

Original Article

EFFICIENCY DYNAMICS OF MICROFINANCE INSTITUTIONS: A DATA ENVELOPMENT APPROACH

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ABSTRACT

The efforts have been in the study to assess the effectiveness of 30 Microfinance Institutions (MFIs) in four areas using Data Envelopment Analysis (DEA) through returns to scale (RTS), scale efficiency (SE), pure technical efficiency (PTE) and overall technical efficiency (OTE).

The findings describe that majority of MFIs experience varied degrees of inefficiency, while only one-third run at maximum efficiency. Several MFIs in the inefficient group exhibit great management skills, however they also have scale inefficiencies, which suggests that production efficiency has decreased as a result of expansion beyond ideal size. More than half of the DMUs have dual inefficiencies, which are connected to both technology and scale. This suggests that operational design, governance and resource allocation are structurally flawed. The prevalence of diminishing returns to scale (DRS) highlights the structural concerns of uneven growth tactics. The policy implications include comparing successful MFIs to best-practice models, encouraging strategic restructuring to align operations with productive scales and supporting capacity-building programs. Regulators are advised to develop frameworks that promote sustainable growth while maintaining efficacy. The findings demonstrate the importance of sector-wide learning, efficiency tracking and balanced growth in enhancing MFIs' long-term sustainability and impact.

Keywords: Pure Technical Efficiency, Technical Efficiency, Scale Efficiency, Data Envelopment Analysis

INTRODUCTION

Microfinance Institutions (MFIs) have emerged as significant participants in achieving financial inclusion by offering credit and other financial services to people who do not have access to traditional banking systems. MFIs, which began as community-based lending practices, have standardized the concept of providing small loans to low-income individuals and households, typically without collateral, to assist address challenges such as poverty, unemployment and a lack of capital [Armendáriz and Morduch \(2010\)](#). The microfinance movement achieved international attention with the success of Muhammad Yunus's Grameen Bank model in the late 1970s, which demonstrated that creditworthiness could be redefined beyond standard collateral and repayment guarantees [Ledgerwood \(1999\)](#).

MFIs now encompass a variety of entities, including non-banking financial firms (NBFCs), cooperatives, societies and non-governmental organizations (NGOs). Their reach extends beyond microcredit to include micro-savings, insurance, remittances and financial literacy initiatives. The worldwide microfinance sector will serve over 140 million clients by 2023, with South Asia

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accounting for the majority of that figure [World Bank \(2023\)](#). In India, the Reserve Bank of India (RBI) regards MFIs as critical to the overall financial inclusion endeavor, recognizing their role in filling gaps created by traditional banking channels [RBI \(2022\)](#).

MFIs have a dual mission: to achieve financial sustainability while also promoting social inclusion and poverty reduction [Cull et al. \(2009\)](#). Financially, MFIs must assure operational viability, effective resource usage and enough returns on assets and equity in order to be viable over time. Socially, they are intended to reach out to marginalized groups, empower women and promote broader development goals such as education, healthcare access and entrepreneurship.

This dualism generates inherent tensions. Prioritizing profitability may cause MFIs to service relatively wealthy borrowers with increased loan demands, but focusing only on outreach may compromise financial stability [Hermes and Hudon \(2019\)](#). Microfinance research has highlighted the issue of "mission drift," as MFIs prioritize financial advantages over social goals [Mersland and Strøm \(2010\)](#). As a result, MFI efficiency analysis must take into account the balance of financial and social components, making it more difficult to evaluate than typical financial institutions.

MFI growth trends differ significantly by region. The most advanced microfinance economies are usually thought to be in South Asia and Latin America, with well-established institutional frameworks and broad reach. In contrast, Africa still faces challenges related to scalability, regulatory framework and infrastructure [Ledgerwood et al. \(2013\)](#).

India has emerged as Asia's largest microfinance market. Institutions like as Bandhan, SKDRDP and Spandana have shown that MFIs can scale operations while serving millions of consumers. The regulatory environment, defined by the RBI and the Microfinance Institutions Network (MFIN), includes supervisory tools to protect borrower interests and ensure financial stability. The sector has also witnessed substantial transition with the introduction of NBFC-MFIs, which now account for a sizable portion of loan portfolios and client outreach. In 2023, India's NBFC-MFIs manage assets worth over ₹1.6 trillion and serve almost 70 million active borrowers [MFIN \(2023\)](#).

