Pathways to Financial Sustainability for Rajasthan's Distribution Companies through Enhanced Organizational Practices

Review of Integrative Business & Economics Research

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ABSTRACT

Even though the Electricity Act was passed in 2003, the Indian power sector is still struggling to recover from massive financial losses. Over the course of twenty years, the industry continues to face a multitude of obstacles that makes it difficult to attain financial sustainability. Major problems include high aggregate technical and commercial (AT&C) losses, widespread electricity theft, dependency on cross-subsidies, a significant disparity between the average cost of supply (ACS) and average revenue realised (ARR), and widespread organisational inefficiencies. The purpose of this study is to perform an in-depth analysis of the influence that these organisational inefficiencies have on the overall financial health of the power sector. The contribution of this article lies in offering specific recommendations with the objective of improving organisational efficiency. The study suggests that efficient organizational practices have the potential to reduce the financial strain that the sector is under and will pave the path for sustained economic performance.

Keywords: Indian power sector, aggregate technical and commercial losses, organizational inefficiencies, financial sustainability.

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1. INTRODUCTION

After two decades of concerted efforts, the Indian electricity sector is still entangled in a web of financial hardship. The implementation of the Electricity Act in 2003 was a significant step towards restructuring the industry, fostering competition, and improving effectiveness. Nevertheless, the desired change has been hindered by ongoing difficulties, leading to significant monetary setbacks. In the financial year 2022-23, India's power distribution companies (discoms) collectively incurred losses of almost ₹60,000 crores, indicating a growing pattern of worsening financial instability. India's power sector has consistently experienced financial difficulties during the past decade. Between 2012 and 2022, the discoms have consistently experienced average yearly losses of approximately ₹50,000 crores, reaching a peak of ₹71,000 crores in the fiscal year 2018-19. Significant elements that contribute to the issue include elevated levels of aggregate technical and commercial (AT&C) losses, widespread energy theft, cross-subsidies, and a considerable disparity between the average cost of supply (ACS) and the average revenue realised (ARR). The sector's financial problems are worsened by organisational inefficiencies (Pargal & Mayer, 2014). The issue of AT&C losses

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continues to be a serious concern, with national averages consistently being high. In 2022, the AT&C losses were over 21%, far exceeding the global standard of 6-8%. These losses are a result of both technical inefficiencies in the power infrastructure and commercial inefficiencies, including billing and collection inefficiencies and electricity theft. The financial burden that results from this situation greatly hinders the ability of discoms to maintain and improve infrastructure, which in turn creates a never-ending cycle of inefficiency and financial loss (Nepal & Jamsab, 2015).

Cross-subsidization fuels sector financial imbalances. Farmers and residential areas pay lesser tariffs, whereas industrial and commercial consumers pay higher rates. A distorted tariff structure reduces efficiency and discourages high-paying consumers from staying on the grid, reducing income. Discoms are also burdened by high power purchase expenses from long-term agreements and volatile coal prices. These costs often exceed the revenue generated, widening the ACS-ARR gap (Kathuria, 2021). Organisational inefficiencies are a key but frequently underestimated factor in the sector's financial hardship despite these technical and financial challenges. Poor management, accountability, and bureaucratic inertia lower operational performance. Discoms generally have decision-making delays, poor infrastructure maintenance, and bad financial management. Inefficiencies increase operational expenses and impede changes and improvements. This study quantifies the financial losses caused by these organisational inefficiencies and makes targeted recommendations to improve organisational efficiency.

