

CHAPTER 9

THE DOUBLE BOTTOM LINE COMMITMENT AND MICROFINANCE SUSTAINABILITY IN PAKISTAN

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Abstract

The purpose of this article is to conceptualize the sustainability of microfinance institutions (MFIs) by reviewing the existing sustainability indices and indicators in terms of double bottom line. A multidimensional construct based on financial and outreach indicators is proposed to develop an index that measures sustainability of MFIs. Principal Component Analysis is used to assign weights to individual indicators to determine the sustainability score of MFIs in Pakistan for the period 2006-2015. The weights assigned to individual indicators of financial self-sufficiency (FSS), operational self-sufficiency (OSS), average loan balance per borrower (ALPB) and number of active borrowers (NAB) are 0.6643, 0.6607, -0.1905 and 0.2931 respectively. The positive values for weights indicate that any increase in FSS, OSS, and NAB will increase the sustainability scores of MFI, whereas increase in ALPB may negatively contribute to the sustainability score of MFI. Additionally, the determinants of sustainability are identified using fixed effect regression. Results suggest that return on asset, borrower per staff member, operating expense ratio, subsidies and age of MFIs are contributing positively towards the sustainability of MFI.

Keywords: Microfinance, sustainability, double bottom line, sustainability index, financial sustainability, outreach

1. Introduction

Sustainability of Microfinance institutions (MFIs) is essential in achieving the poverty reduction goal (Janda & Turbat, 2013; Rahman & Mazlan, 2014b; Tehulu, 2013). It is necessary for capital generation, cost management, controlling the impact of formal lenders, fulfill the needs of stakeholders, and serving the maximum number of poor people (Vinelli, 2002). MFIs sustainability is defined as institutional capacity to provide uninterrupted services to financially deprived people who are declined financial services by the conventional financial institutions (Rao, 2014; Saad, Taib, & Bhuiyan, 2018). It is important that they should provide financial support to the poor without depending on subsidies. MFIs which are dependent on grants, donor funds and government support can achieve short term profitability but they cannot achieve long term financial sustainability (Bogan, 2012). MFIs should reduce their dependency on external support and increase their efficiency to provide long term services (Abdulai & Tewari, 2017; Burki, Sadiq, & Burki, 2018).

According to Adongo and Stork (2005), MFIs which are not dependent on the external support are usually more productive. Long-term use of subsidy leads to incompetent MFIs and they are unable to attract funds from the market when donor support cease (Bogan, 2008). Microfinance borrowers are high-risk as they do not offer collateral and bear more information and transaction cost due to small loan (Pollinger Outhwaite, & Cordero-Guzmán, 2007). Thus, it become difficult for MFIs to manage their cost of operations. Therefore, MFIs which receives subsidies to manage their operations may remain financially sustainable and their future is questionable as subsidies may cease at some point in time. Keeping this in view, Nyamsogoro (2010) have emphasized on not having MFIs instead of holding unsustainable ones who are unable to cover their cost of operation.

So, the next question is how we measure sustainability? Review of literature highlights that the measurement for sustainability of MFIs has been a serious problem (Bhanot, Bapat, & Connelly, 2015; Mia, Nasrin, & Cheng, 2015; Rai & Rai, 2012; Saad et al., 2018, 2019). Sustainability of MFIs is often considered in financial terms only and is approximated by financial sustainability (see for example Ayayi & Sene, 2010; Kaur, 2014; Lenssen et al., 2014). Financial sustainability is usually determined by financial self-sufficiency (FSS) (Chaves & Gonzalez-Vega, 1996; Cull & Morduch, 2007; Rahman & Mazlan, 2014b) and operational self-sufficiency (OSS) (Bogan et al., 2007; Islam, Porporato, & Waweru, 2014; Lenssen et al., 2014; Rai & Rai, 2012).

The use of financial measure to determine MFIs sustainability has been strongly criticized by several researchers such as Wijesiri, Yaron, & Meoli (2017) and Bhanot et al. (2015). They

argued that financial measures does not provide any information about MFIs performance in terms of poverty alleviation. Saad et al. (2018) also raise their concern on financial measure of sustainability. They argued that majority of the researchers have emphasized on achieving the financial sustainability only, whereas MFIs main objective is to reach maximum number of people and contribute to poverty reduction. Their argument was based on “the triangle of Microfinance” theory presented by Zeller and Meyer (2002). According to this theory, MFIs performance is determined by financial sustainability and outreach. Outreach approximates MFIs ability to reach the target clients and fulfill their demands of financial services (Abate, Borzaga, & Getnet, 2014; Okumu, 2007; Yaron, 1994; Zeller & Meyer, 2002). According to Conning (1999), outreach is approximated by its depth and breadth.

The changing landscape of the microfinance industry, which is characterized by a decline in donor funding, has reignited debates regarding the ability of microfinance institutions to serve the poor while remaining financially sustainable (Abdulai & Tewari, 2017). The current debate on microfinance has settled on the point that MFIs has to attain dual goal of achieving financial sustainability and outreach, termed as ‘double bottom line’ (Guntz, 2011; Mia et al., 2015; Wijesiri et al., 2017). However, existing literature on MFIs sustainability is unable to provide a robust measurement of sustainability based on double bottom line (Wijesiri et al., 2017).

Pakistan, a developing country, has documented the significance of microfinance as a robust tool for uplifting of financially deprived segment and reducing poverty. Pakistan Microfinance Network (PMN) has reported a remarkable growth of microfinance sector during the past decade. In 2016, the growth in aggregate loan portfolio of the sector was around 29.2 percent amounting to 132 billion (PMN, 2016). The State Bank of Pakistan has stressed MFIs to increase their outreach so that maximum number of financially marginalized people can avail financial services (Khan, Butt., & Khan, 2017). Although, for the last 3 decades, several initiatives are taken by the government to reduce gender disparity and poverty; still, they lack in achieving the desired outcomes (Khan & Sulaiman, 2015). According to the ‘Microfinance Strategy 2007’ published by State Bank of Pakistan, the microfinance sector set a target of reaching 3 million borrowers by the end of 2010. Furthermore, by the end of 2015, the number of borrowers were expected to increase to 10 million (SBP, 2011). However, the PMN report published in 2015 showed that the number of poor people reached by MFIs were around 3.6 million (PMN, 2015). The target was not achieved even by the end of year 2018 as the total number of poor reached by MFIs were around 6.7 million which was far below the target (PMN, 2018).

Despite a number of initiatives taken by the State Bank of Pakistan and huge support from the government, why the desired outcomes are not achieved? To answer this question, PMN has conducted several studies to investigate the factors that impact MFIs sustainability in Pakistan (Aban & Zahra, 2011; Ammar & Ali, 2014). However, these studies mainly focused on factors such as natural disasters, macro-economic trends, credit risk, competition, and security. Khan et al. (2017), Ahmed, Mehmood and Haq (2016) and Gohar and Batool (2015) have highlighted the lack of empirical research on identifying factors that influence sustainability of MFIs in Pakistan.

The current study is novel in conceptualizing a multidimensional construct to measure sustainability by focusing on both financial and outreach aspects. This study is also the first of its kind to determine the factors that influence the sustainability of Microfinance institutions in Pakistan. Hence, this study contributes to the existing literature in two ways. Firstly, using Principal Component Analysis (PCA), as the basic framework, the index incorporates all the four dimensions of sustainability- financial and operational self-sufficiency, and depth and breadth of outreach. Secondly, multiple regression using fixed effect is done to identify the factors which contribute towards the sustainability of MFIs measured using “double bottom line”.