NEED FOR MEASURING EFFICIENCY IN MFIS

While MFIs have grown dramatically, concerns remain about their efficiency in resource allocation and goal fulfillment. Efficiency measurement is important for several reasons:

- 1) **Resource Optimization** - MFIs operate in resource-constrained situations and inefficiency can harm sustainability [Gutiérrez-Nieto and Serrano-Cinca \(2019\)](#).
- 2) **Stakeholder Accountability** - Donors, investors and regulators need performance benchmarks to evaluate MFIs' ability to provide desired social and financial objectives [Hudon and Traca \(2011\)](#).
- 3) **Policy Implications** - Efficiency assessments inform laws, subsidies and capacity-building activities.
- 4) **Client Welfare** - Inefficient MFIs may increase interest rates and limit service availability, undermining poverty alleviation efforts.

Thus, assessing efficiency is both a financial and a developmental requirement.

ROLE OF EFFICIENCY STUDIES IN POLICY AND PRACTICE

Efficiency studies provide significant information to both policymakers and practitioners. Efficiency analysis assists regulators such as the RBI in identifying systemic flaws and directing the development of prudential standards. Understanding efficiency benchmarks allows MFIs to revamp operational strategies, optimize procedures and implement new technology. Efficiency, from the standpoint of investors, is a proxy for risk management and return potential, which drives capital inflows into the sector.

Furthermore, efficiency analysis enables cross-national and cross-institutional comparisons. Researchers can find exemplary practices and improve global discussions about financial inclusion by comparing MFIs to peers. For example, understanding why Indian MFIs outperform or underperform their counterparts in Bangladesh or Africa can help to improve knowledge transfer and policy.

LITERATURE REVIEW

Evolution of Microfinance: From Traditional Credit Systems to Modern MFIs

The origins of microfinance can be found in informal community-based structures like self-help groups (SHGs), chit funds and rotating savings and credit associations (ROSCAs), which historically gave low-income households emergency borrowing and savings options [Armendáriz and Morduch \(2010\)](#). These informal structures relied on social capital, mutual trust and community monitoring instead of formal collateral, allowing financial inclusion to those who were not able to access traditional banking services.

The current institutionalization of microfinance began in the 1970s, with ventures such as Bangladesh's Grameen Bank, which pioneered group lending. This strategy used borrowers' joint liability to reduce default risk and information asymmetry [Yunus](#)

(2003). Similar programs extend throughout South Asia, Africa and Latin America and are frequently funded by non-governmental organizations (NGOs), donor agencies and development banks.

The microfinance industry had changed significantly during the 1990s and 2000s. Small, donor-funded NGO initiatives gave way to professionally run Microfinance Institutions (MFIs), which now have established governance structures, standardized loan products and frameworks for performance evaluation. Due to legislative recognition, several of these institutions changed their names to Non-Banking Financial Companies-Microfinance Institutions (NBFC-MFIs) and then to Small Finance Banks (SFBs), especially in India Rhyne (2001), Mersland and Strøm (2010).

The microfinance industry was further transformed by technological breakthroughs. In India, the combination of digital payment systems, mobile banking platforms and Aadhaar-enabled services greatly increased accessibility, decreased transaction costs and increased efficiency. But the commercialization and digitization of microfinance has also sparked important discussions about mission drift, as organizations may put their initial social outreach objectives on the back burner in favor of financial sustainability and profitability Cull et al. (2009). As a result, the development of MFIs creates significant difficulties for evaluating efficiency as they move from community-based solidarity mechanisms to formal, financially sustainable and technologically advanced institutions.

Theoretical Frameworks for Efficiency Measurement

Scholars and practitioners have adopted multiple theoretical perspectives to conceptualize and measure efficiency in MFIs. Three dominant frameworks stand out:

Production Approach

According to this viewpoint, MFIs are viewed as financial service providers. Labor (loan officers, branch personnel), capital and operating budgets are all inputs, while the number of loans disbursed, borrowers served and credit volume delivered are the outputs. This method is particularly useful for determining branch-level production and staff efficiency Ferrier and Lovell (1990). It may, however, underrepresent financial sustainability because it is more concerned with service delivery numbers than profit.

Intermediation Approach

According to the intermediation perspective, MFIs act as mediators, mobilizing funds and converting them into earning assets. Total assets, deposits and operational expenses are among the inputs, while financial returns and portfolio quality are the outputs. This approach encapsulates the essence of balance-sheet management and the efficiency with which resources are converted into income-generating activities Sealey et al. (1977). This technique is especially appropriate for MFIs that are converting to NBFC-MFIs and Small Finance Bank.

