PERFORMANCE EVALUATION FRAMEWORKS
IN THE CONTEXT OF INDIAN MICROFINANCE INSTITUTIONS

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Abstract: The paper conducts a detailed examination of the existing evaluative frameworks for microfinance institutions to gauge the differences and similarities. Efficiency evaluates how MFIs are meeting the performance standards considering time and budget constraints. Outreach evaluates the effectiveness of MFIs in reaching the beneficiaries. Relative efficiency scores were calculated using data envelopment analysis and outreach was measured in five different dimensions (pentagon model). Further, cluster analysis assisted in categorizing the MFIs into five value clusters. The study compares both outreach performance and relative efficiency scores employing ANOVA and correlation analysis. The study was conducted among the Indian context when the sector was hit by crisis during 2010. Paper brought out important insights about the sample. Indian MFIs were found to be more socially efficient, since the social dimension taken into consideration was number of female clients and majority of Indian MFIs has exclusive female focus. The correlation tests found that relative efficiency scores are positively related to depth (poor focus) and length (sustainability) outreach. The results showed that cluster analysis model basing outreach scores was more comprehensive and captured more information compared to the data envelopment model relative efficiency scores. The study is original in its approach in using cluster analysis for outreach performance and in the objective of comparing the two different models.

Keywords: microfinance, performance evaluation, cluster analysis, data envelopment analysis, efficiency, India.

JEL: B23, C38, C52, L21, M14.

1   Introduction

The performance has traditionally been evaluated in the context of microfinance either by way of efficiency or outreach. Efficiency gauges how Microfinance institutions (MFIs) are attaining the performance outcomes given the level of resources. Time and budget constraints of MFIs calls for performance evaluation based on efficiency measures. Outreach is deliberated in several frameworks ranging from single to multi-dimensional contexts. Outreach evaluates the effectiveness of MFIs in reaching the beneficiaries. The present study examines the Indian MFIs for its efficiency and outreach performance and investigates how these performance scores are related. The two performance frameworks – data envelopment analysis model (that measured relative efficiency scores) and outreach model (which assessed the outreach performance) – are critically analyzed in the paper.

(MFIs) crossed the hurdles of unsuccessful developmental programs in India by leveraging on innovative lending mechanisms aimed at cost recovery, financial self-sufficiency and wide outreach (Sriram, 2012, pp.136-137). MFIs bring poor population of the country to the mainstream society by providing specialized financial services that are in the affordable limits of the poorest. Evaluation of MFIs has received extensive and deserving attention from the scholars and practitioners, considering the social implication of microfinance. At all times, however, performance evaluation of MFIs invites a bundle of complexity with respect to the dimensions employed in the framework and the methodology used. Performance evaluation, however, may be incomplete when MFIs are viewed as a financial service provider and not as social enterprises. Scholars and

practitioners have long been involved in conceptualizing a framework that comprehensively assesses these dual aspects in the performance of MFIs. Hence, both efficiency and outreach performance are assessed taking both financial and social dimensions into consideration.

2   Literature review

For the purpose of our study, the performance literature in the context of microfinance is deliberated under two heads: studies on efficiency measures and on outreach indicators.

2.1   Studies on efficiency measures

Efficiency ratios explain whether an MFI is serving as many clients as possible while keeping its costs under control. Cost per client, operating expense ratio are the efficiency ratios, which assesses the cost efficiency. Gross loan portfolio to total assets is another efficiency indicator, which measures how much of assets an MFI allocates to loans (Louis, et al., 2013).

One important determinant of efficiency is the macro-economic factor (Gonzalez-Vega, 2003). In a study, where the efficiency of MFIs are compared among US and Iraq, the researcher found substantial differences in the operations ranging from how each approaches transaction costs, innovation to differences in their markets and presence of government support. Second important determinant as per the literature is the lending model adopted by the MFIs. Group lending model is effective in overcoming increased transaction costs (Bhatt and Tang, 1998). Third element consists of institutional factors such as age (Herms, et al., 2009), legal status (Gonzalez, 2007) and so on. A study on 137 MFIs from Eastern Europe and Central Asia region argues that over the years, MFIs have become cost efficient subject to the conditions on MFI's legal status and source of funding (Caudill, et al., 2009). One developing area of research in microfinance is the introduction of information and communication technology (ICT) and its positive consequences. The use of ICT in microfinance is largely focused on the area of efficiency enhancement by reducing the transaction

costs incurred in borrowing, lending, accounting, reporting, control and so on (De` and Ratan, 2009; Ratan, et al., 2010). The positive effect of ICT on cost efficiency (Bhaskar and Subramaniam, 2011) and customer satisfaction (Islam, et al., 2013) are proved.

The analysis of efficiency has long been a topic of interest, and as a result, the focus has shifted from attempts to characterize the efficiency in terms of simple ratios to a perspective of multidimensional systems. A few studies focus on the aspect of efficiency and use data envelopment analysis (DEA) to calculate efficiency scores. DEA is a non-parametric technique (Gutiérrez-Nieto, et al., 2007; 2009), which employs multi-dimensions and rank MFIs according to the relative efficiency scores (Ngheim, et al., 2006; Qayyum and Ahmad, 2006; Sufian, 2006; Bassem, 2008; Haq, et al., 2009). The technique is used extensively and has proved to be appropriate for efficiency analysis. Efficiency analysis studies differ in terms of the dimensions they have used to assess efficiency. The model of the study determined the dimensions. The term model refers to different philosophical approaches used to understand the broad objectives of the given Decision Making Units (DMUs). Model defines specification, which refers to particular set of inputs and outputs that enter into the model (Gutiérrez-Nieto, et al., 2007). Literature on banking efficiency reports two prevalent models: production and intermediation. Production approach treats DMU as a unit, which produces outputs from the inputs such as labor, physical inputs and money (Nghiem, et al., 2006). Another approach looks at DMU as an intermediation unit, where the firm aims at making profit by being intermediaries in a series of financial transactions (Gutiérrez-Nieto, et al., 2007). Sedzro and Keita (2009) assessed MFI efficiency based on both production and intermediation approach. Efficiency literatures in other contexts have taken an approach called market efficiency, which focuses entirely on a firm's efficiency in meeting the needs of its customers (Gaski, 1986; Kamakura, et al., 1988; Athanassopoulos, 1995, 1997, 1998; Athanassopoulos and Thanassoulis, 1995).