Other sections below include literature review, data sample, methodology for index, regression results and discussion. Finally, conclusion, policy implications and limitations were discussed.

2. Literature Review

This section provides a brief view of the evolution of Microfinance sector in Pakistan. It further highlights the issues in measurement of sustainability and propose a robust measurement for sustainability of MFIs in Pakistan. Later, the theoretical review of the literature on determinants of sustainability are also discussed.

2.1. Evolution of Microfinance sector in Pakistan

Microfinance was pioneered in Pakistan in the 1953 through Village Aid package program which was abandoned in 1962. The program was replaced by Agriculture Development Bank of Pakistan (ADBP) which was established in 1957. In 1961, both the programs were merged under ADBP to provide small loans to farmers and poor people in rural areas. The funding of this program was subsidized by the Government of Pakistan. From the 1980s to 1990s, several rural support programs (RSP) including; Orangi Pilot Project (1987), Agha Khan RSP (currently First microfinance bank), Sarhad RSP (1989) and National RSP (1991) were initiated to provide subsidized funds for poverty reduction (Ahmad, 2011; Burki et al., 2018).

The late 1990s appeared to be the defining years for the microfinance sector as it gains attention after the sector was recognized to play a significant role in the economic growth. Kashf Foundation, NRSP supported Urban Poverty Alleviation Program, ADBP supported Khushhali Bank (first government Microfinance bank) were among few of the many initiatives taken for the development of microfinance sector (Burki et al., 2018). In 1998, PMN was formally launched to provide support and assist MFIs operating in Pakistan. Furthermore, the launch of Pakistan Poverty Alleviation Fund (an apex funding body) provided a significant boost to the microfinance sector after its launch in 1999.

In 2006, PMN in support with World Bank launched a fund for providing microloans to MFIs. According to PMN, the sector has reached a total asset size of approximately PKR 427 billion with an expected growth of around 3 times by the end of 2020 (PMN, 2018). Furthermore, the number of active borrowers during the year 2014-2018 are 2.8, 3.6, 4.2, 5.5 and 6.7 million respectively (PMN, 2018).

Likewise, a microfinance guarantee facility of around GBP 10 million is launched with the help of ADBP to ensure the uninterrupted finance for MFIs. This guarantee facility is provided to boost the outreach by providing financial services to the poor people of Pakistan. Moreover, ADBP also provided the loan of USD 150 million for the launch of countries first ever microfinance bank, Khushhali Bank. In 2001, State Bank of Pakistan has issued separate prudential regulations to further strengthen the Microfinance sector in Pakistan (Burki et al., 2018).

2.2. Issues in Sustainability Measurement

The consistency and accuracy of the existing measures for sustainability are questionable as they ignored the achievement of double bottom line (Saad et al., 2018; Wijesiri et al., 2017). Based on the argument above, the existing measurements of sustainability found in the literature are reviewed under double bottom line principal and shortcomings are discussed.

Financial sustainability, one of the two goals, is defined as MFIs ability to generate revenues that cover financial and operating cost, adjust bad loans and further expand financial services (Rahman, Hafeez, & Sun, 2015). It is further explained in terms of financial self-sufficiency (FSS) and operational self-sufficiency (OSS) (Lenssen et al., 2014; Rahman & Mazlan, 2014a). OSS measures MFIs ability to cover operating and financial expenses from its revenues. These include all operational expenses such as expense from operations, expenditure from the provision for loan losses and expenses incurred on financial activities (CGAP, 2003). FSS refers to independence of institution from subsidy and operating

successfully. FSS considers three types of adjustments for subsidies including adjustment for subsidized interest rates, inflation, and write-offs and loan loss provision.

Eventually, this give rise to a debate whether subsidizing interest rates is justified (Hermes & Lensink, 2007). There are two different approaches in microfinance literature: Welfarist approach and Institutionist approach. Welfarist advocates that the poor cannot afford higher interest rates; hence increased emphasis on financial sustainability by reducing subsidise on MFIs funding goes against poverty outreach. On the other hand, Institutionist claims the non-existence of any such empirical evidence where poor cannot afford higher interest rate, nor that poverty level of clients and financial sustainability are negatively correlated. Despite the shift of microfinance paradigm towards financial system approach, the debate continues to exist. Thus, in this study we agree on the double bottom line of achieving financial sustainability and outreach simultaneously. As Yaron (1994) also argued that successful rural financial institutions need to focus on being subsidy independent and reaching maximum outreach.

Yaron (1992) proposed subsidy dependence index (SDI), to measure sustainability of rural microfinance institutions. The index measures the dependence level of MFIs on grants and the degree of interest rural financial institutions should adopt to be independent of subsidies¹. Several studies found in the literature have used SDI to determine the sustainability of MFIs (Manos & Yaron, 2009; Wijesiri et al., 2017). Although the calculations using SDI are useful, the index has major drawbacks as highlighted by the previous researches. Hermes and Lensink (2007) argued that increase in lending rates does not necessarily increase the profit (as assumed by SDI) because moral hazard effects and adverse selection could lead to lower profits. Cull and Morduch (2007) in their study on leading microbanks had to deal with this issue. Additionally, SDI do not provide any information on the minimum acceptable level of subsidies. In order to better understand this issue, there is a need to compare the benefit and cost of subsidies. Unfortunately, with far-reaching assumptions, Khandker (2005), and Townsend and Yaron (2001) suggest that social benefits of Grameen, and BRAAC exceed the costs. Chaves and González Vega (1993) argued that calculation of SDI is not possible due to non-availability of the required data. Morduch (1999) and Nanayakkara (2012) argued that dependence on SDI only focus on the financial sustainability of MFI. Saad et al. (2018) argued that increase effort of MFI to become subsidy independent using SDI may results in higher lending rates and lower outreach.

1 For detail understanding of Subsidy dependence index see (Yaron, 1992)

A recent measure following the double bottom line is developed by Bhanot et al. (2015) for MFIs in India. They include both financial (OSS) and outreach (breadth and depth) measure to develop MFI sustainability index. “Technique for order preference and similarity to ideal solution” is used in their study to determine the sustainability score of MFIs. Although, the index follows the dual goal of microfinance, but it does not include the eradication of the role of subsidy to achieve the sustainability as they ignore FSS measure in their sustainability index. Saad et al. (2018) criticizes the measurement by Bhanot et al. (2015), signifying that MFI are unable to achieve sustainability if they are dependent on subsidies. Adongo and Stork (2005), find that MFIs which are not dependent on the external support are usually more productive in increased outreach. Additionally, long-term dependence on subsidy leads to incompetent MFIs which are unable to attract funds from the commercial investors due to inefficient operation and costly outreach (Bogan, 2008). Microfinance borrowers are high-risk as they do not offer collateral and bear more information and transaction cost due to small loan (Pollinger et al., 2007). Therefore, Nyamsogoro (2010) emphasizes on not having MFIs instead of holding unsustainable ones who are unable to cover their cost of operation.