Institutional/Mission Theory Approach

This framework highlights MFIs' governance structures, incentives and social objectives. It holds that efficiency is shaped not just by technical resource allocation, but also by institutional frameworks and the degree of alignment with the twin goal of financial and social success Mersland and Strøm (2009). NGOs, for example, may prioritize outreach depth, whereas commercially oriented MFIs may focus on profitability.

Frontier Approaches (DEA and SFA)

Both the production and intermediation perspectives can be operationalized through the use of frontier techniques such as Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA). By employing these methods to estimate "best practice" bounds, researchers can evaluate the relative efficacy of MFIs relative to their peers under similar resource constraints Coelli et al. (2005). DEA is particularly popular in MFI studies due to its ability to handle several inputs and outputs simultaneously without necessitating functional form assumptions Bassem (2014).

Together, these theoretical frameworks provide a comprehensive foundation for assessing efficiency while acknowledging that MFIs differ from traditional financial institutions in their dual objectives and stakeholder expectations.

Empirical Studies on MFI Efficiency

In the last two decades, there has been an increase in interest in the assessment of efficiency in MFIs. The globalization of MFIs and their dual objectives of financial sustainability and social outreach have prompted scholars to investigate how well these organizations utilize limited resources. Stochastic Frontier Analysis (SFA) and Data Envelopment Analysis (DEA) are two parametric and non-parametric methods that have been used in the majority of these investigations.

Studies conducted globally in Latin America, Africa and Asia demonstrate that institutional structure, regulatory frameworks and contextual factors all have a significant impact on efficiency. Using DEA on a sample of MFIs, for instance, Gutiérrez-Nieto and Serrano-Cinca (2019) found that the institutions' balance between outreach and sustainability, as well as regional socioeconomic conditions, had a significant impact on efficiency. Similarly, using a large worldwide dataset, Hermes, Lensink (2011) discovered that many MFIs fail to achieve high levels of efficiency since focusing outreach to the poorest borrowers frequently raises expenses.

Bassem (2014) investigated MFIs in the Mediterranean using DEA and found wide variance in technical efficiency, with smaller institutions frequently outperforming larger ones due to improved client closeness and lower operational rigidities. In Latin America, Mersland and Strøm (2010) found that larger MFIs have higher cost-efficiency due to economies of scale.

Scholarly interest in the Indian context has also grown. Using DEA, [Shastry and Rai \(2025\)](#) examined the effectiveness of Indian MFIs and shown that, particularly for Non-Banking Financial Company-MFIs (NBFC-MFIs), regulatory tightening following the Andhra Pradesh microfinance crisis dramatically decreased operational efficiency. Indian MFIs must carefully balance lowering expenses per borrower with continuing to reach out to low-income households and women, as noted by [Singh \(2024\)](#). The importance of digital financial services in increasing efficiency was highlighted in a more recent study by [Sinha et al. \(2024\)](#), which found that organizations that quickly integrated mobile payment systems were able to lower transaction costs and increase the effectiveness of client servicing.

Together, these empirical studies show that although MFIs around the world aim for efficiency, a variety of factors, including organizational type, outreach strategy, regulatory environment and technology adoption, affect how well they perform. There is still a lot of variation in the results, though, which suggests that further context-specific research is necessary, especially in developing nations like India where MFIs play a crucial role in promoting financial inclusion.

RESEARCH GAP AND CONTRIBUTION OF THE STUDY

Despite microfinance's rapid growth, questions persist about how effectively MFIs transform inputs (assets, expenses, cost per borrower) into outputs (returns, outreach and social impact). While various studies have examined financial success, only handful has taken into account the dual mission. Existing literature frequently focuses profitability indicators such as Return on Assets (ROA) and Return on Equity (ROE), but little emphasis has been made to including outreach measures such as average loan balance per borrower or number of active borrowers [Bassem \(2008\)](#).

Furthermore, there is no agreement on the best scientific technique for assessing efficiency in MFIs. DEA and SFA have been implemented in numerous circumstances, but their respective strengths and limitations are still under controversy [Mersland and Strøm \(2010\)](#). Moreover, regional research concentrating exclusively on Indian MFIs remain underdeveloped despite the country's significance in the global microfinance sector.

