

# Comparison of Operational Efficiency of MFIs in South Asia and East Africa

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## Abstract

This study is a comparison of the operational efficiency of microfinance institutions in South Asia and East Africa. Three countries were included from each region (Pakistan, India, Bangladesh from South Asia and Kenya, Rwanda, and Uganda from East Africa). Data Envelopment Analysis (DEA) is used to determine efficiency of microfinance institutions in the selected countries for three years from 2018 to 2020, using input orientation under Constant Return Scale (Technical Efficiency) and Variable Return Scale (Pure Technical Efficiency). Efficiency is measured in terms of the transformation of funds (Intermediation approach) and the productivity of financial services provided by microfinance institutions (Production approach). This study's results reveal that all selected countries are efficient under both methods (Intermediation and Production). However, microfinance in India is found to have weak efficiency in the intermediate approach, and Kenya found to have low efficiency in the production approach.

**Keywords:** DEA, Intermediation, Production, Technical Efficiency, Pure Technical Efficiency.

## INTRODUCTION

Microfinance nowadays is considered as one of the most potent tools in alleviating poverty. Developing and under developing countries are significant micro-credit programs for some years (Mawa, 2008). Microfinance institutions have shown a significant impact on different parts of the world. The effect of MFIs in alleviating poverty is mainly dependent on the level of operational efficiency. This paper is to determine and compare the efficiency of microfinance institutions in East Africa and South Asia.

Microfinance institutions are intended to serve poor people through a wide range of financial services, including microcredits, micro-savings, money transfers, and insurance with the ultimate purpose of poverty reduction (ADB, 2000; Robinson, 2003; Chikwira, Vengesai, & Mandude, 2022). The primary purpose of MFIs is to provide financial services to those who do not have access to commercial finance to help them start or expand a micro-business (CGAP, 2009). In the initial phase, MFIs were supported by grants from governments and donor agencies by providing subsidized financing for poverty alleviation (Zeller & Meyer, 2002; Tamanni & Haji Besar, 2019). The low financial cost was introduced to enable the poor to avail of financial services, but this resulted in a high dependency of MFIs on subsidies and donations (Armendariz & Morduch, 2005; Parvin, Hossain, Mohiuddin, & Cao, 2020). Consistent performance of MFIs forced donors and governments to think about institutions' sustainability and efficiency (Cull, Demirguk-Kunt, & Morduch, 2009; Barres, et al., 2005). Another reason for this change of pyramid was the industry's development, which included the involvement of commercial banks in the microfinance industry and the introduction of advanced technology in the banking industry (Rhyne & Otero, 2006). These developments required that MFIs need to be efficient in covering their running cost and resource utilization (Morduch, 2000; Hermes, Lensink, & Meesters, 2011). Measuring efficiency of MFIs is defined differently in previous studies. Kipesha (2013) stated that efficiency is the optimal

utilization of resources to increase the production of institutions' goods and services. Efficiency can be defined as the ratio of inputs in labor, capital, and equipment and outputs in the form of goods and services (Farrell, 1957). The efficiency of organizations can be viewed as the ratio of resources allocated to produce outputs. According to Farrell (1957), economic efficiency can be divided into two components, which are Pure Technical Efficiency (PTE) and Allocative Efficiency (AE). Pure Technically Efficiency of any firm can be explained as maximum output without wastage of inputs. This efficiency can only be obtained if a firm utilizes its resources by avoiding wastage of resources for maximum output. PTE is also called economic efficiency. Allocative efficiency refers to selecting a mixture of input and utility derived from a selected mix of information. In the context of MFIs, input resources such as assets, personnel, and subsidies to output in terms of outreach and amount of loan distributed (Bassem, 2008; Das & Laha, 2021).

Kipesha (2012) discussed several reasons why MFIs need to be efficient. First is that resources of MFIs are limited as donors cannot provide sufficient funds to serve all the poor people. Secondly, competition among donors has increased all over the world because of the increasing growth of MFIs. The third reason that requires MFIs to be efficient is that experts have realized that microfinance is a useful poverty reduction tool. The fourth reason is immense competition among MFIs, which needs MFIs to be more efficient in attracting donors and governments' funds (Deb, 2018). Finally, the profitability of MFIs has attracted many investors to engage in the microfinance business.

