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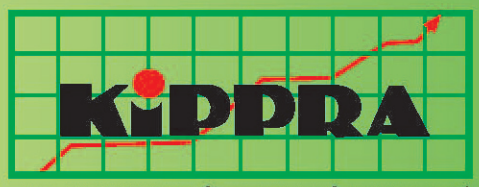

The KENYA INSTITUTE for PUBLIC POLICY RESEARCH and ANALYSIS

The Determinants of Technical Efficiency in Secondary Schools in Kenya

Melap Sitati

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THE KENYA INSTITUTE FOR PUBLIC POLICY RESEARCH AND ANALYSIS (KIPPRA)

YOUNG PROFESSIONALS (YPs) TRAINING PROGRAMME

The Determinants of Technical Efficiency in Secondary Schools in Kenya

Melap Sitati

Kenya Institute for Public Policy
Research and Analysis

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Abstract

Kenya has made tremendous progress towards access to basic education, which encompasses pre-primary, primary and secondary education. This is manifested in the increasing demand for secondary school education. Secondary school enrolment increased from around 1.4 million students in 2013 to 2.3 million students in 2014. This can be attributed to fees subsidy in secondary school education, strong government support for infrastructure and increased teacher staffing. In spite of these efforts, transition rate from primary to secondary schools is still low with about 2.1 million students who are supposed to be in secondary education missing this level of education. The consequence of this is that opportunities for accessing higher education will be missed, implying low access to skills development. In addition, school performance as measured by exam test scores has not improved over the period since the secondary school fee subsidy was implemented. This poor performance could be attributed to resource constraint, wastage of public funds, and inherent inefficiencies in secondary schools. This study examines the determinants of technical efficiency in secondary schools in Kenya and gives policy recommendations. The key findings of the study are: i) there exists wide variability in performance and enrolment of students across secondary schools in Kenya; ii) secondary schools are inefficient and could improve their outcomes by 37.3 per cent at current resource levels; iii) secondary schools have 26 per cent unused capacity; iv)larger schools and urban-based schools are more efficient compared to smaller schools and rural-based schools. Public schools have a negative effect on efficiency. The study recommends implementation of policies that will ensure innovativeness in efficient utilization of existing facilities and resources without incurring extra costs. This may include adoption of ICT infrastructure in classroom delivery, such as digitizing textbooks, and technology-based resources among others. Initiatives to merge small schools within the same locality should be considered. Policies to ensure effective operations and management of schools, such as training and mentorship programmes for school managers, need to be implemented.

Abbreviations and Acronyms

DEA	Data Envelopment Analysis
FDSE	Free Day Secondary Education
GER	Gross Enrolment Rate
GoK	Government of Kenya
MoEST	Ministry of Education, Science and Technology
NER	Net Enrolment Rate
SDGs	Sustainable Development Goals
SFA	Stochastic Frontier Approach

Table of Contents

List of Tables

List of Figures

1. Introduction

Globally, policy makers have for a long time been concerned with providing quality and relevant education to all school-going children (Hanushek and Ludiger, 2008; Becker, 1994). The Sustainable Development Goals (SDGs) number 4 reinforces the global commitment to ensuring that all children complete free, equitable and quality basic education. African countries, Kenya included, had earlier reaffirmed this commitment during the World Education Forum held in Dakar in 2000 (UNESCO, 2000). Therefore, governments and households are significantly investing in education to reap the benefits of human capital development. Needless to say, quality education must be realized with the prevailing public sector financial austerity and existing resources allocated to the sector. Further, it is imperative for the country to apply and utilize her resources efficiently to address the national development challenge.

There is a general consensus that in most developing countries, the correlation between higher resource allocation to the education sector and improved education outcomes is fairly weak (Evans et al., 2000; Duncan, 2004; Afonso et al., 2005; 2006; and Mizala et al., 2002). Therefore, issues relating to efficiency differences among schools and education providers have been an important area for policy makers raising the question of whether education quality could be improved with existing resources.

Despite significant investment in the education sector in developing countries, performance indicators such as skills development, student performance, access and grade attainment are still poor across regions (UNESCO, 2015). This is a major concern and could be partly attributed to inefficient utilization of education resources.

As much as there are policies to address school participation for basic education institutions, inadequate attention has been given to efficiency in utilization of the allocated resources in the sector. Of keen interest is the efficiency of secondary school education. There is need to assess the efficiency of education resources in Kenya especially in view of the subsidy programme and the limited resources needed to attain the expected outputs.

1.1 Secondary School Education in Kenya

Kenya has made tremendous efforts towards achieving the goal for basic education for all since independence. According to the Bill of Rights, basic education is a fundamental human right, implying that citizens can hold the State accountable for ensuring that every child aged 4 to 17 years is in school and receiving quality basic

education. This is in line with the international education commitments and other international conventions to which Kenya is a signatory. In addition, the Constitution of Kenya 2010 emphasizes on the provision of quality and efficient basic education. Basic education encompasses pre-primary, primary and secondary school education. These commitments can be achieved through proper utilization of available resources to maximize the desired education outcomes.

To this end, Kenya implemented the Free Primary Education in 2003 and Free Day Secondary Education (FDSE) in 2008 to increase completion and transition rates from primary to secondary school education and to reduce expenditures borne by households on secondary school education especially for children from poor households (Government of Kenya, 2008). Implementation of these policies has improved secondary school enrolment numbers from around 1,472,600 students in 2009 to 2,331,700 in 2014. Gross Enrolment Rate (GER) increased from 41.9 per cent in 2009 to 58.2 per cent in 2014, while Net Enrolment Rate (NER) increased from 33.1 per cent in 2009 to 47.4 per cent in 2014. This may imply that the cost of secondary education constituted a significant obstacle to more widespread secondary school attendance in the period preceding the subsidy, especially by poor households (Government of Kenya, 2012a).

