# CHRISTIAN SERVICE UNIVERSITY COLLEGE SCHOOL OF BUSINESS DEPARTMENT OF ACCOUNTING AND FINANCE

# ESTIMATING THE TECHNICAL EFFICIENCY OF NON-PROFIT MAKING ORGANIZATION IN GHANA: THE CASE OF FAITH BASED INSTITUTIONS

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A DISSERTATION SUBMITTED TO THE DEPARTMENT OF ACCOUNTING AND FINANCE, SCHOOL OF BUSINESS, CHRISTIAN SERVICE UNIVERSITY COLLEGE, KUMASI, GHANA, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF BACHELOR OF BUSINESS ADMINISTRATION

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# DECLARATION

We hereby declare that this research thesis entitled 'Estimating the Technical Efficiency of Non-Profit Making Organization in Ghana. The Case of Faith Based Institutions' is an authentic record of our own work carried out as requirements for the award of degree (Bachelor of Business Administration) at Christian Service University College, under the guidance of Mr. Kofi Amanor. All sources have been accurately reported and acknowledged and that this research work has not been previously, in its entirely or partially been submitted to any other university.

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# DEDICATION

This thesis is specially dedicated to the Almighty God and to our Parent for their stupendous support and contribution sustaining us through many transitions in our life. May God bless you for being there for us.

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# ABSTRACT

The study focuses on determining and measuring the technical efficiency of non-profit making organization in Ghana. The center of attention was on Churches in Ghana, all in the Ashanti Region. The main objective of the study is to measure the technical efficiency of churches using DEA, to benchmark the church based on the technical efficiency and to determine what influences the technical efficiency of Christian churches in Ghana. The research was guided by the extent of which we measure or determine church technically efficient using DEA, the benchmark of the church that is its technically efficient and what influences the technical efficiency of Christian churches in Ghana? The result of this study may inform churches in making plans to improve the efficiency on the inputs and outputs indicators. Churches which are less efficient will evaluate and measure their activities to match up with the most efficient one. The most efficient church becomes the target for the other churches.

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#### **CHAPTER ONE**

# **INTRODUCTION**

#### 1.1 Background of the study

The background of the study is outlined in this chapter. Over the years church leaders have taken massive steps to ensure accountability of stewards to ensure the judicious use church resources. The establishment of various boards and groups to steer the affairs of the church can attest to this assertion. This has necessitated the use of management techniques that evaluate the performance of these units so as to avail tools that can improve management and policy decisions of nonprofit making organizations (churches).

One measure of non-profit organization performance which could indicate the vulnerability of the organization distress is technical efficiency (TE). TE measures the distance of a firm's performance from the best practice frontier that represents the optimal use of resources (Yin, Yang, and Mehran, 2013). It indicates the resource utilization performance of a firm relative to its peers.

When organizations consume an excess of inputs in the production of outputs, the production process is technically inefficient, since the costs exceed their potential levels. There are other parallel sources of inefficiency: operating with a scale of production that is not optimal (scale inefficiencies) or with an inappropriate mix of products and services (scope inefficiencies). A clear and precise interpretation of scope appears in Panzar and Willig (1981) and can be explained intuitively: there are economies of scope when the cost

of producing a number of products in one firm is lower than producing the same number in different unit-product firms.

The technical efficiency of organizations needs to be measured to ensure their continuous existence. In order to evaluate the activities embedded in some organizations that do not place emphasis on profit-making, the traditional use of measuring the effectiveness and efficiency of a product in terms of profitability cannot be employed since the emphasis here is on the efficiency of an institution not a product. Here performance and efficiency measurement considers inputs or resources used by the institution and the outputs that are the result of input utilization. The performance of nonprofit and voluntary organizations often does not depend on one person but the entire management team (MT). A more cohesive MT may represent a competitive advantage as MT members find satisfaction in group achievement rather than individual self-expression and self-determination (Katz and Kahn, 1978). However, the composition of the MT may affect how well the team works together (Bantel and Jackson, 1989; Hambrick, 1987, 1989; Lott and Lott, 1965; Priem, 1990; Simons, 1995). Previous studies have found both positive and negative effects for MT diversity (Bourgeois, 1980; Dess, 1987; Eisenhardt and Schoonhoven, 1990; Haleblian and Finkelstein, 1993; Hambrick and Mason, 1984; Hansen and Wernerfelt, 1989;

Hrebiniak and Snow, 1982; Hurst, Rush, and White, 1989; Norburn and Birley, 1988; O"Reilly, Snyder, and Boothe, 1995; Virany and Tushman, 1986). For example, greater

diversity in MT functional expertise and working experience may help an organization be more assertive, innovative, and adaptive (Bantel and Jackson, 1989; Hambrick, Cho, and Chen, 1996; Murray, 1989). However, greater MT diversity in perceptual frames and attitudes may make it more difficult to reach consensus decisions efficiently (Goll, Sambharya, and Tucci, 2001; Kirkman,

Tesluk, and Rosen, 2004; Murray, 1989).

As Boussofiane and Dyson (1991) indicated profitability should not be the only performance measure even for profit making organizations. They argue that environment factors outside the company control can affect performance. Thus, when the unit of analysis in an organization (public or private) without lucrative aims, subject to multiple objectives and whose outputs cannot always be expressed in quantitative terms; the assessment of its activity needs a combination of performance indicators.

In situations in which each input and output cannot be added in a significant index of productive efficiency, it is useful that the application of the Data Envelopment Analysis model (DEA) be used as a tool to measure the relative efficiency of a group of homogeneous Decision Making Units (DMU). This research describes the use of DEA methodology to assess technical efficiency of the nonprofit making organizations, particularly, churches. DEA was developed by Charnes et al. (1978) and Banker et al. (1989).DEA is a method used for the measurement of efficiency in cases where multiple input and output factors are observed and when it is not possible to turn these factors into

one aggregate input or output factor. This is a linear programming based technique which is applied to assess the efficiency of organizations.

DEA provides a comparative efficiency indicator of the units to evaluate. The units analyzed are called decision-making units (DMUs). In DEA, the relative efficiency of DMU is defined as the ratio of the total weighted output to the total weighted input. If the homogeneity is maintained, the outputs and inputs indicators can be expressed in any unit of measurement.

The results of DEA model are sensitive to the inputs and outputs factors. Indeed, an accurate selection of the input and output indicators, which are best adapted to the objective of the analysis, is critical to the success of the study. Next; the variables that would be considered to be included in the analysis would be discussed.

The inputs variables are units of measurement, which represent the factors used to carry out the delivery of services. The identification and measurement of these factors is crucial in a fair evaluation of the economy and efficiency in the programs and services management. Previous studies on other performance models (Iannaccone et. al, 1995) have shown that inputs of churches institutions can be categorized in time and money. In our case, we classify the inputs used by the churches as follows. The input variables used in the study are as follows: small groups, pastors, library, time and money. Output variables measure the yield or the level of activity of programmes and services. A broad range of outputs of churches can be found in Perkins and Fields (2010). The output indicator used in the study is to grow in attendance, increase its financial resources, develop constituents spiritually, and Internal business processes.

#### 1.2 Statement of the problem

The TE measurement of non-profit organization is of the vital importance to the organization in assessing the effects of policy interventions. Only strong technically efficient organization can promise the going-concern of the organization and continue to provide satisfactory service to its members. Consistent with this statement, the profit and non-profit organization literature is flooded with studies on the TE of banks, hospitals and other institution (Fujii, Managi, and Matousek, 2014; Homma, Tsutsui, and Uchida, 2014; Hou, Wang, and Zhang, 2014; Rosman, Wahab, and Zainol, 2014; Shyu and Chiang, 2012; Sufian, 2009; Tecles and Tabak, 2010; Yin et al., 2013). The problem is that the assessment of the performance of churches in order to ensure their continued existence has been minored upon. Therefore this study seeks to find the technical efficiency churches in Ghana.

#### **1.3 Objectives of study**

The purpose of the study is to determine the technical efficiency non-profit organization (church) in Ghana. Specifically, this research sought to find out:

1. To measure the technical efficiency of churches using DEA.

- 2. To benchmark the church based on the technical efficiency.
- To determine what influences the technical efficiency of Christian churches in Ghana.

# **1.4 Research question**

The research was guided by the following questions:

- 1. To what extent is a church technically efficient using DEA?
- 2. What is the benchmark of the church that is technically efficient?
- 3. What influences the technical efficiency of Christian churches in Ghana?

# **1.5 Significance of the study**

The result of this study may inform churches in making plans to improve the efficiency on the inputs and outputs indicators. Churches which are less efficient will evaluate and measure their activities to match up with the most efficient one. The most efficient church becomes the target for the other churches.

# **1.6 Scope and limitations**

The study considered only inputs and outputs elements that are paramount to the efficiency of the churches. The study was restricted to the four churches in Kumasi metropolis. The analysis was based on data obtained from the Planning Committee, Finance Committee, welfare Committee, Building Committee of the respondent churches.

# **1.7 Organisation of the Study**

This research covers five (5) chapters. Chapter one deals with introduction and background to the study, statement of the problem, objectives of the study, research questions, significance of the study, limitation of the study and organization of the study. Chapter two on the other dealt with the review of the related literature or other work depicting the opinions of other people. Chapter three dealt with methodology, research design, research population, sample and sampling procedure, research instrument, administration of instrument and data analysis procedure. Chapter four dealt with results of the study. Chapter five finally dealt with summary, conclusions, suggestions, recommendations and references.