Social efficiency is a new concept put forward by Gutiérrez-Nieto, et al. (2009), which highlighted

the achievement of social aims by MFIs and will be measuring MFIs' impact through the number of women clients and poverty index. Poverty index combines average loan size, number of clients and average wealth of the country. The study found positive correlation between social and financial efficiency. Socially efficient MFIs were a subset of financially efficient MFIs.

2.2 Studies on outreach performance

Outreach performance is a commonly used performance indicator for performance evaluation. Outreach is defined as the extent to which MFIs are wide and deep in their client base. Breadth outreach indicates the width that is the size of the client base. Depth outreach indicates the nature of clients, which is assessed by the poverty level, place of residence (rural or urban) and gender (Schreiner, 2002). Schreiner's (2002) framework presents a comprehensive picture of all dimensions of outreach in addition to depth and breadth. These indicators are not exactly measuring social impact, rather, they are an indication of MFIs creating a favorable situation for the impact to occur. Concept of outreach (Schreiner, 2002) consolidates all performance indicators in six different dimensions such as breadth (size of client base), depth (poverty level of clients), cost to clients (costs incurred to access the service), worth (perceived value to microfinance products), scope (diversity of products) and length (sustainable and timely provision of service). Researchers have focused more on breadth, depth and length dimension. Studies on cost to clients, worth and scope are relatively low.

In the cross-country sample, Schreiner's outreach framework when tested to compare the performance with respect to ownership structure resulted in an insignificant relationship between ownership structure and performance (Mersland and Strøm, 2008). However, they ignored worth to clients due to the subjective nature of the concept. A study, which exclusively focused on the concept of scope outreach, indicates the influence of socio-cultural factors. Microfinance provides a variety of financial services along with the credit, such as, insurance (Werner, 2009) and savings (Tavanti, 2013; Berg, 2010) for the beneficiaries. The socio-cultural environment of the MFI is significant as it determines the demand for particular products and the impact of various microfinance programs to the beneficiaries' life. There are studies that claim that Muslim populous countries do not consume micro insurance. In those locations, usually, MFIs focus on lending services (Kwon, 2010, Karim, et al, 2010; Khachatryan, et al., 2014). Rise in women clients urge MFIs to stick to lending business and in low probability, insurance business. However, it lowers the probability that MFIs offer savings services (Kwon, 2010). Apart from the product choice of the clients, the effectiveness of microfinance services depends on the contextual and cultural factors. Jones, et al. (2008) examined the impact of different methods of interventions on women and concluded that the choice of intervention method depends on contextual factors and women's situation (illiteracy, lack of technical and business skills, culture of the society).

Client retention is one proxy of worth to client and the literature has not taken this indicator for performance analysis because of non-availability of the complete data. There are studies that focus on default rates and portfolio quality (Kyereboah, 2007; Ejigu, 2009), but may not exactly be an indication of clients' perception of worth to the products of microfinance. Macro-economic (economic growth of the country) and institutional specific factors such as lending methods (Ross and Savanti, 2005; Abbink, et al., 2006; Ahlin, et al., 2011) are keys to default rates.

Default rates in microfinance have various influential factors. One such factor is the lending methodology adopted by MFIs. Ross and Savanti (2005) in their exploratory study, investigated on how joint liability works in practice and how it facilitates monitoring the activities, member behaviors and how it helps in ensuring repayment. The social capital formation because of group lending, also contributes in the repayment rates of SHGs (Field and Pande, 2008; Feigenberg, et al., 2013). ICT has positive effects on customer satisfaction (Islam, et al., 2013). Customer satisfaction essentially captures the element of worth to client (Schreiner, 2002).

A comprehensive analysis of Ethiopian MFIs with respect to asset size claimed that large sized MFIs

were better off in cost to client (Ejigu, 2009). The interest rates of large sized MFIs were lower than mid-sized and small sized MFIs. On the other hand, the paper reported that small sized MFIs are good in deeper outreach as the percentage of women are more in their client lists.

The lending method adopted by MFI influences depth outreach. Individual lending model necessitates the clients to meet the collateral requirements, although, not tough. Individual lending model leaves the loan inaccessible to the poor. Mersland and Strøm (2010) stated that MFIs, which are adopting individual lending model, seems to drift from the social mission of reaching the poor. Regulatory involvement might result in mission drift because of increased attention towards meeting the capital adequacy requirements (Cull, et al., 2011). Asset size (Hartarska and Nadolnyak, 2007) and age (Mersland and Strøm, 2010) is positive with respect to breadth outreach.

Very few studies support a positive relationship with depth outreach. Studies have come up with mixed results with respect to the impact of legal status on breadth (Gutiérrez-Nieto, et al., 2009; Bassem, 2008). Public ownership, with an exception of Bank Rakyat Indonesia, has failed because of misguided policies, political interference and corruption (USAID, 2005). For non-profit NGOs, their commitment to the mission is the major driver for performance but the chances of failed governance are immense, specifically when the CEO is the founder as well as the chair of the board. They may not have proper oversight as evidenced by the collapse of Corposol in Columbia (Galema, et al., 2012). Although, primarily motivated by profit, the mix of capital determines the performance of for-profit corporate structure. In credit union, the problems might have arisen because of lack of regulation and supervision (Mersland and Strøm, 2009).

Comprehensive performance evaluation is not new in microfinance literature; however, it is not proven which framework captures the MFI performance effectively. This is where the scope of the present paper lies: to compare the frameworks of MFI performance and to put forward a superior model that facilitates the achievement of MFI's multi-faceted goals. The author, thus, carries out a DEA analysis and a cluster analysis model and explains how the performance framework differs in bringing out the information.

3   Methodology

3.1   Sample

The study makes use of MIX market database on Indian MFIs for the year 2010. The year 2010 was selected in order to analyze the crisis scenario in India. The Indian microfinance market exhibited a critical stage during 2010 despite the presence of market based self-regulation by MFIs from 2006. The performance of MFIs during the crisis and in subsequent years would help in identifying the weakness and the scope for improvement. The sample represents 75 MFIs out of the 129 Indian MFIs reported, subject to the condition that the data is complete and none of the values is zero for the selected variables.