After reviewing the existing literature and evaluating the existing measures on double bottom line principal, this study proposes a robust measurement for sustainability of MFIs. Keeping in mind the dual goal of microfinance, this study conceptualizes sustainability in the context of both financial sustainability and outreach and contends that increase in outreach is possible when MFIs are financially sustainable.

2.3. Determinants of Sustainability

Microfinance institutions in Pakistan are facing the problem of sustainability, but it was unable to attract the attention of researchers. In Pakistan, MFIs face a number of issues such as operational and reputational risk, liquidity risk, inflated lending costs, law and order situation and high loan defaults (Burki et al., 2018). Several studies have highlighted the poverty alleviation and welfare through MFIs (Global Monitoring Report, 2015) but very few have actually worked on identifying the factors influencing MFIs sustainability (Burki et al., 2018). The theoretical model for the current study provides an outlook from the institutional perspective and define the factors that play a significant role in determining sustainability of all MFIs operating in Pakistan.

Haider, Tariq, Asim and Tariq (2018) examined the factors that affect MFIs financial sustainability in Pakistan using data of 13 NGOs for the period 2005-2015. They reported

that cost per borrower, staff productivity and cost structure are critical enablers of MFIs financial sustainability in Pakistan. MFIs which effectively utilize their human resource and reduce their operational cost are financially sustainable. Burki et al. (2018) further showed that percentage of female borrowers, number of active borrowers and financing charges are significant contributors to MFIs sustainability. The findings were obtained by analyzing the data from 25 MFIs working in Pakistan from the year 2008-2015.

Khan et al. (2017), in their study on identifying the successful determinants of sustainability for MFIs operating in Bangladesh, India and Pakistan for the year 2011-2015 found more comprehensive results. The balanced panel data analysis for 32 MFIs suggest that inefficient management with poor cost control and high portfolio at risk leads towards unsustainable MFIs. Large MFIs with bigger asset size and gross loan portfolio have higher capacity of being financially sustainable. Ahmed et al. (2016) found that MFIs size, efficiency, capital structure, portfolio quality and yield on gross loan portfolio to be significant determinants of MFIs sustainability. They also found that leverage, productivity, capital structure, and cost per borrower have no significant impact. Muhammad, Chen and Ahmad (2019) further showed that large assets base increase operational efficiency and help achieve economies of scale which leads towards improved financial performance of MFIs operating in Pakistan. The increase in efficiency leads towards more profitable MFIs which provide smooth path for achieving financial sustainability. Quayes (2015), Meyer (2019) and Abdullah and Quayes (2016) also had similar findings in their study. Firm size and leverage have significant positive impact, whereas portfolio quality have significant negative impact on MFIs sustainability in Pakistan (Muhammad et al., 2019).

Iqbal, Tufail, Mohsin and Sandhu (2019) used Data Envelopment analysis base on double bottom line objective to determine the efficiency scores of MFIs working in Pakistan. MFIs working in Pakistan have low efficiency score and none of the MFIs were statistically efficient by using single input. Efficiency scores may be improved by focusing on staff productivity, use of latest technology and advanced methods. The efficiency of MFIs in Pakistan is influenced by their age and size.

2.3.1. Hypothesis Development

Profitability of MFIs is measured using Return on asset (ROA) and return on equity (ROE) (CGAP, 2003). MFIs in Pakistan are struggling hard to achieve the positive profitability level (Syedah, Shan, Anum, Zeshan, & Kaleem, 2013). MFIs which focus on profitability usually target to make bigger loans for clients better-off resulting in increased loan repayment and

minimum cost per loan (Tucker & Miles, 2004). These results may also be achieved by reducing excess to women borrowers who are costly to reach (Cull, 2011). According to Von Stauffenberg, Jansson, Kenyon and Barluenga-Badiola (2003) profitability reflects the overall performance including efficiency and portfolio quality of MFIs. However increased focus on profitability results in the deviation from the social mission of reaching the poor (Yaron, 1994).

H1: Return on Asset significantly influence the sustainability of MFIs.

For many investors ROE is of paramount importance as it provides a reflection of the return on their investment portfolios (Rahman & Mazlan, 2014b). Although, MFIs are not-for-profit institutions, competitive ROE is necessary to attract funds from donors and investors which help to be sustainable (Campbell & Rogers, 2012). Very few studies have focused on the relationship of ROE with MFI sustainability. The lack of interest may be valid to some extent because MFIs function as a not-for-profit entity (Campbell & Rogers, 2012). Since, MFIs are currently trending towards rural banks and non-bank financial institutions (NBFIs) (Armendáriz de Aghion & Morduch, 2000). Therefore, these organizational forms or structures allow MFIs to enter into the capital market to generate funds for operations.

H2: Return on Equity significantly influence the sustainability of MFIs

Portfolio quality, approximated by portfolio at risk greater than 30 days (PAR), represent the credit default risk for loans outstanding greater than 30 days and are not yet recovered. The risk profile of MFIs is dependent on its loan's portfolio, which is based on size of portfolio and degree of risk aversion. MFIs need to explore its portfolio quality to maintain its uninterrupted growth and development (Janda & Zetek, 2014; Naz, Salim, Rehman, Ahmad, & Ali., 2019). Portfolio quality has a significant role as Daher and Le Saout (2015) and Mersland and Strøm (2010) found its negative impact on MFIs profitability and sustainability. This indicate that microfinance institutions need to maintain a portfolio of credit wealthy clients to achieve sustainability. Tchakoute-Tchuigoua and Soumaré (2019) reported that PAR, operating efficiency and capital-asset ratio are the major determinants of sustainability. Awaworyi Churchill (2018) found a positive significant impact of portfolio quality According to Basharat, Hudon and Nawaz (2015), extensive growth of MFI might result in increased risk of poor loan portfolio management. On the other hand, Yimga (2015) found that growth does not deteriorate the portfolio quality. Some researchers also argued that lending funds to the poor not contain default risk (Adhikary & Papachristou, 2014; Conning, 1999; D'espallier Guérin, & Mersland, 2011; Wahid, 1994). A study by Nyamsogoro (2010), Nwachukwu (2014) and Kar and Swain (2014) found that increase in PAR>30 days

results in the decrease in MFIs sustainability. Ayayi and Sene (2010) approximated that loan portfolio quality is an important factor in determining MFIs financial sustainability. Researchers have found inconsistent results while analyzing the influence of portfolio quality on the MFIs sustainability.

H3: Portfolio at risk greater than 30 days is expected to have a significant relationship with sustainability of MFIs

Staff productivity is vital while determining a firm performance (Twaha & Rashid, 2012). Sustainability can be achieved with increased focus on employee development which will uplift overall staff productivity (Ayayi & Sene, 2010). MFIs in Pakistan lack on the efficiency scale at the institution level which needs to be improved. These institutions need to have improved focus on enhancing their employees capabilities and skills to attain maximum output through use of advanced technologies and techniques (Iqbal et al., 2019). Staff productivity and MFIs financial sustainability have a positive correlation (Nwachukwu, 2014; Nyamsogoro, 2010). Furthermore, MFIs which operate in countries with high income per capita usually have less productive staff due to lower outreach (Nawaz, 2010). Very few studies have focused on staff productivity while approximating MFIs sustainability (Twaha & Rashid, 2012). Haider et al. (2018) examined the factors influencing MFIs sustainability in Pakistan and found staff productivity to be significant determinant of sustainability. Ahmed et al. (2016) found that productivity does not influence sustainability of MFIs in Pakistan.