#### **CHAPTER TWO**

#### LITERATURE REVIEW

# **2.1 Introduction**

The first section focuses on the overview effective church management and of church performance. The following sections look theoretical review of efficiency and empirical review of data envelopment analysis.

### 2.1.1 Effective church management

Effective church management is the appropriate administration of church resources. There is sometimes resistance to labeling church management as a business function, but whenever there are people and money involved, there needs to be structured business practices to ensure resources are managed and used appropriately.

Churches are unique in that they rely on donations from members and have a responsibility to be good stewards with those resources. The ability to manage church resources effectively depends on the ministry's process of overseeing church operations.

# 2.1.2 Church board of governance

Churches as organizations are governed by a board of directors. The board is obligated to oversee the operations of the ministry and is responsible for the proper management of resources. Effective board governance lays the groundwork for efficient church management by directing and holding church administrators accountable for proper administration of resources. This includes oversight of ministry budget, capital expenditures, legal compliance and managing the risk of church operations. Effective boards are diverse in membership and have representatives from business or legal backgrounds to ensure a broad perspective and proper documentation of board documents.

#### 2.1.3 Church Strategy

Effective church growth is a result of well thought out church strategy and planning. Churches should go through the process of vision, mission and values development and strategic plan development. Planning allows the organization to set performance targets and helps to map out steps to fulfill its mission and purpose.

#### **2.1.4 Church goal setting**

Implementation of church strategy is dependent on how well goals are set and accomplished. Goal setting can be a time consuming process but once SMART goals are developed, a good performance management process can help ensure focus and timely Completion of church goals that support its mission.

# 2.1.5 Budgeting process

Churches have limited resources so having a structured budgeting process to identify expenditure needs and prioritizing church spending is critical. Saving for the new building or land acquisition is an important part of sound budgeting as well as ensuring needed resources are available for the unexpected building or campus repairs.

#### 2.1.6 Managing performance

Strategy and goal completion is only as effective as the process that manages it. A structured process to monitor goal completion can help strategic implementation and holding people accountable is what performance management is about. Whether it is church employees, volunteers or a sub-committee of the board – completing goals, as written, on time is critical to church strategy and mission fulfillment.

### 2.1.7 Facilities management

Visitors and congregants like to gather in an atmosphere that is clean, maintained and aesthetically appealing so whether a church rents temporary building space or has a fullblown campus, managing the upkeep and maintenance of ministry facilities is important. Buildings need to be cleaned, maintained, updated and repaired so having a scheduled routine maintenance plan is important to keeping a comfortable and appealing church environment.

#### **2.1.8 Volunteer support**

Churches rely heavily on volunteer labor and need a structured volunteer management process to help recruit, place, train and oversee volunteer's help. Volunteer's off-set labour costs so providing a customer-friendly volunteer experience is an important part of growing an efficient and effective volunteer program.

# 2.1.9 Legal and Risk Management

Churches need to manage their risks and be legally compliant with governing laws. Understanding ministry risks and being proactive in minimizing exposure is what good church management is about. Campus safety and volunteer screening are examples of church related risks. Whether a church has a congregation of 100 or 10,000, effective church management is important to ensuring good stewardship of the resources God supplies. Setting the direction by developing strategy, goal development and strong performance management can go a long way in helping a church achieve all that God has called it to.

# **2.2 Indicators of Church Performance**

The Book of Acts, the premiere historical record of the early church, provides some foundation for understanding church performance. The astounding numerical growth of the 1<sup>st</sup> century church is a dominant event in The Book of Acts (Arn & Arn, 1982; Van Engen, 1981) that has led to the modern Church Growth Movement (McGavran, 1990; Schwarz, 1996; Towns, Wagner, & Rainer, 1998). The Church Growth Movement measures church performance based on growth in attendance. However, as Rick Warren, well-known pastor of the Saddleback "Mega-Church" has noted, growth in church attendance is an important part of fulfilling some of the purposes of a Christian church; it is a limited measure of effectiveness (Warren, 1995).

Saddleback church as an example also measures effectiveness in terms of attendees" growth in spiritual maturity, missions outreach within the United States and abroad, internal organizational development, and attaining solid financial standing to facilitate achievement of these objectives (Warren, 1995). Thus, growth in attendance is a very limited measure of church performance in much the same fashion that profitability alone is a limited measure of business performance.

Recognizing the limitations in a single measure of performance, Kaplan and Norton (1996) developed a balanced scorecard approach to organizational performance. The balanced scorecard proposed that appropriate measurements be taken from four areas. These are constituent service, financial, learning and growth, and internal business processes. These areas of operation are also applicable within Christian churches.

The following subsections describe an approach to application of the concepts of the balanced scorecard in a church setting.

#### **2.2.1 Constituent service**

Church constituents are those who regularly attend worship services. Although church membership might also be considered an indicator of customer population, in reality, many church members may not be active attendees and many active attendees may not have become church members. The energy and essence of the worship experience and "life" of a church is most directly evident in the presence of worshippers who are actively engaged in the church"s primary mission. Thus, performance in this area can be measured as growth in average weekly attendees. As growth in attendance may reflect the ability of a church to appeal to a range of groups with interests, greater management team may increase this appeal and be related to growth in church worship attendance

#### 2.2.2 Financial

Solid financial resources are vital for strong churches (Callahan, 1983; Fickett, 1972; Miller, 1990; Rickard, 1984; Schaller, 1988, 1993; Shawchuck, Kotler, Wrenn, & Rath, 1992; Shenk & Stutzman, 1988; Wagner, 1984b). Financial support is a core aspect of stewardship that translates faith into service (Dobbins, 1960) and is a biblical concept (Deuteronomy 16:16b-17; Luke 21:1-4; Acts 2:44; 2 Corinthians 8:1-15; 16:1-2). Thus, a measure of church performance in the financial area is growth in annual offerings (attendee contributions). In many cases, this measure of performance will be highly correlated with growth in attendance. In other cases, a church may attract donations or financial support from various groups in a community regardless of religious affiliation. Whether based on appeal to a wider range of attendees or a wider range of nonattending contributors, greater diversity in the TMT is likely to be positively related to growth in offerings and revenue.

#### 2.2.3 Learning and development

Effective church performance can also be measured in terms of the proportion of attendees who also attend Sunday school (Rainer, 1996). In Christian churches, Sunday school is considered a primary means of Christian teaching and spiritual development of staff and constituents (Arnold, 1992; Callahan, 1983; Chaney & Lewis, 1977; Hull, 1993; Mack, 1996;

McBride, 1995; Miller, 1990; Rainer, 1996, 1999; Robinson, 1997; Towns, Vaughan, & Seifert, 1981; Wagner, 1984a, 1984b). The continual learning and education of believers is a core mission of the church as it develops members" spiritual maturity (Foster, 1978). Many attendees of Christian churches are also volunteer workers in the organization, responsible for carrying out key roles in worship and operation of the church. Thus, it is appropriate to measure learning and growth in churches in terms of the percentage of attendees who also participate in Sunday school. This performance measure may also be positively correlated with growth in attendance, as newer attendees may be seeking a church's help in personal spiritual development. In some cases, the reputation of the Christian education program may help drive growth in worship service attendance. A church's ability to provide a range of alternative perspectives and approach to Christian education and development may be increased by greater diversity among the TMT members. Thus, greater TMT diversity may be positively related to the percentage of attendees participating in Sunday school.

#### **2.2.4 Internal business processes**

Both adequate staffing and efficient operations within a church present a visible example of responsible and conscientious stewardship (Fickett, 1972; Schaller, 1992, 1993; Tucker, 1976; Westing, 1997). Although churches often have substantial fixed expenses such as

building/land financing and utilities, expenses associated with ministry staffing are more directly controllable. Thus, costs of ministry in ratio to attendees may be an appropriate summary measure of overall church efficiency. In this case, lower levels of this measure indicate higher levels of efficiency.

#### **2.3 Theoretical Review of Efficiency**

The theoretical beginnings of the concept of efficiency used in this study were proposed by scholars like Debreu, (1951); Färe and Grosskopf, (1985); Farrell, (1957); Koopmans, (1951). Berger and Humphrey, (1997) and Hauner (2004) later provided extensive literature on the concept of efficiency and productivity. Efficiency could mean a lot of things similar to maximizing value through economies of scale, scope, output mix synergy and managerial efficiency. The yardstick of an efficient firm would be to generate more output from a given mix of inputs. The measurement of efficiency was therefore initially performed in relation to the various industrial sectors of the real economy but in the past 15 to 20 years the focus has shifted to the financial sector and nonprofit making organization (Holló & Nagy, 2006).

The positive underlying belief of efficiency analysis in economics emanates from the urge to create and enhance tangible value, while the normative raison d'etre for efficiency analysis is founded on the challenge to obtain useful policy information (Aikaeli, 2008). The understanding of value is subjective. The scholar, Vilfredo Pareto, defined efficiency as a condition where any change which makes at least one individual better off without making any one worse off, that change is efficient (Debreu, 1959; Schenk, 2004; Varian, 1992). The relationship between cost function and production function, which underlies efficiency assessment, was first established by Shepherd (2015) with the assumption of theoretically known efficiency. Quantitative methods for measuring total economic efficiency (with assumption of unknown theoretical efficiency) were pioneered by Farrell (1957).