Table 1. Legal status and age of the sample (*Source:* MIX Market data, 2010)

	NBFIs	NGOs	Others
Legal status	Number of MFIs		
	45	24	7
Age	Mature (Above 8 years of experience)	Young (5–8 years of experience)	New (Less than 4 years of experience)
	Number of MFIs		
	43	16	17

The selected 75 Indian MFIs vary in their legal status; 45 NBFIs, 24 NGOs and 7 MFIs are either bank or credit co-operatives (Table 1). Above 50% of the sample (43 MFIs) have more than 8 years of operational experience. Sixteen MFIs have 5–8 years of experience and seventeen MFIs have less than 4 years of field experience.

3.2   Method

The performance of 75 Indian MFIs for the year 2010 was evaluated employing two performance evaluation models. The data envelopment analysis model calculated relative efficiency scores and cluster analysis model assessed the outreach performance of 75 Indian MFIs. DEA is a decision making tool applied to derive relative efficiency scores of a comparable set of decision-making MFIs. Using DEA is advantageous because of two major reasons. One, it facilitates the inclusion of multiple inputs and outputs. Second, only limited assumptions are required regarding the relationship between inputs and outputs (Drake and Simper, 2000). Application of DEA is suitable in non-profit organizations when the production function (the process of transformation of inputs to outputs) is unknown or easily specified (Sherman and Gold, 1985). DEA facilitates comparison of an organization, otherwise called as Decision Making Unit (DMU), relative to a set of best practice observations to come up with a relative efficiency score (De Koster, et al., 2009).

Cluster analysis brings out the pattern of data by grouping the MFIs based on certain criteria. The pattern of the data reveals information, such as, the influence of depth outreach on length outreach or impact of gender outreach on worth outreach and so on. The study used K-means cluster analysis, a non-hierarchical method. K-means algorithm work by portioning the data into user specified number of clusters and then iteratively reassigning observations to clusters until some numerical criterion is met. The numerical criterion specifies a goal to minimizing the distance of observations from one another in a cluster and maximizing the distance between the clusters (Hair, et al., 2006). K-means cluster analysis is advantageous as it permits the researcher to specify the number of clusters a priori. K-means clustering algorithm assigns MFIs to clusters based on the smallest amount of distance between cluster means. The method classifies MFIs based on performance evaluations and aids to understand the pattern of the institution's strategic orientations.

4   Results and findings

4.1   DEA relative efficiency model

DEA examined the relative social and financial efficiency scores of MFIs. Social efficiency is assessed using two outputs – number of poor and women clients. The number of poor clients and women clients represents the social outputs as they reflect the depth indicators of MFIs. Depth is the value that society attaches to the net gain of a given client (Schreiner, 2002). If a society has preference for the poor, then poverty is a good proxy of depth. For example, society prefers that a street child or a widow gets a social benefit much more than a wealthy person. Direct measure of depth through income and wealth is difficult. Hence, indirect measures of depth are the loan size (smaller the loan, poorer the client) and the percentage of women clients as Woller (2006) stated – poverty is disproportionately concentrated in women. In India, Government has come up with various welfare schemes for women such as *Rashtriya Mahila Kosh* (providing lower income women with access to loans to begin small businesses) and *Priyadarshini* (offering access through self-help groups to women) to improve their standard of living.

Financial efficiency is assessed employing two financial outputs: financial revenue and gross loan portfolio. Gross loan portfolio, that indicates the total loan outstanding of the MFI and revenue generation, which is generated from the loan portfolio constitute financial outputs. Inputs are same in both cases: asset size of MFIs, personnel employed and costs per borrower (Berger and Humphrey, 1997).

The analysis is run under seven input-output combinations; to measure over-all relative efficiency (model consisting of all four outputs and three inputs), relative financial efficiency (two financial outputs and three inputs), relative social efficiency (two social outputs and three inputs), relative efficiency in loan portfolio (loan portfolio and three inputs), relative efficiency in revenue generation

(financial revenue and three inputs), relative efficiency in the focus of poor (poor clients and three inputs) and relative efficiency in supporting women (women clients and three inputs).
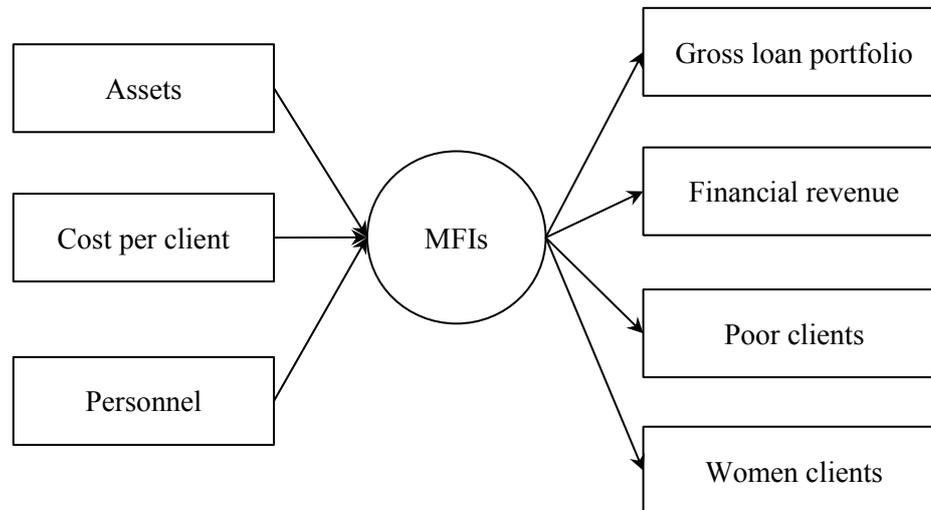

Figure 1. DEA relative efficiency model (*Source:* Gutiérrez-Nieto, et al., 2009)

The relative efficiency scores of Indian MFIs range from 0.37 to 1.00 (Table 2). Around 75% of MFIs holds a relative efficiency score above 0.76. Indian MFIs have an average relative efficiency score of 0.83. The average relative efficiency of Indian MFIs in supporting the poorest is just 0.62. Initiatives of MFIs in supporting women are around 0.69. Relative efficiency with respect to loan portfolio is comparatively better at 0.77.