At inception of FDSE in 2008, Ksh 10,265 was allocated per child per annum as capitation grant, which was increased to Ksh 12,870 in the financial year 2014/15. The FDSE grant covers specific expenditure items in secondary schools as presented in Figure 1.

Figure 1: FDSE comparison between 2008 and 2014 in Ksh

*** Operation and maintenance comprises repairs, local travel and transport, administrative costs and electricity, water and conservancy*

Source: Ministry of Education, Science and Technology (2014), Education Management Information System

In 2014/15, total expenditure in education stood at approximately Ksh 365 billion, with secondary education receiving capitation grant of around Ksh 29.3 billion (Ministry of Education, Science and Technology, 2014). The capitation allocation is only part of the total cost of secondary schooling. On average, the cost to government per student for secondary school education in 2014 was Ksh 31,374 whereas households incurred an average total cost of Ksh 49,411, totaling Ksh 80,785 (Government of Kenya, 2014). The capitation, therefore, only covers a small part of education expenses whereas the rest of the cost is borne by households. The government also provides infrastructure development grant, teachers and training, instructional material development, among others for secondary education.

While acknowledging strong progress in expanding access to secondary education, particularly increase in enrolment, there are some challenges the sector experiences. These include the need to meet the rising demands for secondary schooling, and increase in enrolment unmatched with infrastructure thus leading to a decrease in the quality of education offered. This decrease has been observed in poor performance of students in examinations. Additionally, the capitation grant does not cover all the costs associated with schooling, leaving the households to bear the extra cost.

Completion rate and transition to secondary school education is still low, with over a third of those who complete primary school not transiting to secondary school. For instance, 884,900 pupils completed Standard Eight in 2013 whereas those who joined Form One from the same cohort were 667,200, implying that 217,000 (about 25%) of 2013 pupils did not transit to secondary school. In addition, dropout rate has been increasing as shown in Table 1. Of the 2009 cohort, about 34,000 students did not complete secondary education.

Table 1: Completion in public secondary school education, 2009-2014

	Form One enrolment	Form Four enrolment	% of Students not Completing School
Completion for 2009 to 2012 cohort	445,300	411,300	7.64
Completion for 2010 to 2013 cohort	498,900	448,700	10.06
Completion for 2011 to 2014 cohort	521,600	461,600	11.50
Completion for 2012 to 2015 cohort	532,100	525,802	11.80

Source: Ministry of Education, Science and Technology, EMIS 2014

Besides, the quality of learning should be seen in good test scores in national exams and other literacy measures such as reading and numeracy. Performance in Kenya Certificate for Secondary Education (KCSE) mean scores in the national secondary examinations, which is one education outcome, has been low with only 31.5 per cent scoring C+ and above in 2015, which is the minimum university entry requirement, an increase of 1.5 per cent from 2014. This implies that about 209,807 students in 2015 did not qualify to join university education and other diploma courses, painting a grim picture of the secondary school education performance. Table 2 gives a picture of performance for some secondary education indicators in Kenya.

Table 2: Secondary school education indicators

Indicators	2009	2010	2011	2012	2013	2014
Total Eenrolment '000	1,472.6	1,653.4	1,767.7	1,914.8	2,104.3	2,331.7
GER in %	41.9	45.7	47.8	50.5	54.3	58.2
NER in %	33.1	36.0	38.8	41.7	44.5	47.4
Teachers	44,305	48,087	53,047	56,735	64,338	65,494
Transition to secondary education %	55	61	63.5	64.5	74.7	79.6
PTR	31.2	31.3	32.1	31.2	29.8	19.2
KNEC Pperformance: C+ and Aabove (%)		27	29	29	28	30

Source: Kenya National Examination Council (various years), Ministry of Education (2014), Education Census Booklet

This poor performance of secondary education in light of the scarce public resources presents a dilemma for policy and education stakeholders in their quest to ensure access to quality secondary education. One of the possible solutions to this problem is to efficiently utilize available resources to attain maximum output. Thus, effective actualization of FDSE requires efficient utilization of available resources for attainment of desired education outcomes.

1.2 Problem Statement

Every Kenyan child has a right to access secondary school education. To achieve this, the government implemented the secondary school fees subsidy policy in 2008. The number of national secondary schools also increased from 17 in 2008 to 103 in 2014. Through the economic stimulus project, the government also put up model secondary schools in every district. The main objective of these initiatives was to improve secondary school education outcomes.

However, despite government and households' concerted efforts in investing in secondary education, the performance indicators show that the outcomes are still low and large differences exist across regions. For instance, around 2.1 million students, that is, over half who are supposed to be in secondary education are not in school (Ministry of Education, Science and Technology, 2014). Of the 2011 cohort, about 60,000 students representing 11 per cent did not complete secondary education in 2014. Moreover, out of 482,133 KCSE candidates, only 149,717 students scored C+ and above.

The education sector in Kenya is grappling with challenges of lack of adequate infrastructure, low teachers' salaries and high household poverty levels, among others. These challenges may result in poor skills development and missed opportunities for accessing higher education. Therefore, social returns which is a key incentive for public subsidy, and private returns which drives households to invest in education, will not be met, and this may lead to wastage of public funds, which may be a pointer to existing inefficiencies in the education system.

From the foregoing, the poor performance of the secondary school education sector presents a pertinent policy dilemma on how the country can allocate the scarce resources efficiently. The question for policy makers is whether secondary schools in Kenya could produce more output at the current level of resource allocation. This implies the adoption of strategies that would promote internal and external efficiencies in secondary schools. Therefore, this study examines the factors affecting efficiency of secondary schools in Kenya.

