

ASSESSING THE TECHNICAL EFFICIENCY OF CARE AND SUPPORT PROVIDED
TO ORPHANS AND VULNERABLE CHILDREN BY RELIGIOUS ORGANIZATION IN
KIBERA SLUMS

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A RESEARCH PAPER SUBMITTED TO THE DEPARTMENT OF ECONOMICS
UNIVERSITY OF NAIROBI, IN PARTIAL FULFILLMENT FOR THE AWARD OF THE
DEGREE OF MASTER OF ARTS IN ECONOMICS

SEPTEMBER, 2009

DECLARATION

This research paper is my original work and has not been presented for a degree award in any other university.

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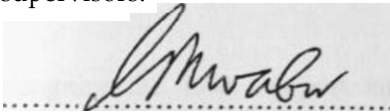
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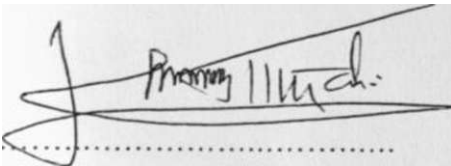
This research paper has been submitted for examination with our approval as university supervisors.



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ACKNOWLEDGEMENT

My first gratitude goes to the Almighty God for guiding me and miraculously helping me complete the master's programme. I am so grateful to him to have brought to an accomplishment what he had begun in me. May your Sovereign name be praised.

I am deeply indebted to my supervisors Professor Germano Mwabu and Dr. Urbanus Kioko, without whose supervision, guidance and valuable comments, this research paper would not have been complete. I also thank Dr. Anthony Wambugu for his comments and suggestions.

I would like to extend my warm thanks to Paul Boadu of the University of Ghana, and Mutuku S. Mutinda from the University Of Nairobi School Of Economics for the moral support and encouragement to apply Data Envelopment Analysis in this project. Thanks to my classmates, Rachel Olela, Muganda, Alice, Phyllis, Esther, Njoroge for your fruitful encouragement, comments, friendship and love in the masters program and to the computer laboratory assistant Edwin ,for being available and providing a working computer system for data analysis.

I recognize the love, support and encouragement during the trying moments of the masters program offered by Pastor Patrick, Apostle Musili, Pastor Muiru, my husband David and to my family members I offer much thanks for being available at the time of difficulties

DEDICATION

This project is dedicated to my Mum, Pheobe Nasimiyu whose prayers and moral support has made this long journey a success. To my Father, John Nalianya, *"your seed is blessed and your dream achieved"*. God bless you all and keep you strong. Amen.

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LIST OF ABBREVIATIONS

RAAAP	Rapid country Assessment, Analysis, and Action Planning Process
AE	Allocative Efficiency
AIDS	Acquired Immune Deficiency syndrome
CRS	Constant Returns to Scale
DEA	Data Envelopment Analysis
DMU	Decision Making Units
ECD	Early Childhood Development
EE	Economic Efficiency
FDH	Free Disposable Hull
HIV	Human immunodeficiency Virus
MPI	Malmquist Productivity Index
OVC	Orphans and Vulnerable Children
TE	Technical Efficiency
UN	United Nations
UNAIDS	Joint United Nations programme on HIV/AIDS
UNICEF	United Nations Children's Fund
USAID	U.S. Agency for International Development
VRS	Variable Returns to Scale
GOK	Government of Kenya
MOH	Ministry of Health
NACC	National AIDS Control Council
JAPR	Joint AIDS Program Review
CACC	Constituency AIDS Control Committee
NGO	Non Governmental Organization
VRS	Variable Return to Scale

ABSTRACT

The national HIV prevalence in Kenya has decreased from a high of around 14% in the mid-1990s, 5.9% in 2006 and 5.1% in 2007. The HIV prevalence in Nairobi province is currently 10.1% being in the highest among all provinces in Kenya. Kibera residents are infected with HIV mainly due to abuse of basic human rights especially among girls and young women. Finding drawn from secondary data showed that the whole of Langata division had 3082 registered OVC at the end of 2006 with Kibera location contributing 1056.0VC. These OVC reported different losses in terms of their parents. The majority (41%) reported to have lost both parents, while 23% were vulnerable children with one parent, and 20% did not know the whereabouts of their parents.

There are 568 civil society organizations in Kibera division. Over 135 of these organizations were reported to be providing support to OVC. Out of 135, 36 were located in Kibera location. Most of these organizations are faith based, self-help groups, youth groups, or women groups. Although the groups were registered to provide care and support to OVC, it was difficult to gauge the help given to OVC due to lack of resources within the groups, some of the groups were reported to be only active when they receive funds from the National Aids Control. In absence of active funding, the OVC supported by the organizations suffered due to lack of resources. This is clearly seen from the sampled FBOs interviewed.

Despite the FBOs serving a large population of OVC, they have not been able to meet the needs of the OVC. These organizations receive funds from donors as grants, community contributions, from income generating activities and government through various ministries. Evidence indicates that most of the FBOs are not operating efficiently. In spite of the extensive studies on Kibera slum, scarcely has there been a study to assess the efficiency of organizations seeking to meet the challenges. This study fills these gaps and recommends measures for improving the needs of orphans and vulnerable children in the Kibera slum. The study applied Data Envelopment Analysis (DEA) to estimate the efficiency levels of the FBOs. The results show that, there is an observable deviation of efficiency scores from the best practice frontier.

CHAPTER ONE: INTRODUCTION

1.1 Background

There are many organizations involved in improving the welfare of orphans and vulnerable children (OVC) globally and in Africa, among them are religious organizations. There are numerous religious organizations present in Africa. For example in Kenya, the number of Christian denominations alone is estimated to be about 430 with 79% of the country population being affiliates. As such, religious organizations could play an important role in the response to OVC

The contribution of religious organization in this direction cannot be overemphasized. Religious organizations could be among the most efficient institutions to address these issues at both local and national levels. It is worth noting that many are now addressing the multi-dimensional impact of AIDS and its particular impact on children. However, most religious based congregational and personal responses are small scale and it has been difficult to measure their cumulative impact compared to the more viable project responses of development agencies. Moreover, much of their work is undocumented and as a result, their activities remain under-supported. OVC support programmes are still in their early stages since there has been no guideline to show the way forward. All children needs so far have been met in haphazard manner. For instance, before the enactment of the Children Act No.8 of 2001; there were no instruments to direct activities or strategies.

1.1.1 Study area - Kibera slum

A slum can be defined in two perspectives: Financial and Urbanist definition.

Financial perspective views a slum as a place with no investment that keeps cost so low that the poorest of the poor can afford them. The urbanist perspective views a slum as a neighborhood with minimal or no basic service such as sanitation. The urbanist defines the condition while the financier defines the cause.

Kibera is located southwest of Nairobi city and is equal to about 755 of the area of Manhattan's Central park (approximately 2.5 square kilometers, 256 hectares, or 630

acres). To the south of Kibera slum is Nairobi dam. It is equal to the south. Kibera is sited approximately 5km south east of the city centre of Nairobi. It holds more than a quarter of Nairobi's population. The estimated population density of the area is 300000/km . There are a number of villages including Kianda, Soweto, Gatewakera, Kisumu Ndogo, laini Saba. Siranga/Undugu, Makina and Mashimon and the newly formed Raila Village. Kibera is heavily polluted by soot, dust and other wastes. Open sewage routes, in addition to the common use of 'flying toilets', also contribute to contraction of the slum with human and animal faeces.

Kibera is associated with a lot of poverty. This point is well made by UN-HABITAT (2003:xxvi) that states that slum and poverty are closely related. Livelihood are earned through different forms of economic activities, which include employment as waiters, barmaids, barmen, drivers, watchmen, shop assistants etc(UN-HABITAT,2003:xxix).

According to the social economic mapping exercise (study) in Kibera that was undertaken by Research International, there are three distinct categories of people living in Kibera. The first category is composed of very poor people earning less than Ksh. 5000 per month. The medium poor who earning between Ksh.5001 and Ksh.10000. The third category comprised of people earning over Ksh.10000. Health related data from Kibera show that malaria is the leading health problems(cited by 69%) followed by HIV/AIDS(cited by 31%).

It was explained that poor sanitation in Kibera offered conducive breeding environment for mosquitoes. The other common diseases cited include, typhoid, TB, Respiratory track infection and diarrhoea. The combination of poor nutrition and lack of sanitation accounts for many illnesses such as those mentioned above. The frequency of illness in Kibera varies with age and gender with children below 12 years falling sick more frequently than adults. Not only are death by diseases and conflict common inside this slum, but it is estimated that 1/5 of the 2.2 million Kenyans living with HIV live in Kibera. Kibera is one of the most pronounced slums within Kenya that is undergoing intensive slum upgrading process. The government, UN-HABITAT and a contingent of NGOs notably Maji na Ufanisi are making inroads in the settlements in an attempt to improve housing and sanitary conditions.

Kibera being one of the most studied slums in Africa, not only because of its location in the centre of the modern city, but also because UN-HABITAT has its headquarters close by. The situation in Kibera has compelled most religious organizations to rise to the challenge to help in capacity building for the caregivers and guardians to help in the reduction of stigma and enhance educational standards in the area. The goal of the organizations is to expand successful interventions, both from a programmatic and geographical perspective in order to reach a higher number of OVC, to increase household and community reliance and also improve capacity to address the multifaceted problems that arise as a result of HIV/AIDS. These organizations receive funding from donors as grants, community contributions, and income generation activities and from the government through various ministries health and education among others.

