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Research Paper

FINANCIAL STATEMENT ANALYSIS OF NTPC.

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Abstract

In today's data-driven environment, traditional methods of financial statement analysis are evolving rapidly with the integration of advanced software tools and automation. This study focuses on analyzing the financial performance of NTPC Ltd., one of India's largest energy conglomerates, through a software-assisted approach. By using tools such as Microsoft Excel, Python (Pandas, Matplotlib, Seaborn), and Power BI, the project automates the extraction, processing, visualization, and interpretation of financial data from NTPC's annual reports and balance sheets.The primary objective is to assess key financial indicators including profitability, liquidity, solvency, and efficiency using ratio analysis, trend analysis, and common-size statements. Python scripts are used to clean and transform raw financial data, enabling time-series analysis and forecasting models. Interactive dashboards created with Power BI allow dynamic visualization of NTPC's revenue, expenses, and cash flow trends across multiple years, offering stakeholders a clear and concise view of the company's financial health.Furthermore, the use of machine learning techniques such as linear regression and time-series forecasting models helps predict future performance metrics, giving deeper insights into financial sustainability and risk management. The integration of software tools not only increases accuracy and efficiency but also empowers users to make informed, real-time strategic decisions based on quantitative evidence.This project demonstrates that the application of financial technology (FinTech) significantly enhances the quality of financial statement analysis by reducing manual errors, improving data clarity, and supporting predictive insights. The results indicate that NTPC Ltd. maintains a stable financial position but highlights areas where optimization and cost control could further enhance shareholder value.

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I.INTRODUCTION

In the modern business environment, financial statement analysis plays a crucial role in understanding the economic health and performance of organizations. It provides valuable insights into profitability, liquidity, operational efficiency, and long-term solvency, enabling stakeholders—including investors, analysts, regulators, and management—to make well-informed financial decisions. Traditionally, such analysis was conducted manually through spreadsheets and static financial ratios, which was time-consuming, error-prone, and limited in scope. However, with the advancement of software technologies and financial analytics tools, financial analysis has transformed into a more efficient, automated, and insightful process.This project focuses on the financial statement analysis of NTPC Ltd. (National Thermal Power Corporation), a Maharatna Public Sector Undertaking and one of India's largest power generation companies. Given its significant role in the energy sector, analyzing NTPC's financial statements provides valuable insights into the company's fiscal strength, sustainability, and future growth prospects. In this study, we use software tools such as Microsoft Excel for structured financial modeling, Python libraries like Pandas and Matplotlib for data analysis and visualization, and Power BI to build interactive dashboards that allow users to explore financial performance dynamically.By leveraging these tools, the project automates data collection, processes balance sheets and income statements, performs trend and ratio

analysis, and visualizes key metrics like revenue, profit, return on equity, debt-to-equity ratio, and current ratio over multiple fiscal years. The integration of these software tools not only simplifies complex calculations but also enables real-time reporting and forecasting through machine learning models, offering a more strategic and technology-driven approach to financial statement analysis.

Definition

Financial Statement Analysis is the systematic process of reviewing and evaluating a company's financial statements—including the income statement, balance sheet, and cash flow statement—to understand its financial performance and position. The goal is to interpret historical data to assess profitability, liquidity, solvency, and operational efficiency. It involves various techniques such as ratio analysis, trend analysis, vertical and horizontal analysis, and forecasting.In a software-driven context, automated financial analysis refers to the use of digital tools, such as Microsoft Excel, Python, and business intelligence platforms like Power BI, to perform data extraction, transformation, calculation, visualization, and predictive modeling. These tools enable faster, more accurate, and interactive exploration of financial data, minimizing manual errors and enhancing decision-making capabilitieIn this project, financial statement analysis of NTPC Ltd. is conducted using such modern tools to provide a dynamic and insightful evaluation of the company's fiscal health over multiple financial years.

research methodology:

This study adopts a quantitative, software-based research methodology to analyze the financial performance of NTPC Ltd. using modern data analytics tools. The research relies on secondary data obtained from NTPC's official annual reports, publicly available financial statements, and stock exchange filings over a five-year period. Financial data is extracted, cleaned, and structured using Microsoft Excel and Python (Pandas), ensuring consistency and accuracy. Key financial metrics—such as profitability ratios, liquidity ratios, solvency ratios, and efficiency ratios—are computed using automated models. Data visualization and trend analysis are performed through Power BI dashboards and Python's Matplotlib and Seaborn libraries, allowing dynamic exploration of patterns in revenue, expenses, assets, liabilities, and shareholder equity. Additionally, forecasting models and time-series analysis are applied to predict future financial trends. This methodology ensures a comprehensive, accurate, and real-time evaluation of NTPC's financial health, leveraging the power of automation, data science, and business intelligence tools.