The fundamental economic problem is scarcity of resources. Efficiency is concerned with the optimal production and distribution of these scarce resources. Fried, Lovell and Schmidt (2008) defined efficiency as a comparison between observed and optimal value of output and input. Efficiency is realized if more outputs are generated without changing inputs. In other scenarios, efficiency could be seen if the same outputs are generated with fewer inputs. Efficiency measurements begin with a production technology in the form of frontiers. The frontier measures how close a firm is to attaining the optimum output level that a best practiced firm will earn facing similar exogenous conditions. Production technology can be depicted by production functions, cost functions or profit functions. Efficiency (Coelli, Rao, & Battese, 1998). Nonetheless, technical efficiency, allocative efficiency, profit and overall economic efficiency are some of the forms of efficiency usually found in existing literature.

In the estimation of efficiency scores, one can use either parametric or non-parametric estimation technique. The popular non-parametric techniques are the Data Envelopment Analysis (DEA) and the free Disposable Hull Analysis (DHA). The parametric approach techniques consist of the Stochastic Econometric Frontier Approach (SFA), the Thick Frontier Approach (TFA) and the distribution–free approach (DFA).

Both parametric and non-parametric estimation techniques are equally good when measuring various forms of the efficiency of firms. Aikaeli (2008) used both techniques in his study into the efficiency of Tanzanian banks. He used the DEA model to estimate technical and scale efficiency and SFA to estimate X-inefficiency.

However, the parametric techniques are often preferred as they generally correspond well with cost and profit efficiency concepts studies. Non-parametric techniques generally ignore prices and therefore can only account for technical inefficiency and not allocative inefficiency (Berger & Mester, 1997 as cited in Ncube, 2009).

#### **2.4 Forms of Efficiency**

#### **2.4.1 Technical Efficiency**

Technical efficiency of a given firm at a given time period is defined as the ratio of its mean production (conditional on its levels of factor inputs and firm effects) to the corresponding mean production function if the firm utilized its levels of inputs most efficiently (Battese & Coelli, 1988). Ogunniyi (2008) defines technical efficiency as the ability to achieve a higher level of output given similar levels of inputs.

In measuring technical efficiency the question of how much input could be proportionally reduced without changing output produced; or how much output could be enhanced without changing the combination of input; is unraveled. These dual options give birth to the two forms of technical efficiency. Technical efficiency can either be output or input-oriented. An input oriented technical efficiency is when a firm is able to employ less of at least one input and still able to maintain the level of output while an output-oriented technical efficiency can either be same level of inputs. According to Koopmans (as cited in Murillo-Zamorano, 2004), when either of the above stated instances occur, then the firm is said to be technical efficient.

Technical efficiencies are derived from production function or production possibility frontier. Firms that produce outputs on the production frontier are operating at maximum possible productivity and are recognized as technically efficient. Firms producing below the frontier line are considered to be technically inefficient, indicating that such firms are failing to optimize the use of all its available resources. According to Coelli, Rao, and Battese (1998), movements outward of a production frontier imply productivity growth which may be as a result of advances in technology. Discovery and utilization of new and improved resources are also likely to result in a firm producing outside of its production frontier. In the short run, a firm may achieve technical efficiency by operating on the production frontier and in the long run, improve in its productivity from exploiting the expanding scale of operations. This supposes that productivity growth may be linked to improvements in technical efficiency, to technological improvements and also to exploitation of scale of operation, or a combination of all three causes (Coelli et al., 1998).

At the optimal scale or the frontier, any increase or reduction in the size of operation either through the inputs or output results in fall of efficiency level. Hence the only efficient level of operations is on the frontier. For instance, a 25% inefficiency score indicates that the firm can both minimize cost by 25% and maintain their current output level by altering their production technique, or the firm can increase production by 25% and maintain the cost of production.

A production frontier can be specified by production functions and distance functions. A single output specification of the production frontier function is valid for cases when many inputs are used to produce single output. Distance functions are useful for cases when many inputs are used to produce many outputs. The parametric estimation of the Stochastic Distance Function has proven to be very useful in estimating technical efficiency with multiple-output technologies and avoiding the major drawbacks of parametric methods associated with the single-output approach (Färe & Primont, 2012).

It is argued that technical efficiency – efficient frontier is computed using the production function at an intermediary stage – is a more appropriate measure when estimating the

efficiency levels of firms in their production process. This is because technical efficiency allows the use of inputs and outputs involved in the production process to indicate whether the firm is efficient or not. Given the difficulty of procuring information from the banking industry concerning their profit margin, cost of production and other sensitive information, the choice of technical efficiency is the best. Also, in assessing the efficiency of banks in performing their intermediation function; estimating the technical efficiency scores of the banks is superior to other forms of efficiency measure.

## 2.4.2 Allocative Efficiency

Allocative efficiency (AE) has to do with the selection of an input mix that distributes factors to their highest value uses and introduces the opportunity cost of factor inputs to the measurement of productive efficiency. Allocative efficiency is realized when a firm chooses the optimal combination of inputs, whiles taking the level of prices and the production technology as given (Coelli, Rao & Battese 1998). Failure of a firm to choose the optimal combination of inputs at the set prices in producing its output makes the firm inefficient in inputs allocation. Badunenko, Henderson, and Kumbhakar (2012), in an empirical study on allocative efficiency, proposed that allocative efficiency can be estimated using information on input and output quantities and profit. This composition shows the ability of a financial co-operative institution to optimally combine available inputs given factor prices and available technology. It tries to come up with the choice that best compare to the budget constraint among different possible combinations of input that yield the same amount of the desired output. That is, the ability of economic agents to

equate marginal cost with marginal benefit measures the allocative efficiency of firms (Guerrero & Negrín, 2005; Manjunatha, Speelman, Van Huylenbroeck, &

Chandrakanth, 2009). Allocative efficiency, therefore, is concerned with and measures how well firms combine inputs to minimize the cost of producing a given output level (Radam, Yacob, & Muslim, 2010).

### **2.4.3 Profit efficiency**

Profit efficiency evaluates how close a firm is to earning the profit that a best-practice firm earns facing the same exogenous conditions. The performance of a best-practice firm under the same exogenous conditions is a reasonable benchmark for how the firm would be expected to perform. The profit efficiency is a good measure when looking at agency cost of firms in relation to capital structure. Profit efficiency is superior to cost efficiency for evaluating the performance of managers, since it accounts for how well managers raise revenues as well as control costs and is closer to the concept of value maximization. Although maximizing accounting profits and maximizing shareholders'' worth are not identical, it seems reasonable to assume that shareholder losses from agency costs are close to proportional to the losses of accounting profits that are measured by profit efficiency (Berger & Di Patti, 2006).

#### **2.4.4 Overall economic efficiency**

Another measure of efficiency, called economic or overall efficiency, is the product of technical and allocative efficiencies. From the discussion it is clear that production and cost functions subsume the concepts of technical and allocative efficiency. Cost functions assume that firms are both technically and allocative efficient and then hint out the relationship between maximum levels of output and minimum prices. However, if the minimization of costs is to be considered in efficiency and it is to be achieved, costs of inputs must be taken into account. Technical efficiency and allocative efficiency combine to provide overall efficiency (Coelli, Rao & Battese 1998). When a firm achieves maximum output from a particular input level, with utilization of inputs at the least cost, it is considered to be an overall efficient firm. The assumption is that an organization is already technically efficient; however, it may not choose the optimal mix of inputs to produce output at the least cost.

#### 2.5 Empirical review of Data Envelopment Analysis (DEA)

Usher and Savino (2006) compared nineteen (19) ranking systems from Australia, Canada, China, USA, Hong-Kong, Italy, Poland, Germany, Spain and the United Kingdom. They pointed out the fact that the difference in the content of the systems can be ascribed to the geographical location and culture, and refer to the standardization issue of results. However, there is agreement on the best institutions and category based rankings. International ranking systems can be complemented with indicators that would allow interinstitutional performance comparison. Barros, (2007), analyzed the efficiency of the Lisbon Police Force precincts with a two stage DEA. In the first stage, the study estimated the DEA efficiency scores and compares the precincts with each other. The aim of this procedure is to seek out those best practices that will lead to improve performance of all of the precincts. The author ranks the precincts according to their efficiency for the period 2000-2002. In the second stage, he estimated a Tobit model in which the efficiency scores are regressed on socioeconomic issues, identifying social causes which vary across the city and affect deterrence policy. The study considers economic implications of the work.

Garcia-Sanchez (2006), established a procedure for evaluating the efficiency of providing the water supply. This procedure has allowed the author realized that the proposed indicators have a discriminating capability in the analysis of the service, and to reject criticisms traditionally assigned to the sensitivity of the DEA technique in relation 9 to degrees of freedom. The article studies efficiency and also illustrate of the use of the technique of DEA.

According to Bretschneider and his associates (2005), the purpose of their article is twofold. First, it critically examines the underlying assumptions associated with "best practices research" in Public Administration in order to distill an appropriate set of rules to frame research designs for best practice studies. Second, it reviews several statistical approaches that provide a rigorous empirical basis for identification of "best practices" in public organizations - methods for modeling extreme behavior (i.e., iteratively weighted least squares and quartile regression) and measuring relative technical efficiency.

