

# A Review of Financial Performance Studies on Indian Public Sector Undertakings

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**Abstract:** *Public Sector Undertakings (PSUs) occupy a foundational position in India's economic architecture, serving developmental and commercial objectives since the Industrial Policy Resolution of 1956. Evaluating their financial performance has accordingly remained a sustained area of academic inquiry across multiple sectors, including steel, oil and gas, engineering, and power. This paper presents a structured review of empirical and conceptual studies that have examined the financial performance of Indian PSUs, drawing on published research in peer-reviewed journals, government reports, and academic books. The review synthesises existing scholarship across six thematic areas: the evolution of financial performance research on PSUs, profitability, liquidity and working capital management, solvency and capital structure, operational efficiency, and sector-wise studies with particular emphasis on the power sector (NTPC Limited, NHPC Limited, Power Grid Corporation of India Limited, and REC Limited) while also covering non-power Maharatna and Navratna PSUs in sectors such as steel, oil and gas, and heavy engineering. Corporate governance and its relationship with financial performance is examined as a cross-cutting theme. The review identifies a predominance of ratio-based, short-period, descriptive studies, highlights persistent research gaps including the absence of longitudinal panel studies and insufficient integration of governance variables in quantitative financial models, and concludes with practical implications for researchers, policymakers, and PSU managements.*

**Keywords:** Public Sector Undertakings; Financial Performance; Power Sector; Maharatna; Ratio Analysis; Profitability; Liquidity; Corporate Governance; NTPC; NHPC; REC Limited; Power Grid Corporation; ONGC; SAIL; BHEL; India.

## I. INTRODUCTION

Public Sector Undertakings (PSUs) — designated as Central Public Sector Enterprises (CPSEs) in official Government of India nomenclature — constitute one of the most enduring institutional features of post-independence Indian economic policy. Established to serve the twin objectives of equitable economic development and strategic self-reliance, PSUs were accorded a commanding position in core industries under the Industrial Policy Resolution of 1956, which reserved sectors including power generation, iron and steel, heavy machinery, coal, oil, and mining for state ownership. Over subsequent decades, the number of CPSEs expanded considerably. According to the annual Public Enterprise Survey (2023–24) published by the Department of Public Enterprises (DPE), Ministry of Finance, Government of India, there were 272 operational CPSEs as of 31 March 2024, recording a combined net profit of approximately Rs. 3.22 lakh crore in that financial year — a figure representing significant growth from Rs. 1.02 lakh crore in FY 2019–20 [1]. The top ten CPSEs alone accounted for approximately 61.58% of aggregate net profit, a concentration that reflects the dominant commercial weight of large Maharatna enterprises such as ONGC, Coal India, NTPC, and IOCL [1].



The economic liberalisation of 1991 marked a decisive inflection point for Indian PSUs. The New Economic Policy curtailed the list of industries reserved for public sector participation, introduced competitive pressures, reduced budgetary support, and launched a disinvestment programme that required PSUs to reconcile commercial viability with developmental mandates. Against this backdrop, the financial performance of PSUs acquired pressing policy relevance — not only in strategic sectors like petroleum and power, but equally in manufacturing-intensive enterprises like Bharat Heavy Electricals Limited (BHEL) and Steel Authority of India Limited (SAIL), which were compelled to compete with private sector rivals in deregulating markets. How these enterprises generated revenue, managed costs, deployed capital, and rewarded stakeholders became critical questions for government administrators, investors, creditors, and academic researchers [2, 3].

Despite the practical significance of PSU financial performance, the academic literature on the subject remains fragmented. Studies vary considerably in scope, methodology, time horizon, and analytical rigour. No structured review of this literature has been published to date, leaving researchers and practitioners without a consolidated synthesis of what is known and what remains unexplored. The present paper addresses this gap by reviewing available research across thematic dimensions and identifying the methodological patterns, empirical findings, and lacunae that characterise the field.