H4: Staff productivity has a significant relationship with MFIs sustainability.

Efficiency, measured by Operating expense ratio (OER), is a major factor that determines MFIs sustainability (Gonzalez, 2007; Kar & Swain, 2014). OER is calculated using operating expenses / average outstanding loan portfolio ratio. The ratio has an inverse relation with efficiency of MFIs. Armendáriz and Szafarz (2011) examined the issues faced by MFIs that expected to increase outreach level while remaining financially sustainable. They concluded that attaining financial sustainability and outreach are impacted by loan monitoring and operating cost due to agency relationships based on moral hazards among investors, equity owners, borrowers and MFIs staff. Daher and Le Saout (2015) and Ayayi and Sene (2010) found an inverse relationship between efficiency and sustainability. They revealed that OER negatively influence MFIs sustainability. Hermes and Lensink (2011) revealed significant impact of efficiency on relative size of the loan. Nevertheless, literature on MFIs efficiency predicted a declining trend for large loan size (Naz et al., 2019). Pasiouras and Kosmidou (2007) and Zopounidis and Kosmidou (2008) have a negative correlation between OER and

profitability of institution. On the contrary, Molyneux and Thornton (1992) approximated that increased expense on productive staff leads to a profitable institution. Furthermore, Hudon and Traca (2011) found that efficiency and MFI sustainability have a negative relationship. They emphasized on the use of subsidies to become operationally efficient. Thus, inconsistent results were found for the influence of efficiency on MFIs sustainability.

H5: OER is expected to have a significant impact on MFIs sustainability.

MFIs that lack loss absorption capacity tends to be unsustainable. Debt to equity ratio (DER) determines the loss absorption capacity of MFIs (Tehulu, 2013). Several studies have found empirical evidence of positive relationship while approximating firm's debt level and performance (Berger & Di Patti, 2006; Roden & Lewellen, 1995). Other studies found that businesses debt level has a negative relationship with sustainability (Booth, Aivazian, Demircug-Kunt., & Maksimovic, 2001; Rajan & Zingales, 1995; Wald, 1999). Kinde (2012) results suggest an insignificant relationship between capital structure and MFIs sustainability. Thus, inconsistent results were found for the impact of leverage on MFIs sustainability.

H6: DER significantly influence MFIs sustainability.

Gross loan portfolio (GLP) represents the size of an MFIs by total loans outstanding. In Pakistan, MFIs have shown an inconsistent growth in the gross loan portfolio (GLP). According to the MIX market balanced data, MFIs in Pakistan have a gross loan portfolio of 51.6 million USD in 2007 and decrease rapidly in the next years. In 2014, gross loan portfolio for MFIs in Pakistan was 44.7 million USD². Gross loan portfolio have been a key determinant of the sustainability of MFIs (Gutierrez-Nieto Serrano-Cinca, & Molinero, 2007; Saeed, 2014; Zeller & Meyer, 2002). Higher the gross loan portfolio more would be the MFIs outreach. Interest, fee and commission on gross loan portfolio have been the core income for MFIs (Nwachukwu, 2014). Therefore, MFIs which are unable to manage their loan portfolios are more exposed to systematic risk (Zeller & Meyer, 2002). Few empirical studies were found to explore the impact of GLP on MFIs sustainability. Both GLP and MFIs sustainability have a positive correlation (Daher & Le Saout, 2015; Ngo, Mullineux, & Ly, 2014). The literature displayed mixed results of GLP on sustainability (Naz et al., 2019).

H7: GLP significantly influence the sustainability of MFIs.

Due to outreach to the poor focus, majority MFIs are dependent on grants, donations and other forms of subsidies, especially at startup phase. Subsidies being part of the majority of

microfinance institutions hinders their sustainability (Cull & Morduch, 2007; De Aghion & Morduch, 2004; Morduch, 1999). Subsidies were considered as primary source of funds for the MFIs in the inception stage (Von Pischke, 2007). Several researchers have emphasized on the use of subsidy in the inception stage of MFIs (Adongo & Stork, 2005; Rhyne, 1998; Schreiner, 2000). However, subsidies, in the long run, result in the unsustainability (Morduch, 2000; Robinson, 2001). According to Bogan (2008), use of subsidy may lead towards profitability but not sustainability. Moreover, it is important for MFIs to be free of external aid as several aid schemes have already collapsed (Ayayi & Sene, 2010). Researchers have found mixed results during their empirical study of the impact of subsidies on MFIs sustainability.

H8: Subsidies and sustainability are linked significantly.

Sustainability of MFI is also influenced by its age (Kipesha, 2013). The age usually refers to the time MFI is in operation from its starting date. Robinson (2001) depicts that MFIs which are having an age of more than six years have sustainability ratio of 102 per cent. Similarly, MFIs whose age is more than three, but less than six years have financial sustainability ratio of 86 per cent. New MFIs with age below three years have sustainability ratio of 69 per cent. This implies that age is related to the level of MFIs sustainability (Robinson, 2001). Bogan, Johnson and Mhlanga, (2007) and Cull and Morduch (2007) further concluded a direct relation between age and financial sustainability. Age is deemed to be the significant contributor in evaluating efficiency, MFIs growth of outreach (Cull & Morduch, 2007) and double bottom line achievement (Wijesiri et al., 2017). On the contrary, Kyereboah-Coleman and Osei (2008) found that MFIs age is not crucial to ascertain outreach level.

H9: Age of MFIs significantly impact their sustainability.

MFI size is determined by the value of total assets (Bogan et al., 2007; Hartarska, 2005; Hermes Lensink, & Meesters, 2011; Lafourcade, Isern, Mwangi, & Brown, 2005; Mersland & Strøm, 2008, 2009). Cull and Morduch (2007) claims that MFI performance is dependent on its size. They argued that large microfinance banks usually have lower outreach. The reason is that large MFIs are more motivated towards increased profits which affect the outreach to the poor. Several studies in the literature (Bogan, 2012; Cull & Morduch, 2007; Tehulu, 2013) have identified a positive significant relationship between size and MFIs sustainability. Nyamsogoro (2010) have also found that size positively impact MFIs sustainability. Size help MFIs in achieving economies of scale which direct MFIs toward financial sustainability. However, Cull and Morduch (2007) found that big MFIs mostly have lower level of outreach

because they are tempted with higher profit spreads. The focus of these MFIs is mostly on less poor clients instead of the deserving poor. Large MFIs can conveniently achieve financial sustainability as they can easily reach large number of poor clients.

H10: Size has a statistically significant relationship with MFIs sustainability.

Based on the arguments above it can be implied that profitability (ROA, ROE), portfolio quality (PAR>30), staff productivity, efficiency (OER), liability management (DER, GLP), subsidies, age and size might be the explanatory factors of sustainability of MFIs.