Ouellette, and Vierstraete (2005), studied the efficiency of Quebec''s school boards during a period of severe cutbacks in their finance is examined using DEA. The average efficiency is found to be relatively high. In spite of this, potential savings could be achieved if school boards were fully efficient. Results depended heavily on school boards'' socio-economic conditions. They were subjected to Tobit analysis and the boards'' corrected efficiencies recalculated. The inefficiencies cost \$800 million of which \$200 million came from unfavorable socio-economic conditions.

Moore et al., (2005), applied DEA as a response to their view that the literature describing the performance of municipal services often uses imperfect or partial measures of efficiency. DEA has emerged as an effective tool for measuring the relative efficiency of public service provision. This article uses DEA to measure the relative efficiency of 11 municipal services in 46 of the largest cities in the United States over a period of 6 years. In addition, this information is used to explore efficiency differences between cities and services and provide input into a statistical analysis to explore factors that may explain differences inefficiency between cities. Finally, the authors discuss municipal governments" use of performance measures and problems with collecting municipal data for benchmarking. Van Dyke (2005) does a detailed presentation and comparison of ranking systems (Asiaweek, The Center, CHE, Good Guides, The Guardian, Macleans, Melbourne Institute, Perspektywy, The times and USNWR) regarding indicators and attributes the difference in the systems to the variety of objectives, systems, culture and availability of data.

Casu et al., (2004), for the period 1994-2000, in an efficiency analysis of the European banking institutions found that Italian banks had an 8.9% productivity increase, Spanish banks had a 9.5% increase, while German, French and English banks had 1.8%, 0.6% and 0.1% productivity increase, respectively. The main reason for such improvement in efficiency for the Italian and Spanish banks was the cost reduction that these institutions managed to achieve.

Dill and Soo (2004), criticized rankings systems regarding statistical validity, the selection of indicators that reflected quality and the negative impact on university performance. They concentrated on USNWR, Australian Good University Guide, Macleans, Times Good University Guide and Guardian University Guide. They examine validity, comprehensiveness, comprehensibility and functionality of the systems and reach the conclusion that the system can be supplemented with other indicators and reflect the quality of an institution in a better way.

Schure et al., (2004), estimated the productivity of the European banking sector for the period 1993-1997. They found that larger commercial banks were more productive on the

average than smaller banks. However, the Italian and the Spanish banks were found to be the least efficient.

Brockett et al., (2003), in a study on Health Maintenance Organizations (HMO), which employ Independent Practice Associations (IPA) versus those that employ group/staff arrangements in a "game-theoretic" DEA model was evaluated. In this model, the authors combine the two-person zero sum game approach with DEA, evaluating the results from both society"s and the consumers" perspectives. Individual DMUs from one group are compared to the collective second group (or the efficient frontier from the second group). This technique is relevant when there are components of a system that may be in competition with each other. Specifically, the civilian network component of the military health care system versus the MTF components might be evaluated using this unique DEA approach.

Similarly, Brockett and his associates (2003) employed the same combined DEA and Ordinary Least Squares (OLS) methodology in evaluating advertising programs for military recruitment. The authors evaluated a "service specific" program for advertising in comparison with a "joint program." Using data from a previously conducted "designed experiment" advertising study, the authors showed that joint recruitment efforts are less efficient then service specific recruiting. Casu and Molyneux (2003), employed DEA to investigate whether the productivity efficiency of European banking systems had improved and converged towards a common European frontier between 1993 and 1997. The geographical coverage of the study was France, Germany, Italy, Spain and the United Kingdom. All the data generated were reported in ECU as the reference currency. Their results indicated relatively low average efficiency levels.

Nevertheless, it was possible to detect a slight improvement in the average efficiency scores over the period of analysis for almost all banking systems in the sample, with the exception of Italy.

Woodbury et al., (2003), reviews municipal efficiency measurement in Australia to advance the argument that the present reliance on partial measures of performance is inadequate and should be heavily augmented by DEA. The authors summarize progress made in efficiency measurement on a state-by-state basis and then examine performance measurement in water and waste water as a more detailed case study. On the basis of this evidence, the authors argue that DEA provides the best means of providing public policy makers with the necessary information on municipal performance.

Drake and Simper (2002), this study uses both parametric and nonparametric techniques to analyze scale economies and relative efficiency levels in policing in England and Wales. Both techniques suggest the presence of significant scale effects in policing and
considerable divergence in relative efficiency levels across police forces. Fernandez et al., (2002), studied the economic efficiency of 142 financial intermediaries from eighteen countries over the period 1989-1998 and the relationship between efficiency, productivity change and shareholders" wealth maximization. The authors applied DEA to estimate the relative efficiency of commercial banks of different geographical areas (North America, Japan and Europe). The European banks were from Austria, Belgium, Denmark, Finland, Germany, Ireland, Italy, Luxemburg, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. The three preferred outputs were total investments, total loans, and non-interest income plus other operating income. In parallel, the four input variables were expressed in billions of US dollars. Their results showed that commercial bank productivity across the world had grown significantly (19.6%) from 1989 to 1998. This effect had been principally due to relative efficiency improvement, with technological progress having a very moderate effect.

Maudos et al. (2002), analyzed the cost and profit efficiency of European banks in ten countries, including Italy, for the period 1993 - 1996. They used multiple regression analysis along with DEA and they split their sample in large, medium and small banks. Their results indicated that only medium sized banks were profit efficient.

Lozano-Vivas et al., (2002), examined banking efficiency in ten European countries among which was Italy, for 1993. The authors adopted the value added approach and analyzed also

the macroeconomic environment where the banks operated. Their results showed that banking efficiency was low in Europe during that time period. Furthermore, the banks in Italy and Netherlands were the only ones which were not able to operate in a unified European banking system compared to the most efficient banks of the other sample countries.

Worthington and Dollery (2002), used the planning and regulatory function of 173 New South Wales (NSW) local governments, several approaches for incorporating contextual or nondiscretionary inputs in DEA are compared. Non-discretionary inputs (or factors beyond managerial control) in this context include the population growth rate and distribution, the level of development and non-residential building activity, and the proportion of the population from a non-English speaking background. The approaches selected to incorporate these variables include discretionary inputs only, nondiscretionary and discretionary inputs treated alike and differently, categorical inputs, 'adjusted' DEA, and 'endogenous' DEA. The results indicate that the efficiency scores of the five approaches that incorporated non-discretionary factors were significantly positively correlated. However, it was also established that the distributions of the efficiency scores and the number of councils assessed as perfectly technically efficient in the six approaches also varied significantly across the sample.

Mante and O'Brien (2002), this paper provide a review and an illustration of the DEA methodology for measuring the relative efficiency of public sector organizations

performing similar tasks. The study focuses on measuring the relative technical efficiency of State secondary schools in a geographical region in the Australian State of Victoria. It recognizes that state secondary schools, like other non-profit making organizations, produce multiple outcomes by combining alternative discretionary and non-discretionary inputs.

Bikker (2001), examined the banking productivity of a sample of European banks in various countries, along with was Italy also, for the period 1989-1997. His results indicated that the most inefficient banks were first the Spanish ones, followed by the French and the Italian banks. The most productive banks were the one in Luxemburg, in Belgium and in Switzerland.

Hasan et al.,(2000), analyzed the banking industries of Belgium, Denmark, France, Germany, Italy, Luxemburg, Netherlands, Portugal, Spain and the United Kingdom. First, the authors attempted to evaluate the efficiency scores of banking industries operating in their own respective countries. Later, they used a common frontier to control the environmental conditions of each country. The results based on cross-country efficiency scores suggested that the banks in Denmark, Spain and Portugal were relatively the most technically efficient and successful. Especially, when the banks of these countries tried to enter into any other European country of the sample were most efficient. On the other hand, the banks in France and Italy were found to be the least efficient institutions among the ones.

Drake and Simper (2000), utilized DEA to estimate the productivity of the English and Welsh police forces and to determine whether there are categorical scale effects in policing using multiple discriminant analysis (MDA). The article demonstrated that by using DEA efficiency results, it is possible to make inferences about the optimal size and structure of the English and Welsh police forces.

Worthington (1999), sampled one hundred and sixty-eight New South Wales local government libraries to analyze the efficiency measures derived from the non-parametric technique of data envelopment analysis. Depending upon the assumptions employed, 9.5 percent of local governments were judged to be overall technically efficient in the provision of library services, 47.6 percent as pure technically efficient, and 10.1 percent as scale efficient. The study also analyses the posited linkages between comparative performance indicators, productive performance and non-discretionary environmental factors under these different model formulations.

Pastor et al., (1997), analyzed the productivity, efficiency and differences in technology in the banking systems of United States, Spain, Germany, Italy, Austria, United Kingdom, France and Belgium for the year 1992. Using the non-parametric approach DEA together with the Malmquist index, they compared the efficiency and differences in technology of several banking systems. Their study used the value added approach. Deposits, productivity assets and loans nominal values were selected as measurements of banking output, under the assumption that these are proportional to the number of transactions and the flow of services to customers on both sides of the balance sheet. Similarly, personnel expenses, nointerest expenses, other than personnel expenses were employed as a measurement of banking input. According to the results France had the banking system with the highest efficiency level followed by Spain, while UK presented the lowest level of efficiency.