While this review covers Indian PSUs broadly — including enterprises in the oil and gas, steel, heavy engineering, mining, and power sectors — the power sector receives more detailed treatment in Section IV-F. This is deliberate and warranted for the following reasons. First, India's power sector PSUs — NTPC, NHPC, Power Grid Corporation, and REC Limited — collectively represent one of the largest concentrations of public investment in any single sector of the Indian economy. Second, the financial performance of power sector PSUs has direct implications for energy tariffs, electricity access, and infrastructure financing, connecting PSU financial health to public welfare outcomes in a way that is more immediate than in most other sectors. Third, the authors' primary research domain centres on these four enterprises, consistent with their doctoral research programme; accordingly, the review reflects this emphasis while ensuring that cross-sector literature is incorporated to sustain the accuracy of the title.

The remainder of this paper is organised as follows. Section II presents the objectives of the review. Section III describes the research methodology with explicit reference to the search strategy and selection criteria. Section IV constitutes the thematic literature review, organised across six sub-sections. Section V identifies research gaps and proposes future research directions. Section VI discusses practical implications. Section VII acknowledges limitations. Section VIII presents concluding observations, followed by the reference list.

## **II. OBJECTIVES OF THE STUDY**

The present review is guided by the following specific objectives:

- (i) To trace the historical evolution of financial performance research on Indian PSUs from the pre-liberalisation period to the present.
- (ii) To synthesise empirical findings on the profitability, liquidity, solvency, and operational efficiency of Indian PSUs across multiple sectors, including oil and gas, steel, heavy engineering, and power.
- (iii) To consolidate sector-specific studies, with particular attention to power sector PSUs — NTPC Limited, NHPC Limited, Power Grid Corporation of India Limited, and REC Limited.
- (iv) To examine the literature on the relationship between corporate governance and financial performance in the PSU context.
- (v) To identify methodological strengths and weaknesses in the existing body of research.
- (vi) To highlight research gaps and propose directions for future scholarly inquiry.



### III. RESEARCH METHODOLOGY

This paper adopts a structured narrative review approach, which is appropriate when the objective is to synthesise a dispersed body of literature thematically rather than to conduct a formal meta-analysis or systematic review. The review is based exclusively on secondary sources and involves no primary data collection.

The literature search was conducted between January and June 2025 using the following databases and official sources: Google Scholar, ResearchGate, Scopus-indexed journals accessed through institutional repositories, the Economic and Political Weekly (EPW) digital archive, Emerald Insight, the publisher portals of Hilaris Publishing, Granthaalayah Publications, Research India Publications, Arabian Journal of Business and Management Review, and the IJREISS and IJRTI open-access repositories. Official government publications were accessed through the DPE portal (dpe.gov.in), the Ministry of Power website, and the annual reports of the four selected power sector PSUs.

The search was conducted using the following primary keyword strings, applied individually and in Boolean combinations: 'financial performance PSU India', 'public sector undertakings profitability India', 'Maharatna financial analysis', 'NTPC financial performance', 'NHPC financial performance', 'Power Grid Corporation financial analysis', 'REC Limited financial performance', 'ONGC IOCL HPCL BPCL GAIL financial performance', 'SAIL BHEL financial analysis India', 'PSU ratio analysis India journal', 'disinvestment financial performance India PSE', 'corporate governance PSU India financial performance', 'liquidity working capital public sector India', 'capital structure leverage PSU India', and 'Altman Z-Score PSU India'. Searches were supplemented with citation chaining — examining reference lists of retrieved papers to identify further sources.

The following inclusion criteria were applied: (a) studies must pertain to Indian PSUs or the Indian power, steel, oil and gas, or heavy engineering sectors; (b) the primary focus must be on financial performance — encompassing profitability, liquidity, solvency, efficiency, or capital structure; (c) sources must be published in identifiable journals, peer-reviewed conference proceedings, or reputable governmental and institutional publications; and (d) the period of coverage spans broadly from 1991 — the year of economic liberalisation — to 2025, with selected references to foundational pre-1991 scholarship.

The following exclusion criteria were applied: (a) studies focused exclusively on state-level public sector enterprises with no relevance to central PSU financial performance; (b) grey literature of unverifiable provenance; (c) any reference whose core bibliographic details could not be independently verified against the original publisher page, DOI, Crossref record, or official source; and (d) studies published in languages other than English. No reference was fabricated, assumed, or taken solely from a secondary citation without verification.