In the 1990s, significant financial sector reforms took place in East Africa, which led to developing a robust financial sector, mobilization of deposits, healthy competition in financial markets, and efficient and effective resource allocation (Kibirango & Kasekende, 1992). One of the primary objectives of these reforms was to provide financial services to those areas and people who cannot access essential financial services. MFIs were established

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to provide basic financial services to low-income society to enhance their ability to earn a better income and help poor people come out of poverty (URT, 2000; Kavura, 1992). Microfinance institutions were developed in the shape of NGOs, government microfinance programs, microfinance companies. The community banks to provide resources to the poor to help their micro-enterprises, household needs, and consumptions, which ultimately results in economic growth and poverty alleviation (BOT, 2005). Microfinance initially found its place in South Asia, where it developed rapidly (Ferdousi, 2013; Siwale & Okoye, 2017). This region consists of mainly developing countries, characterized by many populations living below the poverty line. Through microfinance development in rural areas of these countries, financial performance increased (Epstein & Yuthas, 2013). Apart from this financial performance, MFIs in South Asia required the use of advanced technology and managerial skills to reduce their dependency on subsidies and donations (Qayyum & Ahmad, 2006). Although the success of MFIs is also dependent on the environment of a particular country, the success or failure of MFIs cannot be considered a general trend. Microfinance performance in any country depends on the state (Atoom & Abu Zerr, 2012). In the light of the above discussion, it is evident that efficiency is one of the critical factors of success for MFIs, precisely, and microfinance in general. Higher efficiency is mostly required in developing and underdeveloped countries of the world. MFIs in Asia and Africa are not well known for higher levels of efficiency, the number of MFIs in these regions is vast. International donors and policymakers also require accurate knowledge of the efficiency of MFIs in these regions to allocate resources and restructure policies for the areas, where MFIs are either efficient or inefficient. A comparison of operational efficiency in these regions can help give resources to improve and strengthen microfinance institutions.

One of the main objectives of MFIs is to attain the confidence of depositors and borrowers at a minimum cost. Therefore, the operational efficiency of MFIs in maintaining borrowers and savers is mainly dependent upon staff and expenditure incurred on them. This study is conducted to measure and compare efficiency of microfinance institutions of selected countries of South Asia. East Africa in terms of the transformation of funds (Intermediation Approach) and to measure and compare efficiency of microfinance institutions in selected countries of South Asia and East Africa in terms of production of services (Production Approach).

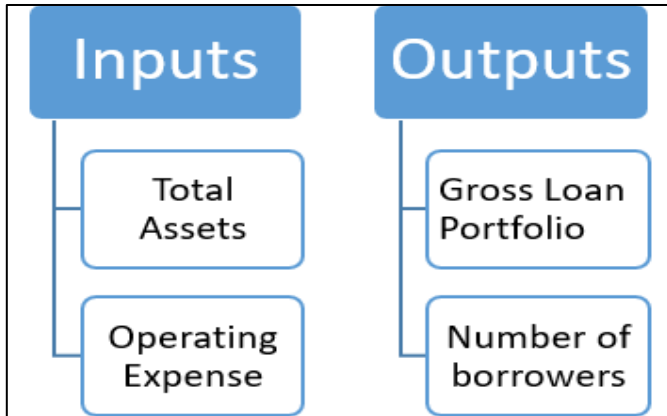
## LITERATURE REVIEW

Hermes, Lensink, and Meesters (2009) applied Stochastic Frontier Analysis-SFA to determine efficiency of MFIs and found that low average balances and a large number of women borrowers are negatively correlated with the efficiency of MFIs. Oteng-Abayie, Amanor, and Frimpong (2011) ascertained efficiency of MFIs in Ghana and found that the age of institutions, cost per borrower, and productivity are significant factors of economic efficiency. Annim, Lmai, and Arun, (2010) determined the technical and scale efficiency of MFIs using Data Envelopment Technique-DEA and found that financial efficiency and outreach are negatively related. In contrast, social efficiency is positively related to outreach. Ahmad (2011) took a gross loan portfolio and number of active