1.3 Research Questions

The understanding of the determinants of technical efficiency at the school level is crucial for decision makers to develop appropriate educational policies to assist inefficient schools improve their educational achievement levels. Therefore, the study addresses the following research questions:

1. What is the level of technical efficiency in secondary schools in Kenya?
2. What are the determinants of technical efficiencies in secondary schools in Kenya?

1.4 Research Objectives

The study objectives are twofold, aimed at determining the extent to which secondary schools are utilizing available resources to produce maximum outputs. The specific objectives of the study are to:

1. Estimate technical efficiency of secondary schools in Kenya.
2. Analyze the factors affecting technical efficiency of secondary schools in Kenya.

1.5 Justification of the Study

To attain a knowledge-based economy as stipulated in the Kenya Vision 2030, the country needs to invest in education. Education is a basic right as enshrined in the Constitution of Kenya 2010 and the Basic Education Act 2013. For the education sector to make a significant contribution to the country's growth and development, it must operate efficiently amidst the scarce resources and many competing needs. As Ergulen and Torun (2009) puts it, efficiency in education is important given that resources are scarce and a robust education system is the base of economic prosperity. Thus, knowledge of efficiency in the education system will inform public policies on the potential for increased efficiency that will guide in achieving better performance for national economic development. There has not been much work done concerning efficiency, particularly of secondary education in Kenya. The study analyzes technical efficiency of secondary school education in Kenya.

A sizeable share of the budget is allocated to the education sector. Public expenditure in secondary school education has been increasing to stand at Ksh 86,992.90 million (29 billion as capitation) in 2014/15, which was equivalent to 30.61 per cent of the total education sector budget. Per capita spending also increased from Ksh 10,265 in 2008 to Ksh 12,687 in 2014. Policy makers would benefit from evidence about sources, and the possible drivers of efficiency which could be an important determinant of subsequent opportunities for higher education. This will help reduce waste in utilization of resources and provide strategies on improving and monitoring outputs in the education sector in tandem with increased government expenditure. The study also provides literature and a road map towards achieving efficiency and identifying the existing gaps for other scholars interested in the subject.

1.6 Organization of the Study

The rest of the study is structured as follows: The next section presents a review of related literature; section 3 discusses the methodology used, data and the key variables. Section 4 presents and discusses the empirical results while section 5 provides conclusions, policy recommendations, interventions and further research.

2. Literature Review

2.1 Theoretical Framework

The underlying principle behind the technical efficiency theory is the theory of production, which states that the quantity of output that a firm can produce is a function of the quantity of inputs to production which a firm employs. A production function can be expressed in a functional linear form as:

$$Q = f(X_1, X_2 \ldots\ldots\ldots X_n)$$

Where Q is the quantity of a firm's output, X_1, X_2 and X_n are the amounts of inputs employed in the production of Q. The various forms of production function represented in literature are: the Cobb-Douglas production function which represents the relationship of an output and two inputs (capital and labour), and the Leontief production function which uses inputs in fixed proportions.

In the education context, inputs are converted to produce a range of outputs through the teaching and learning process. In literature, different scholars have used diverse inputs to produce diverse outputs by applying the production theory, among them Coleman (1966), Mincer (1970) and Psacharopoulos and Patrinos (2004) who used school attainment as an output measure of individual skill. Schultz (1961) and Becker (1962) showed that it is important to include the production process in schooling to achieve the desired utility from education. The common inputs used include parental characteristics, socio-economic factors, teacher characteristics and pupil characteristics.

Econometric modeling of production functions, as earlier defined, was stimulated by the seminal paper of Farrell (1957). According to Farrell, *efficiency* refers to the ability of a decision making unit to produce the maximum attainable output from a given set of inputs. This theory was further explored and applied in the education context. Contrary to Debreu (1951) and Farrell (1957), Koopmans (1951) concept of technical efficiency was that a producer was technically efficient if an increase in an output requires a reduction in at least one other output or an increase in at least one input. This is different from Debreu and Farrell measure that output can still be increased with the existing inputs.

Productive efficiency can be decomposed into technical and allocative efficiency. Technical efficiency implies that resources are used in the most technologically efficient way to achieve the highest possible output (Charnes and Cooper, 1985). Whereas allocative efficiency refers to choosing inputs, given their respective prices to minimize the cost of production, assuming that the decision making unit being examined is already fully technically efficient.

In relation to education, technical efficiency relates to conversion of inputs such as number of teachers, quality of teachers and number of classes, learning and teaching facilities to produce a range of outputs through the education process (Mincer, 1970; Psacharopoulos and Patrinos, 2004; Afonso et al., 2005). Efficiency could be output or input-oriented (Farrell, 1957). Output-oriented technical efficiency refers to maximization of output given the set of inputs. Input-oriented technical efficiency refers to minimization of input given the output (Debreu, 1951; Charnes and Cooper, 1985).

The measure of technical efficiency is widely used. While applying the concept of efficiency in education, the outputs can be categorized as numeracy, literacy and test scores, among others. The study thus borrows from the theory of efficiency and productivity to measure the performance of schools, which converts inputs into outputs (Coelli et al., 2005).

2.2 Measurement of Efficiency

Following Lovell (1993), the efficiency of a decision making unit can be measured by the ratio of its output to its input. Decision making units are efficient if they have produced as much as possible output with the inputs they have actually employed at minimum cost.