Identified literature was organised thematically into six clusters corresponding to the sub-sections of Section IV. Within each theme, a synthesis approach was adopted — drawing together findings from multiple studies to identify patterns, convergences, and contradictions — rather than producing an author-by-author enumeration.

### IV. LITERATURE REVIEW

#### *A. Evolution of Financial Performance Research on Indian PSUs*

The study of PSU financial performance in India has passed through three broadly distinguishable phases, each shaped by the prevailing policy environment.

The first phase, spanning the 1950s through the 1980s, was characterised by descriptive and audit-oriented assessment. PSUs operated within a protected, subsidy-dependent environment, and academic attention focused largely on their social contribution rather than financial viability. The reports of the Committee on Public Undertakings and the Comptroller and Auditor General of India served as primary instruments of performance scrutiny, though independent scholarly analysis remained limited.

The second phase commenced with the economic reforms of 1991. The New Industrial Policy curtailed the list of industries reserved for public sector participation, introduced competitive pressures, and initiated a programme of disinvestment, fundamentally altering the operating environment for PSUs across all sectors. Enterprises in steel (SAIL), engineering (BHEL), petroleum (ONGC, IOCL), and power (NTPC) that had previously operated as sheltered



monopolies were required to demonstrate commercial efficiency alongside their developmental mandates. Jain and Yadav [2] examined the financial management and profitability of public sector enterprises in India over multiple financial years, establishing an analytical foundation that remains widely cited. Their work found that PSE profitability improved in absolute terms post-liberalisation but remained structurally constrained by government pricing controls, social obligations, and rigid labour structures. Jain et al. [3], in their Springer monograph examining non-financial central PSEs from 1986–87 to 2010–11, provided a comprehensive multi-ratio analysis covering profitability, efficiency, liquidity, leverage, and productivity, and demonstrated that disinvested PSEs generally outperformed non-disinvested peers across most financial parameters.

The third and ongoing phase, beginning from the mid-2000s, saw a broadening of the empirical agenda to include Maharatna-category comparisons and Z-Score distress analysis. Vijaya Batth et al. [4] applied the Altman Z-Score model to 24 Maharatna and Navratna PSUs and found that Coal India Limited recorded the highest Z-Score value (38.60), reflecting a near-debt-free balance sheet, while several major PSUs including NTPC and BPCL showed lower values. Gahlot [5], in a comparative study of seven Maharatna companies, found that CIL maintained the highest liquidity across the study period, that NTPC and SAIL carried the highest debt-equity ratios, and that BHEL and SAIL exhibited low or negative net profit margins — conclusions that underscore the heterogeneity of financial outcomes even among India's highest-tier PSUs. The DPE's Public Enterprise Survey has evolved into an authoritative annual data repository routinely employed as a baseline source in post-2010 research [1].

Taken together, this evolution reflects a research field that has matured considerably since 1991 but retains a marked dependence on ratio analysis and descriptive statistics, with limited adoption of advanced econometric or longitudinal panel methodologies.

### ***B. Studies on Profitability***

Profitability is the most extensively studied dimension of PSU financial performance. Researchers have employed a variety of measures — net profit ratio (NPR), return on capital employed (ROCE), return on assets (ROA), return on equity (ROE), earnings per share (EPS), and gross profit ratio (GPR) — though the absence of standardisation across studies complicates direct comparisons.

Studies spanning the broader PSU universe reveal a wide dispersion in profitability outcomes across sectors and firms. Gahlot [5] found that ONGC and NTPC recorded the highest gross and operating profit margins among the seven Maharatna companies studied, while BHEL and SAIL showed low or negative net profit margins — reflecting the structural divergence between resource-extracting and manufacturing PSUs. The Vijaya Batth et al. [4] analysis confirmed this pattern through the Z-Score lens, with Coal India (retained earnings to total assets ratio of 0.80) and GAIL (0.91) showing stronger internal financing capacity than NTPC (0.43) and BHEL (0.40), the latter constrained by high debt-service burdens and declining order books during the study period.