1.1 An overview of Rajasthan’s Power Sector

Rajasthan's power sector has undergone considerable changes over the last two decades, but the state's energy sector continues to face numerous issues that impede its operation and financing. The main cause of the sector's financial difficulties over the last decade has been its inability to keep up with the rising costs of state DISCOMs. Much of the cost increase is attributable to the high cost of power acquisition, which accounts for 70% of total expenses. Rajasthan has added significant generating capacity in recent years; however the acquired power is coupled with a high cost due to the DISCOMs engaging into long-term power purchasing agreements, which increases financial stress. Furthermore, the state faces the issue of cross-subsidies, electricity theft, unmetered connections, and organizational inefficiencies all of which result in significant T&D losses. Since 2000, the Rajasthan Electricity Board has undergone the process of unbundling, dividing the sector into three segments: generation, transmission, and distribution. The State has three distribution utilities: Ajmer Vidyut Vitran Nigam Limited (AVVNL), Jaipur Vidyut Vitran Nigam Limited (JVVNL), and Jodhpur Vidyut Vitran Nigam Limited (JdVVNL). The Rajasthan Urja Vikas Nigam Ltd (RUVNL), a state-owned power generation firm, works as a middleman between various energy sources and DISCOMs. DISCOMs purchase power on a differential bulk supply tariff (DBST), which incorporates a single buyer model in which one buyer acquires electricity from generators through a power buying agreement (PPA).

1.2 Financial performance of Rajasthan’s Distribution Companies

Rajasthan's DISCOMs incur large financial losses, primarily due to high AT&C losses and the gap between ACS-ARR, which is caused by low collection efficiency, high power purchase costs, electricity theft, organizational inefficiencies, overburdened staff, poor decision making, and the use of old metres. Figure 1 states the trend in

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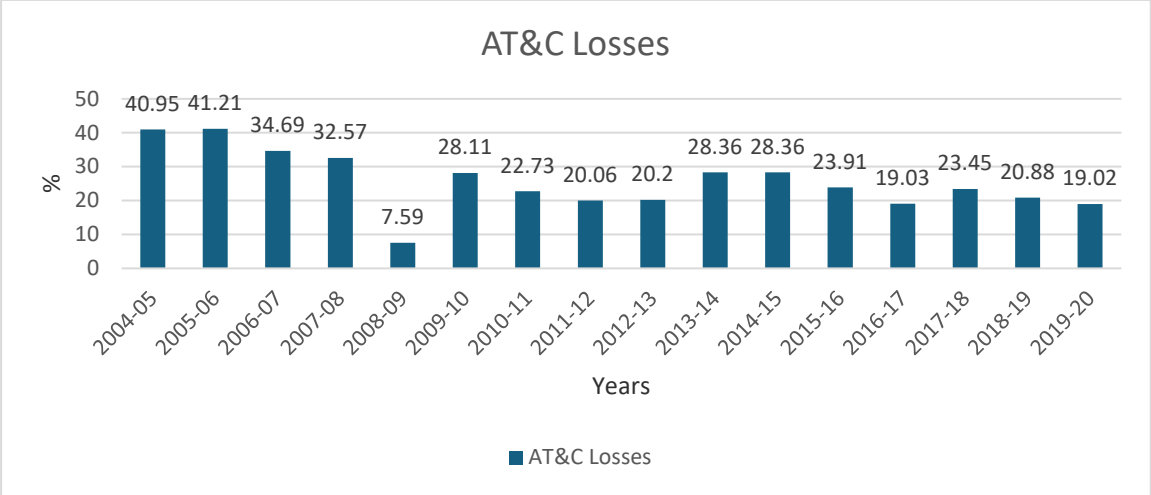
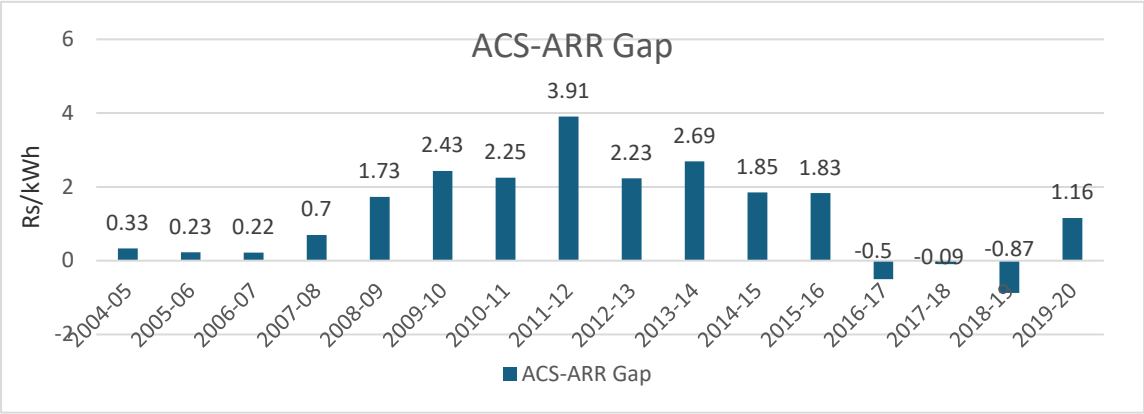
AT&C losses for the State and figure 2 throws light on the ACS-ARR gap. It is clear from the figure that AT&C losses for the DISCOMs have decreased over the last two decade, but it is still significant and contributes major share in the total losses. The difference between cost and revenue has also narrowed and was negative from 2016 to 2019, stating that the sector earned surplus money due to the Government of India's Ujwal DISCOM Assurance Yojana (UDAY) financial rescue initiative. However, in FY 2019-20, the gap widened to Rs 1.16/kWh, indicating that revenue falls short of covering costs. As a result, the data suggest that Rajasthan DISCOMs are incurring significant losses, making financial sustainability difficult to attain.