Allen and Rai (1996), estimated a global cost function using an international database of financial institutions for fifteen countries. Their sample was divided into two groups according to the country's regulatory environment. Universal banking countries (Australia, Austria, Canada, Switzerland, Germany, Denmark, Spain, Finland, France, Italy, United Kingdom and Sweden) permitted the functional integration of commercial and investment banking, while separated banking countries (Belgium, Japan and US) did not. Large banks in separated banking countries exhibited the largest measure of input inefficiency and had anti-economies of scale. All other banks had significantly lower inefficiency measures. Moreover, small banks in all countries showed significant levels of economies of scale. Italian banks, along with French, UK and US ones were found less efficient from Japanese, Austrian, German, Danish, Swedish and Canadians ones.

Arnold et al., (1996), illustrated how DEA may be coupled with traditional Ordinary Least Squares analysis of log linear models to produce satisfactory efficiency estimations. In this study, the authors show that the OLS regression and Stochastic Frontier Analysis (SFA) do not provide results consistent with economic theory or expectations, because they deal with "central tendency" estimates without allowing for differences in efficient and inefficient performers. DEA is then employed to determine efficient public secondary schools in Texas. Subsequently, a dummy variable reflecting efficient versus inefficient schools is incorporated into OLS regression models. The results illustrate that the combined methodology approach produces results consistent with economic theory and successfully combines estimation for efficient and inefficient behavior as identifiable components in one model.

Altunbas and Molyneux (1996) examined the banking systems of France, Germany, Italy and Spain for economies of scale and scope. They found differences among the four markets regarding economies of scale. However, the latter were significant only for the Italian banks, which gained as they succeeded in lowering costs. Pedraja-Chaparro and Salinas-Jiminez (1996), the objective of the article is to provide a measure of technical efficiency of the Administrative Litigation Division of the Spanish High Courts. The concept of efficiency to be measured and the most adequate technique for carrying out the efficiency analysis are selected by considering the specific characteristics of public production. The analysis is undertaken by using (DEA) and various homogeneity tests (returns to scale and restrictions on weights) are applied in order to ensure a correct comparison between Courts.

In 1995, John W. Young contributed a report to the "Educational and Psychological Measurement" bimonthly journal entitled, "A Comparison of Two Adjustment Methods for Improving the Prediction of Law School Grades." Young (1995), wrote, "Criticisms

about the effectiveness of preadmission measures generally focus only on limitations of the predictors". As the title suggests, Young (1995), sought to detect any changes in the predictive validity of the law school admissions test (LSAT) on law school performance when the criterion was changed from first-year grade point average (GPA) to the cumulative GPA (1995). He suggested that many predictive validity studies were inherently limited due their reliance on first year GPA as the criterion. Institutional studies favored first year GPAs because they are easy to obtain and are a well-defined criterion (1995). Further, cumulative GPAs contain "noise" generated by unique grade distributions of the varying combinations of courses taken by students (1995).

Young (1995) viewed the first-year GPA criterion as "neither a sufficient nor an adequate measure of a student's overall achievement" and suggested that a cumulative GPA would offer more advantage. Thus, he proposed using a previously validated grade adjustment method to correct for the interruptive nature of the cumulative GPA.Young (1995), was the first to use his method in a study on post-graduate performance.

Young (1995), obtained data from four accredited U.S. law schools, choosing one school from the West (School A), one from the South (School B), and two from the Northeast (C and D, respectively). Three of the schools were public and one private. Using item response theory (IRT) and the (statistical) general linear model (GLM), Young (1995), generated figures that equated grades from different course (using a rating scale) and displayed optimizing characteristics of the least squares approach.

The results of Young's grade adjustment methods were minor, indicating that the correlation of predictive validity of the law school admissions test (LSAT) was only slightly improved (1995). Young (1995), attributed the low improvement to the similarity of the law courses taken by the students. In other words, previous efforts using the same adjustment methods yielded greater results because of the greater variation in chosen courses among undergraduate students. In law school, everyone essentially takes the same courses. Thus, correlation improvements based on course differences "would likely have little impact in changing the relative rankings of students" (Young, 1995).

Ozcan and Bannick (1994), used DEA to study trends in Department of Defense hospital efficiency from 1998-1999 using 124 military hospitals and data from the American Hospital Association Annual Survey. In a 1995 study, these authors also compared DoD hospital efficiency with that of Veteran''s Administration hospital efficiency (n=284) using 1989 data.

These studies were conducted at the strategic level under a different operational paradigm, prior to the large-scale adoption of managed care. Charnes et al., (1985), conducted arguably the first Data Envelopment Analysis in a military health care facility. These authors evaluated the efficiency of 24 Army military hospitals using criteria that are still relevant for inclusion in this analysis. The authors selected traditional workload criteria for analysis of outputs including personnel trained, relative work product, and clinic visits. These outputs are considered traditional elements of production in health care and are

relevant for inclusion along with other less traditional factors. For inputs, the study evaluated Full Time Equivalent (FTE) employees by specific category, inpatient expenditures, outpatient expenditures, weighted procedures, occupied bed days, and operating room hours(2). Despite the fact that the research was conducted 20 years previously, most of the variables included retain relevance for measuring the traditional workload functions, although the paradigm in military health care has shifted towards prevention and health promotion instead of treatment. Most impressively, a training output is specifically included in this study, although prevention, readiness, and other aspects are absent, as they were less relevant measures in the 1980s.

# **CHAPTER THREE**

## **RESEARCH METHODOLOGY**

# **3.1 Introduction**

This chapter describes how this paper's literature was reviewed. It also describes the methods and procedures used by other researchers. It further describes the choice of variables used by other researchers.

In the process reviewing this paper, many published articles, unpublished articles and books written before this paper were consulted. These articles provided us with detailed procedure and the methodology to employ to review this paper. To ensure a proper literature review, churches and other non-profit making organizations" stakeholders were contacted for their views.

## 3.2 Process of downloading

In the process of downloading the relevant articles for this paper, the topic "measuring the technical efficiency of nonprofit making organizations (churches), using Data Envelopment.

Analysis approach" was entered in Google Scholar search. The search results gave a lot of research articles from various electronic Journals and online publishers. The relevant articles and books were accesses through Christians Service University College internet service due to its subscription to various online publishers. In search of other relevant papers, reference list of related paper were screened and shortlisted. The search also included online books directorate and organizations" website sites. In all twenty-five (25) related articles were downloaded and five closely related articles were sampled for this paper.

#### **3.3 Geographical distribution**

Many studies relating to church activities, development, performance and efficiency have been around the world. Most of the articles we chanced on were conducted in America, Asia, and Europe whiles little has been in Africa.

Majority of the researches were conducted in the United States. For instance, Zaleski and Zech (1996) measured the efficiency of religious organization in the United State. They focused on the inputs and outputs of the Catholic Church within United States. Iannaccone, Olson and

Stark (1995) studied religious resources and church growth. This was conducted in the United State and Canada. Zech (1992) also studied Catholic Church, their resource allocation and shortage of priest in the United States. Also, Stoll and Petersen (2008) studied church growth and decline in Shelby County in the United States. They examined the effects of type of church (high-tension vs. low-tension) on both volunteer time and financial contributions. Moreover, Hoge et. al (1998) examined the value of volunteer as resources for congregation. In their study, they analyzed data from "American

Congregational Giving Study" (Hoge, Zech, McNamara, and Donahue 1995, 1996), involving 625 congregations in the United States. In Addition, Perkins and Fields (2010) investigated the relationship of top management team (TMT) diversity with performance of Christian churches, a particular type of nonprofit and voluntary organization in the United States.

In Asia, Kim and Lee (2018) analyzed the program efficiency and fundraising efficiency of 22 Korean nonprofit organizations in the field of humanitarian assistance in South Korea. In finding the programme efficiency, they selected the number of employees, labor cost, all contributions including donation, grants and in-kind giving, management and fundraising expense as the input variables. The amount of money that has been spent on the purposed program and the number of beneficiaries were also selected as their outputs variables. Meanwhile, fundraising expense and management and fundraising labor cost were selected as input variables, and the amount of donation raised was output variable. Son (2003) also utilized DEA in evaluating efficiency of Social Welfare Agencies in Busan, South Korea. In evaluating the relative efficiency of social work centers using DEA, the variables selected as input were the number of employees, the total annual operating expenses and the number of volunteers per year, and the total operating years, and the output was selected as the number of program users per year. Moreover, Kim (2004) measured South Korea community welfare center's relative efficiency using DEA. The number of social workers, the number of volunteers, the budget amount and donation were used as inputs, and the output was assumed to be the number of users and the number of programs in measuring the relative efficiency of social work centers in a study conducted by. Furthermore, Daduraa and Tzong-Ru (2011) studied innovation ability of Taiwan's food industry using DEA in Taiwan. This research study is designed to determine the key innovation factors of Taiwan's food industry and draws on a questionnaire to collect data about its innovativeness. Kim, Kim and Shin (2014) also studied efficiency analysis of privatization using Data Envelopment Analysis and Malmquist Productivity Index (MPI). This study considered the effect of this reform on the overall efficiency of the public highway corporations and whether the corporations were all equally efficient.