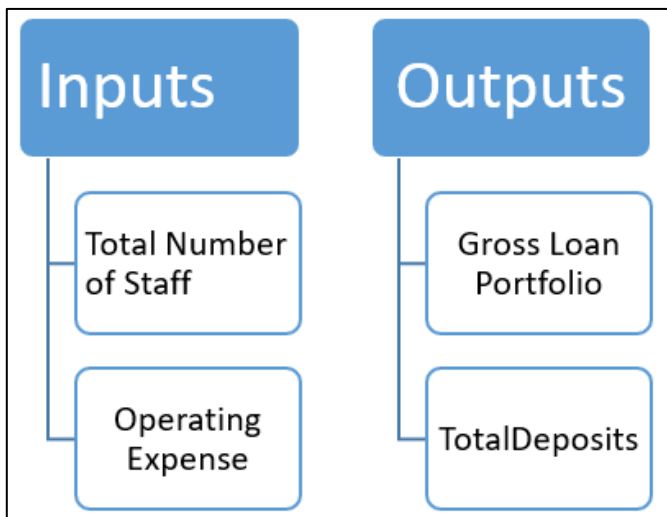
borrowers as output and total assets and number of employees as input; this study found that in 2003 three out of twelve MFIs were efficient, whereas, in 2009, out of 19, four MFIs were efficient. Kipsha (2012), using the DEA technique, found that in five East African countries were found to be inefficient on technical ground. Kablan (2012) determined the social and financial efficiency of MFIs in East Africa using financial expenditure, capital, and personnel as inputs, gross loan portfolio. As an output of economic efficiency and several active borrowers, the proportion of women borrowers, and poverty index as the output of social efficiency, results indicated that social efficiency and financial efficiency are negatively linked. Abdelkader, Jemma, and Mekki (2012) examined the efficiency of MFIs of the Middle East and North Africa-MENA region by taking total assets, operating expenses, several staff members as input variables. And financial revenue, benefits to poor as output variables, and found that the efficiency of MFIs reduced throughout the study. Jayamaha (2012) took deposits, number of deposit accounts, number of branches as input variables and amount of loan, number of loans as output variables for MFIs in Sri Lanka; the study concluded that the technical and scale efficiency of MFIs in Sri Lanka had reduced significantly over the period.

In the Association of Southeast Asian Nations-ASEAN countries, Vietnam, Indonesia, Cambodia, and the Philippines were weak in pure technical efficiency. In contrast, Laos was found to have good performance in pure technical efficiency (Tahir & Tahir, 2013; Parvin, Hossain, Mohiuddin, & Cao, 2020). The technical efficiency of microfinance in India and China is better than Bangladesh, but in pure technical efficiency Bangladesh performed better than India and China.

Berger and Mester (1997) used total loans and savings as output using input average size and number of accounts. This study measured efficiency using three inputs: labor, cost per borrower, and cost per saver with outputs savers per staff member and borrowers per staff member. A combination of these inputs and outputs provides a way to measure the productivity of MFIs in selected countries. Another approach to measuring efficiency of MFIs is the intermediation approach, which means the transformation of funds into loans. Berger and Humphrey (1992) criticized this approach based on interest cost and transactional cost, as these two are not considered under this approach. However, previously many researchers have used deposits and loans to measure efficiency of MFIs (Casu & Molyneux, 2003; Isik & Hassan, 2003). Many MFIs usually provide the facility of savings to their clients and can be taken as output for measuring efficiency through the intermediation approach (Berger & Humphrey, 1992; Hassan & Tufte 2001; Gutierrez-Nieto, 2006). Figures 1 and 2 show inputs and outputs using both types of approaches.



**Figure 1:** Production Approach



**Figure 2:** Intermediation Approach

## RESEARCH DESIGN AND MODEL

For this study, three countries are selected from each region. The nature of this study is quantitative and secondary data is used. The operational efficiency of MFIs in these regions is measured for three years, 2018, 2019, and 2020. Aggregate data for each country is obtained from annual reports published by concerned authorities of each country. Efficiency is measured using different input and output variables. For the production approach, input variables are total assets and operating expenses, whereas output variables are gross loans and an active number of borrowers. For the intermediation approach, the total number of staff and operating expenses are inputs, whereas output variables are gross loan and total deposits.

