

INDIAN POWER SECTOR: A LITERATURE REVIEW

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Abstract

Power is a fundamental component of infrastructure, essential for the economic development and well-being of nations. The presence and advancement of sufficient infrastructure are crucial for the sustainable growth of the Indian economy. India's electricity sector is among the most varied globally. Power generation sources encompass traditional options including coal, lignite, natural gas, oil, hydroelectric, and nuclear energy, as well as feasible non-traditional sources such wind, solar, and agricultural and residential waste. The nation's electricity demand has surged significantly and is projected to escalate further in the forthcoming years. To satisfy the growing demand for power in the country, substantial augmentation of the installed producing capacity is necessary. India secured the sixth position among countries for substantial investments in clean energy, amounting to US\$ 90 billion.

Keywords: Power Sector, Indian Economy.

Introduction

The Indian electricity sector is marked by a significant demand-supply disparity, intrinsic inefficiencies, distorted pricing frameworks, a fragile institutional structure, insufficient environmental sustainability, and socio-political pressures. To alter India's energy intensity in the future, vigorous technological transfer is essential. The Government acknowledges that domestic resources may be insufficient to support the necessary expansion in the sector. Consequently, it has permitted 100% foreign direct investment in the power sector. Foreign direct investment should be augmented, as FDI serves as the catalyst globally for the transfer of technology and expertise to developing nations. Nonetheless, the magnitude of foreign investment in the Indian power industry is not as promising as that observed in certain modernizing nations in Latin America and Asia, despite the sector being opened to private investment in 1991. This chapter is dedicated to providing background information about the Indian electricity sector. It addresses subjects crucial to comprehending the sector.

Literature Review

M. Moradi Korejan and H. Shahbazi (2016) concluded that leadership has always been considered as one of the most important factors of success and failure in any organization and numerous researches have been conducted in this field. In recent decades, transformational leadership has garnered significant attention.

Transformational leaders utilize their personal capabilities to advocate for the ideas of others and elevate others to a higher level of performance. Transformational leaders are pivotal to organizational performance. In essence, the presence of transformational leadership traits will motivate people to improve organizational performance. Transformational leaders inspire motivation in individuals. Leaders with exceptional personalities who acknowledge individual differences and address the higher-level demands of their team members foster cerebral stimulation, hence enhancing member engagement and their propensity to exert greater effort towards achieving success and cultivating high performance inside the organization.

Rizwana Kosar, Sayyed M. & Mehdi Raza Naqvi (2016) in their research paper on "Psychological Empowerment and Employee Behaviors: Employee Engagement as Mediator and Leader-Member Exchange as Moderator" concluded that changes in employee's behavior can increase operational cost for organizations. Managers are advised to enhance the psychological empowerment of employees. Managers can implement the following steps: Initially, ascertain the factors that drive employee motivation, including enhanced involvement in decision-making, possibilities for advancement, promotions, job autonomy, job control, team engagement, and the desire to be an effective team contributor in achieving objectives. Secondly, identify and examine obstacles that may diminish employee motivation, such as

insufficient information and the fear of job loss. Third, establish an employee incentive program that includes enhanced salary packages, favorable intrinsic and extrinsic rewards, as well as recognition, compliments, and gratitude for employees' contributions. Fourth, enhance motivation in staff training. Fifth, establish protocols to incentivize an aging workforce. Managers must offer effective oversight to instruct and direct employee actions.

Zakeer Ahmed Khan (2016) concluded that advocates of transformational leadership have confidence in that the arrangements of the past should not be the guide for the future. Successful transformative leaders are believed to establish clear and appealing visions for the future. Transformational leaders concentrate their efforts on vision, long-term objectives, system alignment and modification, as well as the development and training of others; Bass asserts that these leaders also exhibit transactional tendencies. He asserted that great persons are born, not created. Subsequent events revealed that this model of leadership was ethically deficient, as exemplified by figures such as Hitler and Napoleon, so undermining the legitimacy of the Great Man theory. The initial emphasis on the intellectual, physical, and personality characteristics that differentiated leaders from non-leaders foreshadowed research suggesting that relatively minimal differences exist between followers and leaders.