However, the relative efficiency in generating revenue given the level of inputs is very low, which is 0.09. The average relative efficiency score of financial revenue for a cross-country sample was 14.8 (Gutiérrez-Nieto, et al., 2009), which is higher than the mean score for the present sample. Around 75% of the sample holds a relative efficiency score of 0.08 for financial revenue.

Table 2. Categories of MFIs based on relative efficiency scores
(*Source:* MIX Market data, 2010)

	Over-all efficiency score	Social efficiency	Financial efficiency	Social		Financial	
				Women	Poor	Loan portfolio	Financial revenue
Minimum	0.38	0.38	0.37	0.02	0.36	0.37	0.00
25 Percentile	0.76	0.74	0.70	0.57	0.51	0.70	0.01
50 Percentile	0.84	0.84	0.77	0.71	0.60	0.77	0.02
75 Percentile	0.89	0.89	0.81	0.85	0.72	0.81	0.08
Mean	0.83	0.82	0.77	0.69	0.62	0.77	0.09

The DEA results indicate that nine MFIs are 100% efficient on an over-all evaluation (Table 3). These nine MFIs maintained their 100% relative efficiency score when social outputs alone are considered. Three of the MFIs lost their 100% relative efficiency score when only financial outputs were evaluated.

Table 3. Relative efficiency scores of nine MFIs (*Source:* MIX Market data, 2010)

DMUs	Social	Financial	Women	Poor	Loan portfolio	Financial revenue
AML	1.00	0.99	0.75	1.00	0.99	0.36
Bandhan	1.00	0.94	1.00	0.92	0.94	0.89
Grama Vidiyal	1.00	0.91	1.00	0.71	0.91	0.41
Pustikar	1.00	1.00	0.02	1.00	1.00	0.00
Sanghamithra	1.00	1.00	1.00	0.81	1.00	0.03
SEIL	1.00	1.00	0.07	1.00	1.00	0.01
SHARE	1.00	1.00	1.00	1.00	1.00	0.76
Spandana	1.00	1.00	1.00	1.00	1.00	1.00
WSE	1.00	1.00	1.00	0.54	1.00	0.00

Financially efficient MFIs are thus a subset of socially efficient MFIs in the Indian context, contrary to previous results (Gutiérrez-Nieto, et al., 2009), where socially efficient MFIs were the subset of financially efficient MFIs. One explanation could be the nature of the sample. In other words, not all socially efficient MFIs are financially efficient but all financially efficient MFIs are socially efficient. Gutiérrez-Nieto, et al. (2009), studied social and financial efficiency employing same variables among MFIs from various countries (2003 data) and found that financial efficiency is a prerequisite for social efficiency. The present study took Indian sample for the year 2010 and identifies that MFIs can be socially efficient even when they are not financially efficient. This could be due to the presence of subsidies and grants given to Indian MFIs under several schemes. National Bank for Agriculture and Rural Development (NABARD) manages and administers Microfinance Development and Equity Fund (MFDEF) to facilitate and support the orderly growth of the sector through diverse modalities for enlarging the flow of financial services to the poor, with consistent sustainability particularly for women and vulnerable sections of society. The fund provides capital support to various types of MFIs to enable them to leverage commercial and other funds from banks and also to start-up MFIs with a good track record of undertaking microfinance activities be-

tween 6 months to 2 years. NABARD also provides refinance support to banks to the extent of 100% of the banks loans disbursed to SHGs (State of the sector report, 2013). In addition, the year 2010 is marked as a critical stage for the microfinance industry as MFIs had repayment issues because of the exorbitant interest rates charged to the clients.

4.2 Relationship between social and financial efficiency

Correlation analysis is used to test the relationship between relative efficiency scores under seven specifications (Table 4). The results reflect significant positive relationship among relative social efficiency and financial efficiency (0.937**). Relative efficiency of MFIs in reaching women (0.46**) and in poor focus (0.68**) is positively related to financial efficiency.

MFIs attain relative social efficiency either through focusing on women or poor clients. The relative efficiency in reaching women is having a negative insignificant relationship with respect to reaching poor clients. If MFIs are efficient in loan portfolio, it assists MFIs to attain efficiency in financial revenue as is evidenced by a positive significant value (0.453**) (Table 4). A scatter plot depicts the relationship between social and financial efficiency (Fig. 2).

Table 4. Correlations among efficiency indicators (*Source:* MIX Market data, 2010)

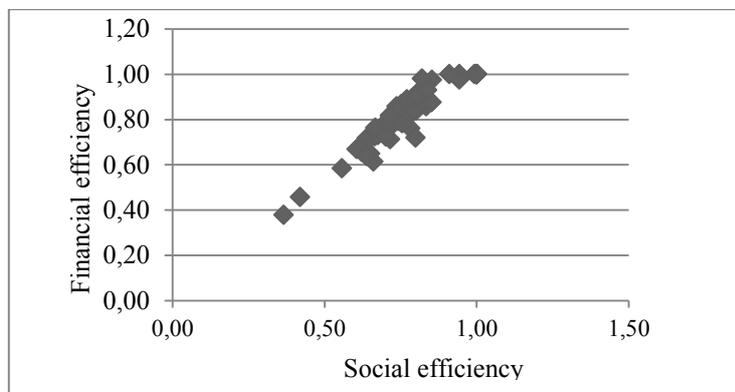|	Financial efficiency	Social efficiency	Loan portfolio	Financial revenue	Women	Poor
Financial efficiency	1					
Social efficiency	0.937**	1				
Loan portfolio	NA	0.937**	1			
Financial revenue	NA	0.385**	0.453**	1		
Women	0.459**	NA	0.459**	0.379**	1	
Poor	0.678**	NA	0.678**	0.490**	-0.147	1
Note: NA: Not applicable; ***$p < 0.01$ level, **$p < 0.05$ level						

Figure 2. Relationship between social efficiency and financial efficiency
(*Source:* MIX Market data, 2010)

The scatter plot identifies very few MFIs that are equally inefficient in social and financial scores. Majority of Indian MFIs are high on relative social and financial efficiency, and hence, locates in the upper right corner of the scatter plot.