Figure 2: Efficiency of production (output-oriented)

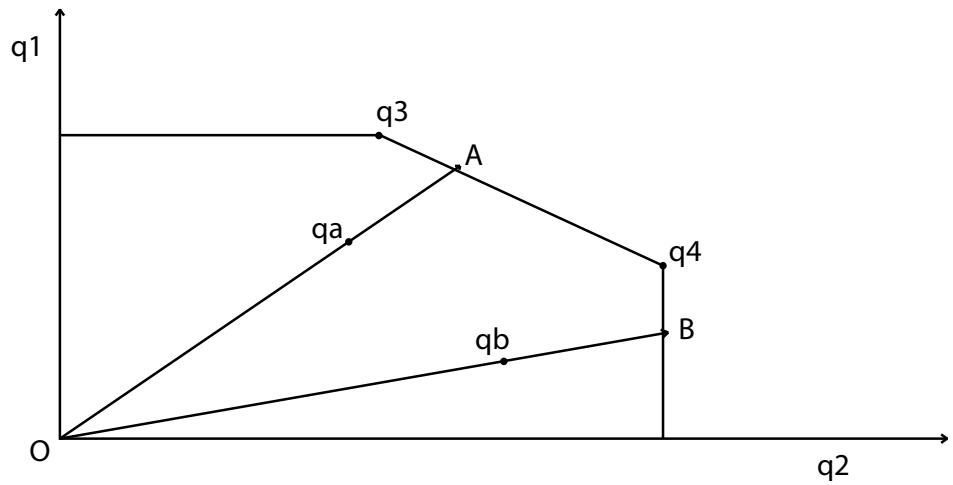


Figure 2 displays a technically efficient production frontier at point AB considering a two output case. In an output-oriented model, an inefficient unit is made efficient through the proportional increase of its outputs, while the inputs proportions

remain unchanged. As shown in Figure 2, output combinations that lie on the isoquant, for example, q_3 *and* q_4 will identify fully efficient producers. Conversely, output combinations that are inside the production frontier, for example, will identify inefficient producers (Farrell, 1957). Efficiency scores take the values between zero and one where a value of one implies that a firm is technically-efficient and values ranging from less than 1 to zero are indicative of decreasing levels of technical efficiency.

To measure efficiency, both parametric and non-parametric techniques can be employed. Stochastic Frontier Approach (SFA) is the most common parametric technique whereas Data Envelopment Analysis (DEA) is a common non-parametric technique. DEA is a popular choice for social science analysis because it does not require us to specify the functional form or distributional forms for errors, and it can be applied to multi-input and multi-output variables. DEA identifies the best performing decision making unit (DMU) within the sample and uses their combination of inputs and outputs to estimate the production possibility frontier. DEA was first developed in public sector analysis of technical efficiency, where price information is not available nor reliable, which is a usual feature of education institutions in many countries.

From the theoretical review, technical efficiency can be applied in the education sector to measure performance of outcomes. However, the inputs used are not systematically related to performance since schools are not homogeneous units.

2.3 Empirical Literature

There are a number of studies that evaluate the technical efficiency of different levels of education and training globally (Charnes et al., 1981; Hanushek, 1986; Hedges and Greenwald, 1996; Summers and Wolfe, 1977; Clements, 2002; Afonso et al., 2005; 2006 and Zulal, 2012). Most of these studies have focused on the relationship between inputs and outputs using either parametric or non-parametric tools to measure efficiency, which produced the same results. These studies found significant divergence of efficiency across countries.

Rassouli-Currier (2007) used DEA and second stage Tobit regression to analyze the efficiency of school districts in Oklahoma. Output used was test scores while inputs were categorized into school-controlled and non-school controlled. The results found that the mean efficiency score under variable returns to scale was 91 per cent, and 82 per cent under constant returns to scale. The second stage Tobit regression results showed that socio-economic variables and family environment were the factors explaining variation on efficiency. The size of the school district had a negative effect on efficiency whereas student teacher ratio had a positive

effect on efficiency. However, selection of production assumptions is critical when using DEA. Using constant returns to scale (CRS) assumption does not fit well with a school setting since it implies that an increase in inputs results in a proportionate increase in the output levels, which is usually not the case. The CRS assumption is only suitable when all schools are operating at an optimal scale.

According to Mizala et al (2002) study in Chile, subsidy and category of schools was an important factor in measuring efficiency. The findings showed that private fee-paying schools were the most efficient, followed by private subsidized and lastly the public schools. The study also found that teachers' characteristics had no effect on efficiency. Contrary to the results of Mizala et al (2002) and Rassouli-Currier (2007), Tyagi et al (2009) study which assessed the technical efficiency of schools in Uttar Pradesh in India showed that teachers' characteristics were found to have a major effect on efficiency while the effect of pupil-teacher ratio and average school attendance were found to have a small effect on efficiency. These studies bring mixed results; therefore, it is critical to assess technical efficiency of Kenyan secondary schools.

Kirjavainen and Loikkanen (1998) applied DEA and Tobit analysis to evaluate efficiency differences of Finnish senior secondary schools. The results showed that teacher quality in terms of qualification and experience affected efficiency positively, and that private schools were inefficient compared to public schools. These findings differed from Rassouli-Currier (2007).

Hanushek (1996) shows that schools in the United States of America have had great increase in resources, yet there is a very small improvement in outcomes or outputs which proves existing inefficiencies.

Farrell (1957) argues that measuring technical efficiency is important because it allows for determination of whether outputs can be increased by simply being efficient and without needing to increase input amount. Furthermore, Lovell (1993) states that measuring efficiency makes it possible to rank and evaluate the DMUs analyzed, thus permitting as to put in place policies that will raise efficiency. In general, an efficient production system yields higher output for a given set of inputs or, on the other hand, uses fewer inputs to yield a given output.

Zulal (2012) used DEA and Tobit regression model to analyze the factors affecting school efficiency for urban and rural-based schools in the state of Georgia using school level data. The regression results found that rural schools operate less efficiently than urban schools due to poor socio-economic characteristics for students and community, and family status.