1.2 The vulnerable situation of children

1.2.1 The concept of vulnerability

Chambers' dictionary defines vulnerability as a situation where one lacks protection and where one is liable to be hurt or damaged. Children all over the world are vulnerable due to their physical weakness and their total dependence on adults for their survival and development. If vulnerability is high when the child is in his or her early years (0-8), the implications for OVC who are in their early years are serious indeed. Orphanhood is one such situation that predisposes children, especially those in their very early years, to possible problems in their development due to the absence of support and parental care, warmth and affection necessary for growth and development. Vulnerability is a complex concept to define Smart (2003). In her publication on OVC policies, Smart refers to vulnerable children as defined in Botswana policy context to include street children, child laborers, children who are sexually exploited, neglected or handicapped, and children from indigenous minorities who live in remote areas.

Another policy definition of vulnerability is the one given by Smart, (2003) within the Rwandan policy context. This is defined as children less than 18 years exposed to conditions that do not permit fulfillment of fundamental rights, for their harmonious

development. This include children living in child-headed households, foster care or centers, children in conflict with the law, affected by HIV/AIDS or living in poor households, refugee and displaced children, infants with their mothers in prison and children of single parents. A local community definition for vulnerability in South Africa refers vulnerability as child that is orphaned, neglected, destitute or abandoned, has a terminally ill parent or guardian, and is bom to a teenage or single mother, lives with the adult who lacks income generating opportunities or who is abused or ill treated by a step parent. Where all or some of these factors are used as indicators of vulnerability, orphaned children seem to be the most vulnerable. However. Smart,(2003), using non-enrolment in school and non-attendance at school as proxies for vulnerability found that in many countries poor children, rather than orphans, were most likely not to be enrolled to be out of school. Smart (2003) therefore concludes that generalization across 28 countries in four regions can be challenged. The link between poverty and vulnerability seems well established, suggesting that policies to raise enrolment among the poor will also have a positive impact on disadvantaged OVC.

1.2.2 Definition of orphan

There are various definitions of orphans across countries and different program environments. In Namibia, for example, the Ministry of Women's Affairs working definition of an orphan is a child under the age of 18 who has lost a mother, a father or both or a primary caregiver due to death or a child who is in need to care. In Ethiopia, the Child, Youth and Family Welfare Organization sees an orphan as a child under 18 who has lost both parents, regardless of how they died. The policy project respondent in Uganda sees an orphan as a child below the age of 18 who has lost one or both parents, while Rwanda does not specify the age but simply defines an orphan as any child who has lost one parent or both.

Interventions of care for these children by government, organizations and communities are faced with the acute need to devise ways of assisting AIDS-affected children equal to the enormous scale of the crisis. It is becoming clear that too often; such efforts lag behind and are fragmented. Institutionalized care for the majority of orphans and other

vulnerable children is neither a developmental[^] ideal nor a financially appropriate option (Joint UN Programme, 2001).

1.3 Global and sub-Saharan Africa perspectives

The vulnerability of children as a direct consequence of HIV/AIDS and is generally defined from various perspectives in the global context. Since HIV/AIDS was discovered in 1981, more than 20 million people have lost their lives to the virus. According to the Joint United Nations Program on HIV/AIDS (UNAIDS, 2006), nearly 40 million are currently living with HIV/AIDS, inclusive of about 2.2 million children under the age of 15. Accordingly, the United Nation found that over 36% of children in the world were orphaned and made vulnerable by AIDs (UNICEF 204, UNAID 2004 and USAID, 2004). With the global number of children orphaned by AIDS increasing from 11.5 million in 2001 to 15 million in 2003, the number is expected to be more than double by year 2010. Since this number is expected to increase, children are anticipated to be the worst victims and a global fight against it is imperative. While the impact of AIDs continues to be devastating, Sub-Saharan Africa remains the most affected region with about 25.4 million people living with HIV/AIDS at the end of 2004. Of this number, children constitute 1.9 million under the age of 15. (USAID, UNICEF and UNAID, 2003). In addition, it was found that about 15 million children under the age of 18 had lost one or both parents due to AIDS, with 82% in sub-Saharan Africa. Prevalence rates in Kenya and Ethiopia have reached double digits, while the rate in Uganda has fallen to 8 per cent from a peak of 14 per cent in the 1990s (UNAIDS, 2000). Similar trends have been witnessed in Zambia where both countries continue to suffer from the impacts of past HIV infection.

13.1 Orphan and vulnerable children (OVC) in Kenya

HIV prevalence in Kenya has fallen from a peak of 10% in adults in 1990 to the current estimate of 7.3%, however the decline is not uniform throughout the country and prevalence in some antenatal clinics falls between 14% and 30%. The Joint United Nations Programme on HIV/ AIDS (UNAIDS) also estimates that 1.1 million children living in Kenya have been orphaned by AIDS (UNAIDS, 2006).The percentage of

children orphaned or otherwise considered "vulnerable" is estimated at approximately 60% of all children within Kenya (government of Kenya 1999).

Children affected by HIV/AIDS often live in households undergoing dramatic changes, including intensified poverty; increased responsibilities placed on young members of the family; poor parental health that may increase emotional or physical neglect; stigma and discrimination from friends, community members, or extended family; or parental death. These changes often result in reduced household capacity to meet children's basic needs. Orphaned children may undergo a transition to a new household or, in relatively few cases, be forced to head their own households.

Orphans are more likely to live in households with higher dependency ratios; may experience property dispossession; often miss out on opportunities for education; may live in households experiencing food insecurity; and often experience decreased emotional and psychological well being due to such dramatic life changes, challenges, and losses (*UNICEF\ 2006a*).

Political will and donor support in Kenya have combined to intensify programmatic and policy responses to the HIV/AIDS epidemic and increasing numbers of OVC. The Ministry of Home Affairs and (UNICEF) undertook a rapid country assessment, analysis, and action planning process (RAAAPP) for OVC in 2004, based on a feeding program for orphans and other vulnerable children enrolled in Learning and Development Kenya (LDK)'s sponsorship program in Kenya. The Kenya government also developed a National Database of OVC to coordinate the efforts of various agencies offering interventions for OVC. Beyond national policies, coordination, and plans for action, OVC in Kenya benefit from government efforts to address the needs of all children through provision of free health care for children under the age of five, free primary school education, and efforts to establish children's courts. However, school fees often prohibit OVC living in poor households from attending preschool education at early childhood development (ECD) centers and secondary schools.

In local organizations, attempt small-scale community work to meet the needs of OVC with scarce human, monetary, and technical resources and without technical or managerial training. Often drawing on dedication and commitment of community volunteers, these organizations have great potential to address the needs OVC in their communities; however, they require capacity building, including training, network strengthening, and grant support.

1.4 Problem statement

Although Faith Based Organizations could play an important role in the response to OVC in Kenya, there is still persistence of enormous problems in addressing the need for better child's welfare. OVC support programmes are still in the early stages and there are no guidelines to regulate the quality of the services offered. Children needs so far have been addressed in haphazard manner. For instance, before the passage of the Children Act No. 8 of 2001, there was no instrument to direct child service. Although the contribution of FBO are invaluable in responding to the needs of OVC, much could have been done if they receive the needed attention and support (both in kind and in cash) from the government and other donor agencies. In spite of the extensive studies on the slum, scarcely has there been a study to assess the efficiency of organizations seeking to meet the challenges. This study fills the gaps and provides measures for improvement in order to meet the greater needs of OVC in Kibera slum.

1.5 Objectives of the study

The main objective of the study is to asses efficiency of FBOs in the provision of support and care for orphans and vulnerable children in Kenya using the Data Envelopment Analysis. The specific objectives of the study are:

- i) To asses relative technical efficiency of a sample of faith based organisations in meeting the welfare needs of orphans and vulnerable children.
- ii) To estimate technical efficiency levels of FBOs meeting the welfare needs of OVC
- iii) To make policy recommendations based on the findings.

1.6 Hypothesis of the study

The study seeks to test the following hypothesis:

- a) Faith based organizations are efficient in the provision of care and support for OVC. This will be tested against the null hypothesis that faith based organizations are not efficient in the provision of care and support for OVC.
- b) Efficiency of care and support provided by the Faith Based Organizations has improved over the years. This will be tested against the null hypothesis that efficiency of care and support provided by the Faith Based Organizations has not improved over the years.

1.7 Significance of the study

Only few studies have been conducted on assessing technical efficiency of FBOs in the country as a whole. The findings of this research will be invaluable and it is hoped that it will contribute in adding to the existing knowledge on the importance of well-organized and funded support based organization for OVC. The study will offer policies and measures to ensure efficiency in the operations of support based organizations for the OVC. This will also pave way for further research in areas of care and support for OVC to enhance effective and integrated policy development of support-based organizations.