Data Envelopment Analysis-DEA is used, which is a nonparametric technique; this technique can measure efficiency on variable return to scale and multiple variables of input and output without prices, which make this technique preferable on Stochastic Frontier Analysis as mentioned by Ruggiero (2005). DEA was introduced by Farrell (1957), and the primary use of this technique is in mathematical programming problems. Later, Charnes, Cooper, and Rhodes (1978) made further developments and Banker, Charnes, and Cooper (1984) in this model. DEA can project inefficient decision-making units (DMUs), which may

include minimization of input, maximization of output, or both. Although DEA has specific weaknesses in the form of sensitivity to errors, lack of measurement of error, and inability to measure absolute efficiency still it is considered as most the suitable tool for measuring efficiency at the firm level and country-level (Berger & Mester, 1997; Jemric & Vujcic, 2002; Zhu, 2003). DEA was previously used in many studies in evaluating efficiency of financial institutions such as studies done by Portela and Thanassoulis, (2007), Akhtar (2002), Sathye (2001), and Aikaeli (2008), they all used DEA to evaluate efficiency of financial institutions from different aspects. Similarly, Bassem (2008), Qayyum, and Ahmad (2006), also applied DEA to analyze efficiency of MFIs in East Africa.

Evaluation of efficiency of MFIs can be done using two approaches, which are production and intermediation. In the production approach, microfinance institutions are considered to have output in deposits and loans by using inputs in the way of assets, capital, and staff (Haq, 2010; Bassem, 2008). Some previous studies have taken total assets, personnel, and operating expense as an input variable, whereas loan portfolio, financial revenue, and an active number of borrowers as output variables for measuring production efficiency (Kipsha, 2013; Bassem, 2008; Ahmad, 2011).

In the intermediation approach MFIs mobilize funds by accepting deposits and advances to the poor. The application of the intermediation approach in MFIs is limited because, in most cases, MFIs accept debts for loan advances rather than deposits. Therefore, production efficiency is considered more suitable for measuring technical efficiency (Bassem, 2008; Ahmad, 2011). Among the empirical studies, which employed intermediation efficiency. Haq (2010) estimated the intermediation efficiency of a microfinance institution in Vietnam. Considering the cost per borrower, cost per saver, and operating expenses as input proxy. For the mobilization of funds to produce a gross loan portfolio. Moreover, Molinero (2004) employed several credit officers and operating expenses as input variables to produce several loans outstanding, gross loan portfolio, and interest and fee income.

In this study, we employed the production approach with total assets and operating expenses as inputs. Simultaneously, the gross loan portfolio and the number of active borrowers is taken as outputs. In this study nonparametric DEA technique is used. DEA does not require an examination of the shape of the production function. DEA uses Decision Making Units (DMUs) to measure efficiency, which incorporates 'inputs' and 'n' outputs. Let DMU<sub>k</sub> be one of s decision units,  $1 \leq k \leq s$ . There are 'm' inputs marked with  $k_i$  (where  $i = 1, \dots, m$ ) and 'n' outputs marked with  $Yk_j$  (where  $j = 1, \dots, n$ ). The efficiency equals total outputs divided by total inputs. The DEA program's efficiency uses proper weights to maximize efficiency of DMU and determines efficiency score and frontier.

DEA has two ways to measure efficiency, which are the Constant Return Scale (CSR) as given by Charnes, Cooper, and Rhodes (1978) and Variable Return Scale (VRS) introduced by Banker, Charnes, and Cooper (1984). Both these models are further extended into two orientations, which are input and output. In input orientation, a fixed level of production is attained through a

minimum level of input. In contrast, output orientation maximum level of output is achieved through a fixed level of input. In CRS, it is assumed that one input can give a fixed level of output, whereas, in VRS, one information can provide different levels of output. Technical efficiency is measured through CRS, whereas pure technical efficiency is measured through VRS.

In this study, DEA is constructed to measure the technical efficiency of MFIs using an input-oriented approach. There are 'K' DMUs representing different countries utilizing 'N' inputs to produce 'M' outputs. Input is denoted by 'x<sub>jk</sub>' (j=1,2,3,...,n) and outputs by 'y<sub>ik</sub>' (i=1,2,3,...,m) for each DMU. Technical efficiency can be measured as

$$MinTE = \frac{\sum_{i=1}^m u_i y_{ik}}{\sum_{j=1}^n v_j x_{jk}} \quad r = 1, \dots, K \quad (1)$$

$$Subjecto = \sum_{i=1}^m u_i y_{ik} - v_j x_{jk} + w \geq 0 \quad (2)$$

$$X_{jk} - \sum_{j=1}^n u_j x_{jk} \geq 0 \quad u_i, \text{ and } v_j \geq 0 \quad (3)$$

In equation (2), if W=0, then the model measures technical efficiency using a constant return scale. If W≠0, then pure technical efficiency is measured using variable return to scale (Haq 2010; Shui, 2002; Worthington, 1999; Coelli, 1998).