Furthermore, there has been little research into how recent regulatory changes (RBI reforms following the 2010 crisis) and digital financial innovations impact the efficiency dynamics of Indian MFIs. Given India's fast digitalization and policy reforms, there is a crucial gap in the literature.

This study adds to the body of knowledge and application in microfinance in a number of ways. First, it addresses the dual role of MFIs by including social outreach and financial success metrics into a thorough framework for measuring efficiency. In a region with substantial microfinance activity but little efficiency-based research, it offers new empirical findings by applying DEA to a sizable number of Indian MFIs. Third, the study provides policy-relevant insights that might help practitioners, investors and regulators improve the sector's sustainability and resilience. Lastly, the study adds to the global conversation on financial inclusion and the future of pro-poor financial institutions by identifying efficiency gaps and causes.

RESEARCH METHODOLOGY

RESEARCH DESIGN

A quantitative, cross-sectional research approach is used in this study to assess the effectiveness of Microfinance Institutions (MFIs) in India. MFIs' efficiency is defined as their capacity to convert inputs, or resources like assets and expenses, into outputs, or financial returns and outreach metrics. The study does this by using Data Envelopment Analysis (DEA), a non-parametric frontier method that is frequently used in financial institutions to quantify efficiency [Charnes et al. \(1978\)](#), [Banker et al. \(1984\)](#). DEA is especially well-suited in this situation because; It manages several inputs and outputs at once without taking on a functional form. It supports both social and financial performance, which is consistent with MFIs' dual objective. It offers information on scalability and technical efficiency, two important aspects of microfinance.

RESEARCH OBJECTIVE

Based on the literature review, introduction and research gaps, the current study attempts to assess and analyze Microfinance Institutions' (MFIs') effectiveness in India in a methodical manner. The following are the particular goals:

- 1) To study Overall Technical efficiency of selected MFIs.
- 2) To examine Technical Efficiency of selected MFIs.
- 3) To study Scale efficiency of selected MFIs.

DATA SOURCE AND SAMPLE

The study considers 30 major MFIs in India, including NBFC-MFIs, NGO-MFIs, SHG-based institutions and cooperative models [Table 1](#).

Table 1

Table 1 Showing the Micro Finance Institutions in India			
“MFI	Type (Institutional Form)	Scale	Notable Features (Metrics)
Adhikar	NGO-MFI	Small	Focus on rural women SHGs, outreach-based
Annapurna	NBFC-MFI	Medium/Large	Diversified products, strong outreach
Arohan	NBFC-MFI	Medium/Large	Urban & semi-urban focus, OSS > 100%
Asirvad	NBFC-MFI (subsidiary of Manappuram Finance)	Large	High portfolio, strong capital backing
Asomi	NGO-MFI	Small	Regional focus in NE India
Bandhan	NBFC-MFI → Now Bank	Very Large	Commercialized, wide national coverage
BFIL (Bharat Financial Inclusion)	NBFC-MFI	Very Large	One of India’s largest MFIs
BWDA	NGO-MFI	Small	Tamil Nadu focused, SHG model
Cashpor	Section 25 Company (Not-for-profit)	Medium	Pioneer in rural microfinance in UP & Bihar
Chaitanya	NBFC-MFI	Medium	Karnataka focused, group-lending
Equitas	NBFC-MFI → Small Finance Bank	Very Large	Commercialized, urban markets
Fusion	NBFC-MFI	Large	High growth, spread across states
IDF Financial	NBFC-MFI	Small/Medium	South India focus
Madura	NBFC-MFI	Medium	Rural-centric, SHG to JLG transition
Mahashakti	NBFC-MFI	Small/Medium	Odisha focus, women borrowers
Prayas	NGO-MFI	Small	Community-based lending
Sahara Utsarg	Cooperative Society / NGO-MFI	Small	Localized operations
Samasta	NBFC-MFI	Medium	Part of IIFL group, high outreach
Sanghamitra	NGO-MFI (Society)	Small/Medium	Karnataka-based, SHG & JLG model
Sarvodaya Nano	NBFC-MFI	Small/Medium	Odisha & Chhattisgarh, rural
Satin	NBFC-MFI	Large	Nationwide presence
SKDRDP	NGO / Trust	Large	SHG-bank linkage model, Karnataka
SMILE	NBFC-MFI	Medium	Tamil Nadu focused
SONATA	NBFC-MFI	Medium	North India, JLG model
Spandana	NBFC-MFI	Very Large	One of the biggest MFIsandhra Pradesh origin
Suryodaya	NBFC-MFI → Small Finance Bank	Large	Urban penetration, commercial
SV Credit Line	NBFC-MFI	Medium	PAN-India operations
Utkarsh	NBFC-MFI → Small Finance Bank	Large	Commercialized, strong outreach
Ujjivan	NBFC-MFI → Small Finance Bank	Very Large	High outreach, urban-poor focus
Utrayan	NGO-MFI	Small	West Bengal focus”