3. Data Sample and Methodology

The sustainability index in this study is developed using Principal Component Analysis, a multi-variable statistical method that helps to disclose information in an easier pattern by using a complex set of indicators (García Márquez & García-Pardo, 2010; Lian, Lai, Lin, & Yao, 2002). Shlens (2010) highlighted that output produced from PCA are the best available values obtained from linear algebra application. Due to non-parametric and simple method of extracting useful information out of complex data, the application and use of PCA is found in almost all forms of analysis - computer graphics to neuroscience. Furthermore, depending upon the nature of the data, Fixed effect regression identified using Hausman test is applied in this study to determine the factors that influence MFIs sustainability. The application of Fixed effect regression model for panel data is supported by Naz et al. (2019), and Daher and Le Saout (2015).

The sample of this study comprises of 38 microfinance institutions located in Pakistan, which are categorized under microfinance banks, microfinance institutions and rural support programs. Unbalanced panel data for this study is obtained for the period of 2006-2015. The data have been gathered from Pakistan microfinance network, Mix market and annual reports of microfinance institutions.

3.1. Sustainability Index Using Principal Component Analysis

Principal components determined by factor analysis is a technique to examine the similarities in a data series (Asteriou & Price, 2001). It provides a means for identification of common factors which are unobserved (sustainability in this case)³. In this technique, a combination of the linearly independent variables explains the observed variable. Following Asteriou and Price (2001), the objective of the study is to develop a mix of technical variables

3 For a more detailed exposition of the Principal Components Method see Koutsoyiannis (1977) and Theil (1971).

out of the initially available variables. The loadings for the variables are chosen to satisfy the following conditions of constructed principal components:

- 1) the primary components are not correlated,
- 2) the first principal component captivates the maximum proportion out of the total variation for the group of available variables, the second component absorbs the maximum proportion out of the remaining variation in the group (after considering the variation captivated by the first principal component), and so on.

In order to overcome the shortcomings of the index developed by Bhanot et al. (2015), this study estimated sustainability of MFIs using the following equation.

$$S_{it} = w_1 FSS_{it} + w_2 OSS_{it} + w_3 DOO_{it} + w_4 BOO_{it} \quad (1)$$

Where; S represents the sustainability for microfinance institutions; w_1, w_2, w_3, w_4 are the weights assigned by PCA; FSS indicates the financial self-sufficiency ratio; OSS represents the operational self-sufficiency ratio; DOO denotes the depth of outreach and BOO represents breadth of outreach.

Since outreach depth is approximated by ALPB, whereas, outreach breadth is approximated by NAB, the above equation takes the following form.

$$S_{it} = w_1 FSS_{it} + w_2 OSS_{it} + w_3 ALPB_{it} + w_4 NAB_{it} \quad (2)$$

Where, ALPB is the proxy used to measure average loan balance per borrower and NAB measures the number of active borrowers.

3.1.1. Measuring Weights Using Principal Component Analysis

In this study sustainability index is developed by assigning weights to the sustainability indicators using PCA. The four indicators including FSS, OSS, depth of outreach and breadth of outreach are used to determine the scores of sustainability for the respective years under study. The loadings for the variables are obtained using PCA. Asteriou and Price (2001) stated that loadings for the variables are chosen if they are not correlated. Table 1 shows the correlation matrix for the variables identified for the PCA. The correlation matrix shows that the pairwise correlation among the variables is low. The financial sustainability variables of FSS and OSS have comparative high values of 0.84. According to Asteriou and Hall (2007), if the correlation coefficient value exceeds 0.9, it may be problematic. Considering coefficient value of 0.9 as benchmark supports that the problem of correlation among the sustainability index variables are not problematic.

Table 1. Correlation matrix for PCA

	FSS	OSS	ALPB	NAB
FSS	1	0.8477	-0.1254	0.2410
OSS	0.8477	1	-0.1599	0.1960
ALPB	-0.1254	-0.1599	1	0.0043
NAB	0.2410	0.1960	0.0043	1

Table 2 provides the component values for the variation in the group. The eigenvalue for the component 1 as shown in the table is 1.9852. According to Asteriou and Price (2001), the first principal component captivates the maximum proportion out of the total variation for the group of available variables. The total number of components are 4 and the number of observations reported are 273. Moreover, the proportion for component 1 is 0.4964 which is more than the remaining components.

Table 2. Principal components / correlation

Component	Eigenvalue	Difference	Proportion	Cumulative
Component 1	1.98552	0.979791	0.4964	0.4964
Component 2	1.00573	1.47311	0.2514	0.7478
Component 3	0.858418	0.708086	0.2146	0.9624
Component 4	0.150333	-	0.0376	1.0000

Table 3 represents the principal component (eigenvectors).

The weights for each of the individual variables assigned under component 1 are used in this study. The weight for FSS representing financial self-sufficiency is 0.6643. operational self-sufficiency represented by OSS have assigned weight of 0.6607. Moreover, ALPB representing depth of outreach and NAB representing breadth of outreach have -0.1905 and 0.2931 weights, respectively.

Table 3. Principal component (eigenvectors)

Variable	Component 1	Component 2	Component 3	Component 4	Unexplained
FSS	0.6643	0.0272	0.2352	-0.7090	0.000
OSS	0.6607	-0.0357	0.2591	0.7036	0.000
ALPB	-0.1905	0.8289	0.5252	0.0275	0.000
NAB	0.2931	0.5576	-0.7757	0.0386	0.000

By assigning weights to the respective indicators, equation 2 takes the following form

$$S_{it} = (0.6643)FSS_{it} + (0.6607)OSS_{it} + (-0.1905)ALPB_{it} + (0.2931)NAB_{it} \quad (3)$$

The positive values for the weight assigned to FSS, OSS, and NAB indicates that these indicators contribute positively towards sustainability. Increase in FSS and OSS indicates that MFIs that tend to be more sustainable needs to focus on generating revenues by being

independent of subsidy. As MFIs tend to increase the NAB their sustainability level also increase. The positive component value support that increase in outreach of MFI enhances the sustainability. Additionally, ALPB has reported a negative value in contributing toward MFIs sustainability in Pakistan. This implies that when average loan size increases the sustainability of MFIs decreases which supports the assumption for the double bottom line and outweighs the existence of mission drift. MFIs main objective is to reach maximum number of poor people and this may be achieved when loan size is small. The small loan size is an indicator that MFIs are providing facility to the deserving poor people of the society. Mersland and Strøm (2010) have clearly identified that MFIs providing small loans to a large number of poor people are more cost-effective than MFIs providing bigger loans. Kumar Kar (2011) reported that MFIs which are increasing their loan size must be very careful as large loans increase the risk associated with them. Since MFI loans are not backed up with collateral, the possibility of default increase as loan size increase, this affects MFI profitability in the long run.

By using equation 3 sustainability score for the MFIs is obtained from the year 2006-2015. Table 4 presents the descriptive statistics for the sustainability of MFIs. The number of observations using unbalanced panel data are 273. It is observed from the table that mean score for S is approximately equal to 0. The inclination of score towards the positive values indicate higher sustainability level for MFIs.

Variable	Obs.	Mean	Std. Dev.	Min	Max
S	273	0.0000000238	1.000009	-2.29566	3.513061

The sustainability score for MFIs in Pakistan over the year 2006-2015 are obtained using the Principle component analysis. These scores are used further to determine the factors which effect MFIs sustainability.