Figure 1. Trends in AT&C losses (2004-2020) in Rajasthan



Source: Power Finance Corporation report

Figure 2. Trends in ACS-ARR gap



Source: Power Finance Corporation report

From the above data it is evident that despite various reforms and initiatives implemented over the last decade to improve the financial state of DISCOMs, these utilities remain significantly underperforming and generating financial losses. AT&C losses for FY 2019-20 are 22.50 percent, implying that the weight of such loss's accounts for 3.5% of DISCOMs' overall losses. The State DISCOMs were able to close the ACS-ARR gap between 2015 and 2018, as the gap decreased from Rs 1.83/kWh in

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FY 2015–16 to a profitable situation in FY 2017–18, where the gap was negative at Rs -0.09/kWh, indicating that the DISCOMs realised more revenue than the cost. However, the difference widened by Rs 1.16/kWh in the 2019–20 fiscal year, underscoring the utilities' declining financial performance.

It was noted that the State of Rajasthan is second on the list of states experiencing losses, with the distribution segment suffering significant losses. Two DISCOMs in the State, JVVNL and JdVVNL, have been placed in category C and needs to make major strides in several areas, including lowering aggregate technical and commercial (AT&C) losses, improving billing efficiency, raising customer satisfaction, and putting energy-saving measures into place (Mukherjee & Gupta, 2021). On the other hand, the Ajmer DISCOM (AVVNL) has been classified under the C+ category, indicating low performance on both operational and financial parameters, indicating that it is performing very poorly as per the Ministry of Power's 9th integrated ratings on power utilities for the fiscal year 2021. Below mentioned table shows all the parameters which are considered before putting any state power utility under a specific category.

Table 1. Rating Parameters

Parameters	Weightage / Maximum Score
OPERATIONAL & REFORM Parameters	43
Operational related	
AT&C Losses	28,-4
Power purchase	3
Cost Efficiency	6
Reform related	
RPO Compliance	2
Corporate Governance	4
EXTERNAL Parameters	15
Regulatory	11,-19
Govt. Support	4
FINANCIAL Parameters	42
Ratios	
Cost Coverage Ratio	15
Interest Coverage Ratio	4
Total Debt to Net Worth	3,-2
Sustainability	6
Receivables	5
Payables	4
Audited Accounts	5,-12
Audit Qualifications	0,-1
Default to Banks / FIs	0,-2
Total	100