Yameen and Pervez [6], in a ten-year study of SAIL (2005–06 to 2014–15), found a consistent decline in financial performance across all indicators — ROCE, ROA, and net profit ratio all contracting over the period. The multiple regression model confirmed that debt-equity ratio and inventory turnover ratio were statistically significant determinants of profitability, while the current ratio's impact was statistically insignificant. These results for SAIL are remarkably consistent with Khan's [7] findings for NTPC, where the debt-equity ratio was also the dominant predictor, suggesting that leverage management is a cross-sector concern for large capital-intensive PSUs regardless of industry.

For the oil and gas sector, Singh [8] examined ONGC, IOCL, HPCL, BPCL, and GAIL for FY 2018–2022 and found that ONGC performed best on profitability ratios, while GAIL demonstrated stronger liquidity, and HPCL showed the highest leverage. The study highlighted that companies with high liquidity and low debt did not necessarily achieve higher profitability, echoing the familiar liquidity-profitability trade-off documented across industries and consistent with the findings of Vijaya Batth et al. [4] and Gahlot [5] in broader Maharatna comparisons.

Turning to the power sector, Khan [7] found a sharp decline in NTPC's profitability across the decade 2006–07 to 2015–16: ROE fell from 37.05% in 2007–08 to 5.11% by 2015–16, and ROCE declined from 42.01% (2008–09) to



6.68% (2015–16). The multiple regression model confirmed that debt-equity ratio significantly influenced all three profitability proxies. Patidar and Movalia [9] compared NTPC and NHPC using Altman's Z-Score over 2010–11 to 2014–15, finding NTPC financially superior but with a declining trend common to both. Rai and Prakash [10], covering multiple power generating companies in India, confirmed significant variation in net profit margins attributable to fuel mix, tariff structures, and asset vintage, and argued for sector-adjusted profitability benchmarks. The IJSR [11] comparative study found that NHPC maintained the strongest profitability metrics among public sector power companies over FY 2018–19 to FY 2022–23 — a partial reversal of the earlier Patidar and Movalia [9] finding, illustrating how profitability rankings across PSUs are time-period sensitive.

### ***C. Studies on Liquidity and Working Capital Management***

Liquidity analysis in PSUs presents interpretive challenges absent in standard manufacturing-sector analysis. PSUs operate under regulatory pricing constraints and, in many sectors, enjoy government-assured offtake arrangements. The conventional benchmarks of a current ratio of 2:1 and quick ratio of 1:1 may not directly apply to capital-intensive regulated utilities.

Indrasena Reddy and Someswar [12], in an early contribution, identified systemic inefficiencies in current asset management as a defining feature of Indian public sector undertakings, drawing attention to the dominance of trade receivables and government dues in PSU current assets — a structural observation that remains relevant across both power and non-power PSU research three decades later.

In the steel sector, the liquidity-profitability relationship for SAIL was studied by Yameen and Pervez [6], who found that current ratio, quick ratio, and absolute liquidity ratios all deteriorated over 2005–06 to 2014–15. Regression analysis found no statistically significant impact of the current ratio on SAIL's profitability — a result analogous to Khan's [7] finding for NTPC. In the oil and gas sector, Singh [8] found that GAIL maintained the strongest liquidity position among the five Maharatna petroleum companies studied for FY 2018–2022, while HPCL exhibited the weakest. The study confirmed the Vijaya Bath et al. [4] observation that companies with high liquidity and low debt in the PSU universe tend to suffer from lower profitability.

Pal and Ukil [13], in a panel data study of listed oil sector companies over FY 2009–10 through FY 2023–24, found that most working capital management variables did not exhibit robust, consistent relationships with ROA or ROCE after controlling for firm fixed effects, while the creditors' turnover ratio showed a significant inverse relationship with profit before interest and tax. These results reinforce the view that the liquidity-profitability trade-off in regulated, capital-intensive PSUs operates through mechanisms quite different from those documented in private manufacturing firms.

For the power sector, Khan [7] documented a marked deterioration in NTPC's short-term liquidity across the decade: the current ratio fell from 2.01 in 2008–09 to 0.91 by 2015–16, the quick ratio dropped from 1.54 to 0.34, and the cash ratio collapsed from 1.09 to 0.09. Patidar and Movalia [9] similarly documented declining quick ratios for both NTPC and NHPC over 2010–11 to 2014–15. A recurring structural explanation is the receivables overhang from state distribution companies (DISCOMs), which inflates current assets while representing genuine credit risk — a duality that conventional ratio analysis cannot adequately capture.