Some studies found in Europe were Prior and Magda Sola (2000) who studied technical efficiency and economies of diversification in health care. They evaluated the change in efficiency in Catalan hospitals between 1987 and 1992, and analyze the presence of possible diversification economies in each hospital. We use Data Envelopment Analysis, which does not need information on either input or output prices. Waldo (2007) did a research on efficiency in Swedish public education in Sweden. In this paper, efficiency in Swedish public education is estimated with data envelopment analysis. Baldin (2017) applied DEA approach for selecting a bundle of tickets for performing arts events. They analyzed a structural-based Revenue Management problem for the performing arts organization, related to the composition of a bundle of tickets to be offered. The decision problem consists in the determination of the most efficient bundle in terms of quantity of events to be included and the ratio between high demand and low demand events. Webb (2003) studied levels of efficiency in UK retail banks: a DEA window analysis. This article

has investigated the relative efficiency levels of large UK commercial banks during the period of transition 1980–1995.

In Africa a little has been done concerning the use of DEA in measuring the efficiency of nonprofit and even particularly on the health services. For instance, Akazili, Adjuik, Jehu Appiah and Zere (2008) studied the extent of technical efficiency of public health centers in Ghana using data envelopment analysis as a measure. The study calculated technical efficiency of 89 randomly sampled health centers in Ghana. Likewise Eke and Oburota (2019) studied the determinants of relative technical efficiency of hospitals in Nigeria. Inua and Okafor (2015) studied the determinant of performance efficiency in non-profit organizations: evidence from Nigerian Federal Universities. The study measured the performance efficiency of Nigerian nonprofit making organizations with emphasis on federal universities and showed how some factors such are related to the performance efficiency of Nigerian federal universities.

It can be attested that though there are a lot of research done on estimating efficiency of nonprofit making around the world only few has been done on estimating the efficiency of religious bodies specifically churches. A number of studies on determining the performance of churches did not also apply the DEA.

## 3.4 Methodology

In our search for previous studies on using DEA as tool in measuring the efficiency of nonprofit organizations, we found numerous of them scattered around. Majority of the studies only calculated for the relative efficiency without finding the determinants of efficiency. In order to serve the purpose of this research, 5 closely related and/or relevant studies were selected from 25 related studies. The 25 related studies consisted of those who applied DEA to calculate for relative efficiency but not determinants in other nonprofit organizations (health centers, libraries, Art Theater, humanitarian assistance organizations and social service providers) other than religious organizations. Also those who studied the efficiency and/or performance of religion did not applied DEA. Out the 25 related studies only 4 of them applied the DEA to find the relative efficiency and also find the determinants of the efficiency.

These 5 closely related studies are summarized in Table 1 below. They include studies that applied DEA in estimating efficiency and determined the factors of efficiency of nonprofit making organizations such as Universities in Nigeria, hospitals in Nigeria, Catholic Church in the United States, Arts theaters in Australia and Switzerland, and nonprofit nursing homes in the United States.

Main paper	Setting	Methodology	Variables
Inua and Okafor	Nigerian	1.DEA Input-	Inputs: Number of academic
(2015) determinant	Federal	Oriented	staff, Number of non-academic
of performance	Universities	CCR Model	staff, Number of admitted
efficiency in non-			undergraduate students, Number
profit organizations			of admitted postgraduate
			students, Capital Grants,
			Recurrent Grants
			Outputs: Number of graduating
			undergraduate students, Number
			of graduating Postgraduate
			Diploma students, Number of
			graduating Masters students,
			Number of graduating Doctorate
			students.
		2.Ordinary Least	Funding, Assessment And
		Square	Ranking, Size, Technology
		Technique	Application and Age

Table 1. 1 Five closely related and relevant studies included in the studies

Eke and Oburota	Hospital in	1.Input Oriented	Input: Beds, Doctors, Nurses,
(2019) determinants	Nigeria	DEA	and Other Staff
of relative technical		Model	Output: Outpatient, Inpatient
efficiency of			Care, Surgeries, Laboratory
hospitals			Tests and Scan
		2.Ordinary Least	Hospital Size and Ownership
		Square	
		Regression	
Zieba (2010) An	Non profit	1.Stochastic	Input: Number of ortistic and
analysis of	Non-pront	Frontier	<b>Input:</b> Number of artistic and
technical efficiency	Arts	Approach	technical staff, Number of
and efficiency	theaters		administrative staff and house
factors for Austrian	Australia		staff, Labour cost, Decoration
and Swiss nonprofit	and		cost and Number of seat
theatres	Switzerland		Output: Theater attendance and
			Tickets on offer
		True-Random	Subsidy per seat and Number of
		Effects	
		(TRE)	nonprofit theaters

United	1.DEA	Inputs: Diocesan priests,
States	nonlinear	Religious priests, Parishes,
Catholic	fractional	Sisters, Deacons, Priestless
Church	program	parishes, Catholic private and
	problem	parochial school, Lay teachers,
		Special service centres.
		Output: Sum of five sacrament,
		Sum of diocesan students in
		Catholic schools, Number
		served by Catholic special
		service centres
Churches in	Linear Production	Input: Time And Money
United	Function	Outputs: Growth
State and		
Canada		
	United States Catholic Church Church Churches in United State and Canada	UnitedI.DEAStatesnonlinearCatholicfractionalChurchprogramproblemDescriptionProblemChurches inLinear ProductionUnitedFunctionState andCanada

# **3.5 Variable description**

The results of DEA model are sensitive to the inputs and outputs factors. Indeed, an accurate selection of the input and output indicators, which are best adapted to the objective of the analysis, is critical to the success of the study.

## **3.5.1 Input variables**

The inputs variables are units of measurement, which represent the factors used to carry out the delivery of services. The identification and measurement of these factors is crucial in a fair evaluation of the economy and efficiency in the programs and services management. Previous studies on other performance models (Iannaccone et. al, 1995) have shown that inputs of churches institutions can be categorized in time and money. Likewise, Zaleski and Zech (1997) identified Diocesan priest, Religious priests, Parishes, Women religious, Permanents deacons, priestless parishes, Catholic private and parochial schools, lay teachers and special services centres as their inputs. However, Inua and Okafor (2015) identified Number of academic staff, Number of non-academic staff, Number of admitted undergraduate students, Number of admitted postgraduate students, Capital Grants, Recurrent Grants as their inputs in the study of determinant of performance efficiency in non-profit universities in Nigeria. After evaluating and consulting the relevant stakeholders, our choice of input would have been the number of small groups, time, head pastor" years of experience, number of pastors, number of male pastors, number of female pastors, number of pastors with seminary certificate, number of pastors without seminary certificate, number of church executives, number of female executive of the church, number of male executive of the church, total number workers, number of paid workers, number of voluntary workers, number of registered members, average number of church attendance, number of programmes in a year, number of church meetings in a week, number of small groups in the church, total asset of the church (GHC), staff cost (GHC), total revenue per year (GHC).

## **3.5.2 Output variables**

Output variables measure the yield or the level of activity of programmes and services. The Church Growth Movement (McGavran, 1990; Schwarz, 1996; Towns, Wagner, & Rainer, 1998) measures church performance based on growth in attendance. However, Warren (1995) noted growth in church attendance is an important part of fulfilling some of the purposes of a Christian church; it is a limited measure of effectiveness. Saddleback church as an example also measures effectiveness in terms of attendees" growth in spiritual maturity, missions outreach within the United States and abroad, internal organizational development, and attaining solid financial standing to facilitate achievement of these objectives. A broad range of outputs of churches are found in Perkins and Fields (2010) where he indicated that Attendance growth – which provides average weekly worship attendance levels for the current and previous years; financial growth – which also provided annual offering revenue for the current and previous years; Sunday school attendance percentage - provides average weekly levels of Sunday school attendance for the current and previous years and Ministry budget ratio - provides annual ministry budget amounts for the current and previous years. The output indicators best to be adopted for the study was growth in attendance and increase financial resources.

#### 3.6 summary

In our search for related studies, we did not chance on a study which applied DEA to measure technical efficiency of churches and its determinants though some measured only the technical efficiency. But the evaluation of published and unpublished articles and books written before this paper provided a path to be followed in reviewing this paper. In our evaluation, it was disclosed that numerous studies on measuring technical efficiency of various forms of nonprofit organization have been carried around the world. In the United State (Hoge et. al, 1998; Iannaccone, Olson and Stark, 1995; Zech, 1992; Stoll and Petersen, 2008; Zaleski and Zech, 1996; Perkins and Fields, 2010; Hoge, Zech, McNamara, and Donahue 1995, 1996), Asia (Kim and Lee, 2018; Son, 2003; Kim, 2004; Kim, Kim and Shin 2014; Daduraa and Tzong-Ru 2011), Europe (Prior and Magda Sola, 2000; Waldo, 2007; Webb 2003; Baldin, 2017) and Africa (Inua and Okafor, 2015; Eke and Oburota, 2019; Akazili, Adjuik, Jehu-Appiah and Zere 2008) a lot of studies on hospitals, schools and public services, social service art theaters have been carried on. All the studies applied different methodology. Some studies only applied DEA to find efficiency and/or relative efficiency without finding determinants of efficiency while few of the studies find the efficiency and its determinants in other nonprofit organisations other than churches. In the nutshell we adopted the methodology applied by Inua and Okafor, 2015; Eke and Oburota, 2019; Zieba 2010; Zaleski and Zech (1997, and Iannaccone, Olson and Stark, 1995.