Source: Power Finance Corporation

Therefore, this study attempts to explore the reasons behind the ongoing bailouts of the Rajasthan’s power sector. A questionnaire was designed to determine how organisational and managerial decision-making affects DISCOM losses. The study used personal interviews with field specialists, academicians, and DISCOM officials along with focused group discussions to understand the issue and possible solutions. In-person surveys were done with Rajasthan's 3 DISCOM officials. Survey was done in the year 2021-22. The literature says that organisational inefficiencies increase the

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sector's financial burden, but only few studies analyse their impact on power sector financial performance. The present research is noteworthy because it analyses the impact of organisational inefficiencies on the financial performance of Rajasthan's power sector which has been sparsely researched.

2. METHODOLOGY

The present study begins by formulating the null hypothesis which is:
H_o: Organizational and managerial inefficiency has not resulted in financial bankruptcy of the power utilities in Rajasthan.

A primary survey was conducted to assess the impact of organizational inefficiencies on financial bankruptcy of Rajasthan power utilities. The survey was conducted on the DISCOM officials of all the three distribution utilities of Rajasthan state to study the perception of the respondents in defining the impact of managerial/organizational (in)efficiencies on the financial performance of the sector. Personal interviews and focused group discussion method was adopted to find out the possible solutions to the problem from DISCOM officials. For this purpose, a questionnaire was developed to conduct the personal interviews and focused group discussions. The variables for the questionnaire were chosen from the existing literature which established a direct relationship between the DISCOM losses and organizational inefficiency. The questionnaire was validated via pilot survey on academicians, industry experts, bureaucrats, and officials before undertaking the final survey. The broad categories for the final variables were technical and non-technical losses.

The power dissipation in distribution transformers, transmission lines, and measurement devices causes most technical losses in power system operations. Long distribution lines are common in rural areas, where long-distance heating wastes energy as heat. Voltage variations could blow distribution transformers due to their small conductors. Installing distribution transformers far from load centres causes line losses and low voltage for distant users, even with good voltage. Installation of smart meters is delayed. Technical losses result from widespread usage of low-quality equipment, especially in rural areas. However, non-technical losses are caused by power system externalities or loads and conditions not considered into technical losses. These are business and financial losses. Power theft causes most of these losses. Over 20% of India's power industry losses are due to theft. Indian electricity theft has two main categories. First, meter fraud involves manipulating electricity usage data. Second, unmetered usage is free electricity use.

Political interference and little managerial autonomy cause significant non-technical losses. Politicians typically promise free or subsidised electricity, burdening the industry. In addition, most overhead electrical wires in the country are uninsulated, allowing illicit hookups. Low managerial autonomy influences staff decision-making. Poor planning and higher power purchase costs lead to cap disallowance. This impacts timely tariff revision, long-term power purchase agreements, power sector reforms, competition, interest expenses, billing and collection processes, and the gap between power supply costs and realised revenue. Distribution companies also have employee theft. Sometimes power utilities suffer from staff conspiracies.

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Data was gathered through a structured survey of DISCOM officials across Rajasthan's three main distribution utilities: AVVNL, JVVNL, and JdVVNL. To enhance representativeness, officials from diverse roles and levels were sampled. The survey, conducted from 2021 to 2022, used a 5-point Likert scale and was validated through a pilot survey with academicians and industry experts. The sampling method emphasized collecting insights from experienced professionals, with a focus on middle-to-top management personnel, to ensure an informed perspective on organizational inefficiencies. The data collection process was conducted primarily via personal interviews and focused group discussions, aligning with best practices for qualitative research reliability. Table 2 summarizes the characteristics of the respondents.