### ***D. Studies on Solvency and Capital Structure***

Sarkar and Sarkar [14], in a study of selected public sector oil and gas companies, found using regression analysis that asset tangibility and firm size were significant positive determinants of leverage, while profitability showed a negative relationship — consistent with the pecking order theory, indicating that profitable PSUs in the petroleum sector prefer internal financing over debt for incremental investment.

Gahlot [5] found, in the broader Maharatna context, that the debt-equity ratio was approximately zero for CIL, BHEL, and ONGC — confirming their near-debt-free capital structures — while NTPC and SAIL showed increasing debt levels. Singh [8] similarly found that HPCL carried the highest leverage among Maharatna oil companies for FY 2018–



2022. Vijaya Batth et al. [4] confirmed that the retained earnings to total assets ratio — a proxy for internal financing capacity — varied widely, from 0.91 for GAIL to 0.40 for BHEL, with the manufacturing and power PSUs clustered at the lower end of the distribution.

For NTPC, Khan [7] found a mean debt-equity ratio of 1.18 times over 2006–07 to 2015–16, with the interest coverage ratio deteriorating sharply from 46.11 times in 2008–09 to 2.89 times by 2015–16 — a decline directly linked to the company's heavy capital expenditure programme and associated debt accumulation. This progressive weakening of interest coverage, even within a company that remained solvent and profitable in absolute terms, illustrates the risk of interpreting PSU financial health through a single ratio in isolation.

REC Limited presents a structurally distinct capital structure case. As a Non-Banking Financial Company (NBFC) classified as a Maharatna CPSE, REC's balance sheet is inherently leverage-intensive, with total borrowings of approximately Rs. 4,96,289 crore against net worth of Rs. 77,637 crore as of FY 2024–25. Its Capital to Risk-weighted Assets Ratio (CRAR) of 25.99% and net non-performing asset (NNPA) ratio of 0.38% indicate sound regulatory solvency [15]. Peer-reviewed academic studies rigorously examining REC's capital structure dynamics remain absent from the reviewed literature — a finding that constitutes both a limitation of the existing scholarship and an invitation for original research.

### ***E. Studies on Operational Efficiency***

Across sectors, the literature reveals a broadly consistent pattern: PSUs in capital-intensive sectors show low asset turnover ratios relative to service-sector or consumer-goods firms, reflecting long gestation periods, large fixed asset bases, and constrained revenue growth in regulated environments.

Vijaya Batth et al. [4] computed the sales to total assets ratio for 24 Maharatna and Navratna PSUs. Coal India Limited recorded the highest value (0.51), indicating high revenue generation per unit of assets, while NTPC (0.11) and BHEL (0.12) registered the lowest values. The authors rightly cautioned that cross-sector asset turnover comparisons carry limited analytical value, since the ratio depends fundamentally on the nature of the asset base and the pricing environment rather than on management quality per se.

For SAIL, Yameen and Pervez [6] found that total assets turnover ratio declined over the ten-year study period, driven by a combination of declining steel prices, weak demand, and a growing asset base from capacity expansion. The inventory turnover ratio for SAIL also fell, reflecting the accumulation of unsold stock during the demand downturn. This pattern parallels the NTPC experience documented by Khan [7], where the TATR declined from 1.01 in 2007–08 to 0.49 by 2015–16, and the inventory turnover ratio fell from 6.04 times in 2008–09 to 2.82 times in 2015–16 — suggesting that across both steel and power PSUs, operational efficiency as measured by conventional ratios deteriorated during periods of intensive capital expenditure regardless of the sector.

The IERJ [16] comparative study of power companies covering FY 2018–19 to FY 2022–23 — examining Adani Power, NTPC, Power Grid Corporation, and Torrent Power — found no statistically significant difference in return on net worth or return on assets across the selected companies, but identified a significant difference in net profit margin. The authors interpreted this divergence as indicating that public sector power companies convert revenue to profit at materially different rates from private sector companies, with Power Grid's regulated cost-plus transmission model producing more stable margin outcomes and private generation companies showing greater margin volatility.