Kenyan context

Ngware et al. (2007) applied an educational production function using KCPE mean score as the output to analyze the factors determining performance of primary schools in Kenya. Using OLS regression, results indicated that utilization of textbooks, teacher characteristics, school facilities and existence of school-feeding programmes, which were used as inputs had a major effect on students' performance in the KCPE. Pupil-teacher ratio had a negative effect on performance. For pupils from poor areas, the existence of school feeding programme was positively related to improve KCPE scores. According to Abagi and Odipo (1997), Kenyan primary school education system was found to be inefficient, and these inefficiencies were mainly as a result of teachers' poor time management, low pupil-teacher ratio, and a curriculum that was too wide to be fully implemented.

Kanina (2012) evaluated the technical efficiency and the changes in total factor productivity of public primary schools in Kenya grouped into 72 districts using (DEA) and DEA-based Malmquist productivity index. Mean scores in examination were used as output, while inputs used were gross enrolments, pupil-classes ratio and pupil-teacher ratio. The results showed the mean efficiency score of 90.8 per cent. She found that schools can improve their performance by 9.2 per cent using the existing level of inputs. Tobit regression analysis showed that high pupil-teacher ratio is associated with low levels of technical efficiency, and districts located in urban areas are found to perform better than their rural counterparts.

Bwonda's (2013) study on essays on benefit incidence and efficiency of public spending on education and training in Kenya, using mean scores in the Kenya Certificate of Secondary Education (KCSE) as output, estimated technical efficiency scores using DEA bootstrap and found 1.24, 1.12 and 3.04 for primary, secondary and tertiary education levels, respectively. Total factor productivity change was estimated at 0.95, depicting a decline between 2005/6 and 2009/10. The findings indicated that there was scope for improving efficiency in education resource utilization and that outputs can be increased by 24 per cent, 12 per cent and 20 per cent for primary, secondary and tertiary education, respectively, using the current inputs. Bwonda's (2013) study used 2008 data. Although this study analyzed part of secondary school education, there have been major policy reforms in the secondary education sector since then. Among them, a taskforce was put in place to rationalize secondary education school fees. Thus it will be important to assess whether the secondary school education subsidy (FDSE) has an impact on learning outputs.

Kinara (2014) used DEA and Tobit regression to analyze the determinants of technical efficiency of technical training institutions in Kenya. The results showed

that a large number of the tertiary vocational, educational and technical (TVET) institutions were not efficient because they have efficiency scores of less than 1. Moreover, TVET colleges could improve performance by 32 per cent while using the same resources. The results also showed the mean annual total factor productivity growth was positive and increased by 42.2 per cent and was entirely due to technical change accounting for 38.2 per cent.

To assess the technical efficiency of Technical, Vocational and Entrepreneurship Training Institutions in Kenya (TVET), Kariuki (2015) used DEA and, second, Tobit model to test environmental factors. Students' results and graduation rate were used as outputs whereas student enrolment, teaching staff, non-teaching staff and physical facility index were used as inputs. They found the overall efficiency of TVET institutions in Kenya as 79.4 per cent. Using the Malmquist index, it was clear that total factor productivity in TVET increased in the period 2009-2011. Further, the study found that the qualification of teaching staff measured by the number of teachers with advanced degree affected the performance of TVET institutions.

2.4 Overview of Literature

Various inputs used in literature include; education expenditure, average class size, pupil teacher ratio, teacher characteristics, parent literacy level and outcomes such as number of graduates and student test score. Some studies revealed mixed results using the same inputs (Kirjavainen and Loikkanen, 1998; Mizala et al., (2002) and Rassouli-Currier (2007)

Indeed, studies on efficiency of education institutions have pinpointed specific efficiency measures that can be adopted to ensure maximum attainment of outputs (Afonso et al. (2005), (2006); Mizala et al., (2002); Ngware et al. (2007); Kanina (2012); Bwonda (2013). The existence of technical inefficiencies offers an opportunity to increase output from the same amount of inputs which is very ideal for a school setting.

Different conclusions have been drawn by different researchers. Even so, developing countries are investing heavily on inputs, based on the perception that they improve learning outputs (Kirjavainen and Loikkanen 1998; Hanushek 1996). Previous research has shown that DEA is the most common method for investigating efficiency.

Some studies reveal considerable low technical efficiency levels in the provision of education globally. However, studies on efficiency of secondary schools in Kenya are almost non-existent and very little is known about the efficiency in which different schools utilize the existing resources to generate the requisite outputs.

Previous studies on technical efficiency in Kenya in education have focused on primary and tertiary education (Kanina, 2012; Kinara, 2014; Abagi and Odipo, 1997; Mancebon and Malinero, 2000; and Kariuki, 2015). Therefore, this study will fill this literature gap by analyzing determinants of technical efficiency of secondary schools in Kenya.

3. Methodology

3.1 Conceptual Framework

From the literature review, a number of factors influence technical efficiency in the education sector. An efficient production system yields higher output for a given set of inputs or, conversely, uses fewer inputs to yield a given output (Kumbhaker and Lovell, 2000). Even though schools are not profit-maximizing firms, the framework treats them as production units on the supply side. Empirical studies have adopted Data Envelopment Analysis (DEA) to measure efficiency. DEA is a non-parametric method for measuring efficiency of homogenous organization units called Decision-Making Units (DMUs) and it is attributed to Charnes, Cooper and Rhodes (2007).