3.2. Regression Model

Multiple regression analysis is used in this study to test the impact of independent variables including profitability, portfolio quality, productivity assessment, efficiency, liability management, subsidies, age and size on sustainability of MFIs. The empirical model for the current study can be specified as.

$$S_{it} = \alpha_0 + \beta_1 ROA_{it} + \beta_2 ROE_{it} + \beta_3 PAR_{it} + \beta_4 BPS_{it} + \beta_5 OER_{it} + \beta_6 DER_{it} + \beta_7 LNGLP_{it} + \beta_8 LNSUB_{it} + \beta_8 LNAGE_{it} + \beta_8 LNTA_{it} + \varepsilon_{it} \quad (3)$$

Where; S_{it} represent the sustainability of MFIs measured using PCA; ROA (proxy for profitability) measures the return on assets; ROE (proxy for profitability) indicates return on equity; PAR (proxy for portfolio quality) represents portfolio at risk > 30 days; BPS (proxy for productivity assessment) denotes the borrowers per staff member; OER (proxy for efficiency) measures the operating expense ratio; DER (proxy for liability management) represents debt to equity ratio. While LNGLP indicates gross loan portfolio; LNSUB denotes the subsidies; LNAGE indicates the age of MFIs and LNTA is the proxy used to measure the size of MFIs; ε is the error term; i represents the individual microfinance institution and t denotes the time period. The study have used natural logarithm for gross loan portfolio, subsidies, age and size to overcome simultaneity bias and improve the goodness of fit of the model (Nasrin, Rasiah, Baskaran, & Masud, 2018).

3.2.1. Descriptive Statistics

In table 5 descriptive statistics are presented for the independent variables used in this study. The number of observations for each variable are presented in Column 2 of the table. This study used the unbalanced panel data. According to Quayes (2015), the unbalance data contains randomly missing values which does not pose any problem in the results. In table 5, ROA, ROE, PAR, BPS, OER, DER, LNGLP, LNSUB, LNAGE and LNTA are the independent variables used in this study.

As for profitability, the mean value for ROA is -0.0039 which indicates that on average the MFIs in Pakistan are unable to generate positive income level by using its assets. The possible reason for negative ROA could be the diverse nature of the industry, having high proportion of MFIs and rural support programs with dominating social performance goals. This implies that MFIs operating in Pakistan are not efficiently utilizing their assets and their conversion rate of deposit into loan is not satisfactory which leads towards negative returns. The negative value also indicates that Pakistani MFIs are not efficient in managing their expenses (Mohsin, Bashir, & Bin Tariq, 2018). This value of ROA is lower than 0.03 value reported by Daher and Le Saout (2015) for 362 MFIs from 73 countries between 2005-2011 and higher from -0.068 reported by Qayyum and Ahmad (2006) for Pakistan. The mean value of ROE for current study is 0.196 or 19.6 per cent for MFIs in Pakistan. Positive value for ROE indicates that MFIs in Pakistan are generating positive returns by utilizing their equity. Percentage of portfolio at risk with mean value of 4.85 indicate that portfolio at risk is low. This mean value is much lower than ratio for PAR of 6.1 when studied by Adhikary and Papachristou (2014) using panel data of 113 MFIs for South Asian countries from 2003 to 2009. However, the maximum value for PAR with 83.4 per cent in table 5 indicates that MFIs

are at a risk of default. Borrower per staff member assesses the staff productivity and the maximum value of 586 borrowers indicates that MFIs in Pakistan are efficiently using its staff members to increase outreach. Additionally, the mean value of BPS for MFIs in Pakistan is 138 which is lower than the BPS of 176.01 studied by Adhikary and Papachristou (2014) for 113 MFIs in South Asia.

Furthermore, the mean value for OER reported in the current study is 0.17 or 17 per cent. The lower OER indicates that MFIs are more efficient in generating operating profits. This ratio is higher than 14 per cent for Pakistan MFIs, 12.2 per cent for Indian MFIs and 11.8 per cent for MFIs in Bangladesh, reported by Qayyum and Ahmad (2006). A high value for DER shows the dependence of MFI on leverage, which reduce the loss absorption capacity. Negative value for DER for some MFIs is due to negative book value of equity which points to financial issues. The minimum (-51.09) and maximum (60.80) value of DER reported in table 5 have a big gap. Moreover, the mean for DER reported is 2.618. This value is much higher than DER mean value of 1.316 for Pakistan MFIs, but lower than 16.541 for Indian MFIs and 9.052 for MFIs in Bangladesh, reported by Qayyum and Ahmad (2006).

Variable	Obs.	Mean	Std. Dev.	Min	Max
ROA	273	-0.003913	0.094202	-0.585559	0.244821
ROE	273	0.196258	0.989337	-2.296683	8.333191
PAR	273	0.048595	0.112156	0	0.834862
BPS	273	138.3918	93.22045	0	586.0429
OER	273	0.170237	0.157261	0	1.282449
DER	273	2.618457	9.635145	-51.0999	60.80763
LNGLP	273	12.77811	1.817673	6.475433	17.01875
LNSUB	272	7.185693	5.985084	0.693147	15.54199
LNAGE	272	2.344570	0.765924	0	3.367296
LNTA	273	13.40439	1.666288	9.239414	17.10004

On the other hand, mean value for subsidy represented by LNSUB in table 5 is 7.18. MFIs which are more dependent on subsidies to meet its operations, usually leads to unsustainability. LNAGE represents the number of years MFIs have been in operation. The mean value for the age in current data is 2.34. The mean value for AGE when studied by Adhikary and Papachristou (2014) is reportedly 4.803. Bhanot et al. (2015) reported the mean value for AGE is 10.44 for MFIs in India. This indicates that MFIs in Pakistan are still comparatively young when compared across countries of the same region. On the other hand, LNTA representing size has the mean value of 13.404. Overall, it is observed that there are no large variations among the institutions over the study period. This is evidenced by small standard

deviations of the variables. Other than DER, LNSUB and LNTA which have standard deviation of 9.63, 5.98 and 1.66 respectively, other variables reported a more stable standard deviation that is between 0.09 to 0.98. The small variations in the variables could be due to the strict monitoring by the regulator in strengthening the microfinance sector especially for the achievement of millennium development goal.

3.2.2. Diagnostics

Before analyzing the data for the regression analysis, a series of diagnostics are done to fulfill the BLUE (best linear un-biased estimation) condition. Data is tested for the existence of multicollinearity, homoskedasticity and autocorrelation problem.

Correlation Matrix is reported in research studies to identify the multicollinearity among the explanatory variables. Asteriou and Hall (2007) state that researchers appear to believe that correlation coefficient of more than 0.9 between variables may be problematic in estimation. Taking this as the benchmark, the table 6 shows that the pair wise correlations among the regressors are relatively small. Hence, multicollinearity should not be of concern in this study. Pair wise correlation coefficients among the variables such as ROA, and BPS are relatively higher but still they are lower than the benchmark of 0.9, suggested by Asteriou and Hall (2007).