Table 2. Description of Respondent's characteristics

Respondent Characteristics	Description
Age Range	40-60 years
Gender	Gender-neutral; included both male and female participants
Experience	Minimum of 5 years
Role/Position	Middle and top management officials
Company Affiliation	Officials from the three major distribution companies in Rajasthan: AVVNL, JVVNL, and JdVVNL

The survey seeks to find out whether the organizational efficiency is causing technical and non-technical losses in the power sector or not. A total of 22 questions were formulated on the 5-point likert scale after the pilot survey. After checking the validity of the questionnaire, its reliability was checked by applying Cronbach's alpha test, which was developed by Lee Cronbach in 1951, that measures internal consistency and reliability.
Cronbach Alpha formula:

$$\alpha = \frac{N.\underline{c}}{\underline{v} + (N+1) * \underline{c}}$$

where:

- N=number of items
- $\underline{c}$=average covariance between item-pairs
- $\underline{v}$=average variance

Primary survey interviews and targeted group discussions could reach 112 DISCOM middle-to-top management personnel from AVVNL, JVVNL, and JdVVNL. 35.7% were from AVVNL, 27.7% were from JVVNL and 36.6% were from JdVVNL. The goal was to reach more authorities, but COVID-19 and its aftermath limited responses to 112. Cronbach alpha for the questionnaire is 0.78, which is satisfactory. Statisticians recommend a minimum alpha coefficient of 0.65 to 0.80. The survey results are displayed on graphs below. This survey took place in 2021-22. Non-parametric test was used because data is qualitative. Data was tested using Pearson chi-square test to determine validity of the hypothesis.
Formula:

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

$$\chi_c^2 = \Sigma \frac{(O_i - E_i)^2}{E_i}$$

where:
$\sum$ = sum of calculations of each category
O_i = observed value
E_i = expected value
Therefore, to test the significance of the obtained results this test was applied which further implies that if p-value is smaller than the standard alpha value i.e., 0.5 then the hypothesis is rejected and vice versa.
In addition to that Principal Component Analysis (PCA) and correlation analysis was conducted. These methods enable us to identify key patterns within survey responses and quantify relationships between variables associated with organizational inefficiencies. PCA was applied to the survey data, which was structured on a 5-point Likert scale. Correlation analysis was also conducted to explore relationships among different inefficiency indicators.

3. RESULTS AND DISCUSSION

As mentioned in the above section that review of literature suggests that financial burden on the sector is caused due to inefficacy on part of management hence this section deals with the survey results which was obtained from the personal interviews that were taken from DISCOM officials through questionnaire.

Questions 1-6 (table 3) deals with the technical losses and opinion on the factors contributing towards technical losses on 5-point likert scale while questions 7-22 deals with factors contributing towards non-technical losses as mentioned in table 3.

Table 3. Primary survey finding on 5-point likert scale

Survey Questions	Survey findings (in percentage of respondents)				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lengthy distribution lines results in transmission losses.	12.5	80.4	7.1	0	0
Inadequate conductor size results in distribution losses.	14.3	77.7	7.1	0	0.9
Installation of distribution transformers away from load centres causes transmission losses.	12.5	80.4	7.1	0	0
Non-timely inspection of obsolete wires that causes transmission losses is due to organizational inefficiencies.	8	80.4	11.6	0	0
Organizational inefficiencies have caused	9.8	78.6	0	11.6	0