Ebenezer Malcain and Stephen Tamatey (2017) study investigated the impact of leadership style on employee performance within Ghana's public sector. The study employed a mixed-method approach utilizing descriptive linear regression to assess the impact of leadership styles on employee performance. The comprehensive spectrum of leadership styles, including transformational, transactional, and laissez-faire, was examined in relation to employee performance, specifically In-Role Performance (IRP) and Organizational Citizenship Behavior (OCB). The research population consists of all 921 staff members of the Ghana Atomic Energy Commission (GAEC). This research employed simple random sampling, purposive sampling, and convenience sampling procedures. Data on leadership style and employee performance were collected using three surveys, including both quantitative and qualitative methods. SPSS software was employed to compute basic linear regressions for hypothesis testing. Themes were derived from the interview transcriptions. The findings from both analyses indicate that none of the leadership styles

influence employee performance. Nevertheless, the leaders were observed to demonstrate a combination of transformative and transactional leadership characteristics.

Institutional Structure

The governance system in the energy sector, particularly renewable energy, is quite intricate. At the central level, energy decision-making is allocated among the Ministry of Petroleum and Natural Gas, the Ministry of Coal, the Ministry of New and Renewable Energy (MNRE), the Ministry of Environment and Forests, the Department of Atomic Energy, and the Ministry of Power. The MNRE is tasked with formulating policies and promoting renewable energy initiatives in the nation. India possesses a distinctive Ministry focused on the advancement of renewable energy: the MNRE. This augurs positively for the advancement of renewable energy production across the nation. The Planning Commission of India delineates overarching policy orientations and mediates between the plans of several ministries. The planning, exploration, and development of coal and lignite resources in India are entirely regulated by the Ministry of Coal. The Ministry of Environment and Forests is responsible for the formulation and implementation of environmental regulations. The Indian power sector is predominantly controlled by government ministries and public sector enterprises.

The Ministry of Power is chiefly accountable for the advancement of all facets of power generation, transmission, and distribution in India. It engages in planning, policy formation, project and investment decision processing, project monitoring, human resource development, and the application of electrical legislation (Ministry of Power, 2006).

Consequently, the Ministry of electricity exerts significant authority over the Indian electricity sector, although the presence of an autonomous regulatory agency, the restructuring of State utilities, and an increased emphasis on private-sector participation since the 1990s. According to India's constitution, electricity is classified as a "concurrent" issue, granting both the Central and State governments legislative and regulatory authority. The Central government, via the Ministry of Power, establishes overarching electrical policy, while State governments concentrate on power plants within their jurisdictions and on regional and local transmission and distribution (T&D) networks. Following India's independence, the electricity sector was nationalized under State and Central government ownership, as a

sufficient power supply was deemed crucial for achieving the nation's goals.

The Indian Power Sector: A Performance Review

The Indian power sector is marked by a significant demand-supply disparity, intrinsic inefficiencies, distorted pricing frameworks, a fragile institutional structure, insufficient environmental sustainability, and socio-political pressures.

The Indian power sector is predominantly controlled by government-owned utilities at both national and state levels. The total installed capacity is approximately 185.5 GW, with the private sector contributing merely 24.16%. For decades, coal has been the primary fuel for electrical generation in India. At present, coal constitutes a predominant share of 55.45% in power generation capacities, succeeded by hydroelectric sources. Alternative methods of generating are inconsequential by comparison. The growing homogeneity of fuel sources renders India highly susceptible to the threat of physical disruption. Coal, because to its environmental repercussions, cannot be utilized on a bigger scale until modern technologies are implemented to produce cleaner energy. In the fiscal year 2010-11, India's overall energy deficit constituted 8.5% of its total needs, while the peak deficit reached 9.8% of peak demand requirements. The disparity between demand and supply is expanding and remains concerning. Shortages in numerous states have intensified in recent years, resulting in diminished reliability and quality of delivered power. Industries and commercial companies have been compelled to invest significantly in expensive captive generating capacity, which diminishes their competitiveness. Encouraging captive production may create a scenario in which urban areas maintain electricity supply but rural areas lag farther behind (Joseph, 2010).

The sector is significantly distant from achieving financial viability. Despite the continuous changes, state-owned power utilities incurred losses of around Rs. 537.13 billion (\$11.50 billion) in the fiscal year 2008-09, which escalated to Rs. 635.48 billion (\$13.60 billion) in 2009-10 (PFC, 2011). Utilities must provide increased cash flows to secure substantial expenditures in generation, transmission, and distribution.

Estimates of transmission and distribution losses in India (26.91% in 2007-08) consistently indicate that these figures above those of most other nations (CEA, 2008). The aggregate technical and commercial (AT&C) losses for utilities selling directly to consumers at the national

level decreased by 0.59%, from 27.74% in 2008-09 to 27.15% in 2009-10 (PFC, 2011); yet, this figure remains elevated. This is mostly attributable to theft, lack of metering, inadequate collection, and inefficiencies within the distribution network (Ruet, 2006). It indicates a gradual improvement in the operational efficiency of India's power sector.