## ANALYSIS AND RESULTS

In this study, operational efficiency is viewed through the production and intermediation approach using input orientation. Technical and pure technical efficiency is measured under both approaches. The results of DEA for both approaches are given in Table 1 and Table 2.

**Table1:** Intermediation Approach Results

Country	Technical Efficiency (CRS)		
	2018	2019	2020
Pakistan	1.00	1.00	1.00
India	0.86	0.18	0.25
Bangladesh	0.43	0.42	1.00
<b>South Asia</b>	<b>1.00</b>	<b>0.30</b>	<b>0.34</b>
Kenya	1.00	1.00	1.00
Rwanda	1.00	1.00	1.00
Uganda	1.00	1.00	1.00
<b>East Africa</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>

**Table2:** Production Approach Results

Country	Technical Efficiency (CRS)		
	2018	2019	2020
Pakistan	1.00	1.00	1.00
India	1.00	1.00	1.00
Bangladesh	0.98	1.00	1.00
<b>South Asia</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>
Kenya	0.31	0.23	0.77
Rwanda	1.00	0.74	0.66
Uganda	1.00	0.87	0.77
<b>East Africa</b>	<b>1.00</b>	<b>0.61</b>	<b>1.00</b>

In Table 1, MFIs in all countries have achieved technical and pure technical efficiency under the intermediation approach for years 2018 to 2020 except for Bangladesh and India. India's technical efficiency score is 0.18 in 2019 and 0.25 in 2020, after having a score of 0.86 in 2018. These low scores indicate that MFIs in India

are not efficiently utilizing their resources. Similarly, Bangladesh is found to have low technical efficiencies in 2018 and 2019 (0.42 and 0.43), but the sector achieved better technical efficiency in 2020. Low scores in 2018 and 2019 (0.42 and 0.43) mean that Bangladesh's sector wastes 58% and 57% of its inputs.

An intermediary approach microfinance sector of South Asia has low technical efficiencies in 2019 and 2020 but found to have high scores in pure technical efficiency for all the three years. East African region is found to have high scores in both technical and pure technical efficiency in all the three years. In the production approach, all countries achieved high technical efficiency scores except Kenya, which has low scores in 2018 and 2019 (0.31 and 0.23). Similarly, in pure technical efficiency Kenya is found to have a weak position in the years 2018 and 2019 (0.37 and 0.45). This shows that Kenya's MFIs wasted 63% and 55% of inputs, respectively, to achieve a fixed level of outputs. All other countries achieved pure technical efficiency. On the whole, South Asia is found to have both technical and pure technical efficiency in the production approach for all three years. In contrast, East African countries are found to be weak in technical efficiency in the year 2019. Apart from the year 2019, East Africa has also achieved both technical and pure technical efficiency.

## CONCLUSION

Operational efficiency was analyzed through the intermediation approach and production approach. The study results indicate that India's microfinance sector was less technically efficient in mobilizing funds in the years 2018 and 2019. Still, all other countries were found to be efficient in the mobilization of funds. This means that these countries' microfinance sector is efficient in providing financial services to the poor people of the respective countries. The overall efficiency of MFIs as a producer of services is high in all countries except Kenya, which has a weak position both in overall technical and pure technical efficiency. This demands significant reforms in MFIs because low efficiency under the production approach means MFIs are not providing satisfactory services to their clients. All other countries included in the study (Pakistan, India, Bangladesh, Rwanda, and Uganda) offer the clients satisfactory services.

The overall productivity of MFIs in South Asia and East Africa is high for all three years except in 2019. The East African region had a low score in technical efficiency. MFIs in both these regions were found to be working properly in terms of providing financial services to clients and the transformation of funds. The study results will help the policymakers, and donor agencies allocate their funds to those regions where maximum funds can be obtained. Allocating funds to the microfinance sector of that country which is efficient in providing services and mobilization of funds will fulfill the ultimate purpose of microfinance programs. Similarly, restructuring needs to be done in the countries found to have less efficiency. Like Kenya, the underproduction approach is less efficient which shows that the sector's productivity is low in providing services.

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