1.8 Organization of the study

The study is structured into five (5) chapters. Chapter one deals with the introduction, description of the study area, the statement of the research problem, objectives of the study, hypothesis formulation, relevance of the study, and the organization of the study. Chapter two contains definition of concepts, the review of literature (both theoretical and empirical) support based organizations for the OVC. Chapter three describes the methodology and procedures used in the study. It provides an insight on DEA and Malmquist production index. Chapter four presents the results of the analysis, and chapter five (5), gives a summary of the findings and policy recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

In this section, we review the existing literature on technical efficiency both from within the country and across borders. The literature review will be both theoretical and empirical. The chapter is divided into three parts; the first section discusses the theoretical literature relevant to the study. The second part reviews the empirical literature on technical efficiency of non-parametric method of estimation, while the final part gives an overview of the literature reviewed.

2.2 Theoretical Literature

Concept of efficiency measurement

Economists are concerned with efficiency as it aims at obtaining the best out of the available scarce resources. Economics is concerned with evaluating and choosing among alternative course of action. In doing so, it determines the costs and consequences of alternatives; the primary criterion is through the analysis of efficiency - which can be seen as the property of society getting the most it can from its scarce resources. The concept of efficiency is subjective as it is not always clear what this involves and how to achieve it.

Economists attach very precise meanings to the concept of efficiency some of which may not be obvious, agreed to or understood by every one. Thus efficiency is an instrumental concept and as such it is always necessary to specify the outcome being sought for or the output being produced. Culyer (1985) identified three basic element of efficiency: the first element is, do not waste resources - technical efficiency .the second element is to produce each output at least cost - cost effectiveness and the third produce the type and amount of output which people value most. These three comes together to give us allocative efficiency.

There are two principal methods of analyzing efficiency: 1) Non-parametric (linear) programming approach and 2) Parametric approach. The parametric approach is based on econometric estimation of production frontier whose functional form and density function is specified in advance. The non-parametric approach is based on enveloping technique. Frequently used among them are the Free Disposal Hull (FDH)- which imposes less restrictions on the data and assumes free disposability of resources and Data Envelopment Analysis (DEA)- which assumes a linear combination of the observed input-output bundles are feasible and therefore assumes convexity of the production set to construct an envelope around the observed combinations.

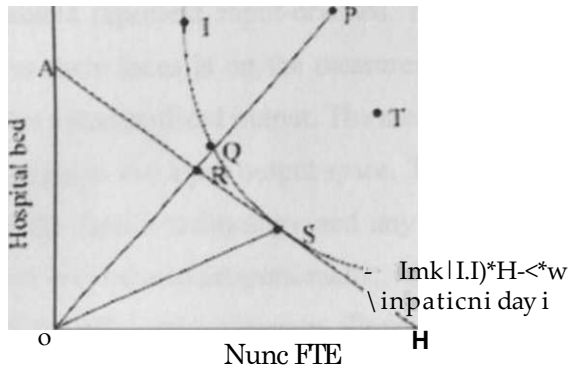
Farrell (1957), drawing upon the framework of Debra (1951), introduced a measure of productive efficiency that avoids the problem of associated with traditional average production measures. He refused the idea of an absolute measure of efficiency and proposed that efficiency be measured relatively to a best-performing frontier determined by a relative peer group. Furthermore, he provided the definition and computational framework for technical efficiency and allocative (in) efficiency. In the Farrell framework, a firm's efficiency is measured relative to the efficiency of all other firms in the industry, subject to the restriction that all firms are on or below the frontier. A firm is said to be technically efficient if it is operating on the best practice production frontier in the industry. The basic idea underlying Farrell's concept of technical and allocative efficiency (under the assumption of constant returns to scale) illustrated in the figure 1 below (see also Eyob, 2000).

In the illustration bellow, a firm produces its output using a combination of two inputs. A technically efficient firm is one that is located on an isoquant that is on the frontier. Thus firm operating at point I, O and S are technically efficient. Firms operating at point P, the measure of technical efficiency (TE) is given as:

$$TE=OQ/OP$$

Figure 1.1

TECHNICAL AND ALLOCATIVE EFFICIENCIES



This denotes the ratio of the minimal inputs required to the actual input use, given the input mix used by P. The ratio OQ/OP represents the percentage by which all inputs could be reduced without a reduction in output. If the Firm produces at point P is to be efficient, it has to relocate itself at point Q. technically efficiency takes values between zero and one, technically inefficient production units have a TE value less that one, while the efficient ones have a TE value of 1.

Given input prices, the isocost line AB represents the minimum cost of producing one unit of output. Allocative efficiency demands that production takes place at the point where the isoquant is tangential to the isocost line. Given this definition, firms producing at point I and Q, which are regarded as technically efficient, are allocatively inefficient. Only the firms operating at point S is both technically and allocatively efficient. The allocative efficiency for the firms at point P is given as:

$$AE=OR/OQ$$

The ratio RQ/OQ represents the reduction in production costs that would occur if production were to occur in the allocatively efficient point S. Farrell proposed that overall efficiency (EE) be measured as:

$$EE=OR/OP$$

Overall, economic efficiency (EE) has the advantage that it easily decomposes into technical and allocative efficiencies:

$$OR/OP=OQ/OP*OR/OQ$$

That is, $EE=TE*AE$

The above measures represent input-oriented, radical measure of efficiency. They are input oriented, as their focus is on the measurement of variations in input use between different firms for a standardized output. The measures are radical as they are taken along a ray from the origin in the input output space. This implies that the current input-output mix determines the firm's technology and any possible increase in efficiency will be achieved if inputs are reduced proportionally, with output proportions held constant. The radical nature of the efficiency measures allows comparison of firms with similar input-output mixes. Furthermore, each input and output can be measured in its natural physical unit without having to resort to a weighting system, to express the different units in a common denominator such as price (Valdmanis 1992).

Output oriented measures can also be illustrated on the input-output space by taking an example of a production process involving one input and two outputs. The two measures of efficiency are equivalent under the assumption of constant returns to scale (CRS).

As seen in the foregoing discussion, empirical estimates of efficiency measures involve two steps:

- (a) Estimation of the frontier and
- (b) Calculation of the individual firm deviations from the frontier.

Currently, there are two approaches used in estimating frontiers (Seiforand Thrall 1998). These are the parametric approach which employs econometric methods and the non-parametric technique, which involves linear programming technique. The non-parametric approach known as data envelopment analysis is used in this study.

2.3 Empirical literature

The non-parametric method of estimation has been extensively used in measuring the efficiency of hospitals, agricultural productivity, banks, education and government expenditure, among other due to its nature of supporting a multiple output production

among other advantages. Most of the studies in hospitals, which this study is related uses recurrent expenditure, number of hospital beds, number of physicians and nurses as inputs; this is broadly categorized into labour, capital and supplies, and total admissions, total discharge, inpatient days, and outpatient visits to capture the bulk of outputs of hospitals.

Eyob (2000), Applied the DEA method to estimate the technical efficiency of hospitals in South Africa. He classified inputs into labour, capital and supplies. The labour inputs include professional groups such as physicians, nurses and administrative staff. In most studies as in his case, capital is proxied by the number of hospital beds. It included annual recurrent expenditure and number of beds. He considered inpatient days and outpatient visits as outputs. The study divided the hospitals into three groups. The results indicated that there is a marked variation of performance among the hospitals within each group. Average overall technical efficiency of 0.74, 0.68 and 0.70 was computed for level I, II and III hospitals respectively. This indicated that when compared to peers on the frontier, the inefficient hospitals on the average consumed 35-47 per cent more resources.

I

Osei, D., d'Almeida, Melvill, O, Kirigia, J, Ayiye, O. and Kainyu H. (2005), used DEA methodology to analyze the technical efficiency of public hospitals and health care centers in Ghana. The results indicated that eight hospitals were technically inefficient, with an average technical efficiency score of 61% and a standard deviation of 12%. Ten hospitals were scale efficient, manifesting an average scale efficiency of 81% and standard deviation of 25%.

Other studies proceed after the estimation of efficiency scores to identify the determinants of (in) efficiency. This involves a two-stage estimation in which in the second stage a tobit regression is used to the efficiency scores on the determinants.

Tibesigwa B. (2002) applied the DEA to evaluate the technical efficiency of general hospitals and primary hospitals in Botswana. The study provided an overall technical efficiency of general and primary hospitals to be 83.7%. Although the application of DEA in analyzing the efficiency of support based organizations is real especially in

developing countries, this study employs the DEA approach to analyze the efficiency of FBO in the Kibera slum in Kenya.

2.4 Data envelopment analysis

Building on Farrell's seminal work, Chariness et al (1978) proposed the non-parametric technique of DEA for measuring the relative efficiencies of decision-making units (DMU) such as schools, post offices, non-profit organization and other firms. DEA uses linear programming methods to establish the frontier from sample data. The efficiency of a DMU is then measured relatively to the efficiency of all other in the group, subject to the restriction that all DMUs lie on or below the frontier (Bjurek et al 1990, Seiford and Thrall 1990. Coelli et al, 1998). This is performed by solving a series of linear programme problems. DEA is the preferred method of efficiency analysis in the non-profit sector (Coelli et al; 1998), where:

- a) Random noise is less of a problem
- b) Multiple -output production is relevant
- c) Price data is difficult to find and
- d) Setting behavioral assumptions such as profit (cost) maximization (minimization) is difficult.