### ***F. Sector-wise Studies on Indian PSUs***

In the oil and gas sector, Singh [8] examined the five Maharatna petroleum companies — ONGC, IOCL, HPCL, BPCL, and GAIL — over FY 2018 to FY 2022 and found mixed trends across liquidity, leverage, profitability, and activity ratios. GAIL was the strongest performer on liquidity ratios, HPCL demonstrated the highest leverage, and ONGC led on profitability. Sarkar and Sarkar [14] provided the field's most rigorous capital structure analysis for oil and gas PSUs, confirming that asset tangibility and firm size are the principal determinants of leverage in that sub-sector.



In the steel sector, SAIL has attracted the most sustained scholarly attention. Yameen and Pervez [6] documented a broad-based decline in SAIL's financial performance between 2005 and 2014, with ROCE, ROA, and net profit ratio all contracting over the period. Their regression analysis identified the debt-equity ratio and inventory turnover ratio as statistically significant determinants of profitability. These findings should be contextualised within SAIL's structural position as a government-owned integrated steel manufacturer competing against more efficient private sector players. BHEL — India's largest engineering and manufacturing PSU and a Maharatna CPSE — has been studied across multiple frameworks. Gahlot [5] found that BHEL exhibited a near-zero debt-equity ratio but simultaneously showed low or negative net profit margins, a combination that suggests the company's difficulties arise primarily from operational cost structures and declining order flow rather than financing costs. The Vijaya Batth et al. [4] analysis found BHEL's retained earnings to total assets ratio at 0.40, reflecting a weaker internal financing capacity consistent with sustained profitability pressures.

In the power sector, NTPC Limited has attracted the largest volume of published research. Khan [7] provided the most detailed ratio-based evaluation, covering ten years of profitability, liquidity, efficiency, solvency, and market valuation data and concluding that NTPC's overall financial performance was satisfactory in the early years of the study (2006–07 to 2008–09) but deteriorated materially thereafter. Patidar and Movalia [9] applied Altman's Z-Score to NTPC and NHPC for 2010–11 to 2014–15, confirming NTPC's superior financial health relative to NHPC, though both companies showed a declining trend in Z-Score values over the period. Mohapatra and Rath [17], in a descriptive study published in ShodhKosh, confirmed NTPC's dominant position as India's largest power producer with a diversified generation portfolio.

NHPC Limited — India's largest hydropower PSU, with an installed capacity of approximately 7,233 MW as of Q3 FY 2024–25 — has been studied primarily in conjunction with NTPC rather than as a standalone entity. Patidar and Movalia [9] established NHPC's financial health as inferior to NTPC's on Z-Score metrics over 2010–11 to 2014–15. However, the IJSR [11] comparative study reported that NHPC maintained the strongest profitability metrics among the public sector power companies examined for FY 2018–19 to FY 2022–23, suggesting a reversal of the earlier ranking over subsequent years.

Power Grid Corporation of India Limited was included in the IJSR [11] comparative study, which assessed dividend per share, operating profit margin, net profit margin, debt-to-equity ratio, asset turnover, and earnings retention ratio over five years. The findings highlighted Power Grid's operational efficiency in transmission asset utilisation and its stable margin profile relative to generation companies exposed to fuel cost volatility. No published peer-reviewed study has examined Power Grid's full financial performance trajectory through its major capital expenditure expansion cycles. REC Limited, elevated to Maharatna status in 2022, reported total assets under management of approximately Rs. 5,59,088 crore, profit after tax of Rs. 15,713 crore, a PAT margin of 28.07%, and return on equity of 21.46% for FY 2024–25 [15]. The company has received the DPE's 'Excellent' MoU rating for three consecutive financial years — FY 2022–23 through FY 2024–25 [18]. Despite this financial profile, peer-reviewed academic studies rigorously examining REC's performance are absent from the reviewed literature, constituting a significant research gap.

### ***G. Corporate Governance and Financial Performance***

The relationship between corporate governance and financial performance in Indian PSUs has attracted scholarly attention since the early 2000s, accelerating following high-profile governance failures in both sectors and the strengthening of the regulatory framework through SEBI's LODR Regulations, 2015 and the Companies Act, 2013.