MFIs achieve relative social efficiency either by focus on poor or women. The scatter plot depicts the relationship of MFIs reaching poor and women. The values are present in the top right corner of the graph, which implies MFIs are high on both reaching women and poor (Fig. 3).
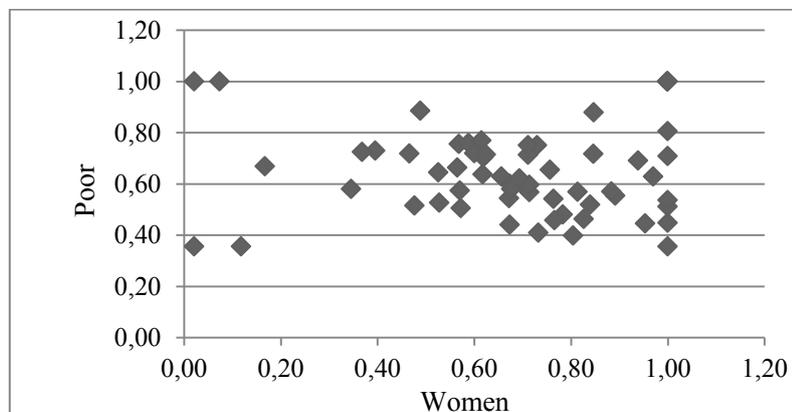

Figure 3. Relative efficiency in MFIs' focus on poor versus focus on women
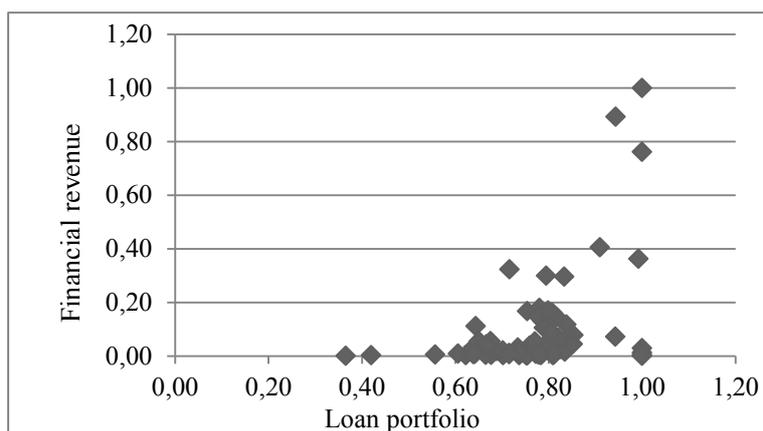(*Source:* MIX Market data, 2010)

Figure 4. Relative efficiency of MFIs in loan portfolio and financial revenue
(*Source:* MIX Market data, 2010)

The scatterplot depicting the relationship between financial revenue efficiency and loan portfolio reflects the left skewness because approximately 75% of the sample holds very low relative efficiency score in financial revenue. However, it is having a positive relationship with the relative efficiency in loan portfolio. Share, Spandana and Bandhan are the three MFIs which are high on relative financial revenue efficiency compared to the whole sample (Fig. 4).

4.3   Cluster analysis model

The paper further evaluates the outreach performance of the 75 Indian MFIs. Outreach is defined as the extent to which MFIs reach the poor (Hartarska, 2005). Outreach to poor is the basic purpose of microfinance institutions (Christen, et al., 1995).

The present study however adapts the Schreiner's framework unique to India and ignores breadth outreach, represented by the number of active clients, because there is high correlation between breath outreach and depth outreach. Moreover, breadth outreach may not capture social performance since there are evidences of MFIs lending to wealthier clients as well (Imai and Arun, 2008).

Number of distinct products offered by MFIs is also avoided since innovative products offer is practiced by very few MFIs. The apexes of the cluster analysis model depict five dimensions of MFI performance, which considers both social and financial components (Fig. 5). The apex point 'depth outreach' indicates the number of poor clients served by the MFIs.

'Gender outreach' apex point represents the gender targets of the MFI. Lending to poor, rural and women clients are the various indicators of depth outreach (Schreiner, 2002; Hartarska and Nadolnyak, 2007; Mersland and Strøm, 2010).

Gender outreach is shown as a separate indicator of outreach owing to the relevance given to women clients in India. 'Cost to clients' apex point denotes the cost component of availing microfinance services. The yield on gross loan portfolio is a proxy for the interest rate paid by the poor to avail the services and constitutes the third apex of the model (Woller, 2005). 'Worth to clients' apex point reflects the value attached by the clients to the microfinance service.

The variable client retention rate captures the value of the services provided by the microfinance institutions (Mersland and Strøm, 2008). Clients stick to one MFI if the products are satisfactory for them. Loan loss rate is another possible proxy for measuring worth to client. Client retention is preferred as it gives more information than the loan loss rate.

The loan loss rate only reflects the number of loans lost by the institution but client retention rate highlights the loyalty of the clients to the MFI. The 'Length outreach' apex point indicates sustainability of the microfinance service. Only when MFIs meet their expenses with revenue, they are capable of continuous supply of services according to the demand. Dependence on grants and donations in order to meet MFIs' operating expenses does not ensure permanence. Hence, sustainable MFIs are necessary to ensure the long term and timely supply

of services. Thus, measuring sustainability status reflects the length dimension of MFI performance. Instead of return on assets or profit margin, opera-