There are two major drawbacks to this method (Lovell 1993, Coelli *et al*, 1998). First, DEA is non-parametric and does not capture random noise (e.g. epidemics, weather, and strike). Any deviation from the estimated frontier is interpreted as being due to inefficiency. Secondly, it is non-statistical in the sense that it is not possible to conduct statistical test of hypothesis regarding the efficiency and the structure of the production technology. Farrier and Valdmanis (1996), however, argue that, these drawbacks may not be as serious as they initially seem. First, there is no a priori specification of the functional form of the technology, specification error that might show up as a noise is ruled out. Secondly, as inputs and outputs are measured in their natural physical units, a measurement error is most unlikely. Under the assumption of constant returns to scale, the efficiency of firm j th can be obtained by solving the following model (Chamed *et al*, 1978):

2.5 Overview of literature

The literature reveals different measures of efficiency and has proven that DEA is a reliable and effective method of estimating the efficiency (or lack of efficiency) in any institutions, unlike other measures. Bowlin et al (1985), developed a hypothetical data set for hospital units known efficiencies and inefficiencies. They used this data set to test (DEA) against ratio and regress analysis. They too found that DEA outperformed both ratio analysis and least square's regression in identifying sources and amounts of inefficiencies. It is therefore that this study will adopt DEA.

CHAPTER THREE: THEORETICAL FRAMEWORK

3.0 Introduction

This chapter outlines the method used to carry out this study. This includes description of the method of data collection and analysis and models specification. First, we look at theory behind the DEA model used.

Model 1: DEA model, input-oriented, constant returns to scale.

$$\text{Max } \lambda = \sum_{r=1}^t y_{rj} \theta$$

Subject to

$$\sum_{i=1}^m x_{ij} \lambda_j \leq 1$$

$$\sum_{j=1}^n \lambda_j = 1, \dots, A, T$$

$$u_r, v_j > 0$$

3.1 Definition of Variables

y_{ij} ($r = 1 \dots s$) = observed amount of output r produced by FBO j

x_{ij} ($i = 1, \dots, m$) = Observed level of input i used by FBO j

u_r = Weight given to output r

v_i = Weight given to input i

n = number of faith based organizations

The first constraint indicates that the weighted sum of inputs for the particular firm equals one. The second implies that all firms are on or below the frontier, that is, the efficiencies of all firms have an upper bound of one. The weights u_r and v_j are treated as unknowns and their weights are obtained in the linear programming solution. The CRS assumption is only appropriate if all firms under consideration are operating at an optimal scale.

When firms are not operating at an optimal scale, the TE can be decomposed into pure technical efficiency and scale efficiency, thus in a situation where the CRS assumption does not hold, the TE measure is mixed with scale efficiency. To disentangle the effect of scale efficiency it is necessary to use a DEA model with a variable return to scale (VRS) assumption. To this end, Banker *et al* (1984) developed an extension of the original CRS model. The linear programming problem to be solved is:

Model 2: DEA model, input-oriented, variable returns to scale (VRS)

$$\text{Max } \theta = \sum_{r=1}^s u_r y_{rno} + u_0$$

Subject to

$$\sum_{j=1}^m Z^j v_j = 1$$

$$\sum_{r=1}^s u_r v_j - \sum_{l=1}^m Z^l v_l = 0, j = 1, \dots, N$$

$$u_r v_j > 0$$

$$u_0 > 0$$

Where the notations, are as given in first model. The additional term corresponds to an intercept (Bjarek et al 1990) and is unconstrained in sign, the sign of U_0 determines the returns to scale and $U_0 < 0$ indicates increasing return to scale, $u_0 = 0$ is for constant returns, and $u_0 > 0$ is for decreasing returns to scale.

3.2 The Malmquist Productivity Index

To measure changes in efficiency over the past years, the study adopted the Malmquist Productivity Index. The Malmquist Productivity Index that was proposed by Caves *et al*, (1982), measure total factor productivity change between two data points in terms of ratios of distance functions. A Malmquist index greater than one, indicates growth in productivity, while a value of less than one indicates a decline. The Malmquist index

approach requires neither a priori behavioral assumption about the production technology nor input and output price data. These characteristics make it more appealing for measuring productivity in the public sector and non-profit organizations. Following Fare *et al* (1994) output-oriented Malmquist total factor productivity changes between period t and $t+i$ is defined as:

Model 3: Malmquist Total Factor Productivity Index

$$D_o(y',x') \quad D_o(y',x')$$

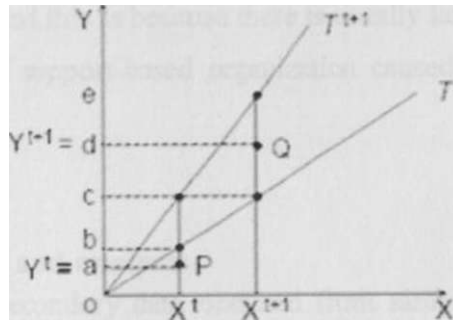
Fare *et al* (1994) further decomposed the MPI into two parts; one measuring efficiency changes and the other measuring technologic changes as follows:

$$M_o(y',x';y'+1,x'+1) = \left[\frac{D_o(y',x')}{D_o(y'+1,x'+1)} \right] * \left[\frac{D_o(y',x')}{D_o(y'+1,x'+1)} \right]$$

The first term on the right hand side measures efficiency changes and the second measure technical change. Fare *et al* (1994) list a number of different methods to calculate the Malmquist productivity index, however, the most preferred of these methods is the one that uses DEA-like linear programming techniques. Four linear programming problems are solved for each firm to compare four distance functions to measure the total factor productivity change between periods under a constant returns to scale technology. The technical efficiency change can further be decomposed into pure efficiency-change component and scale-change component by solving two additional linear programming problems under variable return to scale technology (Coelli *et al*, 1998). The definition and measurement of MPI is illustrated in figure 3.1 below.

Figure 3.1

OUTPUT-BASED MALMQUIST PRODUCTIVITY INDEX



T^t and T^{t+1} represent the production technology in two period , t and $t+1$.

The firm produces at point P in period t and at Q in period $t+1$

Using the formular above, the decomposition of the MPI from the above figure is given as

$$\text{Efficiency change} = \frac{Od/Oe}{Oa/Ob} \tag{3c}$$

The above expression implies that the efficiency change is the ratio of the Farrell technical efficiency in period $t+1$ to that in period t . The technical change is the geometric mean of the shift in technology evaluated at X^{t+1} and the shift in technology evaluated at X^t .

$$\text{Technical change} = \frac{Od/Oc \cdot Oa/Oe}{Oa/Oc} \tag{3d}$$

3.3 Justification of the model

Most researchers when studying hospital performance focus on assessing hospital efficiency in technical terms only and decompose this technical efficiency in to pure

technical efficiency and skill efficiency, by using CRS and VRS. For example, Shearman (1984), Kerrigan et al (2000), and the main reason is that calculation of allocative components and hence overall cost minimization efficiency, requires information on the relative prices of inputs and outputs. However, much information on relative prices of inputs and outputs is difficult to obtain especially in the health care sector and support based organizations, and this is because there is usually large dispersion of prices in both inputs and outputs of support-based organization caused by differences in quality and case makes.

3.4. Data source and analysis

The study will use secondary data obtained from sampled FBOs since they all offer homogenous primary services to OVC. Secondary data from individual FBOs was obtained by count system and geographical estimation. The analysis was undertaken using DEAP 2.1 econometric software (Coelli, 1996).

3.5 DEA inputs, outputs and estimation procedure

Input selection for DEA study requires careful thought as the distribution of efficiency is likely to be affected by the definition of output and the number of input and output included (Magnussen 1996). Three inputs, recurrent expenditure and number of staff will be used in this study. In addition, four outputs will be considered namely; health OVC referrals, (number of FBO fed), education (secondary) and nutrition (average feeding per day). DEA application software version 2.1 is used for the estimation.

CHAPTER FOUR: STUDY FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents and discusses the results of the calculations on standard CRS and VRS DEA models under Technical and Scale efficiencies used in the analysis. Summary statistics on technical efficiency are presented followed by a discussion of findings on returns to scale, input and output target and their changes. The productivity growth in 2003-2008 was analyzed using the Malmquist Productivity Index (MPI) and results presented.