A review of corporate governance in Indian PSUs published in the PEOPLE: International Journal of Social Sciences [19] found that PSUs face unique governance constraints — including government interference in board appointments, delays in the posting of independent directors, and a dual accountability structure — that impede adoption of governance best practices. The study identified four pillars of the PSU corporate governance framework: transparency, full disclosure, independent monitoring, and fairness to all stakeholders.



An empirical study on the interdependence of corporate governance and financial performance in 21 PSU banks [20] found that board size and board independence were positively associated with net profit, while higher non-performing asset (NPA) levels negatively affected profitability. The study concluded that sound governance practices were a necessary condition for PSU bank profitability.

A 2024 governance assessment from the Directors Institute [21] reported that as of December 2023, all seven of the BSE 100 companies non-compliant with SEBI's board independence requirements were PSUs, including a bank. This persistent structural governance deficit in Indian public enterprises — decades after the introduction of mandatory governance codes — reflects the inherent tensions within PSU governance architecture: the government simultaneously acts as majority owner, policy-setter, regulator, and in many cases as customer.

The power sector PSUs covered in this review have not, to the best of the authors' knowledge, been subjected to published peer-reviewed studies that specifically quantify the impact of board governance variables on financial performance outcomes such as ROE or ROCE. The unique governance arrangements of listed Maharatna CPSEs — which must simultaneously comply with SEBI's public company requirements, adhere to DPE performance framework guidelines, and respond to Ministry of Power policy directives — create a governance context that is analytically distinct and warrants dedicated empirical investigation.

## **V. RESEARCH GAPS AND FUTURE RESEARCH DIRECTIONS**

The foregoing thematic review identifies several substantive gaps in the existing literature on PSU financial performance, each representing an opportunity for original scholarly contribution.

First, the reviewed literature is dominated by short-period studies, typically covering three to ten financial years. Given the long investment and gestation cycles of capital-intensive PSUs — particularly in power generation and steel, where projects require five to ten years from sanction to commissioning — short-period analysis captures only a segment of the financial performance cycle. Future research should employ longitudinal panel data frameworks spanning at least twenty years to capture full economic and policy cycles.

Second, peer-reviewed academic coverage of REC Limited and Power Grid Corporation is sparse. REC, as a Maharatna NBFC operating at the intersection of infrastructure finance and public energy policy, presents a distinct financial profile encompassing loan portfolio quality, funding cost dynamics, interest rate risk, and capital adequacy — none of which has received dedicated peer-reviewed treatment in the surveyed literature.

Third, while studies on NTPC, NHPC, SAIL, and ONGC exist, they rarely compare PSUs across sectors within a single analytical framework. Future research should adopt multi-sector panel designs that allow direct comparison of financial performance across power generation, steel, and petroleum PSUs, controlling for sector-specific structural factors.

Fourth, the existing literature makes limited use of advanced analytical methodologies. Future studies should employ panel data regression with fixed and random effects, vector autoregression (VAR), and generalised method of moments (GMM) estimation to identify causal relationships among governance, capital structure, and financial performance variables.

Fifth, no published study in the reviewed literature employs Economic Value Added (EVA) or Market Value Added (MVA) as performance metrics for any of the four power sector PSUs under review. As NTPC, NHPC, and Power Grid are listed on Indian stock exchanges, EVA-based analysis is both feasible and analytically valuable.

Sixth, the literature has yet to integrate Environmental, Social, and Governance (ESG) metrics with traditional financial performance analysis for PSUs in a systematic way, despite the growing relevance of ESG commitments to the investment decisions of institutional investors in Indian listed CPSEs.

Seventh, the impact of the COVID-19 pandemic on PSU financial performance across sectors has received only incidental attention. A systematic comparative study of how power, steel, petroleum, and engineering PSUs were differentially affected by the pandemic and how quickly their financial ratios recovered would constitute a timely and policy-relevant contribution.



## **VI. PRACTICAL IMPLICATIONS**

The findings of this review carry implications for several stakeholder groups.

For PSU managements across sectors, the review draws attention to the cross-sector pattern of declining asset turnover ratios during periods of capital expenditure — observed in both NTPC and SAIL — suggesting that investment phasing and capacity commissioning timelines have a systematic depressive effect on reported efficiency ratios that should be explicitly factored into performance evaluations.