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usage of poor-quality equipment in rural areas.					
Organizational inefficiencies have caused delay in installation of smart meters.	9.8	77.7	0	12.5	0
Organizational inefficiencies have caused power purchase cost to rise.	8.9	81.3	0	9.8	0
Organizational inefficiencies have caused interest costs to rise due to poor decision making.	8	82.1	0	9.9	0
Long term power purchase agreement is due to high political interference and less managerial autonomy.	11.6	82.1	0	6.3	0
Organizational inefficiency has caused non-timely revision of tariff.	8.9	84.8	0	6.3	0
Faulty meter reading is due to incompetent staff.	9.8	83	0	7.2	0
Organizational inefficiency has caused poor billing and collection efficiency.	8	83	0	9	0
Organizational Inefficiency has resulted in unmetered connections.	8	81.3	0	10.7	0
Electricity theft is caused due to employee theft.	8.9	84.8	6.3	0	0
Inefficacy on part of officials causes power theft.	8.1	85.6	1	5.3	0
Cross-subsidization has caused power theft by industries.	15.2	79.5	5.3	0	0
Poor implementation of reforms is due to organizational inefficiency.	9.8	82.1	1.2	6.9	0
Low rate of competition in the sector is due to organizational inefficiency.	8	83	4	5	0
Strict actions against poachers are not taken due to organizational inefficiency.	10.7	80.4	4	4.9	0
Lack of field vigilance and irregular monitoring of	80.4	9.8	2.8	4	3

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unmetered connections and theft is due to organizational inefficiency.					
Managerial autonomy can help in reducing power theft.	17	77.7	1.3	1	3
Organizational efficiency can reduce aggregate technical and commercial losses.	18.8	76.8	2.4	1	1

Source: Survey questionnaire

Firstly, a non-parametric test, chi square is applied in the present research to validate the statistical significance of the scaled responses of the experts acquired through primary survey. The value of the chi-square statistic is143.682 which is greater than the critical value of 0.05, hence the null hypothesis is rejected (Table 4). Results of the analysis suggests that the managerial indecisiveness and inefficiencies cause significant losses to the DISCOMs.

Table 4. Chi-square Test Results

	Value	Asymptomatic Significance (two sided)
Pearson Chi-Square	143.682	.000
Likelihood ratio	89.595	.000
Linear by linear association	70.294	.000
N of valid case	112	
The result is significant as the value is less than the threshold alpha value of 0.05		

Source: Author's calculation

Secondly, the Principal Component Analysis (PCA) was applied which identified five principal components (PCs), that together explain approximately 71% of the variance in the survey data (Table A1). This level of variance explained indicates that the main themes captured by the components account for most of the differences observed across survey responses. Below, each component is interpreted based on the highest factor loadings of survey questions within it:

- PC1 (24.3% of variance explained): This component captures organizational inefficiencies related to technical and operational issues. Survey items with high loadings on this component include statements on transmission and distribution losses, conductor size inadequacies, and the strategic placement of distribution transformers. This suggests that respondents identify technical inefficiencies as a major source of transmission losses.
- PC2 (17.1% of variance explained): This component seems to focus on financial and managerial inefficiencies. Survey questions with high loadings on PC2 address issues like rising power purchase and interest costs, often attributed to poor decision-making. This component highlights the financial burden resulting from inefficiencies in organizational management.
- PC3 (12.7% of variance explained): PC3 centers on staff competence and

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operational errors that contribute to revenue loss. Items that load strongly on this component include statements regarding faulty meter readings, poor billing, and collection efficiency, suggesting that respondents see incompetence in field operations as a factor contributing to financial losses.

- PC4 (9.6% of variance explained): PC4 captures aspects related to policy and regulatory interference. Questions with high loadings here focus on issues like political interference in power purchase agreements and delays in tariff revisions, indicating that external policy pressures may be perceived as reducing the organization's operational autonomy.
- PC5 (7.3% of variance explained): This component appears to reflect security and anti-theft enforcement. Questions on electricity theft due to employee theft and inadequate actions against poachers load heavily on this component, indicating respondents see these as critical areas where increased vigilance could reduce losses.

These components collectively reveal that organizational inefficiencies are perceived across multiple domains—technical, managerial, operational, regulatory, and security.