4.2 Technical efficiency

From the 10 Faith Based Organizations sampled, there is an observable deviation of efficiency scores from the best practice frontier. A summary of the efficiency scores is presented in table 4.1 below:

Table 4.1: Summary of efficiency results

	2003/4			2004/5			2005/6			2006/7			2007/8		
	CRS	VRS	SE(CRS/VRS)	CRS	VRS	SE(CRS/VRS)	CRS	VRS	SE(CRS/VRS)	CRS	VRS	SE(CRS/VRS)	CRS	VRS	SE(CRS/VRS)
Min	0.86	0.913	0.942	0.872	0.944	0.924	0.909	0.936	0.971	0.920	0.942	0.977	0.847	0.968	0.875
Median	0.949	1.00	0.949	0.930	1.00	0.930	1.00	1.000	1.000	1.000	1.000	1.000	0.981	1.000	0.981
Max	0.364	0.409	0.743	0.538	0.659	0.847	0.524	0.534	0.981	0.590	0.598	0.987	0.604	0.681	0.887
Mix	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Facilities	13.6, 7.9, 0	13.4, 6.7, 8.9, 10	13.6, 7.9, 10	13.6, 9.1, 0	13.5, 6.7, 8, 9, 10	13.6, 9.1, 10	13.6, 7.8, 9, 10	123, 6.7, 8, 9, 10	13.6, 7.8, 9, 10	13.6, 7.8, 9, 10	U3, 6.7, 8, 9, 10	13.6, 7.8, 9, 10	13.6, 9.1, 0	1.23, 5.6, 7, 8.9, 10	13.6, 9.1, 0
Facilities on frontier	6	8	6	5	8	7	7	8	7	7	8	7	5	9	5

Source: survey data

The results show that the overall average of TE (CRS) among the FBOs in year 1 (2003/4) to year 5 (2007/2008) is as follows: 86%, 87.2%, 90.9%, 92%, and 84.7% respectively. This means that on average the Faith Based Organizations should be able to reduce the consumption of the three inputs by 14%, 12.8%, 9.1%, 8% and 15.3% respectively from year 1 to year 5 without reducing output levels. Under pure technical efficiency scores (VRS), the sampled FBOs have the following percentage: 91.3%, 94.4%, 93.6%, 94.2%, and 96.8% respectively from year 1-5. The trend of the sampled

FBOs for overall average of TE (CRS) and pure technical efficiency scores (VRS) is similar. Using the first year as the example, the overall average of TE (CRS) of the sampled FBOs is 86% and that under pure technical efficiency scores (VRS) is 91.3%.; this implies that on average the FBOs in the sample performed better under pure TE than under scale efficiency hence there is a major contributing factor of inefficiency in FBOs by scale. In the second, third and fourth years the overall efficiency fell between 96.8% and 84.7%, thus requiring an increase to the number of inputs to be reduced at ceteris paribus on the output.

Table 4.2: FBOs making the frontier under VRS and CRS

year	NO. of FBOs	percentage	scores	year	NO. of FBOs	percentage	scores
1	8	80	1.000	1	6	60	1.000
2	8	80	1.000	2	5	50	1.000
3	8	80	1.000	3	7	70	1.000
4	8	80	1.000	4	7	70	1.000
5	8	80	1.000	5	5	50	1.000

Source: Survey Data

Under pure technical efficiency score (VRS), 8(80%) of the FBO's over the period of five years had efficiency scores of 1.000, this can be seen from table 4.2 above.

The FBO's under overall average of TE (CRS) are 60%, 50%, 70%, 70%, and 50% respectively from 2004 to 2008. Generally there is reduction of FBOs under overall average of TE (CRS) in the frontier from year 1 to year 5(see table 4b above) hence reducing the scale efficiency which is the ration of CRS and VRS; This implies that on average the FBOs in the sample performed better under pure TE than under scale efficiency; there is a major contributing factors of inefficiency in FBOs by scale.

4.2.1: Variable Returns to Scale/Constant Returns to Scale Results

Table 4.3: Variable Returns to Scale/Constant Returns to Scale Results

Codes	CRS	VRS	CRS/VRS	Returns of scale	CRS reference / peer group	VRS Reference/ peer group	CRS reference /peer count	VRS Reference/ peer count
1	1.000	1.000	1.000	CRS	1	1	1	2
2	0.704	0.719	0.980	IRS	1,3,6,10	1,3,6,8,10	0	0
3	1.000	1.000	1.000	CRS	3	3	3	2
4	0.364	0.409	0.891	IRS	3,7,6	1,3,7	0	0
5	0.634	1.000	0.634	IRS	6,10	6	0	0
6	1.000	1.000	1.000	CRS	6	6	4	2
7	1.000	1.000	1.000	CRS	7	7	2	1
8	0.899	1.000	0.899	IRS	10,7,6,3	8	0	1
9	1.000	1.000	1.000	CRS	9	9 „	0	0
10	1.000	1.000	1.000	CRS	10	10	3	1

Source: Survey Data

DEA identifies the optimal input/output combination and presents it with "best practice frontier"¹ or data envelope. The DMUs that make up the frontier are assigned a score of one, are technically efficient and become peers (Coelli, 1996). The DMUs not within the frontier as shown in table 4.2 above are assigned the value between zero and one because they are technically inefficient. From the CRS DEA results, the Peer groups and counts for each FBOs are presented.

Best practice is the set of management and work practices those results in the highest potential or optimal quantity combination of outputs for a given quantity and combination of inputs (productivity) for a group of similar organizations.

From table 4.3 above, the results shows that 6 (60%) out of 10 FBOs are technically efficient that is, have scores of 1.000. The remaining 4(40%) are technically inefficiency because their scores are less than 1.000. It is likely that Nescp, Utumoni community, Ebenezer Christian ministries and Kibera School of hope are inefficient because they are not peers in at least 2 to 3 times in the sample.

The existence of VRS in DEA reduces the stringent rules adopted by the Constant Returns to Scale which don't allow for flexibility in its assumptions. The VRS allows for variability/change in input analyses, which relaxes the simplistic assumption that inputs normally will move in exact proportions to the scale of operations: and allows for the existence of economies and diseconomies of scale. From table 4.3 above the sampled FBOs that operate under constant return to scale are Red Rose children's center, Tunza children's center, NBM kids programme, Kibera community vision group, Kibera Salvation Army, and Nescop center.

Those operating under increasing return to scale are: Nescp, Utumoni community, Ebenezer Christian ministries and Kibera School of hope. The VRS DEA further decomposes this overall technical efficiency score in to one due to pure technical efficiency (column3) and one due to scale efficiencies (column 4). This means that if the overall TE score is less than one, then this could be attributed to either pure technical efficiency score being less than one or the scale efficiency score being less than one. The peer count and peer groups are different between CRS DEA (column 6&8) and VRS DEA (column 7&9), this is because the VRS DEA efficiency scores also include scale efficiency in the assigning the peer groups and peer counts.

The difference between the CRS and the VRS peer group as shown in column 7 and 8 explains that while in some FBOs the peer counts have decreased especially in Kibera School of Hope and Ebenezer Christian Ministries; other FBOs like NESCP have their peers increased. The remaining 9 facilities coded as (1, 3,6,7,9 and 10) have remained constant. As shown in CRS DEA, Red rose Children's Centre, Tunza Children's Centre, NBM Kids program and Kibera Community Visions' Group are still peer for more

facilities in the sample and have been joined by NESCOPE Centre under the VRS DEA, which means that they are efficient.

Table 4.4: Summary of input targets

FBOs	Codes	Input (0) target -	Average Input target	Input change	Input (2) target -	Average Input target	Input change	Input (3) target	Average Input target	Input change
Red Rose children's center	1	2.000	2.000	0.00	6.000	7.6	-1.6	111,591.000	131417.4	-19826.4
NESCP	2	3.593	68	-3.207	4.312	11.2	-6888	962,921.203	1447659.8	-484738.6
Tunza children's center	3	5.000	6.4	- 1.4	8.000	9.6	-1.6	2,252,868.000	6492763.4	-4239895.4
Utumoni community	4	2.250	5.2	-2.950	3.680	5.6	-1.92	584,557.720	1364177.4	-779619.7
tbeneztr Christian ministries	5	2.000	2.4	-0.4	4.000	3.8	0.2	238,900.000	484503.4	-484503.4
NBM lads programme	6	2.000	2.4	-0.4	4.000	2.4	1.6	238,900.000	280492.8	-41592.8
Kjbera community vision group	7	2.000	2	0.00	2.000	3	-1	585,481.000	606797.8	-21316.8
Kjbera school of hope	8	2.000	2	0.00	3.000	2	1	493,000.000	505299	-12299
Kjbera salvation army	9	6.000	6	0.00	2.000	4	-2	1,961,096.000	1667260.2	293835.8
Nescop center	10	6.000	6.6	-0.6	6.000	6	0.000	1,961,096.000	2139588.6	-178492.6

Source: Survey Data

Faith Based Organizations should have an input target to be technically efficient. For an FBOs to be technically efficient, this is gotten by subtracting average input target for five years from the input target; if the input change is zero, this means that the FBO is technically efficient, but if the change is negative or positive as shown in table 4.4 above, that means the FBO is Technically inefficient therefore there is need for addition or subtraction of the input for example, Red Rose children center, Kibera community vision group, Kibera school of hope, and Kibera salvation army have efficient input (1) (subordinate staff) that is (40%) and the remaining FBOs (60%) have inefficient input(1).

Table 4.5: efficient/inefficient inputs

Input	% of FBOs with efficient input	% of FBOs with inefficient input
Subordinate staff	40%	60%
Director/teachers/nurses	10%	90%
expenditure	0%	100%

Source: Survey Data

Table 4.5 shows FBOs having efficient or inefficient input 1, 2, and 3 (subordinate staff, director/teachers/ nurses, and expenditure). From Appendix 6 it is clear that all the sampled FBOs have inefficient input (3) (Expenditure). In table 4.5, all FBOs lack enough funds to meet their target apart from Kibera Salvation Army that has more (Ksh.293,835.8) funds. Sampled FBOs with negative input change means that they need addition to the input target to get the input change of zero, for FBOs to be technically efficient.