DEA identifies the best performing DMU within the sample and uses the combination of inputs and outputs to estimate the production possibility frontier. The estimation of performance is based on the efficiency of a DMU in utilization of the existing resources to generate the optimal output. It is therefore a ratio of DMU's total outputs to total inputs equated as:

Productivity = Outputs/Inputs

It is conceptualized that the government through FDSE provides inputs (per capita spending, teacher employment, teaching and learning materials, physical infrastructure, among others) to all public secondary schools in Kenya. The DMUs are both public and private secondary schools, which employ inputs through the teaching and learning process and further interact with environmental factors to attain the desired education outputs as illustrated in Figure 3.

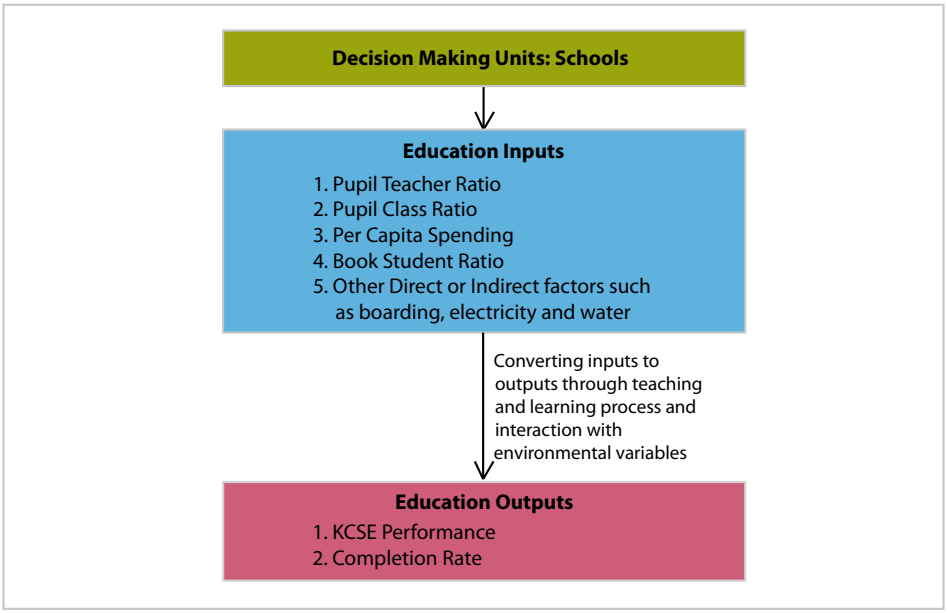
3.2 Analytical Framework

Following the model by Charnes et al. (1978) and used by Mizala et al. (2002) and Zere (2000) to determine the efficiency of a target schools in county *c*, we look at a number of *n* productive units (secondary schools): DMU_1, DMU_2, ..., DMU_n. Each unit produces *s* outputs while employing *m* inputs. The input matrix can therefore be written as $X = (x_{ij}, i = 1, 2, ..., m, j = 1, 2, ..., n)$ and an output matrix $Y = (y_{ij}, i = 1, 2, ..., s, j = 1, 2, ..., n)$.

The efficiency rate of such a unit can then be generally expressed as:

$$\frac{sum\ of\ outputs}{sum\ of\ inputs} = \frac{\sum_{i=1}^{s} u_i y_{iq}}{\sum_{j=1}^{m} v_i x_{jq}} \quad \text{..... (1)}$$

Figure 3: Conceptual framework



Source: Author's own formulation

We solve the following equation:

$$\max h_c = \sum_{r=1}^{s} u_r y_{rc} \quad \text{..... (2)}$$

Subject to:

$$\sum_{i=1}^{m} v_i x_{ic} = 1 \quad \text{..... (3)}$$

$$\sum_{r=1}^{s} u_r y_{rj} - \sum_{i=1}^{m} v_i x_{ij} \leq 0, \qquad j = 1, \dots, n$$

$$u_r, v_i \geq 0 \qquad r = 1, \dots, s \qquad i = 1, \dots, m$$

Where:

n – number of secondary schools evaluated in Kenya

m – the total number of inputs

s – the total number of outputs

h_c – technical efficiency of secondary schools in Kenya

U_r – vector of output weights to be determined by the solution to the LP problem

V_i – vector of input weights to be determined by the solution to the LP problem

Y_{rc} – amount of output *r* for secondary schools in Kenya

X_{ic} – amount of input *i* used by secondary schools in Kenya

The first step in the analysis is to identify those units that form the efficiency frontier. The first constraint indicates that the weighted sum of inputs for the particular secondary school equals one while the second one implies that all secondary schools operate on or below the frontier. Solving this linear programming problem, we obtain the efficient production for the schools in Kenya and the efficiency index.

The model by Charnes et al. (1978) assumes constant returns to scale (CRS). Returns to scale refer to the changes in output as a result of change in all inputs by the same proportion. CRS implies that output changes by the same proportion as the change in inputs and thus the size of the schools in the county is irrelevant when measuring efficiency, since all schools are deemed to be operating at their best scale size. However, size is an important factor in this analysis and thus the assumption of variable return to scale (VRS) which allows the level of outputs to inputs to vary with the size of the schools is more binding. Banker et al. (1984) added an intercept term to the Charnes et al. (1978) model to take care of the returns to scale.

For estimation of efficiency scores, the study employed the Data Envelopment Analysis programme (Coelli, 1996) under the output orientation two stage DEA instruction mode for the period 2007 and 2014. We measure and interpret efficiency scores which range from zero to one where schools with efficiency score of one are most efficient among the chosen peers of schools. DEA employs scale assumptions: variable returns to scale (VRS) which reflects the fact that production technology may exhibit increasing, constant and decreasing returns to scale whereas constant returns to scale (CRS) imply that output will change by the same proportion as inputs are changed. The CRS assumption is only appropriate when all DMUs are operating at an optimal scale. However, this study uses the VRS assumption because it permits the calculation of technical efficiency devoid of scale efficiency effects.