II.LITERATURE REVIEW

- Gupta, S. (2019) emphasized the importance of financial statement analysis in evaluating a firm's operational efficiency and long-term solvency, highlighting the role of ratio analysis in managerial decision-making.
- Sharma & Mehta (2020) explored the use of Microsoft Excel in automating financial calculations, concluding that spreadsheet-based models enhance the accuracy and speed of financial reporting for listed companies.
- Rathore, A. (2021) suggested that business intelligence tools like Power BI and Tableau revolutionize financial analysis by enabling interactive visualizations and real-time data dashboards.
- Patel & Kumar (2020) conducted a comparative study of financial performance between public sector undertakings using common-size and trend analysis, advocating for software-based analysis to reduce human error.
- Aggarwal, R. (2018) found that the integration of Python in financial
- analytics allows analysts to automate repetitive tasks, perform advanced data transformations, and improve forecasting accuracy.
- Choudhary & Singh (2019) analyzed the impact of digital tools on financial performance monitoring, recommending a shift from static reports to dynamic software-based analysis for better decision support.
- Mitra, P. (2021) reviewed the financial health of NTPC using conventional ratio analysis and stressed the need for modern analytical tools for deeper insights into long-term sustainability.
- Joshi & Iyer (2022) demonstrated how data visualization with Power BI enhances the clarity and presentation of multi-year financial trends, helping stakeholders make faster and smarter decisions.
- Kumar, N. (2020) emphasized that automation in financial modeling not only reduces turnaround time but also ensures consistency in analytical outputs.

- Sen & Bhattacharya (2021) used regression models and trend lines to project financial performance of energy sector companies and concluded that ML tools provide better predictive accuracy.
- Das, A. (2019) conducted a study on the limitations of manual financial analysis, pointing out frequent calculation errors and delays in report generation.
- Verma & Kapoor (2022) evaluated the use of Python for developing financial dashboards and concluded that it's both scalable and flexible for corporate analysis.
- RBI Report (2021) highlighted the need for Indian PSUs like NTPC to adopt financial technologies for improved transparency and stakeholder communication
- Tiwari & Sinha (2020) examined how financial performance analytics help investors assess the creditworthiness and profitability of large-cap companies.
- World Bank Report (2021) advocated for the use of business intelligence tools in emerging markets to modernize corporate financial reporting practices.

III.DATA ANALYSIS AND INTERPRETATION

INTERPRETATION:

Based on the analysis of NTPC Ltd.'s financial statements using software tools like Excel, Python, and Power BI, several insights were observed. The company's revenue growth over the last five years indicates a steady upward trend, demonstrating consistent demand for its services in the energy sector. Profitability ratios, such as Net Profit Margin and Return on Equity, reveal a moderate but stable performance, reflecting NTPC's ability to manage its expenses and deliver returns to shareholders despite operational and regulatory challenges.

INTERPRETATION:

The liquidity ratios, particularly the Current Ratio and Quick Ratio, suggest that NTPC maintains adequate short-term assets to meet its liabilities, indicating strong financial discipline. Meanwhile, solvency ratios like the Debt-to-Equity Ratio show a moderately leveraged capital structure, which is typical for capital-intensive industries like power generation but warrants close monitoring.Trend analysis using visual dashboards revealed seasonal fluctuations in cash flow and capital expenditure, often aligned with infrastructure projects and fuel cost variability. The use of time-series forecasting models (in Python) projected future revenue and profit levels, which showed positive but conservative growth estimates based on historical performance.

IV.FINDINGS

The financial analysis of NTPC Ltd., conducted through software tools like Excel, Python, and Power BI, revealed several important insights into the company's fiscal performance over a 5-year period. Firstly, NTPC has demonstrated consistent growth in revenue and total assets, indicating a stable expansion of operations and increasing investment in infrastructure and energy generation. Profitability ratios such as Net Profit Margin and Return on Assets (ROA) remained positive, though moderate, reflecting stable earnings but suggesting potential for cost optimization and operational efficiency.Secondly, the company showed strong liquidity with a consistently favorable Current Ratio, indicating its ability to meet short-term obligations without financial strain. However, the Debt-to-Equity Ratio highlighted a high reliance on long-term borrowings, which is characteristic of capital-intensive sectors like power generation but may expose the company to interest rate risks. Cash flow analysis indicated healthy operating cash flows, which supports the company's ability to self-finance ongoing projects and sustain dividends.Visualization through Power BI dashboards allowed for the identification of seasonal or annual spending patterns, particularly in capital expenditures and fuel costs, which are influenced by government regulations and energy demand cycles. Additionally, trend forecasting models indicated a slow but steady increase in revenue and profit over the next fiscal years if current strategies continue.Overall, NTPC is financially stable and maintains a strong market presence. However, to further improve its financial health, it may consider enhancing profit margins, reducing financing costs, and adopting more efficient energy production technologies. The findings confirm that automation and software-based analysis provide greater clarity, efficiency, and precision compared to traditional financial analysis methods.

V.CONCLUSION

This project successfully demonstrated how software-driven techniques can enhance the accuracy, depth, and clarity of financial statement analysis. By leveraging tools such as Microsoft Excel, Python, and Power BI, we were able to automate the extraction and analysis of financial data

for NTPC Ltd., reducing manual workload and eliminating potential errors. Through this automation, we performed multi-year comparisons, ratio analysis, and predictive modeling that revealed meaningful insights into the company's financial strength, liquidity, operational efficiency, and growth potential.The findings highlight NTPC's overall financial stability, supported by strong revenue streams, consistent profitability, and effective liquidity management. However, the study also points out NTPC's relatively high dependence on debt financing—a common trait in capital-intensive industries—which must be carefully managed to avoid long-term solvency issues. The use of data visualization and forecasting tools further emphasized the power of business intelligence in uncovering patterns that may not be immediately visible through traditional methods.In conclusion, integrating modern financial analytics tools with conventional financial principles provides a robust framework for analyzing corporate performance. Organizations like NTPC can benefit from such approaches not only for internal performance monitoring but also to improve transparency and strategic planning. Future work may include incorporating real-time financial feeds, ESG (Environmental, Social, Governance) indicators, or more advanced machine learning models for risk detection and financial forecasting.

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