Table 4.6: summary of output targets

Code	Output (1) target	Ave output	Output change	Output (2) target	Ave output	Output change	Output (3) target	Ave output	Output change	Output (4) target	Ave output	Output change
I	15.000	19.6	-4.6	1.000	1	0.00	2.000	2	0.000	85.000	121.4	-36.4
2	10.000	15	-5	17.923	1.8	16.123	2.688	2	0.688	208.000	312.6	104.6
3 "	40.000	82.6	-42.6	25.000	31	-6	3.000	3	0.000	350.000	376	L-26
4	9.000	16	-7	2.999	2.8	0.199	2.083	2	0.083	91.529	133.8	42.27 1
5	5.000	2	3	1000	1	1	3.000	1	2	100.000	106.4	-6.4
6	5.000	4.6	0.4	2.000	2	0.00	3.000	3	0.000	100.000	135	-35
7	2.000	1.4	0.6	1.000	1	0	2.000	2	0.000	60.000	98.6	-38.6
8	5.000	4.4	0.6	2.000	2.6	-0.6	2.000	2	0.000	87.000	109.2	-22.2
9	1.000	1.4	-0.4	2.000	2	0	2.000	2	0.000	360.000	360	0
10	11.000	13.8	-2.8	43.000	32.6	10.4	3.000	3	0.000	379.000	412.6	-33.6

Source: Survey Data

Output (1)	Numbers of OVC referrals (seeking treatment)
Output (2)	Number of secondary school completion
Output (3)	Average Feeding per day
Output (4)	Number of OVC Fed
Ave.	Average

Table 4.6 shows that no sampled FBOs have attained their efficient production target of output (1) (No. of OVC referral), because of the output change. 40% of sampled FBOs have attained their efficient production target of output (2) (form four completions); these are; Red Rose Children's Center, NBM Kids Programme, Kibera Community Vision Group, Kibera School of Hope, and Kibera Salvation Army.

The table 4.7 below is a summary of FBOs that have efficient or inefficient production of the four outputs.

Table 4.7: efficient/inefficient output

Output	% of FBOs with efficient output	% of FBOs with inefficient output
OVC Referrals	0%	100%
Form four completion	40%	60%
NO. of times fed (OVC)	70%	30%
NO. of OVC being fed	10%	90%

Source: Survey Data

- Output (1) - Numbers of OVC referrals (seeking treatment)
- Output (2) - Number of secondary school completion
- Output (3) - Average Feeding per day
- Output (4) - Number of OVC Fed

Table 4.7 shows the number of FBOs that have reached efficient production of output (1) (OVC) Referrals). The inefficiency can be attributed to lack of enough funds to most of these FBOs. For example Kibera Salvation Army 1(10%) is the only FBO that has efficient production of output 4(OVC being fed). There are no sampled FBOs that has excess margin of the number of OVC being fed. Most sampled FBOs have produced less the required outputs (1 and 4).The less the output means that either one or more than one input is inefficient, and therefore need to be increased. Other factors that can contribute to inefficient production of outputs can be misuse of funds, and other management problems such as unprofessionally running of the FBOs.

43 Input Reduction in Each FBO

Two methods can be used to determine the input reduction for efficiency purposes. The Efficiency Reference Set (ERS)~ as applied by Kirigia et al., (2000) in calculating the input reductions in the Kwazulu-Natal hospitals. The other method used in this study has been based on the DEA results and uses the Input Scores (IS) and the TE scores. Input reduction for the inefficient FBO is calculated as the amount of input (A) used multiplied by the level of inefficiency. The results are added to the technical efficiency score for that FBO. (See below).

Table 4.8: Calculating input reduction using the IS and TE scores

Ebenezer Christian center	Input (A)	(B H A) M- efficiency score)	(C) = (B) +(input change)	Input /addition/reduction (C)
Support Staff	2	2(1-0.963) =0.074	0.074+-0.4	- 0.326
Director/teachers/nurses	4	4(1-0.963) =0.148	0.148++0.2	0.348
expenditure	238900	238900(1- 0.963) =8839.3	8839.3+- 484503.4	- 484,503.4

Source: Survey Data

" These are the group of facilities against which DEA locates the inefficiency facilities and the magnitude of the inefficiency

Table 4.9: Input increase or shortfall of FBOs

Code	Increase/ shortfall of sub staff	Current No. of sub staff	Add	Increase/ shortfall No of d/t/n	Current No Of d/t/n	Add	Increase/ shortfall Expenditure Per year	Current Expenditure Per year	Add
1	0.074	2	2	-1.378	6	7	-15697.533	111591	15697.53
2	-3.059	4	7	-6.74	4	11	-449110.52	962921.203	449110.5
< 3	-1.215	5	6	-1.624	8	10	-4156539.3	2252868	1456539.3
4	-2.876	2	5	-1.772	4	6	-757991.07	584557.72	757991
5	-0.326	2	2	0.348	4	4	-475664.1	238900	475664.1
6	-0.326	2	2	1.748	4	6	-32753.5	238900	32753.5
7	0.074	2	2	-0.926	2	3	345.997	585481	-345.99
8	0.074	2	2	1.111	3	4	5942	493000	-5942
9	0.222	6	6	-1.926	2	4	-221275.25	1961096	221275.2
10	-0378	6	6	0.222	6	6	-105932.05	1961096	105932

Source: Survey Data

D/t/n - directors/teachers/Nurses

Add - Addition

4.4 Productivity Growth

Table 4.10: Total factor productivity scores

YR	Technical Efficiency	Scale Efficiency	Pure Technical efficiency	Total Factor Productivity Change
2004	1.000	1.000	1.000	1.000
2005	1.211	0.982	1.057	1.258
2006	0.876	1.058	0.985	0.913
2007	1.026	1.006	1.010	1.043
2008	1.091	0.881	1.033	0.994
mean	1.044	0.980	1.021	1.044

Source: Survey Data

Table 4.10 shows that the year 2004 is used as a base line and it is assumed that the FBOs are operating efficiently. Over a period of 5 years, there has been fluctuation of total factor productivity. Total factor productivity increased though marginally by 25.8% in

year 2. reduced by 8.7% in year3, increased by 4.3% in year 4 and reduced by 0.6% in year 5. Generally the mean of TFP increased by 4.4% over a period of 5 years. The mean change of efficiency remained the same over 5 years while the margin for scale efficiency dropped by 0.2%, at the same time pure technical efficiency increased marginally by 0.2%. The drop in productivity shows that the results are very significant given that the period covered is before and one year after political change (election time); there is some political influence in the way FBOs operate. There is a negative impact after election because of the drop productivity. One year to election time, productivity is at the peak this is attributed to a lot of support in terms of funds material wealth given to FBOs by politicians, unlike the year after election where support reduces drastically because of lack of political will to support the FBOs.

Table 4.11: Ranges of inefficiency scores of FBOs

Ranges	Overall Technical Efficiency		Pure Technical Efficiency		Scale Efficiency	
	% of FBOs	No. of FBOs	% of FBOs	No. of FBOs	% of FBOs	No. of FBOs
<0.50	10	1	10	1	0	0
0.50 - 0.80	20	2	10	1	10	1
0.80 - 0.99	20	2	10	1	30	3
Total	50	5	30	3	40	4

Source: Survey Data

From table 4.11, the inefficiencies were tabulated to range in three categories. The first and second category required significant improvement for better efficiency, while the third category involves the FBO that can be said to be better off in-terms of efficiency and requires minimal attention to attaining efficiency levels. The tabulation involves the overall technical efficiency, the pure technical efficiency and the Scale efficiency. Only one FBO had efficiency level below 0.50 for both overall technical and pure efficiency

levels. For those facilities with efficiency between 0.50 - 0.80, 2(20%) were under overall technical efficiency, and 1(10%) was applicable for both pure technical and scale efficiency. For efficiency levels between 0.80 - 0.99, 2(20%) were under overall technical efficiency, 1(10%) under pure technical efficiency and 3(30%) under scale efficiency respectively.

Table 4.12: Returns to Scale³

FBOs	IRS	CRS
No. of FBOs	4	6
% No. of FBOs	40%	60%

Source: Survey Data

In Table 4.12, (40%) of the 10 FBOs are operating at an increasing returns to scale (IRS), 60 % in constant returns to scale (CRS), and none in decreasing returns to scale. Hence, all FBOs under IRS and CRS need to adjust their capacity to 100% in order to improve efficiency.

Source of results from appendix 1; A health facility is said to operate at IRS if there is a reduction in cost per unit **resulting from** increased production, realized through operational efficiencies. DRS explain a situation where by there **are increasing** costs due to less outputs produced from the inputs employed. However, for the CRS a health facility **produced** optimal outputs from the inputs employed.

hearing impairment .As a result, such children were locked up in houses or left to roam around begging for money and food. The study also found out that FBOs lacked adequate financial and material capacities to care for the OVC likewise the OVC lack knowledge on paralegal issues such as will writing, memory books, and child rights of inheritance that required intensive training.

For the 10 sampled FBOs, there is an observable deviation of efficiency scores from the best practice frontier, for instance using the year 2004 as an example, the overall average of TE (CRS) of the sampled FBOs is 86% and that under pure technical efficiency scores (VRS) is 91.3%. This implies that on average the FBOs in the sample performed better under pure TE than under scale efficiency hence there is a major contributing factor of inefficiency in FBOs by scale.