tional self-sufficiency ratio measures sustainability, as profit is secondary for a double bottom line business (Sriram, 2012, pp.129-135).
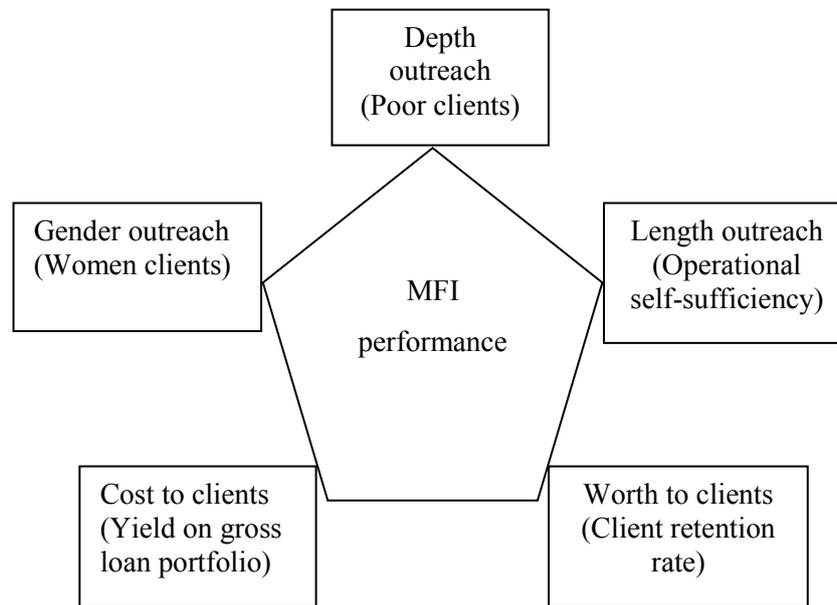

Figure 5. Cluster analysis model of outreach (*Source:* Balammal, et al., 2016)

Performance data based on five dimensions of outreach (Fig. 5) for the 75 Indian MFIs are grouped through cluster analysis gave rise to five clusters. Five groups of MFIs gave a better differentiation than two cluster classification. The ANOVA result

identify, depth outreach (341.56 (F value)) and women outreach (0.034 (F value)) as significantly different for the five MFI groups at five percent level (Table 5). Labelling is given to each cluster according to the dominant characteristics it represents.

Table 5. Cluster centers of cluster analysis variables (*Source:* MIX Market data, 2010)

Cluster Name	Perceived value	Social value	Financial value	Moderate mix	Low social value
No. of MFIs	14	9	13	18	21
Depth outreach**	9.38 (11966)	**11.35 (80982)**	*5.47 (239)*	8.12 (3388)	6.91 (998)
Women outreach**	0.91	0.82	0.97	**0.98**	**0.98**
Cost to client	*0.12*	*0.12*	**0.18**	0.15	0.13
Worth to client	**0.71**	*0.45*	0.64	0.68	0.56
Length outreach	1.16	**1.24**	1.15	1.10	*1.09*

Note: The figures in parenthesis represent the number of poor clients; the highest values are bolded and the lowest values are in italics.

The performance of perceived value cluster high-lights the importance they have given for clients' satisfaction of the microfinance program and the cluster constitutes 14 MFIs. Social value cluster (nine MFIs) has high averages on depth and length outreach. The dominant value in this cluster is serving a large number of poor clients and ensuring timely delivery of microfinance services, hence, achieving social value.

Financial value cluster (13 MFIs) gives importance to the financial mission of microfinance, thus, showing high average value of the costs to clients. The financial cluster is low on depth outreach and worth to clients. When MFIs are stressing the financial value alone, it affects the accessibility and affordability of the program. Moderate mix (18 MFIs) cluster performs neither high nor low in all the cluster analysis variables; however, they lag behind per-ceived value and social value cluster. Low social value clusters (21 MFIs) are low on depth outreach and length outreach compared to all other clusters. Although, they offer their products at affordable rates, their performance with respect to depth out-reach is comparatively lesser. They can reach out to more poor clients, given the cost structure and it might increase their length outreach.

The distinct characteristics of the clusters are brought out in Table 6. NBFIs dominate in all clus-ters except financial value cluster. MFIs exist in legal status other than NBFIs and NGOs holds sig-nificant percentage in perceived value cluster (21%). In all clusters, percentage of matured MFIs is on higher side. Regulated MFIs are more in number in social value cluster, followed by perceived value cluster and then moderate mix.

Table 6. Characteristics of value clusters (*Source:* MIX Market data, 2010)

	Perceived value	Social value	Financial value	Moderate mix	Low social value
NBFIs (P)	64.29	77.78	30.77	66.67	47.62
NGOs (P)	14.29	11.11	69.23	22.22	38.10
Others (P)	21.43	11.11	0	11.11	14.29
Mature (P) (>8 years)	78.57	77.78	38.46	55.56	42.86
Young (P) (5-8 years)	14.29	11.11	23.08	27.78	23.81
New (P) (< 5 years)	7.14	11.11	38.46	16.67	33.33
Regulated (P)	78.57	88.89	69.23	77.78	52.38
Note: P – indicates Proportion.					

The three performance values for Indian MFIs are thus found to be financial value, social value and perceived value. Financial value highlights the fi-nancial return incurred on the loan, which is the indi-cator of financial evaluation. Social value underlines serving large number of poor clients and sustainabil-ity of MFIs. The perceived value focuses on the cli-ent's satisfaction, an indicator of employee contribution to the MFI.

4.4   DEA model and cluster analysis model

The objective of DEA analysis was to understand how well MFIs are utilizing its resources to maxim-ize their social and financial outputs. Cluster analysis model captured MFI performance in a broader per-spective compared to the DEA model. The present section attempts to understand how the information gained through DEA model and cluster analysis model is different. To understand the similarities between DEA model and cluster analysis model, the relative efficiency scores are mapped with the mem-bership in the value clusters.

Table 7. Relative efficiency scores of low social value cluster (*Source:* MIX Market data, 2010)

MFIs	Efficiency score	Financial efficiency	Social efficiency
Adhikar	0.70	0.66	0.61
AMMACTS	0.46	0.42	0.46
Asomi	0.77	0.69	0.77
Chaitanya	0.66	0.62	0.66
Disha Microfinance	0.79	0.74	0.79
GOF	0.72	0.64	0.72
Hope	0.90	0.79	0.90
India's Capital	0.87	0.76	0.87
Indur MACS	0.84	0.79	0.84
KCIPL	0.67	0.64	0.65
Kotalipara	0.98	0.82	0.98
Mahashakti	0.82	0.75	0.82
NEED	0.86	0.83	0.86
PWMACS	0.58	0.56	0.58
Saija	0.67	0.64	0.64
Samasta	0.83	0.76	0.83
Sarala	0.89	0.77	0.89
SMSS	0.86	0.81	0.86
SU	0.76	0.67	0.76
SVSDF	0.83	0.78	0.83
WSE	1	1	1
Mean relative efficiency scores	0.78	0.72	0.78
Minimum	0.46	0.42	0.46
Maximum	1	1	1

The relative efficiency score of low social value cluster on an average is 0.78 and has the scope of improvement by 0.22 (Table 7). The relative financial efficiency of low social value cluster is lower than their relative social efficiency. AMMACTS obtained lowest relative efficiency scores and WSE holds 100% relative efficiency score in all specifications. WSE is the only relatively efficient MFI, which belonged to low social value cluster.