From the background, the study focuses on two time period (that is 2007 and 2014). Therefore, estimating technical efficiency change between the two time periods *t* and *t+1* is necessary. In the DEA estimations using output-oriented, Malmquist productivity index was used to determine technical efficiency change between the two time periods. Malmquist productivity index is a measure of total factor productivity, technology change and scale efficiency.

In the second stage of our analysis, DEA efficiency scores in the first stage are regressed on the inputs and other external variables to determine the possible determinants of technical efficiency in the DMUs under study. These are size of the school, location and the average cost of operating. We use Tobit regression model for this analysis. Tobit is favoured because the efficiency scores are limited to the interval [0;1] and thus can be interpreted as censored. Tobit regression can be used for models that are censored from above where the dependent variable is truncated at zero or some other cut-off (Long, 1997).

The model for estimating the determinants of efficiency can be specified as follows:

$$\sigma = \beta_0 + \beta_1 z + \beta_2 l + \beta_2 u + \varepsilon \quad \text{..... (4)}$$

Where:

σ – represents technical efficiency score of the school *i*

z – is the size of the school measured by total enrolment;

l – is the geographical location which takes a dummy variable with the value one if the school is located in an urban area and zero if otherwise;

u – is the type of school, which takes a dummy variable with the value one if the school is public and zero if otherwise;

ε – is normally independently distributed with mean, zero, and variance.

Assumptions and data problems

1. The Tobit model assumes that there is a latent variable underlying the observed dependent variable.
2. The presence of zeros in the data is likely to affect standard errors by introducing heteroskedasticity into the residual. However, using robust method (Tobit) to compute standard errors should address this problem.
3. The Tobit model generates downward biased estimates and the bias increases as the fraction of zero observations (including non-doers) increases.

3.3 Data and Variables

The study uses secondary data for the year 2007 and 2014 from the Ministry of Education Science and Technology to examine the technical efficiency of secondary schools in Kenya. The study sampled 377 secondary schools in Kenya for the year 2007 and 2014.

The sample size (number of observations) was computed with the formula below to enable us come up with the appropriate number of responses.

Sample Size = (Distribution of 50%) / ((Margin of Error% / Confidence Level Score) Squared)

Finite Population Correction:

True Sample = (Sample Size × Population) / (Sample Size + Population – 1)

The year 2007 is used as a baseline year before the government implemented the secondary education subsidy programme in 2008 whereas the year 2014 is used because it shows the impact of FDSE on education outcomes, which also coincides with the end of the first medium term plan for the Kenya Vision 2030.

The dependent variables are the performance which is measured by KCSE mean scores, and completion rate which is measured by number of students successfully completing secondary school level. Selected explanatory factors included in this study are pupil teacher ratio, average class size and book ratio which were used to determine the efficiency scores. The efficiency scores are further regressed against environmental factors to determine the effect on efficiency. Other factors that are known to affect completion and performance such as household characteristics, student innate factors are not included in this study because data was not available. The hypothesized input and output set is tabulated in table 3.

Table 3: Input and output set

Variables		Description
Inputs	Pupil-teacher ratio	This is the average number of pupils per teacher. Its computed by dividing the total number of pupils in a school by the number of teachers in the school. The data on teachers refers to teachers who are engaged in teaching and excludes those performing non-teaching duties
	Pupil-classroom ratio	This is the number of pupils per classroom in a school. It is computed by dividing the total number of pupils in the school by the number of classrooms
	Book ratio	This is the number of pupils per book in a school
Output	KCSE mean scores	This is the schools' average KCSE scores in a county
	Completion rate	Number of students who sat for KCSE

Environmental factors	Gross enrolment	This refers to the total number of students in a school. It will be used as a proxy for size of the school
	Location	Dummy variable which takes a value of 1 for urban secondary schools and 0 otherwise
	Type	Dummy variable which explains if the school is private or public and takes the value of 1 for public and for private

Source: Authors own formulation

4. Study Results and Discussion

This chapter discusses and presents the results of the study. First, summary descriptive statistics of the data are presented. Next, efficiency scores computed from Data Envelopment Analysis technical efficiency results are discussed. Lastly, Tobit regression results are analyzed to explain the determinants of efficiency in secondary schools in Kenya.

4.1 Descriptive Statistics

An overview of the summary descriptive statistics of the variables used in the analysis is presented in Table 4.

Table 4: Summary descriptive statistics

2014					
Variable	**Observations**	**Mean**	**Std. Dev.**	**Min**	**Max**
Mean score	377	40.39	14.72	10.5	79.2
No. of students completed secondary education	377	109.56	67.16	12	393
Enrolment per school	377	509.49	316.10	26	2430
Pupils per teacher	377	21.55	8.18	2.6	81
Student per book	377	4.02	2.78	1.05	21.32
Student per class	377	41.58	13.25	6.5	101.25
2007					
Variable	**Observations**	**Mean**	**Std. Dev.**	**Min**	**Max**
Mean score	377	40.62	11.98	10.5	75.68
No. of students completed secondary education	377	83.34	54.39	6	293
Enrolment per school	377	333.23	244.47	17	1130
Pupils per teacher	377	19.03	13.26	2.44	219
Student per book	377	10.02	19.41	0.06	227
Student per class	377	36.59	17.08	3	219

Source: Author's computations

Over this period, the mean enrolment per school increased significantly from 333 students in 2007 to 509 students in 2014 per school. This can be attributed to the secondary school subsidy programme. Equally, the average number of students completing Form Four per school increased from 83 in 2007 to around 110 students in 2014. However, it was observed that performance dropped.