It is likely that NESCP, Utumoni Community, Ebenezer Christian ministries and Kibera school of Hope are inefficient because they are not peers in at least 2 to 3 times in the sample. Sampled FBOs that operate under constant return to scale are Red Rose children's center, Tunza children's center, NBM kids programme, Kibera community vision group, Kibera Salvation Army, and Nescop center. Those operating under increasing return to scale are: Nescp, Utumoni community, Ebenezer Christian ministries and Kibera School of hope.

This inefficiency can be attributed to lack of enough funds to most of these FBOs .For example Kibera Salvation Army 1(10%) is the only FBO that has efficient production of output 4(NO. of OVC being fed) there is no sampled FBOs that has excess margin of the NO. of OVC being fed. Most sampled FBOs have produced less than required of output (1 and 4)

5.3 Conclusions and Policy Recommendations

The results indicate the existence of a huge potential for improving efficiency in Faith Based Organisation towards providing care and support to OVC by either injecting or reducing resources into the primary FBOs. This is illustrated by the unachieved targets

CHAPTER FIVE: CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Introduction

This chapter concludes the study by giving a brief analysis of the important findings. This is complemented by a discussion of policy recommendations and suggestions for future research. The main purpose of the study was to test the hypothesis that Faith Based Organizations are efficient in the provision of care and support for OVC and also that, the efficiency of care and support provided by the Faith Based Organizations has improved over years. This is in accordance with the objectives stated in chapter one. Data from Ten FBOs of thirty seven was collected for the year 2003/4 to 2007/8. Productivity change was analyzed for the five years. The study employed Data Envelopment Analysis (DEA)

5.2 Summary of the Findings

A total of 10 FBOs were interviewed including representatives of the relevant government departments including the Assistant chief, Social Development officer. From the data sources, there was no documented exact number of OVC but it was estimated for instance, Kibera location had between 5000 and 10000 OVC. The study found out that majority (41%) of the OVC had lost parents (dual orphans) while 23% were vulnerable children, with either both parents alive (20%), or did not know the where about of their parents. OVC in Kibera have various physical and psychosocial needs including lack of adequate nutrition, access to education, clothing, shelter, security, love, guidance, and counseling, belonging, recognition and identity. The reason given for these needs include rampant poverty, overcrowding and uncoordinated OVC support services.

Most organizations reported to be providing physical care to the OVC including provision of food, educational materials modification, and clothing, however, provision of psychosocial care and support remained inadequate. The OVC lacked guidance and counseling, recreation facilities, vocational skills and they suffered discrimination, neglect and displacement. Based on the information gathered, there is no care and support for OVC with special needs such as physical disability and mental, visual and

bearing impairment .As a result, such children were locked up in houses or left to roam around begging for money and food. The study also found out that FBOs lacked adequate financial and material capacities to care for the OVC likewise the OVC lack knowledge on paralegal issues such as will writing, memory books, and child rights of inheritance that required intensive training.

For the 10 sampled FBOs, there is an observable deviation of efficiency scores from the best practice frontier, for instance using the year 2004 as an example, the overall average of TE (CRS) of the sampled FBOs is 86% and that under pure technical efficiency scores (VRS) is 91.3%. This implies that on average the FBOs in the sample performed better under pure TE than under scale efficiency hence there is a major contributing factor of inefficiency in FBOs by scale.

It is likely that NESCP, Utumoni Community, Ebenezer Christian ministries and Kibera school of Hope are inefficient because they are not peers in at least 2 to 3 times in the sample. Sampled FBOs that operate under constant return to scale are Red Rose children's center, Tunza children's center, NBM kids programme, Kibera community vision group, Kibera Salvation Army, and Nescop center. Those operating under increasing return to scale are: Nescp, Utumoni community, Ebenezer Christian ministries and Kibera School of hope.

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5.3 Conclusions and Policy Recommendations

The results indicate the existence of a huge potential for improving efficiency in Faith Based Organisation towards providing care and support to OVC by either injecting or reducing resources into the primary FBOs. This is illustrated by the unachieved targets

by FBOs such as Red Rose, children Center, NESCP, Tunza Children's Center, Utumoni Community, Kibera Salvation Army and Nescop Center. To reduce inefficiency resulted from scale effects, the government through the ministry of youth and social services, the ministry of Health, the ministry of education and the ministry of children and gender should work in conjunction with the FBO to expand both their inputs and outputs to increase or decrease if an FBO exhibits increasing return to scale. Decisions can be made according to the weights attached to inputs and outputs. Other variables likely to cause inefficiency are incompetence of the personnel officers to run the FBO, the element of corruption in these Organizations, availability of donors to support the FBOs, among others.

For the government to address the problem of duplication of projects there must be smooth implementation of OVC Programmes where, FBOs are recommended to venture in to a re- entry process to ensure that there is a well-defined partnership between the organization and the relevant government departments. There is need to psychosocial (PSS) care and support of OVC such as guidance and counseling, group therapies, trauma healing, life skill training and recreational activities. Given that, there are no Organizations offering care and support to OVC with special needs, it is recommended that FBOs should consider starting special care and support responses for OVC with special needs. This can be incorporated in existing schools.

The government through the relevant departments is recommended to offer coordination to avoid duplication of services among the FBOs. This is to ensure, care and support services are given to deserving OVC. Facilitation and monitoring of the impacts of the service rendered will run smoothly. In order to get a clear understanding of the OVC, caregivers and the wider community, there is need for a household baseline survey. This will enable the FBOs to get information for individual OVC and caregivers and also make observations and judgment about the living conditions of the OVC.

5.4 Areas of Further Research

This study only assessed technical efficiency, which is just a necessary condition but not a sufficient condition; there is need for further research to know the factors causing inefficiency which should incorporate price. To add more emphasis on further research, there is need to compare efficiency of FBOs under different autonomous management structures. Further, studies should broaden the efficiency level of FBOs and their possibility to attain government-planning objectives, like the vision 2030. Most FBOs have implemented some urban child development programme in Kibera slum. Therefore, there is need for a study to be carried out on the OVC needs assessment in Kibera slum with the aim of understanding the current OVC situation and current responses and gaps.

5.5 Limitations of the Study

Most of FBOs were left out in this study due lack of information; from a sample of thirty seven FBOs, only 10 had computerized services provided to OVC and delivery records. According to district children officer, OVC in Kibera have various physical and psychosocial needs including lack of health care, adequate nutrition, access to education, clothing, shelter, security, love, guidance, and counseling, recognition and identity. This study is limited because it only focuses on three issues: health services, adequate nutrition and access to secondary education this is because majority of the FBOs carry out integrated programmes and common in all these FBOs are these three. Lack of complete data from FBOs reduced the number of FBOs analyzed to ten from a population of thirty seven.

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APPENDICES

Appendix 1: Summary Statistics

FBOs	code	CRSTE(overall TE)	VRSTE(pure TE)	CRS/VRS(scale efficiency)	Returns to scale	CRS reference /peer group	VRS Efficiency reference/peer group	CRS Efficiency reference/Peer count	VRS efficiency reference/Peer count
RedRose Children's Center	1	1.000	1.000	1.000	CRS	1	1	1	2
Nescp	2	0.704	0.719	0.980	IRS	1,3,6,10	1,3,6,8,10	0	0
Tunza Children's Center	3	1.000	1.000	1.000	CRS	3	3	3	2
Utumoni Community	4	0.364	0.409	0.891	IRS	3,7,6	1,3,7	0	0
Ebenezer Christian Ministries	5 1	0.634	1.000	0.634	IRS	6,10	6	0	0
NBM kids programme	6	1.000	1.000	1.000	CRS	6	6	4	2
Kibera Community Vision Group	7	1.000	1.000	1.000	CRS	7	7	2	1
Kibera School of Hope	8	0.899	1.000	0.899	IRS	10,7,6,3	8	0	1
Kibera Salvation ^Aimy	9	1.000	1.000	1.000	CRS	9	9	0	0
1 Nescop Center	10	1.000	1.000	1.000	CRS	10	10	3	1

Appendix 2: FBO Analyzed

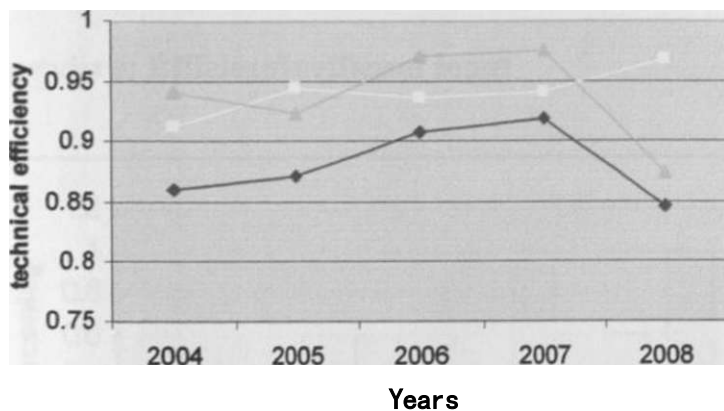
Code	FBOs
1	RedRose Children's Center
2	Nescp
3	Tunza Children's Center
4	Utumoni Community
5	Ebenezer Christian Ministries
6	NBM kids programme
7	Kibera Community Vision Group
8	Kibera School of Hope
9	Kibera Salvation Army
10	Nescop Center