A crucial factor in assessing the durability of commercial enhancements is the corresponding advancement in the system's operational efficiency. It is presently imperative to contemplate enhancing efficiency by augmenting the plant load factor (PLF), diminishing auxiliary power usage, avoiding unexpected outages, reducing transmission and distribution losses, curtailing power theft, and improving service quality to maintain competitiveness in the open market. The utilities are unable to compensate for the electricity they supply due to offering it at minimal or no cost to agricultural producers, coupled with revenue losses from theft and uncollected invoices. The insolvency of utilities, coupled with politicians' failure to implement policy reforms during a period of critical demand for consistent and reliable electricity, exacerbated the electrical crisis in India (Joseph, K.L., 2010).

Market competition is considered essential for enhancing the performance of public utilities. The Indian Power Sector is undergoing substantial transformations to enhance competition and efficiency. The competitive landscape profoundly affects plant operations, necessitating the efficient utilization of all resources, including personnel, for enhanced management of plant activities such as outages and maintenance programs, for increased application of analytical tools to evaluate the costs and benefits of proposed initiatives, and for the collaborative sharing of resources, facilities, and services among utilities. There seems to be a necessity to develop new performance indicators, particularly for operations and maintenance (O&M) expenses. There is a significant necessity to optimize operations and maintenance costs to guarantee economic competitiveness. Benchmarking should be employed to evaluate international economic performance statistics. Cost benchmarking enables members to attain the highest degree of performance. Altering managerial cultural styles to align with optimal economic decision-making is essential. Foreign Direct Investment might induce necessary modifications in management practices and processes. Regulatory measures are crucial for enhancing efficiency in India's

power sector (Sinha & Kumar, 2008). The reform process requires time, and resultant changes cannot occur instantaneously.

Conclusion

The natural monopoly rationale has resulted in the power industry predominantly remaining within the public domain in numerous countries globally. Following independence, the government assumed the responsibility of advancing the power industry. The Indian power sector is predominantly controlled by government ministries and public sector enterprises. According to India's constitution, electricity is classified as a "concurrent" issue, granting both the Central and State governments legislative and regulatory authority. The financial deficiencies stemming from politically motivated tariff policies exacerbated issues within the power sectors, such as inadequate professional management in State Electricity Boards (SEBs), substandard electricity supply to the grid, elevated technical losses in transmission and distribution, a rise in electricity theft, and ineffective metering. These issues exacerbated the financial condition of the power sector.

References

1. Ebenezer Malcalm and Stephen Tamatey (2017), "Examining Leadership Style on Employee Performance in the Public Sector of Ghana A Case of Ghana Atomic Energy Commission", *International Journal of Scientific and Research Publications*, Volume 7, Issue 11, pp. 343-361.
2. Joseph, K. L. (2010). The politics of power: Electricity reform in India. *Energy Policy*, 38(1), pp. 503-511.
3. M. Moradi Korejan and H. Shahbazi (2016), "An Analysis of the Transformational Leadership Theory", *Journal of Fundamental and Applied Sciences*, 8(3S), pp. 452-461.
4. Ministry of Power. (2006). Annual Report 2005-06. Ministry of Power, New Delhi.
5. Muhammad Saqib Khan, Irfanullah Khan, QamarAfaq Qureshi and Hafiz Muhammad Ismail, (2015), "The Styles of Leadership: A Critical Review", *Public Policy and Administration Research*, 5(3), pp. 87-93.
6. PFC. (2011). Report on the performance of the state utilities for the years 2007-08 to 2009-10. Power Finance Corporation, New Delhi.
7. Rizwana Kosar, Sayyed M. Mehdi Raza Naqvi (2016), "Psychological Empowerment and Employee Behaviors: Employee Engagement as Mediator and Leader-Member Exchange as Moderator", *Journal of International Business Research and Marketing*, Vol.1, Issue 6, September, pp. 24-30.
8. Ruet, J. (2006). Cost-effectiveness of alternative investment strategies for the power sector in India: a retrospective account of the period 1997–2002. *Utilities Policy*, 14 (2), pp. 114-125.
9. Sinha N. & Kumar N.V. (2008), An Integrated approach to Energy Efficiency Management in India, 14th Annual International Sustainable Development Research Conference September 21-23, 2008, New Delhi, India.
10. Zakeer Ahmed Khan (2016), "Leadership Theories and Styles: A Literature Review", *Journal of Resources Development and Management*, Vol.16, pp. 1-7.