	S	ROA	ROE	PAR	BPS	OER	DER	LNGLP	LNSUB	LNAGE	LNTA
S	1.000										
ROA	0.704	1.000									
ROE	0.104	-0.016	1.000								
PAR	-0.256	-0.181	0.052	1.000							
BPS	0.318	0.250	0.128	-0.118	1.000						
OER	-0.137	-0.326	0.155	-0.036	-0.197	1.000					
DER	0.061	0.095	-0.191	-0.041	0.024	-0.111	1.000				
LNGLP	0.310	0.189	0.123	-0.321	0.165	-0.197	-0.083	1.000			
LNSUB	0.243	0.189	0.031	-0.128	0.296	-0.207	0.132	0.022	1.000		
LNAGE	0.346	0.279	0.055	-0.033	0.395	-0.141	0.149	0.014	0.338	1.000	
LNTA	0.232	0.167	0.063	-0.153	-0.032	-0.262	-0.088	0.866	0.161	-0.139	1.000

Breusch-Pagan-Godfrey test is described in table 7, which is used to detect the existence of heteroscedasticity problem in the model is found to be not significant, indicating the problem of heteroscedasticity does not exist in the model. The F-statistics indicates the significance level above 5% and does not support the alternative hypothesis.

Table 7. Diagnostic tests		
Heteroskedasticity Test: Breusch-Pagan-Godfrey	Prob. Chi-Square(10)	0.0223
Breusch-Godfrey Serial Correlation LM Test	Prob. Chi-Square(1)	0.0000

Table 7 provide the results for the autocorrelation in the data. The significance of Breusch-Godfrey serial correlation LM test shows that the problem of auto correlation exists in the data. The problem is resolved by White-Cross section later.

3.2.3. Hausman Test

Fixed and random effect techniques are mostly used for the panel data analysis. To check for the fixed or random effect, several tests are conducted. Likelihood ratio test is applied on the data to select among ordinary regression or fixed effect regression. Likelihood ratio test results are presented in table 8. Result show the value of $p < 0.01$, indicating that the appropriate model is fixed effect. The decision whether random effects or fixed effects should be used is made using the Hausman test (refer to Table 8). The results for the Hausman test accept the alternative hypothesis at 5 per cent significance level, indicating that preferred model is fixed effect (FE).

Cross-section tests	Statistic	d.f.	Prob.
Likelihood ratio	140.442929	37	0
Hausman test	20.516049	10	0.0247

4. Findings and Discussion

To handle the problem of autocorrelation, GLS estimation is used in this study for the regression analysis. GLS is a transformed model of OLS and it is more appropriate than OLS when there is some problem in the data (Gujarati, 2003). White cross section standard error and covariance are conducted as to tackle auto-correlation problems, while fixed effects model is used as it is found from the Hausman test to be the most appropriate model. Millson (2013), Kipasha and Zhang (2013), and (Quayes, 2015) have also used FE estimation while studying sustainability of MFIs in their study. Sustainability of MFIs, measured by S, is the dependent variable used in this study.

F-statistics in table 9 clearly show that the fixed effect estimation model is significant. Additionally, R^2 value of 70.5 (0.705) per cent shows that the representing model well explain the variation in S. Results further shows that ROA has significant impact on the sustainability of MFI when measured using sustainability index. The coefficient value of 6.17 for ROA significant at 1 per cent implies that 1 per cent increase in ROA would increase the sustainability of MFI by 6.17 per cent. MFIs in Pakistan need to efficiently utilize their assets and increase their deposit utilization ratio. They must emphasize on reducing their operational cost and improved their

portfolio quality. This would help MFIs to increase their outreach and become less dependent on external funds and equity borrowings. The results of this study are consistent with other studies such as Bhanot et al. (2015) for MFIs in India, and Crabb (2008) for MFIs in 90 countries.

Statistical results show that borrower per staff member have a positive significant relationship with sustainability. The results of this study are also in line with Bhanot et al. (2015) and Twaha and Rashid (2012) for MFIs in India. This indicates that the staff should be kept motivated to better manage their clients and increase their outreach. Additionally, the increase in value of BPS implies that MFI are reaching more poor people, instead of wealthier clients. Given that outreach to the poor is associated with small loans, increase in BPS shows that MFI staff are reaching relatively poor client. Thus, MFIs in Pakistan need to ensure that their staff is highly motivated and attached with institution goal of serving the very poor to keep MFI moving up the sustainability ladder.

Operating expense ratio has a significant relation with sustainability of MFI. The positive significant relation indicates that MFI in Pakistan are expanding their operations and have a higher target outreach. The cost incurred by MFIs in Pakistan on expansion of infrastructure, structural changes and technological advancement is contributing positively towards sustainability. This is supported by Molyneux and Thornton (1992) who argued that higher expenditures may increase profits of the organization due to more expenditures on the productive human resource and business expansion. The positive relation of OER with sustainability is consistent with the study of Rai and Rai (2012) for MFIs in Bangladesh and India. Moreover, Tehulu (2013) for East Africa, and Kar and Swain (2014) for 71 countries found that variation in OER significantly explain MFI sustainability.

Table 9. Fixed effect Estimation Results		
Variable	Coefficient	Prob.
C	-2.64955	0
ROA	6.177***	0
ROE	0.028	0.337
PAR	-0.672	0.120
BPS	0.001***	0.004
OER	1.204*	0.094
DER	0.003	0.411
LNGLP	0.083	0.174
LNSUB	0.014*	0.056
LNAGE	0.529***	0.004
LNTA	9.71E-05	0.999
R ²	0.756	
Adjusted R ²	0.705	
F-statistic	14.730***	
Note: ***, * shows significance at 1% and 10%.		

As evidenced from the table 9, logarithm of subsidies has a significant relationship with sustainability of MFI in Pakistan. The coefficient value for subsidies is 0.014 and is significant at 10 per cent level. Results suggest that subsidies play a significant role in achieving sustainability of MFI. Morduch (2006) highlighted that smart subsidy plays an important role in improving performance of MFIs. Subsidies received from donor may be used for client and staff training, development and research activities, and activities that match the donor interest. These activities help MFI to achieve positive outreach as both staff and clients become efficient and remain aware of the use of funds. Additionally, MFIs need start-up subsidies to operate and expand their operations. In Pakistan, several MFIs have recently started expanding their operations, so their dependence of subsidies may help them to achieve sustainability.

Table 9 shows that age of MFI is significant at 1 per cent level. The coefficient value of 0.529 with positive sign shows that as MFIs age increases, sustainability of MFI also increases. The results are aligned with life cycle theory which shows that as MFIs age increase they tend to be more sustainable (Nyamsogoro, 2010). The results indicate that over the years MFIs in Pakistan are learning from their experiences and improving their operations. Mature MFIs in Pakistan are more productive in managing, retaining and improving their customers. Over the years, MFIs staff have learned through their experience and as these institutions get mature, their outreach also increases. MFIs further improve their control on operation related issues, loan portfolio quality, reduce the default rate which leads them towards sustainability. In other words, MFIs that have considerable experience in the microfinance sector have diligently applied credit risk management and general efficient management techniques to attain financial sustainability. Young MFIs in Pakistan are inexperienced and have higher operating cost, and low market penetration. The finding of current study is consistent with the Nurmakhanova, Kretzschmar and Fedhila (2015) for 71 countries and Rahman and Mazlan (2014) for MFIs in Bangladesh.

Return on equity has no impact on sustainability of MFIs which indicates that ROE does not contribute in achieving the double bottom line goal in Pakistan. The insignificant relationship with sustainability indicates that MFIs in Pakistan are not dependent on income from their equity. Positive insignificant relationship of ROE in Pakistan may be attributed to the argument of Campbell and Rogers (2012) that, lack of emphasis towards ROE is because MFIs operate as a non-profit entity which is also supported by Tucker and Miles (2004). The findings of the study are consistent with Naz et al. (2019), Ayayi and Sene (2010) and Churchill (2019).