Lastly, the correlation matrix (Table A3) highlights relationships between various survey items. Notable correlations include:

- Technical Inefficiencies: Survey items regarding transmission losses due to lengthy distribution lines and inadequate conductor size show moderate to strong correlations with items on transformer placement and inspection delays. This indicates that respondents view these factors as interrelated aspects of technical inefficiency contributing to overall losses.
- Financial and Managerial Aspects: Items related to financial costs, such as rising interest costs and delayed installations, show positive correlations, reflecting a perceived link between poor management practices and financial strain within the organization.
- Regulatory and Policy Constraints: Questions on political interference, long-term power purchase agreements, and tariff revision delays are positively correlated, suggesting that respondents see these as intertwined regulatory challenges that affect organizational efficiency.
- Staff Competence and Theft: Responses on poor meter reading practices and inadequate billing are positively correlated with perceptions of power theft due to employee inefficacy, hinting at a link between internal staff performance and overall organizational security.

These correlations underscore the interconnected nature of the inefficiencies identified, suggesting that improvements in one area, such as staff competence or technical upgrades, can have a cascading positive effect across other areas.

This interpretation synthesizes the PCA and correlation results, emphasizing how different dimensions of inefficiency are linked within the organization and that organizational inefficiencies plays a vital role in causing losses for the distribution companies of Rajasthan.

Apart from interviewing the officials, focused group discussion was also conducted on a round table with all the managers of respective DISCOMs. This method was adopted to find out the possible solutions to resolve the above stated problem and measures that needs to be incorporated to reduce the financial burden of the power utilities which is discussed briefly in the next section.

Next section presents conclusion and recommendations which if implemented rightly can reduce the financial burden of all the three distribution companies and will help in

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achieving financial sustainability for Rajasthan's power sector.

4. CONCLUSION

Distribution is the weakest link in the Indian power sector's value chain and a barrier to financial sustainability. The above results show that organisational inefficiencies increase the financial burden for State-owned distribution companies. To reduce the utilities' financial burden, organisational reforms must ensure more managerial autonomy and less political interference. To drive people to make good decisions and work hard for sector's growth, incentives and tactics should boost efficiency and productivity. The present study proposes recommendations for policymakers, regulatory authorities, and other stakeholders of the Indian electricity sector and loss-incurring utilities of Rajasthan State to turn around their distribution companies into profitable ones.

- For technical losses, smart metering should be implemented, and low tension (LT) networks should be replaced with high tension (HT) networks in places where power theft is common through the high voltage distribution system (HVDS). Install small capacity transformers near to load centres that cover fewer users to improve power supply and reliability by localising issues. Early costs will be offset by long-term theft reduction.
- Non-technical losses, from power theft, need field vigilance, inspection, and raids from the supplier side. There should be performance-based group incentive programs that share gains between DISCOMs and subdivisions that reduce AT&C losses. Employee capacity-building programs should teach managerial, technical, safety, performance benchmarking, quality, financial, commercial, customer behavior and patterns connected to power theft.
- For achieving managerial efficiency, less political interference and more managerial autonomy should be granted. Training, capacity building programs and performance-based incentive schemes should be adopted.

These suggestions, if implemented appropriately, will significantly reduce the financial strain on the Indian power sector and will assist Rajasthan's power sector in achieving financial sustainability. Moreover, the findings and recommendations from this study on Rajasthan's power sector inefficiencies can be beneficially applied to regions with similar structural and financial challenges in electricity distribution. Countries across **South Asia** (such as Bangladesh, Pakistan, and Nepal), **Southeast Asia** (including Indonesia, Philippines, Myanmar, and Vietnam), **Sub-Saharan Africa** (notably Nigeria, Kenya, and Ghana) and **Latin America** (Brazil, Argentina, and Peru) face common issues like high AT&C losses, electricity theft, dependency on subsidies, and political interference in utility operations. These regions struggle with inefficient billing and collection, unmetered connections, and limited managerial autonomy, which hamper financial sustainability. Implementing strategies to improve organizational efficiency, reduce technical and non-technical losses, and enhance regulatory support could provide a path toward sustainable operations for these power sectors.