Appendix 3: Efficiency Mean Trend

MEAN TREND			
	(CRS)	(VRS)	SE
2004	0.86	0.913	0.942
2005	0.872	0.944	0.924
2006	0.909	0.936	0.971
2007	0.920	0.942	0.977
2008	0.847	0.968	0.875

Source: Survey Data:

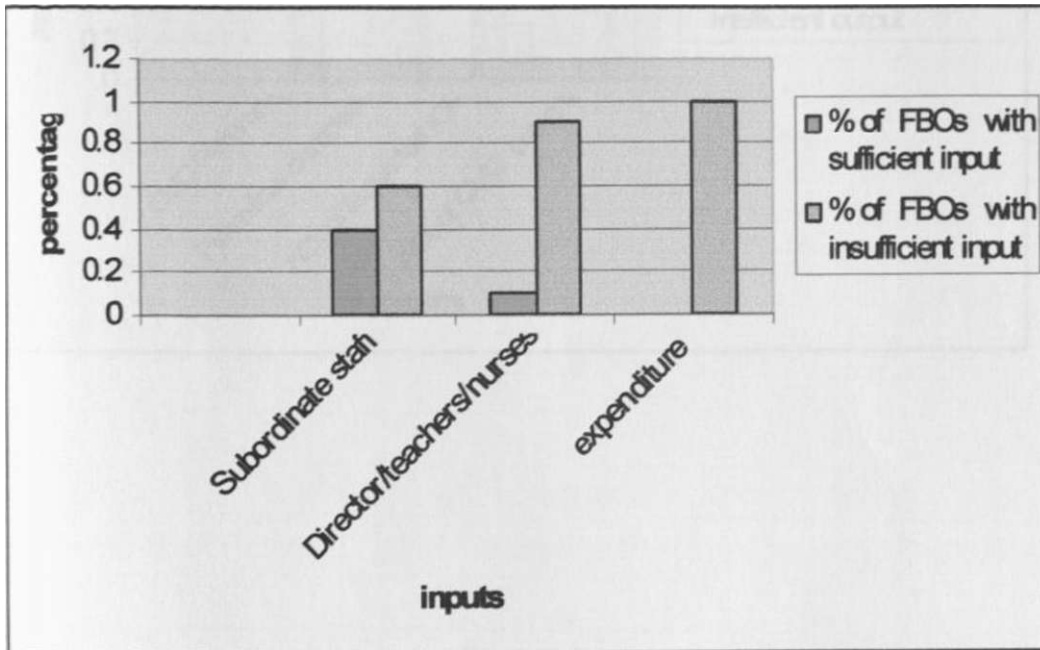
Appendix 4: Mean trend of efficiency



Appendix 5: Efficient/Inefficient Input

Input	% of FBOs with Efficient input	% of FBOs with inefficient input
Subordinate staff	40%	60%
Director/teachers/nurses	10%	90%
Expenditure	0%	100%

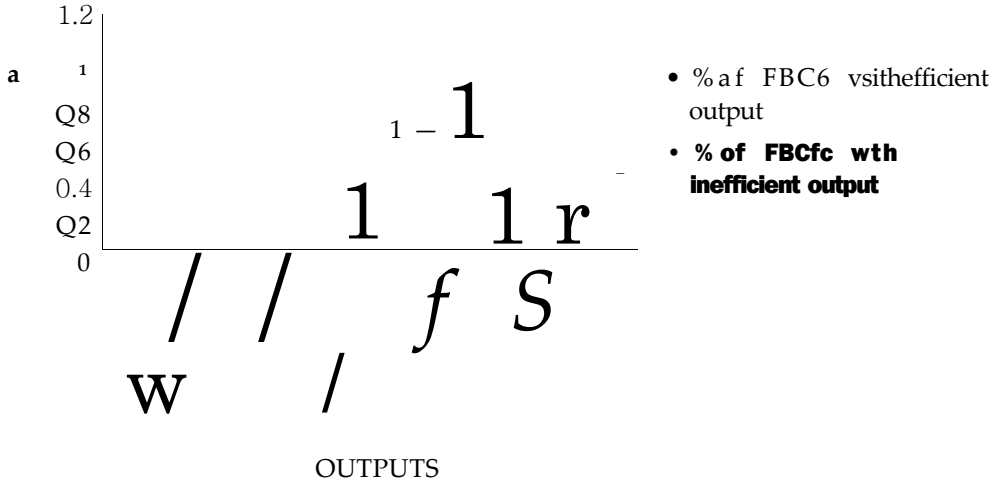
Appendix 6: Efficient/Inefficient input



Appendix 7: Efficient/Inefficient output

Output	% of FBOs with efficient output	% of FBOs with inefficient output
OVC Referrals	0%	100%
Form four completion	40%	60%
NO. of times fed (OVC)	70%	30%
NO. of OVC being fed	10%	90%

Appendix 8: Efficient/Inefficient Output



Appendix 9: Inputs and Outputs used in the study for the DEA model

Referral	Sch	T/fed	N/ovc	Sub	D/t/n	Exp
5	1	2	85	2	6	111591
10	1	2	208	5	6	1339950
40	25	3	350	5	8	2252868
9	1	2	70	6	9	1429726
1	1	1	75	2	4	528170
5	2	3	100	2	4	238900
2	1	2	60	2	2	585481
5	2	2	87	2	3	493000
1	2	2	360	6	2	1961096
1 U	43	3	379	6	4	1961096
30	1	2	112	2	6	122750
15	1	2	255	5	8	1406948
93	25	3	360	5	9	2252868
13	2	2	109	4	4	1123267
1	1	1	91	2	4	591821
5	2	3	100	2	2	250882
1	1	2	100	2	3	585481
5	2	2	94	2	2	493000
2	2	2	360	6	4	1961096
13	47	3	391	6	6	1041190
30	1	2	92	2	8	128888
10	2	2	320	8	12	1547642
105	35	3	380	6	9	2478155
14	3	2	145	5	6	1349489
2	1	1	122	3	4	481693
2	2	3	140	3	2	301891
1	1	2	104	2	3	621009

3	3	2	104	2	2	519500
1	2	2	360	6	4	1961096
9	51	3	403	7	6	2565219
25	1	2	125	2	8	154665
20	2	2	410	8	12	1547642
90	35	3	380	8	10	2478155
19	3	2	165	5	6	1349489
3	1	1	150	3	4	523009
9	2	3	180	3	3	397698
2	1	2	138	2	3	621009
5	3	2	120	2	2	519400
2	2	2	360	6	4	2109000
17	53	3	437	7	6	2565219
8	1	2	193	2	8	139193
20	3	2	370	8	12	1396117
85	35	3	410	8	10	2725971
25	5	2	180	6	6	1568916
3	1	1	94	2	3	297824
2	2	3	155	2	2	213093
1	1	2	91	2	3	621009
4	3	2	141	2	2	501595
1	2	2	360	6	4	2109000
19	55	3	453	7	6	2565219

Source: survey data

Key

Sch - Secondary school completion

t/fed - Number of times OVC's are fed

n/ovc - Number of OVC's

sub - subordinate staff

d/t/n - directors/teachers/nurses

- expenditure

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Appendix 10: Questionnaire used for collection of data.

Introduction

I am from the University of Nairobi; School of Economics and I am collecting data for my project, on assessing the technical efficiency of care and support provided to Orphans and Vulnerable Children by FBO, CBO, and NGO. This is a requirement to complete my MA. All the information gathered will be highly confidential so please feel free to give me the information

Section I: Inputs

No.	Source of income	2003/4	2004/5	2005/6	2006/7	2007/8

Capital expenditure

No.	Name of the Faith Based Organization	2003/4	2004/5	2005/6	2006/7	2007/8
	Land					
	buildings					
	Furniture					
	Vehicles					
	Computers					
	Printers					
	Photocopiers					
	Fax machines					

B: Number of staffs

No.		2003/4	2004/5	2005/6	2006/7	2007/8
1	Directors/ Managers					
2	Teachers/ nurses					
3	Subordinate staff					

C. Number of OVC Targeted

No.	Name of the Faith Based Organization	2003/4	2004/5	2005/6	2006/7	2007/8
	NO. of OVC					

Allocation for the OVC Project

No.		2003/4	2004/5	2005/6	2006/7	2007/8
	Project					
	Personnel					
	i administration					
	Other costs					

Section II: Outputs

No.	Name of the Faith Based Organization	2003/4	2004/5	2005/6	2006/7	2007/8
	NO. of OVC attendance/referrals					
1.	NO. of secondary school completion					
	Average Feeding per day					
2.	NO. of OVC Fed					

. Is the facility registered with the Ministry of Social Services, or NGO Board?

a) Yes

b) No

2. If (1) is yes, when was it registered?

3. In which year did the facility start supporting OVC?

4. What age group does it support?

5. What is the proportion in %?

a) Under 5 years

b) 5-9 years

c) 10-14 years

d) 14-19 years

6. What type of support services do you provide to the orphans? (Rank them beginning with the most a gent)

a) Educational support

b) Food and nutritional support (If yes

%

c) Health care

d) Shelter

e) Clothing

f) Psychological support

g) Others (specify)

7. Kindly indicate the type of clinic in which the OVC are treated?

a) Government hospital

b) Missionary hospital

c) Orphan care facility

d) Private hospitals

8- Do you have any partners?