Source: Literature Review

The sample includes both large institutions (e.g., Bandhan, BFIL, Ujjivan) and regionally-focused MFIs (e.g., Sanghamitra, Asomi, Prayas), ensuring representation across institutional types and operational scales. Data is collected for the most recent 10 years

(depending on availability) to account for fluctuations due to regulatory and economic changes. Secondary data from annual reports of MFIs, MIX Market database, Sa-Dhan reports and RBI publications.

Research Variables

Following the **intermediation approach** [Sealey et al. \(1977\)](#), MFIs are modeled as intermediaries that use financial resources to provide credit and outreach services. Based on prior studies [Gutiérrez-Nieto et al. \(2007\)](#), [Hermes et al. \(2011\)](#), [Bhanot and Bapat \(2015\)](#), the variables are defined as follows:

Table 2

Table 2 Input and Output Variables Selection				
“Category	Variable	Description	Justification	References
Inputs	Cost per Borrower	Average operating and administrative cost incurred per client served	Reflects cost efficiency and resource utilization per beneficiary. A lower cost per borrower indicates better operational efficiency.	Bhanot and Bapat (2015) , Gutiérrez-Nieto et al. (2007)
	Total Assets	Sum of all assets including loan portfolio, cash and fixed assets	Represents the financial capacity and scale of operations of MFIs. Used as a proxy for input resources available for lending and outreach.	Hermes et al. (2011) , Haq et al. (2010)
	Operating Expenses	Total expenditure incurred in running operations (salaries, admin, logistics, etc.)	Key determinant of cost-efficiency. High expenses reduce ability to serve clients sustainably.	Louis et al. (2013) , Cull et al. (2007)
Outputs	Return on Assets (ROA)	Net income / Total assets	Measures financial sustainability and efficiency in generating profit from assets.	Quayes (2012) , Bassem (2008)
	Return on Equity (ROE)	Net income / Shareholder's equity	Reflects profitability and ability to generate returns for investors while balancing social goals.	Mersland and Strøm (2009) , Kar (2012)
	Average Loan Balance per Borrower	Total loan portfolio / Number of borrowers	Indicates outreach depth. Smaller loan sizes imply targeting poorer clients, larger sizes imply scaling.	Cull et al. (2007) , Bhanot and Bapat (2015)
	Number of Active Borrowers	Total ongoing clients served	Measures breadth of outreach, showing social performance and market penetration.	Hermes et al. (2011) , Schreiner (2002)

Source: Literature Review

DEA MODEL CONSTRUCTION

In alignment with the study's objectives, DEA has been employed as the primary analytical tool, using an output-oriented model. DEA operates through two core approaches: CRS and VRS. The CRS model, also identified as the CCR model (introduced by [Charnes et al. \(1978\)](#)), is used to assess OTE and TE under the assumption of constant scale. In contrast, the VRS model often referred to as the BCC model, developed by [Banker et al. \(1984\)](#), focuses on estimating PTE. The SE score helps determine whether a DMU, is operating at an optimal or suboptimal scale [Wang and Duan \(2023\)](#).

Mathematical Formulation

Let there be n DMUs, each using m inputs to yield s outputs. For the i -th DMU. The output-oriented CRS DEA model is expressed as:

$$\text{Maximize } z_{pq} = \frac{\sum_{i=1}^s u_{ip} y_{iq}}{\sum_{j=1}^n v_{jp} x_{jq}}$$