The average relative efficiency score of moderate mix is 0.81 and have the possibility of improvement by 0.19 (Table 8). The relative financial efficiency is 0.74, which is lesser than their relative social efficiency of 0.80. SEWA bank is the least efficient among the whole sample, belong to moderate mix. The cost structure of SEWA bank is higher than many of these MFIs. The cost per client is 60 US dollars, which is one of the highest in this category. Swadhaar, from the same cluster, also has high cost per client, which is 64 US dollars. However, the yield on gross loan portfolio for SEWA bank is 28.76% and it is 34.46% for Swadhaar. Given the cost structure, only if SEWA increases its yield on gross loan portfolio, it can improve its relative financial efficiency. SEWA bank has the scope of reaching more clients. Probably, serving more

women clients would help SEWA to increase its relative social efficiency score. Sanghamithra, although attained 100% relative efficiency, performed moderately in cluster analysis values. The asset size of Sanghamithra is of medium range (17 million US dollars). Considering the inputs they have, Sanghamithra attained 100% relative social and financial efficiency. When outputs alone are compared, they are of moderate value.

Table 8. Relative efficiency scores of moderate mix cluster (*Source:* MIX Market data, 2010)

MFIs	Efficiency scores	Financial efficiency	Social efficiency
Arohan	0.88	0.79	0.84
Asirvad	0.97	0.85	0.97
BSS	0.71	0.64	0.71
BWDA Finance	0.69	0.65	0.65
GU	0.79	0.74	0.79
IDF Financial Services	0.87	0.75	0.87
Mahasemam	0.74	0.67	0.74
Mimo Finance	0.83	0.76	0.83
RGVN	0.86	0.80	0.86
Sahara Utsarga	0.88	0.79	0.88
Sanghamithra	1	1	1
Sarvodaya Nano Finance	0.92	0.81	0.92
SEWA Bank	0.38	0.37	0.38
Sonata	0.73	0.68	0.73
Suryoday	0.81	0.73	0.81
SVCL	0.81	0.74	0.81
Swadhaar	0.72	0.70	0.72
VFS	0.90	0.80	0.90
Mean efficiency scores	0.81	0.74	0.80
Minimum	0.38	0.37	0.38
Maximum	1	1	1

The financial value cluster holds a mean relative efficiency score of 0.82 (Table 9). The relative social efficiency scores of these MFIs is 0.82, which is higher than their relative financial efficiency score of 0.74. The cost to clients is higher for availing the services of financial value cluster MFIs; however, they had managed to be efficient in social measures. CDOT holds low relative efficiency scores and Guardian has higher relative efficiency score in this category.

As the performance in cluster categories are improving, the relative efficiency scores are also increasing. Social value MFIs have high relative efficiency score compared to other clusters (Table 10).

Table 9. Relative efficiency scores of financial value cluster (*Source:* MIX Market data, 2010)

MFIs	Efficiency score	Financial efficiency	Social efficiency
Ajiwika	0.82	0.72	0.82
BJS	0.89	0.81	0.89
BWDC	0.87	0.77	0.87
CCFID	0.76	0.68	0.74
CDOT	0.73	0.67	0.73
GLOW	0.84	0.75	0.84
GUARDIAN	0.91	0.81	0.91
NBJK	0.79	0.78	0.76
NCS	0.75	0.70	0.75
RISE	0.86	0.74	0.86
Sanchetna	0.79	0.75	0.78
UFSPL	0.84	0.74	0.84
VFPL	0.81	0.72	0.81
Mean efficiency scores	0.82	0.74	0.82
Minimum	0.73	0.67	0.73
Maximum	0.91	0.81	0.91

Table 10. Relative efficiency scores of social value cluster (*Source:* MIX Market data, 2010)

MFIs	Efficiency scores	Financial efficiency	Social efficiency
AML	1	0.99	1
Bandhan	1	0.94	1
BASIX	0.72	0.72	0.71
Equitas	0.94	0.83	0.94
SEIL	1	1	1
SHARE	1	1	1
SKDRDP	0.80	0.80	0.72
Spandana	1	1	1
Ujjivan	0.84	0.79	0.84
Mean efficiency scores	0.92	0.90	0.91
Minimum	0.72	0.72	0.71
Maximum	1	1	1

Among the nine social value MFIs, three are 100% relatively efficient in all specifications. They are: SEIL, Share and Spandana. AML and Bandhan attained 100% for overall and social relative efficiency. Basix performed high for cluster analysis value categories; however, they have a vast scope of im-

provement given the asset size (352 million US dollars), labor (9000 personnel) and reduced cost structure (12 US dollars per client). Their focus is more on women, approximately, 1 million women clients. They serve 80,000 poor clients, which indicates a very small depth outreach, given the asset size and personnel.

Among the perceived value MFIs, Pustikar and Grama vidiyal attained high relative efficiency score. When both relative efficiency scores and cluster scores is considered, Pustikar performs the best (Table 11).

Table 11. Relative efficiency scores of perceived value cluster (*Source:* MIX Market data, 2010)

MFIs	Efficiency scores	Financial efficiency	Social efficiency
ASA India	0.87	0.78	0.87
BISWA	0.84	0.80	0.84
Cashpor MC	0.83	0.75	0.83
ESAF	0.88	0.82	0.88
FFSL	0.98	0.94	0.98
GFSPL	0.81	0.78	0.81
Grama Vidiyal	1	0.91	1
Janalakshmi	0.88	0.84	0.88
KBSLAB	0.67	0.61	0.67
MMFL	0.90	0.83	0.90
Pustikar	1	1	1
SCNL	0.73	0.70	0.73
SMILE	0.93	0.84	0.93
Trident Microfinance	0.88	0.85	0.88
Mean efficiency scores	0.87	0.82	0.87
Minimum	0.67	0.61	0.67
Maximum	1	1	1

The mean relative efficiency scores of perceived value cluster (0.87, 0.82 and 0.87 respectively for overall, financial and social efficiency) are lower than social value MFIs. Perceived value cluster MFIs lack on output maximization, given the input combinations. Grama vidiyal demonstrates high performance and high scores on overall and social relative efficiency scores. However, they could not attain 100% relative financial efficiency.