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APPENDIX

Table A1: Principal Component Analysis (PCA) Summary

Component	Eigenvalue	% of Variance Explained	Cumulative % of Variance Explained
PC1	4.87	24.3%	24.3%
PC2	3.41	17.1%	41.4%
PC3	2.53	12.7%	54.1%
PC4	1.92	9.6%	63.7%
PC5	1.45	7.3%	71.0%

Table A2: PCA Loadings of Survey Questions on Principal Components

Survey Question	PC1	PC2	PC3	PC4	PC5
Lengthy distribution lines results in transmission losses.	0.72	-0.05	0.15	0.09	0.22
Inadequate conductor size results in distribution losses.	0.65	0.24	0.05	-0.07	0.31
Installation of distribution transformers away from load centres causes transmission losses.	0.71	0.02	0.14	0.19	-0.04
Non-timely inspection of obsolete wires due to organizational inefficiencies.	0.63	0.18	0.20	0.11	0.12
Organizational inefficiencies have caused usage of poor-quality equipment in rural areas.	0.67	0.09	-0.21	0.28	-0.12
Organizational inefficiencies have caused delay in installation of smart meters.	0.69	-0.02	0.16	-0.09	0.13
Organizational inefficiencies have caused power purchase cost to rise.	0.68	0.05	-0.04	0.22	-0.16
Organizational inefficiencies have caused interest costs to rise due to poor decision making.	0.74	-0.03	0.17	-0.11	0.18
Long term power purchase agreement is due to high political interference and less managerial autonomy.	0.62	0.22	-0.14	0.19	0.21
Organizational inefficiency has caused non-timely revision of tariff.	0.71	0.10	-0.05	0.20	-0.07
Faulty meter reading is due to incompetent staff.	0.70	0.08	0.13	0.16	-0.09
Organizational inefficiency has caused poor billing and collection efficiency.	0.69	0.07	-0.18	0.11	0.15
Organizational Inefficiency has resulted in unmetered connections.	0.68	-0.12	0.19	0.08	-0.11
Electricity theft is caused due to employee theft.	0.65	0.09	-0.17	0.10	0.18
Inefficacy on part of officials causes power theft.	0.70	0.04	0.11	0.22	-0.14
Cross-subsidization has caused power theft by industries.	0.68	-0.08	0.21	0.12	0.10
Poor implementation of reforms is due to organizational	0.63	0.15	-0.09	0.18	0.22

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Survey Question	PC1	PC2	PC3	PC4	PC5
inefficiency.					
Low rate of competition in the sector is due to organizational inefficiency.	0.65	0.12	0.17	-0.10	-0.05
Strict actions against poachers are not taken due to organizational inefficiency.	0.72	-0.03	0.22	0.11	0.09
Lack of field vigilance and irregular monitoring of unmetered connections and theft is due to organizational inefficiency.	0.67	0.14	-0.11	0.23	-0.12
Managerial autonomy can help in reducing power theft.	0.69	-0.01	0.20	-0.13	0.16
Organizational efficiency can reduce aggregate technical and commercial losses.	0.71	0.09	0.13	-0.04	0.18

Table A3: Correlation Matrix of Survey Questions

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22
Q1	1.00	0.45	0.53	0.32	0.44	0.35	0.50	0.46	0.43	0.39	0.40	0.38	0.42	0.48	0.41	0.49	0.36	0.39	0.47	0.37	0.34	0.44
Q2	0.45	1.00	0.28	0.29	0.33	0.41	0.39	0.37	0.35	0.31	0.42	0.33	0.36	0.39	0.34	0.41	0.30	0.36	0.40	0.32	0.39	0.31
Q3	0.53	0.28	1.00	0.37	0.47	0.34	0.45	0.43	0.40	0.42	0.39	0.38	0.41	0.44	0.46	0.40	0.35	0.33	0.42	0.36	0.32	0.40
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