Where:

n no. of DMUs being evaluated

s no. of outputs
t no. of inputs
 u_{ip} weight attached to i-th output ($i=1, \dots, s$) for DMUp ($p=1, \dots, n$)
 v_{jp} weight attached to j-th input ($j=1, \dots, t$) for DMUp ($p=1, \dots, n$)
 y_{ip} value of i-th output ($i=1, \dots, s$) for DMUp ($p=1, \dots, n$)
 x_{jp} value of j-th input ($j=1, \dots, t$) for DMUp ($p=1, \dots, n$)
 z_{pq} relative efficiency of DMUq ($q=1, \dots, n$) when evaluated using the weights associated with DMUp ($p=1, \dots, n$)
For the VRS DEA model:

$$\text{Maximize } z_{pq} = \frac{\sum_{i=1}^s u_{ip} u_{0p} + u_{0p}}{\sum_{j=1}^t v_{jp} x_{jq}}$$

Where:

n No. of DMUs being evaluated
s No. of outputs
t No. of inputs
 u_{ip} Weight attached to the i-th output ($i=1, 2, \dots, s$) for DMUp
 v_{jp} Weight attached to the j-th input ($j=1, 2, \dots, t$) for DMUp
 y_{iq} Value of the i-th output for DMUq
 x_{jq} Value of the j-th input for DMUq
 u_{0p} A scalar that accounts for Variable Returns to Scale (VRS)
 z_{pq} Relative efficiency of DMU q using weights of DMUp
Scale Efficiency is then calculated as:

$$SE_q = \frac{\theta_q^{CRS}}{\theta_q^{VRS}}$$

Where:

SE_q Scale Efficiency of DMU q
 θ_q^{CRS} Technical Efficiency under CRS (Output-Oriented CCR Model) for DMU q
 θ_q^{VRS} Technical Efficiency under VRS (Output-Oriented BCC Model) for DMU q

Interpretation and RTS Classification

DMUs with TE = 1 under both CRS and VRS are fully efficient. If TE under VRS = 1 but under CRS < 1, the DMU is purely technically efficient but scale inefficient. Based on returns to scale:

- **CRS:** Optimum scale
- **IRS:** Underutilized resources
- **DRS:** Oversized operations

ANALYTICAL TOOLS

Tim Coelli's DEAP program, version 2.1, has been used to calculate the efficiency scores of DMUs.

DATA ANALYSIS AND INTERPRETATION

Table 3

Table 3 Efficiency Score of MFIs				
DMU	OTE	PTE	SE	RTS
Adhikar	1	1	1	
Annapurna	0.912	0.987	0.924	Drs
Arohan	0.394	0.646	0.611	Drs
Asirvad	0.543	0.733	0.741	Drs
Asomi	0.377	0.527	0.716	Drs
Bandhan	1	1	1	-
BFIL	1	1	1	-
BWDA	0.307	0.354	0.867	Drs
Cashpor	0.764	1	0.764	Drs
Chaitanya	1	1	1	-
Equitas	0.51	0.697	0.731	Drs
Fusion	0.802	0.887	0.904	Drs
IDF Financial	1	1	1	-
Madura	0.548	0.916	0.599	Drs
Mahashakti	0.487	0.698	0.699	Drs
Prayas	1	1	1	-
Sahara utsarg	0.329	0.589	0.558	Drs
Samasta	0.696	0.812	0.857	Drs
Sangmithra	1	1	1	-
Sarvodya nano	1	1	1	-
Satin	0.804	1	0.804	Drs
SKDRDP	1	1	1	-
SMILE	0.513	0.545	0.941	Drs
SONATA	0.749	1	0.749	Drs
Spandana	0.628	0.949	0.661	Drs
Suryodya	0.609	0.855	0.712	Drs
SV credit line	1	1	1	-
Utkarsh	0.59	0.814	0.724	Drs
Ujjivan	0.681	1	0.681	Drs
Utrayan	0.3	0.502	0.597	Drs

Source: Max DEA Software Output

Table 4

Table 4 Efficiency Classification of DMUs				
Category	No. of Efficient DMUs	Percentage (%)	DMUs	Key Characteristics
Fully Efficient (OTE = 1, PTE = 1, SE = 1)	10	33.3	Adhikar, Bandhan, BFIL, Chaitanya, IDF Financial, Prayas, Sangmithra, Sarvodya Nano, SKDRDP, SV Credit Line	Operate at most productive scale, benchmarks for others

PTE Efficient but Scale Inefficient (PTE = 1, OTE < 1, SE < 1)	4	13.3	Cashpor, Satin, SONATA, Ujjivan	Good resource utilization, but oversized (DRS)
Both Technically and Scale Inefficient (OTE < 1, PTE < 1, SE < 1)	16	53.3	Arohan, Asirvad, Asomi, BWDA, Sahara Utsarg, Utrayan, Equitas, Fusion, Madura, Mahashakti, Samasta, Spandana, Suryodya, Utkarsh, SMILE, Annapurna	Weak input-output conversion, poor scale management, mostly DRS

