 Chart Showing Comparison Of Return On Net Worth For Five Years 2021 To 2025



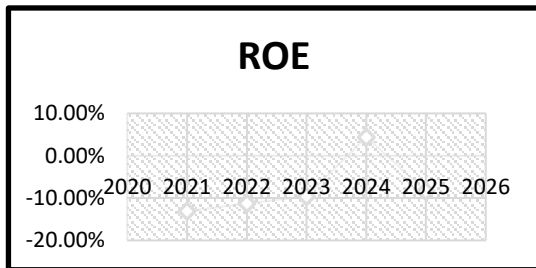
The graphical trend of Return on Net Worth for the years 2021 to 2025 shows a gradual improvement in financial performance. The company has reported significant negative returns between 2021 (-13.67%) and 2023 (-9.90%), indicating continuous losses and inefficient utilization of shareholders' funds. However, a significant improvement is observed in 2024 with RONW turning positive (4.46%) suggesting better operational efficiency and profitability.

5.8 DUPONT ANALYSIS

5.8 Table Showing Comparison of Dupont Analysis for Five Years From 2021 To 2025.

Year	Profit Margin	Asset Turnover	Equity Multiplier	ROE
2021	-4.1	0.006	5.32	-13.10%
2022	-3.43	0.007	4.73	-11.30%
2023	-1.16	0.014	5.88	-9.60%
2024	0.27	0.039	4.21	4.40%
2025	-1.61	0.011	4.75	-8.40%

5.7 Chart Showing Comparison of Dupont Analysis for Five Years From 2021 to 2025



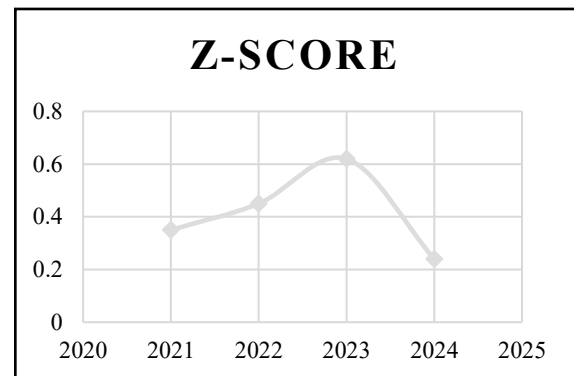
According to the DuPont analysis for Chennai Metro Rail Limited, the company incurred losses between 2021 and 2023, which contributed to negative gains during the period. In 2024, there was an improvement in the firm's performance, leading to positive gains; however, it fell in the subsequent year. The asset turnover ratio is low, which means inefficient use of resources, whereas the equity multiplier is high due to increased dependence on debt financing.

J5.9ALTMAN Z-SCORE

5.9 Table showing Altman Z-Score calculation (2021–2025)

Year	1.2 X ₁	1.4 X ₂	3.3 X ₃	0.6 X ₄	1.0 X ₅	Z - Score	Result
2021	-0.12	-0.06	-0.07	0.14	0.006	0.35	Distress
2022	-0.17	-0.07	-0.08	0.16	0.007	0.45	Distress
2023	-0.16	-0.05	-0.05	0.12	0.014	0.62	Distress
2024	-0.1	0.08	0.04	0.18	0.039	0.24	Distress
2025	-0.14	-0.06	-0.07	0.16	0.011	0.7	Distress

5.9 Chart Showing Altman Z-Score calculation for Five Years From 2021 to 2025



The Altman Z-Score value for Chennai Metro Rail Limited is still under the threshold mark during the period of 2021-2025. This shows that there exists financial distress. But this is because of the heavy investments made initially. As this is an infrastructural project backed by the government, a poor Z-Score value is not an indication of failure

DISCUSSION

Analysis of the company shows that currently Chennai Metro Rail Limited is at the stage of growth or expansion since the asset base and investments in infrastructures are increasing continuously. Nevertheless, the issue of profit is one of the key problems of the enterprise since losses occur almost every year, while some improvement can be observed only in 2024. It means that profits do not increase along with development. According to the cash

flow analysis, operating cash flows are negative, which implies inefficiency in the generation of income as the result of core business activity. Negative investing cash flows demonstrate that capital expenditure occurs continuously, while positive financing cash flows imply dependency on external sources, such as loans and stocks. The pattern means that borrowing is needed to conduct business. Moreover, ratios show that profitability ratios like ROA, ROCE, and RONW are negative, which means improper use of resources in the work process. Despite some improvements in liquidity in 2025 and decrease in the debt/equity ratio, dependency on debt persists. In addition, analysis shows that investment appraisal ratios like NPV are negative, and ARR and payback period are volatile. DuPont analysis also demonstrates inefficiency of work, while Altman Z-score implies the company's financial troubles. Nevertheless, the situation is common for capital-intensive projects funded by the government.

6.0 IMPLICATIONS OF FUTURE RESEARCH

The results of this research point out some key areas that can be examined in further research concerning the financial soundness and stability of Chennai Metro Rail Limited. Although the present research is done on financial performance based on the use of such tools as ratio analysis, DuPont analysis, Altman Z-score and investment appraisal methods, the future study can increase the scope by adding other financial indicators, like working capital management, revenue segmentation and cost efficiency analysis. This would give a better overview of the financial structure and performance of the company. Future researchers can also carry out comparison studies between various metro rail projects or infrastructure companies to determine the differences in the financial performance and patterns of financing. These comparisons can aid in the establishment of best practices and effective financial strategies embraced by various organizations that are in the same line of operation. The use of advanced financial modelling techniques and analytical tools is another area that may be explored in future research. To examine the future trends in revenue, cost and profitability, techniques like predictive analytics and financial forecasting can be applied. This would assist in enhancing financial planning and decision making. Further research can also be conducted on how other non-fare sources of revenue like advertising, leasing and commercial activities affect the overall financial stability of metro rail systems. The discussion of these may give information into other ways of generating revenue. The contribution of government policies, subsidies, and

public-private partnerships in the financial performance can also be explored. Knowledge of these factors may be useful in evaluating the sustainability in the long run. Lastly, future studies can take the long-term or longitudinal approach to examine the alterations in financial performance over an extended period. This would assist in knowing the trends and enhancing strategic financial management.

7.0 CONCLUSIONS

It can be seen that the organization is experiencing a period of growth with a substantial increase in the asset base of the organization and other infrastructural developments. However, even though the company has made considerable strides in the aspects of development and liquidity improvement, the performance of the company in financial terms has been poor because of inconsistent profitability and negative operating cash flows. The conclusion drawn from the financial analysis shows that the company has to depend on external sources of funding as well as face the challenge of earning enough from their business activities. Financial distress exists; however, the existence of such a state in the organization does not mean that it will fail since it belongs to an industry that requires a lot of money to invest.

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