The estimation results in Table 9 shows that PAR, a proxy of portfolio quality have an insignificant negative relationship with sustainability. The findings are consistent with Bayai (2017) for South African Development Community, using a dataset of 122 MFIs from 11 countries for period 1997-2013. The insignificant relationship of PAR with sustainability is consistent with the previous findings by Naz et al. (2019) for MFIs in Pakistan. Additionally, Mersland and Strøm (2008) found that PAR has insignificant relationship with outreach of MFIs. Tehulu (2013), Nwachukwu (2014), and Rai and Rai (2012) also found that variation in PAR days negatively impact the sustainability of MFIs.

In addition, DER has insignificant relation with sustainability of MFI. Lenssen et al. (2014) provide possible explanation for this result. They argue that various combinations of capital do not improve the financial sustainability of the MFIs. Additionally, Kinde (2012) and Rai and Rai (2012) have also found that DER does not impact MFI sustainability. Additionally, GLP another proxy for liability management also found insignificant relation with sustainability. The increase in GLP does not necessarily leads to increase in outreach as there is a possibility that MFIs are repeating their customers to increase the number of loans. Additionally, Okumu (2007) argued that if average loan size increases at a rate higher than the rate at which GLP increases, this also does not implies that MFIs have better outreach. Henceforth, increase in GLP may not necessarily always improve the sustainability. Several managerial factors including lack of vision and bad governance may also be the reason for the insignificant impact of increase in GLP on sustainability.

Size of MFIs have found to be insignificant in relation to sustainability. This indicates that economies of scale do not provide significant support for MFIs in Pakistan in expanding outreach and financial sustainability. The possible reason for the above result could be that, the data for size variable does not indicate enough variation to significantly impact the sustainability of MFIs in Pakistan when sample include different type of MFIs. The results of current study are in line with Hartarska (2005), and Kar and Swain (2014).

5. Conclusion

Critical review of the previous literature highlighted that MFI achieve sustainability if they attain the double bottom line by being financially sustainable and achieving outreach simultaneously. The measure of sustainability developed in this study posit equal emphasis by considering the financial (financial and operational self-sufficiency) and outreach (depth and breadth) measures simultaneously. As it is complex to independently study and analyze trends across separate indicators (Saltelli, 2007), a composite indicator of sustainability is proposed in this study.

Using PCA, weights are assigned to all the four indicators of sustainability. The weight for FSS, OSS, ALPB and NAB are assigned as 0.6643, 0.6607, -0.1905 and 0.2931 respectively. The positive values for weights indicate that increase in FSS, OSS, NAB increase the sustainability scores of MFI, whereas increase in ALPB may negatively contribute to the sustainability score of MFI. The findings imply that increase in number of borrowers and decrease in loan size contribute to the sustainability of MFIs in Pakistan. MFIs in Pakistan must focus on increased outreach, providing small loans to a large number of poor people. This outweighs the possible existence of mission drift in Pakistan. It is impetus for the policy makers and governing authorities that MFIs in Pakistan need to emphasize on the double bottom line to achieve long term sustainability. Next, these weights are assigned to individual indicators and sustainability score of MFIs in Pakistan are obtained for the year 2006-2015.

Results of this study suggest that ROA is the most significant contributor toward sustainability with coefficient value of 6.177 and is significant at 1 per cent. Although ROE has insignificant impact, yet profitability is the key contributor towards sustainability. The descriptive statistics shows that on average MFIs in Pakistan have negative ROA which shows that MFIs need to focus on reducing their operating and financial costs. The operating cost can be reduced by adopting new technologies and product innovations. The positive significant impact of OER on sustainability further endorse the viewpoint. Microfinance institutions incur diverse kinds of expenses such as financial expenses, provision for loan impairment, operating expenses, personnel expenses, and administrative expenses. MFIs in Pakistan are expanding their operations as the overall sector is growing rapidly over the past few years. All these expenses affect the sustainability of MFIs. In Pakistan, MFIs can reduce their operating cost if they posit strict monitoring to late payments, vigorous credit screening, and enhance their staff productivity. Regression results also show that staff productivity has a positively significant impact on sustainability. MFIs provide collateral free loans with higher chances of loan default. Highly productive and vigilant staff may help reduce the cost of loan default, ensure timely repayment, and increase the sustainability.

Regression result show that subsidies have a significant impact on sustainability of MFIs. Although, MFIs become sustainable when they are independent of subsidies, but this does not posit that MFIs in Pakistan should not accept them. Schreiner (2000) highlighted that MFIs need subsidies during the early years of operations for expansion of operations and outreach. Subsidies may help MFIs for staff development programs, enhanced technical assistance, and increase in outreach. However, the long-term dependence on subsidy is highly

criticized as it leads to unsustainability. Furthermore, results suggest that MFIs age is also positively correlated with sustainability of MFIs. As MFIs get mature, they tend to be independent of subsidies and become more sustainable. MFIs gain several advantages with increase in age. They improve their lending methods through years of experimentations and improved technology and have better understanding of market and customers. Learning by doing help MFIs staff to gain experience and become more competent in the field, which reduce MFIs operating cost and results in higher profitability and sustainability.

Policy implications of this study are manifold. Firstly, to achieve a higher sustainability level, MFIs in Pakistan need to be financially independent, with less or no support from the government or donor agencies. Secondly, MFIs core focus is to increase outreach and reach maximum poor people, they tend not to increase their loan size. Regulatory authorities in Pakistan must keenly observe the loan size as large loans may increase the risk of default due to lack of collateral support. Thirdly, Policy makers in Pakistan needs to understand that sustainability level of MFIs may best be achieved when they increase their focus on double bottom line. MFIs in Pakistan are gradually increasing their outreach over the years. They must focus on targeting very poor clients and increase their target population for long term sustainability. MFIs in Pakistan can achieve their sustainability goals if they increase their focus on staff productivity. MFIs need to focus on developing human resource by providing them on field and off field training. They need to ensure that their staff have clear understanding of the compliance and regulations. Staff needs to be kept motivated and goal oriented by increasing their remunerations. Resultantly, MFIs staff will help them to reduce loan losses, enable savings and deposit, reach maximum poor people, and increase in outreach. Productive staff members will eventually help to better manage their portfolio quality, reduce the average costs of operations, and increase profitability which may lead towards greater sustainability of MFIs in Pakistan.

MFIs in Pakistan are highly equity based, retaining their deposits and not converting loans into deposits. This ultimately resulted in negative return. State Bank needs to facilitate MFIs in successful conversion of their deposit into loans for increased revenues. Furthermore, majority of MFIs in Pakistan are not accepting deposit or are reluctant to take deposit. The policy makers must understand the significance of deposit and their contribution in achieving sustainability.

The current study has several limitations and recommendations. Firstly, theoretical framework for the study is developed from the institutional perspective and lack the impact of external factors such as unemployment, gross domestic product, inflation, interest rate and

growth on MFIs sustainability. Future research may include external factors and other institutional variables to have a better understanding of the proposed model. Furthermore, corporate governance has significant contribution in institutional growth and success. So, future research may determine the impact of corporate governance on MFIs sustainability.

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