#### **CHAPTER FOUR**

## SUMMARY, CONCLUSION AND RECOMMENDATION

## 4.1 Summary

Over the years church leaders have taken massive steps to ensure accountability of stewards to ensure the judicious use church resources. The establishment of various boards and groups to steer the affairs of the church can attest to this assertion. This has necessitated the use of management techniques that evaluate the performance of these units so as to avail tools that can improve management and policy decisions of nonprofit making organizations (churches).

One measure of non-profit organization performance which could indicate the vulnerability of the organization distress is technical efficiency (TE). TE measures the distance of a firm's performance from the best practice frontier that represents the optimal use of resources. It indicates the resource utilization performance of a firm relative to its peers.

Data Envelopment Analysis developed by Charnes et al. (1978) and Banker et al. (1989) is a method used for the measurement of efficiency in cases where multiple input and output factors are observed and when it is not possible to turn these factors into one aggregate input or output factor. This is a linear programming based technique which is applied to assess the efficiency of organizations. The study sought to use Data Envelopment Analysis to measure the technical efficiency of nonprofit making organization (churches) in Ghana. The study was guided by the following questions:

- 1. To what extent is a church technically efficient using DEA?
- 2. What is the benchmark of the church that is technically efficient?
- 3. What influences the technical efficiency of Christian churches in Ghana?

Descriptive survey was used as our research design. Questionnaire was used as the instrument for the primary and secondary data collection. In all, 80 questionnaires were distributed using purposive sampling and 60 were retrieved. DEA input oriented, descriptive statistics, Correlation matrix and OLS regressions analysis were employed to find the technical efficiency, the correlation between variables and the effect of variables on TE from the resulting data. Churches located in the Kumasi district that had ministerial staff that included at least a senior minister and three associate ministers were selected for the survey.

# 4.2 Findings

From the evaluated studies it was revealed that some non-profit organizations were found to inefficient because they had too many members on the top management board. At the same some were also found to be inefficient because less members on the top management board. Others findings supports that some non-profit organizations possess too many resources for the amount of output they were producing, thus making them inefficient, at the same time others were inefficient because they had fewer resource.

Among other findings, it was discovered that growth in donations to a church may depend on constituents getting to know Top Management Team members and the Top Management Team presenting a unified perspective. Church attendees who are willing to donate more funds may see contributions as an investment in the education and spiritual qualities provided by a church. If so, donors may commit larger amounts when they sense that the ministry team is unified with the senior pastor and is stable in composition.

It also found that level of spiritual maturity has a positive and significant coefficient, suggesting that a consistent biblically based and well-developed theology is important in attracting new attendees. Indeed, a ministry team that includes a variety of approaches to top management team and a variety of levels of spiritual maturity, but that also has a high overall average level of spiritual development, seems to present an optimum profile for growth in church attendance.

# 4.3 Discussion

## 4.3.1. The extent to which a church is technically efficient using DEA

Efficiency is evaluated for the purpose of measuring how efficiently the input has produced the purposed outputs in the service programs. It is to select the adequate input and output variables that are relevant to the input–output transforming process and can express the purpose of the non-profit making organization. Inua and Okafor (2015) found that the efficient Nigerian federal University scored "1" or 100% whiles the inefficient university scored less than less than "1" or 100%. Eke and Oburota (2019) revealed that of the hospitals included in the analysis in 2010, 17 (68%) had efficiency score of 1 or 100% and were found to lie on the efficiency frontier, 5 (20%) had efficiency score ranging between 70% and 99.9% while 3 (12%) scored between 20% and 69.9%. In 2011, 17 (68%) of the hospitals were efficient but 3 (12%) hospitals had efficiency score ranging between 70% and 99.9% while 5 (20%) hospitals had efficiency score below 70%. Furthermore, Zaleski and Zech (1997) study resulted in an efficiency rating for each diocese, ranging between 0 and 1.0. Of the total population of 174 dioceses, with a score of "1" or "100", 66 were found to be relatively technically efficient in that they produced as much out as could be expected with their inputs, relative to other dioceses. The other 108 dioceses were found to be relatively inefficient as they score less than "1" or 100.

Zieba (2010) also found that the for output 35% of Austrian theatres and 36 per cent of Swiss theatres have technical efficiency scores which are lower than 40 per cent with the minimum efficiency score of 19 and 15 per cent for Austria and Switzerland, respectively. In contrast, for all theatres and the same output measure, the True Random Effect model has the average TE scores above 80 per cent with the minimum score of 88 and 53 per cent for Austria and Switzerland, respectively. Kim and Lee (2018) reported that of 22 NPOs, 15 were identified as being efficient in the program efficiency and 7 of 15 NPOs were

found efficient in the fundraising efficiency. In all, four organizations were found efficient in both the program and the fundraising efficiency.

#### 4.3.2 The benchmark of the church that is technically efficient

DEA provided a reference set of efficient DMUs to which the inefficient DMU is directly compared to obtain its efficiency. The reference set DMU has a similar input combination to the inefficient DMU, thus it gives the direction to improve efficiency while maintaining the current production structure as a whole. Reference set information offers peer DMUs and their weights to refer to. In Kim and Lee (2018) DMU 4 and DMU 7 was set as reference point for DMU 1 in other to improve its efficiency by controlling the inputs reflecting the reference weights of DMU 4 and 7.

In establishing the cause of inefficiency, the pure technical efficiency and the scale efficiency were calculated. The Scale inefficient DMU's can eliminate the inefficiency by adjusting the budget and the number of employees. If the cause of inefficiency is in the pure technology inefficiency then education and training for the professionals can improve the efficiency. For example, Kim and Lee (2018) identified 6 DMUs (DMU 1, 2, 5, 9, 15 and 19) to be scale inefficient while 5 DMUs (DMU 8, 10, 11, 18 and 21) were also found to be pure technical inefficient.

It was also judged whether the profit of the scale is in the three state of variable returns (constant returns to scale (CRS), increasing returns to scale (IRS) and decreasing returns to

scale (DRS) according to the total Lambda value. DMUs with Lambda value less than 1 denotes an increasing returns to scale which needed to expand their inputs. However, DMUs with Lambda value higher than 1. If it is higher than indicated a decreasing returns to scale which needed to reduce the size of their inputs to improve efficiency. In Kim and Lee (2018) study results, it establish that DMU 2 was in the state of decreasing returns, it was necessary to reduce the size of inputs to improve the efficiency. In case of DMU 1, it was in the state of increasing returns to scale. Thus, it needs to expand their scale of inputs to improve the efficiency.

### 4.3.3 What influences the technical efficiency of Christian churches in Ghana

The correlation between the DEA efficiencies and variables were calculated. The three efficiency measures were not strongly related which implies that they represent different measures of performance efficiency. It was also revealed that none of the variables (funding, technology, size and age) is strongly associated with any of the three measures of efficiency scores for the sampled. These correlation results were not necessary for our hypotheses testing since they only measure association and not impact. The full correlation matrix also revealed that no two explanatory variables were perfectly correlated.

The regression analysis used to analyse the cause and effect relationship between the dependent variable and independent variables revealed that though the efficiency of nonprofit making organisations is negatively related to rating, technology application and age while the efficiency of nonprofit making organisations is positively related to funding

and size; funding, assessment and ranking, size and technology application do not have any significant relationship with the performance efficiency of non-profit making organizations while age has a significant relationship with the performance efficiency of non-profit making organizations, the non-profit making organizations system may not be suffering from funding and human resources problem as such but lacks close monitoring of activities and constant performance efficiency measurements to ensure proper utilization of resources.

#### 4.4 Conclusion

Churches as non-profit institutions are viewed as religious firms and individuals as religious consumers. In a pluralistic religious economy, religious firms are subject to market influences. According to lannaccone (1992), "Religion is advertised and marketed, produced and consumed, demanded and supplied". In order to attract religious consumers, religious firms must offer products and services that are competitive with other firms in a market economy. Religious firms that are unable to do this risk losing consumers. In a competitive market, religious producers must abandon inefficient modes of production and unpopular products for more profitable and attractive alternatives (lannaccone 1995). Efficiency in their input activities should be obtained in the process of achieving the goals. In spite of its importance, there has been scant research in evaluating efficiencies in the nonprofit (church) sector. In the study, the technical efficiency of the purposed input activities was to be analyzed by applying DEA input oriented model, find the benchmark

of the church that is technically efficient and determine what influences their technical efficiency.

# 4.5 Implications

Firstly, the study will provide a benchmark for inefficient DMUs to use as reference point to improve on their efficiency. Secondly, the study will also indicate the state of variable returns to scale to propose the way of improving inefficiency by controlling the scale of inputs. Thirdly methods and the results of this study can serve as a model for researchers and practitioners to follow when evaluating efficiency in the non-profit sectors.

## 4.6 Limitation

This study has limitations as follows. Firstly, the DEA model will be applied to the limited numbers of churches as nonprofit organization. Secondly, the qualitative factors were not applied to the analysis. Thirdly, the form and selection of the input and output variables were limited only in the available data of the churches. It must be noted that the DEA is not completely flawless. It does facilitate an estimate of "relative" efficiency of a selected unit within a group, but stops short of estimating absolute efficiency. In other words, it tells us how well a unit performs within a given group based on chosen criteria. Another shortcoming is that the DEA method is based on extreme points and compares each unit to the best performers. This particular feature makes the DEA analysis more sensitive to data noise and measurement errors.