Source: Author's own Calculations

Figure 1

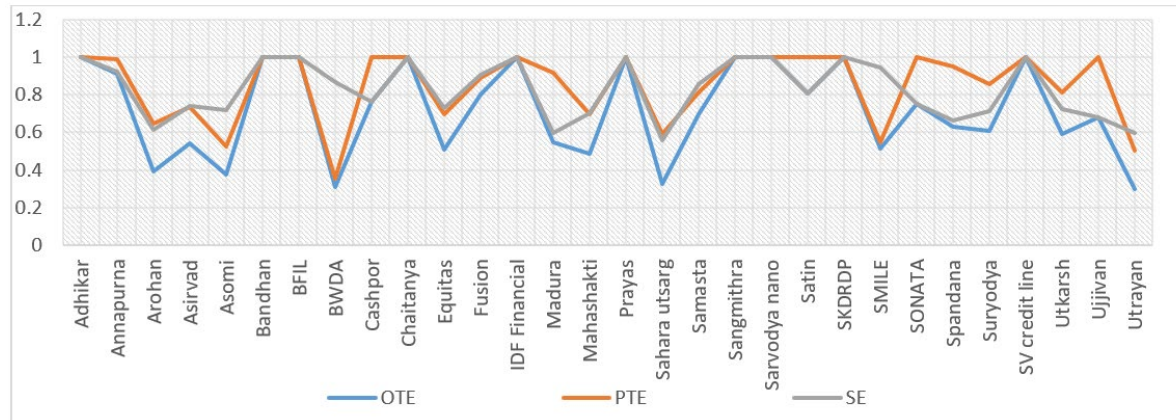


Figure 1 Comparison of OTE, PTE and SE across DMUs

Source: Excel Software Output

The DEA analysis of 30 DMUs reveals significant heterogeneity in efficiency performance across institutions. Out of the total, 10 DMUs (33.3%), Adhikar, Bandhan, BFIL, Chaitanya, IDF Financial, Prayas, Sangmithra, Sarvodya Nano, SKDRDP and SV Credit Line, achieved full efficiency with OTE, PTE and SE equal to 1. These organizations operate at the most productive scale size under constant returns to scale (CRS), demonstrating strong managerial practices as well as optimal utilization of resources. They serve as benchmark institutions for others in the sector.

A second category consists of 4 DMUs (13.3%) Cashpor, Satin, SONATA and Ujjivan that are managerially efficient but scale inefficient. Their PTE scores equal 1, reflecting robust input-output conversion and sound managerial capability; however, their OTE and SE scores are below unity, coupled with decreasing returns to scale (DRS). This suggests that although their operations are well-managed, their expansion has gone beyond the optimal scale, creating inefficiency due to oversized operations.

The largest group, comprising 16 DMUs (53.3%), including Arohan, Asirvad, Asomi, BWDA, Sahara Utsarg, Utrayan, Equitas, Fusion, Madura, Mahashakti, Samasta, Spandana, Suryodya, Utkarsh, SMILE and Annapurna, demonstrates both technical and scale inefficiencies. Their relatively low OTE and PTE scores indicate weaknesses in managerial decision-making and poor utilization of resources, while low SE values confirm that they are not operating at the right scale. These findings highlight structural and operational inefficiencies that must be addressed through both organizational restructuring and improved resource allocation.

The bar graph comparison of OTE, PTE and SE further strengthens these insights. Fully efficient DMUs appear with all three efficiency scores at the maximum level of 1, while the partially efficient group shows strong PTE but weaker OTE and SE, reflecting scale-related issues. The weakest performers, such as Arohan, Asirvad, Asomi, BWDA, Sahara Utsarg and Utrayan, show consistently low values across all three measures, indicating compounded inefficiencies. This graphical representation highlights not only the performance gaps but also the sources of inefficiency across DMUs.

The efficiency classification distribution, as depicted in the pie chart, underscores that only one-third of DMUs are operating at full efficiency, while a majority (two-thirds) face varying degrees of inefficiency. Importantly, most of the inefficient DMUs operate under decreasing returns to scale, suggesting that expansion strategies have surpassed the optimal scale size and reduced overall productivity. This pattern indicates a systemic issue where growth in size does not necessarily translate into proportional efficiency gains.