The ratio of gross loan portfolio of KBSLAB is 0.63, which is low compared to other MFIs; however, their client retention rate is 0.87. To attain relative effi-

ciency, they could consider serving more clients and increasing the loan portfolio.

- **Mean comparison tests**

ANOVA was tested to find out whether the relative efficiency scores of each cluster is significantly different (Table 12). The results reveal that MFI value clusters significantly differ with respect to over-all, social and financial efficiency scores. Mean scores show that low social value cluster significantly differed from other value cluster on relative over-all and social efficiency. With respect to relative finan-

cial efficiency, social value and perceived value clusters significantly differed from other value clusters. Social value cluster is relatively efficient in all terms compared to the other clusters. The differences in the relative efficiency scores among various clusters indicate that both DEA and cluster analysis performance model discriminates MFIs in somewhat similar way.

Table 12. ANOVA results of relative efficiency scores among the five performance clusters
(*Source:* MIX Market data, 2010)

Relative efficiency scores	MFI value clusters					
	Low social value	Moderate mix	Financial value	Social value	Perceived value	F-value
Over-all efficiency	0.78	0.81	0.82	0.92	0.87	3.31**
Social efficiency	0.78	0.80	0.82	0.91	0.87	3.04**
Financial efficiency	0.72	0.74	0.74	0.90	0.82	6.48**

- **Correlation analysis**

The correlation analysis of relative efficiency scores with cluster analysis dimensions indicate a positive relation among poverty depth outreach, length outreach and relative efficiency scores (Table 13). The correlation analysis assisted in understanding why social value cluster is high in its relative efficiency scores. Social value cluster are high on poverty depth outreach and length outreach and consequently higher relative efficiency scores. Perceived value cluster performed high on worth, moderate on other indicators of outreach and have the second highest relative efficiency scores.

Table 13. Results of correlation analysis (*Source:* MIX Market data, 2010)

	Depth outreach	Gender outreach	Cost to clients	Worth to clients	Length outreach
Over-all efficiency	0.31**	-0.07	-0.13	-0.11	0.33**
Social efficiency	0.30**	-0.04	-0.11	-0.12	0.32**
Financial efficiency	0.44**	-0.21	-0.22	-0.08	0.34**

The results indicate that relative efficiency scores have strong correlation only with depth outreach and length outreach. Although, number of women clients was one of the social outputs of DEA model, correlation analysis could not find a significant relationship. The positive correlation identifies similarity in DEA model with two outreach indicators. The insignificant relationships in the cluster analysis dimensions of gender outreach, cost to clients and worth to clients indicate that these are not evaluated by the DEA model. Thus, cluster analysis model is more comprehensive than DEA model. However, both frameworks retain a similarity with respect to length and depth outreach.

5   CONCLUSION

Microfinance institutions (MFIs) are financial institutions with a social responsibility. The evaluation of MFI performance has to be carried out considering the existence of dual mission such as financial and social goals. The present study attempted to employ the DEA model and outreach performance in the Indian data for the year 2010, period when the crisis hit the sector.

The objective of the study was to identify the relationship between relative efficiency scores and outreach performance and finds a positive relationship.

The paper comments on the relative efficiency scores of Indian MFIs based on data envelopment analysis. The assessment finds that Indian MFIs, on an average, are 83% efficient. Around 75% MFIs possess less than 0.08 efficiency scores for financial revenue indicating a vast scope for improvement. Financially efficient MFIs were a subset of socially efficient MFIs. Thus, in the context of India, MFIs are more socially oriented when we consider efficiency aspect.

However, case studies on microfinance crisis say a different story where the MFIs were allegedly charging exorbitant interest rates that ultimately led to a spate of suicides among the clients.

Efficiency is not a signal of success; rather, it is a measure of operational excellence (Mouzas, 2006). For continuously growing and embracing business opportunities in the surrounding networks, MFIs should go beyond relative efficiency. Being efficient is important for MFIs in order to maintain a financial discipline. Going beyond efficiency helps MFIs to innovate and differentiate by creating values in the market. The cluster analysis captured the pattern of the outreach performance among Indian MFIs and identified five clusters of MFIs. Each cluster represented the underlying value of the performance. The perceived value cluster performed high on worth to clients. Social value cluster emphasized serving more poor clients with timely supply of services. Financial value cluster MFIs stressed the income generation through microfinance. Moderate mix balanced all pentagon variables and performed at moderate level. Low social value clusters have the scope of increasing the depth outreach and length outreach, given the cost effectiveness of the products they are offering.

Further, comparative analysis of DEA model with cluster analysis model brought out significant information. ANOVA tested the significant difference in social and financial efficiency scores of value clusters of MFIs and results supported the hypothesis. To understand how the relative efficiency scores change across the MFI value cluster, relative efficiency scores were cross-tabulated under each value cluster. The correlation tests found that relative efficiency scores are positively related to depth and length outreach. Thus, the cluster analysis model is proved to be more comprehensive than the DEA model, where the length and depth dimension of outreach model is not represented in the DEA evaluation process.

Performance assessment of MFIs as a service provider of the poor with a social mission would help funding agencies and the Government in emphasizing their growth. Ratings, performance standards and benchmarking in the microfinance industry are increasingly becoming important. Performance standards boost quality and efficiency of MFIs and provide confidence and security for private investors (Copestake, 2003). It is imperative to encourage prospective donors and financial markets to back their operations. Donors are interested in setting performance standards to provide clear benchmarks and guidelines to determine future funding for MFIs (Hashemi, et al., 2007). Performance evaluation standards can be useful in promoting independent and transparent review of MFIs that should enhance prospects for the growth of MFIs. It is, thus, a regular practice for MFIs to report their performance data so that the donors and investors can separate star performers from mediocre performers.

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