# 4.7 Recommendation

- 1. Technology providers and university administration should ensure that any technology provided is user friendly and meets the demands of members.
- 2. Funds should not just be released to churches, but there should be checks and control on the use of such funds.
- 3. As the study provides the inefficient DMUs with their reference set of efficient DMUs, inefficient DMUs can improve their inefficiency by referring to the reference set of DMUs.
- 4. Churches that were found to be inefficient because of scale inefficiency can improve their inputs other than management skills to be efficient and churches which are pure inefficient may improve their management skills inputs to become efficient.

#### References

- Akazili, J., Adjuik M., Jehu-Appiah, C., & Zere, E. 2008. Using data envelopment analysis to measure the extent of technical efficiency of public health centres in Ghana. *BMC International Health and Human Rights*, 8 (11)
- Arn, W., and Arn, C. (1982). The master's plan for making disciples. Pasadena, CA: Church Growth Press.
- Banker, R., Conrad R., and Straus R., 1986. A comparative application of data envelopment analysis and translog methods: an illustrative study of hospital production. *Management Science*, **32**(1): pp. 30-44.
- Bourgeois, L. J., III. 1980. Performance and consensus. *Strategic Management Journal*, **1**,pp. 227-248.
- Boussofiane, A. and Dyson, R., 1991. Applied Data Envelopment Analysis. *European* Journal of Political Research, 52, pp 1-15
- Charnes, A., Cooper, W.W., Rhodes, E.,1978. Measuring the Efficiency of the Decision Making Units, *European Journal of Operational Research*, **2**,(6) pp. 429- 444.
- Dess, G. G. 1987. Consensus on strategy formulation and organizational performance: Competitors in a fragmented industry. *Strategic Management Journal*, **8**, pp. 259-277.
- Eisenhardt, K. M., and Schoonhoven, C. B. 1990. Organizational growth: Linking founding team, strategy, environment, and growth among U.S. semiconductor ventures, 19781988.bAdministrative Science Quarterly, 35, pp. 504-530.

- Eke, F. A. and Oburota, C. S. 2019. Determinants of relative technical efficiency of hospitals in nigeria: a two-stage approach. *International Journal of Economics, Commerce and Management*, 7(6) pp.222-242.
- Fujii, H., Managi, S., and Matousek, R. 2014. Indian bank efficiency and productivity changes with undesirable outputs: A disaggregated approach. *Journal of Bankingand Finance*, **38**, pp. 41–50.
- García-Sánchez 2006 Efficiency Measurement in Spanish Local Government: established a procedure for evaluation of the efficiency of the water supply. ... Refs [15][16][17][18][19]
- Goll, I., Sambharya, R., and Tucci, L. 2001. Top management team composition, firm ideology, and firm performance. *Management International Review*, **41**, pp.109-129.
- Haleblian, J. and Finkelstein, S. 1993. Top management team size, CEO dominance, and firm performance: The moderating roles of environmental turbulence and discretion. *Academy of Management Journal*, **36**, pp.844-863.
- Hambrick, D. C. 1987. The top management team: Key to strategic success. *California Management Review*, **30**, pp.88-108.
- Hambrick, D. C. 1989. Putting top managers back in the strategy picture. *Strategic Management Journal*, **10**, pp.5-15.
- Hambrick, D. C., and Mason, P. A. 1984. Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, **9**, pp.193-206.

- Hansen, G. S., and Wernerfelt, B. 1989. Determinants of firm performance: The relative importance of economic and organizational factors. *Strategic Management Journal*, **10**, pp.399-411.
- Homma, T., Tsutsui, Y., and Uchida, H. 2014. Firm growth and efficiency in the banking industry: A new test of the efficient structure hypothesis. *Journal of Banking and Finance*, 40, pp.143–153.
- Hoge, D. R., Zech, C., McNamara, P. and Donahue M. J. 1998. The value of volunteers as resources for congregations. *Journal for the Scientific Study of Religion*.37(3), pp. 470480.
- Hou, X., Wang, Q., and Zhang, Q. 2014. Market structure, risk taking, and the efficiency of Chinese commercial banks. *Emerging Markets Review*, **20**, pp.75–88.
- Hrebiniak, L. G., and Snow, C. C. 198). Top-management agreement and organizational performance. *Human Relations*, **32**, pp.1139-1158.
- Hurst, D. K., Rush, J. C., and White, R. E. 1989. Top management teams and organization renewal. *Strategic Management Journal*, **10**, pp.87-105.
- Iannaccone, L. R., Olson, D. V. A., and Stark R., 1995. Religious resources and church growth. *Social Forces*,**74**(2) pp.705-732
- Iannaccone, Laurence R. 1992. Sacrifice and Stigma: Reducing Free-Riding in Cults, Communes, and other Collectives. *Journal of Political Economy* pp.100:271
- Inua, O. I.and Okafor C.,2015. Determinant of Performance Efficiency in Non-Profit Organizations: Evidence from Nigerian Federal Universities" *Research Journal of Finance and Accounting*, 6 (17), pp.81-90.

- J.C. Panzar and R.D. Willig, 1981 Economies of scope, *American Economic Review***71**(2) pp. 268–272.
- Kaplan, R. S., and Norton, D. P. (1996). Translating strategy into action: The balanced scorecard. Boston: Harvard Business School Press.
- Katz, D., and Kahn, R. L. (1978). *The social psychology of organizations* (2nd ed.). New York: John Wiley and Sons.
- Kim and Lee, Y.M. 2004, A measurement of community welfare center's relative efficiency using DEA, *Journal of Korean Association for Local Government Studies*, **16** (3), pp. 133-153.
- Kirkman, B., Tesluk, P., and Rosen, B. (2004). The impact of demographic heterogeneity and team leader–team member fit on team empowerment and effectiveness. *Group and Organization Management*, **29**, pp.334-368.
- Lott, A. J., and Lott, B. E. 1965. Group cohesiveness as interpersonal attraction: A review of relationship with antecedent and consequent variable. *Psychological Bulletin*,**64**, pp.259309.
- Laurie C. S., and Larry R. P., 2008. Church growth and decline: a test of the market-based approach, *Review of Religious Research*, **49**(3), pp. 251-268
- McGavran, D. A. (1990). *Understanding church growth* (3rd ed.). Grand Rapids, MI: William B. Eerdmans.
- Murray, A. 1989. Top management group heterogeneity and firm performance. *Strategic Management Journal*, **10**, pp.125-141.

- Norburn, D., and Birley, S. 1988. The top management team and corporate performance. *Strategic Management Journal*, **2**, pp. 225-237.
- O"Reilly, C. A., III, Snyder, R. C., and Boothe, J. N. Effects of executive team demography on organizational change. In G. P. Huber and W. H. Glick (Eds.), *Organizational change and redesign: Ideas and insights for improving performance* (pp. 147-175). New York: Oxford University Press.
- Perkins, D. C., and Fields, D. 2010 Top management team diversity and performance of Christian churches. *Nonprofit and Voluntary Sector Quarterly*, **39**(5), pp.825–843.
- Priem, R. L. 1990. Top management team group factors, consensus, and firm performance. *Strategic Management Journal*, **11**, pp. 469-478.
- Rosman, R., Wahab, N. A., and Zainol, Z. 2014. Efficiency of Islamic banks during the financial crisis: An analysis of Middle Eastern and Asian countries. *Pacific-Basin Finance Journal*, 28, pp.76–90.
- Rosko M. D., 1990. Measuring technical efficiency in health care organizations. *Journal of Medical Systems*, **14**(5), pp. 307-326
- Schwarz, C. A. (1996). *Natural church development: A guide to eight essential qualities* ofhealthy churches. Carol Stream, IL: Church Smart Resources
- Son, K. H. 2003, A study on utilizing DEA in efficiency evaluation of social welfare agencies, *Korean Journal of Social Welfare*, **52**(2), pp. 117-141.
- Shyu, J., and Chiang, T. 2012. Measuring the true managerial efficiency of bank branches in Taiwan: A three-stage DEA analysis. Expert Systems with Applications, 39, pp.11494–11502.

- Simons, T. 1995. Top management team consensus, heterogeneity, and debate as contingent predictors of company performance: The complimentarily of group structure and process. *Academy of Management Journal*, **62**, pp. 62-67
- Sufian, F. 2009. Determinants of bank efficiency during unstable macroeconomic environment: Empirical evidence from Malaysia. *Research in InternationalBusiness and Finance*, 23, pp.54–77.
- Towns, E. L., Wagner, C. P., and Rainer, T. S. 1998. *The every church guide to growth: How anyplateaued church can grow.* Nashville, TN: Broadman and Holman.
- Virany, B., and Tushman, M. L. 1986. Top management teams and corporate success in an emerging industry. *Journal of Business Venturing*, 1, pp.261-274.
- Warren, R. 1995. The Purpose Driven Church. Grand Rapids, MI: Zondervan.
- Yin, H., Yang, J., and Mehran, J. 2013. An empirical study of bank efficiency in China after WTO accession. *Global Finance Journal*, 24, pp.153–170.
- Zaleski and Zech, C. E. 1992. The catholic church, resource allocation and the priest shortage. *Review of Social Economy*, **50**(3) pp. 297-30.
- Zieba ... Anne-Kathrin Last & Heike Wetzel, 2010. An Analysis of Technical Efficiency and Efficiency Factors ... estimate the technical efficiency scores for
  20 Austrian and 30 Swiss non-profit theatres