For the Department of Public Enterprises, the review highlights that the existing six-parameter MoU performance scoring model rewards profitability and turnover but does not explicitly assess solvency deterioration, liquidity quality, or long-term leverage risks. A more comprehensive evaluation framework incorporating solvency ratios, receivable quality indicators, and ESG metrics would produce a more balanced picture of CPSE financial health across the diversity of operating contexts represented in the CPSE universe.

For policymakers, the evidence on capital structure in power and infrastructure PSUs points to the persistent cost of debt as a profitability constraint. Policy instruments that reduce financing costs — sovereign guarantees for infrastructure bonds, green financing frameworks, and liquidity support during project construction phases — would directly improve the profitability and solvency metrics of capital-intensive PSUs.

For researchers, this review documents a clear deficit of rigorous, peer-reviewed coverage of REC Limited and Power Grid Corporation, a persistent shortage of multi-sector comparative studies, and an equally clear need for advanced econometric methods in PSU financial research.

## **VII. LIMITATIONS**

This review is subject to several limitations that should be acknowledged openly.

First, the review follows a structured narrative approach rather than a formal systematic review protocol. Although defined inclusion and exclusion criteria were applied and search keywords were explicitly specified, the absence of a PRISMA-compliant procedure and inter-rater reliability assessment means that some relevant studies may have been inadvertently excluded.

Second, the literature on PSU financial performance spans a wide range of publication outlets — from Scopus-indexed journals to non-indexed institutional journals — and the methodological quality of studies varies considerably. The heterogeneity of analytical rigour in the surveyed body of work limits the strength of generalisations that can be drawn.

Third, despite the broadened coverage achieved in this review, the literature on non-power sector PSUs remains illustrative rather than exhaustive. PSUs in telecommunications (BSNL, MTNL), defence (HAL, BEL, BEML), petrochemicals, and the railway sector, among others, are beyond the scope of this review.

Fourth, peer-reviewed academic studies specifically on REC Limited and Power Grid Corporation are very limited. While the review draws on official publications, annual reports, and government data for these entities, the absence of independent academic scrutiny constrains the depth of synthesis achievable for these PSUs.

Fifth, the review covers literature published primarily in English and does not incorporate studies published in Hindi or regional Indian languages. Sixth, the review was conducted at a defined cutoff of June 2025. Studies published after this date are not reflected in its findings.

## **VIII. CONCLUSION**

This paper has presented a structured review of the financial performance literature on Indian Public Sector Undertakings, covering enterprises across the oil and gas, steel, heavy engineering, and power sectors, with particular analytical depth on four Maharatna power sector CPSEs: NTPC Limited, NHPC Limited, Power Grid Corporation of India Limited, and REC Limited. Drawing on published research spanning the liberalisation era through 2025, the review has synthesised existing scholarship across six thematic dimensions: the evolution of PSU financial performance research; profitability; liquidity and working capital management; solvency and capital structure; operational efficiency; sector-wise studies; and corporate governance.



Several cross-cutting conclusions emerge from the synthesis. The PSU financial performance literature has grown considerably since 1991 but remains methodologically concentrated around ratio analysis and descriptive statistics. Profitability in large capital-intensive PSUs — whether in steel, power, or petroleum — is consistently found to be most strongly influenced by leverage and sector-level demand conditions rather than short-term liquidity or operational efficiency metrics. The liquidity-profitability trade-off observed in the literature suggests that PSUs with high liquidity and low debt, such as CIL and GAIL, tend to record lower profitability than more leveraged peers — a pattern that carries implications for how the MoU performance framework is designed. Solvency positions are generally adequate across the reviewed PSU universe, supported by implicit government backing, though the interest coverage ratios of power-generation and steel PSUs have deteriorated over the study periods examined, warranting continued monitoring. Significant research gaps have been identified: the near-absence of peer-reviewed studies on REC Limited and Power Grid Corporation; a shortage of longitudinal studies and multi-sector comparative designs; limited application of EVA-based performance metrics and advanced econometric methods; and the under-examined impact of the COVID-19 period and the ESG transition on PSU financials. Addressing these gaps through methodologically rigorous research will strengthen the evidence base available to policymakers, PSU managements, regulators, and investors engaged with India's evolving public enterprise landscape.

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