Taken together, these findings suggest that while a minority of DMUs serve as sectoral leaders and benchmarks, the majority require strategic interventions. These may include downsizing or restructuring to correct scale inefficiencies, capacity building to

improve managerial efficiency and benchmarking practices from fully efficient peers. From a policy perspective, the dominance of DRS among inefficient DMUs signals the need for growth strategies that balance scale expansion with efficiency optimization, ensuring sustainable performance in the long run.

DISCUSSION AND CONCLUSION

Using Data Envelopment Analysis, study assessed effectiveness of 30 DMUs with an emphasis on returns to scale (RTS), scale efficiency (SE), pure technical efficiency (PTE) and overall technical efficiency (OTE). The results show that a substantial majority of the DMUs (66.7%) are inefficient to varied degrees, while just one-third (33.3%) are fully operational. In the inefficient group, a significant portion has management skill (PTE = 1) but experiences scale-related inefficiencies, whereas over half of DMUs experience both technical and scale inefficiencies. Crucially, declining returns to scale (DRS) indicate that many institutions have grown larger than required one which has led to a decline in output.

The findings show a clear disparity in sector's efficiency performance. The discovery of ten totally effective DMUs is consistent with other research that frequently identifies a small number of industry leaders in best practices (Gutierrez-Nieto et al., 2009; Bassem (2008)). The most productive operational scale has been represented by these DMUs, which can be used as standards by other academic institutions.

A significant structural problem is reflected in the second group of DMUs that are managerially effective but scale-inefficient. These institutions' OTE and SE ratings indicate that efficiency losses result from scale development beyond ideal size, despite good input-output conversion (PTE = 1). This result is consistent with Hermes et al. (2011) and Widiarto and Emrouznejad (2015), who have pointed out that when expansion strategies prioritize outreach without making enough changes to operational design, MFIs frequently see a decline in efficiency.

The greatest cluster of 16 DMUs with dual inefficiencies suggests systemic issues. These DMUs have poor managerial practices (low PTE) and suboptimal scale (low SE). Similar tendencies have been found by Hudon and Traca (2011) and Bassem (2014), who attribute inefficiency to a combination of poor governance, insufficient resource allocation and an improper size of operation. Efficiency gains for these organizations necessitate both capacity-building programs to increase managerial abilities and restructuring measures to realign operations with the most productive scale.

There are significant policy ramifications to inefficient DMUs' predominance of diminishing returns to scale (DRS). Cooper et al. (2011) and Ray (2004) contend that scale misalignment frequently causes efficiency losses more so than technological inefficiencies. In order to improve efficiency, many DMUs may need to reevaluate their expansion plans and look into regional specialization, shrinking, or restructuring. While regulatory bodies may need to create interventions that support balanced growth strategies, making sure that institutions expand without sacrificing operational efficiency, managers may find that benchmarking practices from fully efficient DMUs could direct process improvements.

The findings have several policy-related ramifications. First, other DMUs can use efficient DMUs as a benchmark. Knowledge-sharing systems that allow these organizations to share best practices in governance, scale management and resource usage should be supported by policymakers and sector regulators. Second, existence of managerially effective but scale-inefficient DMUs emphasizes the necessity of strategic restructuring, which may include branch network simplification, operational resizing, or adoption of region-specific strategies to maximize scale efficiency. Third, significance of capacity-building activities is shown by the huge number of DMUs displaying both technical and scale inefficiencies. Adoption of digital tools, enhanced monitoring systems and focused management team training programs could improve operational performance and resource allocation.

On a larger scale, prevalence of DRS among DMUs indicates the necessity of frameworks for policies that support balanced growth. Outreach requires growth, but unbridled development can reduce effectiveness. Therefore, regulatory bodies should provide performance-based incentives that reward efficiency and sustainability in addition to financial development and outreach. Periodic DEA-based assessments can also assist policymakers in tracking institutional performance, spotting inefficiencies and making sure the industry develops in a way that is both competitive and sustainable.

In conclusion, the majority of DMUs experience difficulties that call for remedial measures, even while a tiny percentage perform at their best. The industry may increase productivity, attain financial sustainability and have a bigger influence on its target communities by implementing benchmarking, restructuring and capacity-building strategies in addition to policy frameworks that support balanced and efficient growth.

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