From the summary statistics, it is evident that the mean performance in KCSE examinations declined from 40.62 per cent in 2007 to 40.39 per cent in 2014, suggesting that the performance in examinations did not improve with implementation of the secondary school subsidy over the period 2008 to 2014. This can be attributed to the population pressure on existing teaching and learning facilities. For example, PTR increased from 19 students per teacher in 2007 to 22 students per teacher in 2014. Average class size also worsened from 36.59 in 2007 to 41.58 in 2014. Nonetheless, book ratio improved from 10 students per book to 4 students per book over the same period. This could be as a result of government increased investment in provision of books to public secondary schools.

It was also noted that there was wide variation in education indicators across secondary schools in Kenya. For instance, enrolment varied from 26 students to 2,430 students in 2014. This is also reflected in PTR (including both Teacher Service Commission (TSC) teachers and non-TSC teachers), where lowest PTR was recorded at three students per teacher and the highest PTR was 219 students per teacher. In addition, there is also wide variation across the schools in the book-pupil ratio.

4.2 Correlates of the Selected Secondary Education Performance and Completion

The correlation between variables was examined, and is presented in Table 5. The correlation between independent variables is low, suggesting there are no problems of high colinearity. A negative correlation was found between PTR and mean score and also between class size and book ratio. This may mean that bigger classes have fewer books to use. The correlation between number of books and mean score is low, suggesting that the extent to which textbooks are available and used by pupils improves performance. There is a positive strong linear correlation between enrolment and the dependent variables, thus we expect that any increase in enrolment will lead to a positive increase in performance and high number of completion.

Table 5: Correlates of dependent variables (performance and completion rate)

	Mean score	No. completed	Enrolment	PTR	Book Ratio	Class Size
Mean score	1.0000					
No. completed	0.5144**	1.0000				
Enrolment	0.5186**	0.8437***	1.0000			
PTR	-0.0067	0.1613	0.2941	1.0000		
Book ratio	0.0337	-0.0249*	-0.0226	-0.0042	1.0000	
Class size	0.2242	0.3678*	0.5452	0.7126	-0.0217	1.0000

(and ***) represents low and high levels of correlation between mean score and independent variables respectively.*

4.3 Efficiency Results from Data Envelopment Analysis

The results show a set of efficient schools that produce the highest output for a given set of inputs from the sampled 377 secondary schools in Kenya.

Appendix Table A1 shows the distribution of efficiency scores obtained from DEA by determining schools which produce the highest output for a given set of inputs. In this case, the results of this study found the mean efficiency for the sampled 377 secondary schools under the VRS assumption at 62.7 per cent. This means that, on average, these schools could improve outcomes (performance and completion rate) by 37.3 per cent using the same level of current inputs for them to operate on the efficiency frontier. There are thirty (30) technical efficient schools with an efficiency score of 100 per cent. The remaining 347 had a technical efficiency score of less than 100 per cent out of which 92 schools are operating at an efficiency score of below 50 per cent.

This means that around 92 per cent of secondary schools in Kenya operate below the efficient frontier. We find that, collectively, these inefficient secondary schools have a mean efficiency score of 59.5 per cent. This suggests that these schools could improve their outputs by 40.5 per cent with their current level of input. The technical efficiency among these secondary schools ranges from 96.9 per cent to 20.1 per cent. This shows a wide variation in efficiency across different secondary schools in Kenya. The findings of this study are in line with other efficiency studies discussed in the literature above, indicating wide variation in technical efficiency in education sector institutions (Ruggiero et al., 1999; Mancebon et al., 2010; Mitinta, 2010; and Mizala et al, 2002). The efficiency levels shown imply a substantial output increase if schools became efficient, which could go a long way in addressing issues of secondary school shortages since the country is under pressure to meet the rising demand for secondary schooling places.

The wide difference in efficiency implies that there are other factors that explain differences in efficiency across different schools. This can be explained in terms of different management structure, location, type, size of schools, among others, which varies nationally. For instance, from the results, it is evident that private schools are more efficient than public schools with a mean efficiency of 69.48 per cent and 60.78 per cent, respectively. Urban schools are also more efficient than their rural counterparts with mean technical efficiency of 0.68 and 0.61, respectively, as illustrated below.

Category	Mean Technical Efficiency
Public secondary schools	60.78
Private secondary schools	69.48
Urban secondary schools	67.80
Rural secondary schools	61.06
Total Technical Efficiency	62.70

To summarize, the presented empirical analysis makes it obvious that the secondary education sector in the considered counties suffers from relatively low technical efficiency. The inefficiency is particularly evident in some public and rural schools. These categories of schools could improve outcomes (performance and completion rate) by 39.2 per cent and 38.9 per cent, respectively, using the same level of current inputs.

On average, the mean scale efficiency is 74.3 per cent, suggesting that secondary schools have 25.7 per cent unused capacity. Only 15 secondary schools out of 377 sampled schools are operating at optimal size of 100 per cent. This means that they employed all their factors at full capacity in production using the inputs given to produce the desired outputs. With regard to scale, the study has shown that there exists scale inefficiency in Kenyan secondary schools.

Measuring total factor productivity change

The estimated indices of the output-oriented Malmquist productivity change index show wide differences across schools as shown in Table 6.

Table 6: Malmquist TFP index summary of annual mean

Year	Efficiency change	Technological Change	Pure Efficiency change	Scale efficiency Change	Total factor productivity (TFP)change
Mean	0.905	1.116	0.904	1.001	1.009

Source: Author's computations

There was insignificant change in total factor productivity mean of 0.9 per cent despite government investment in the secondary education sector. The technical efficiency change increased positively by 11.6 per cent. This suggests that schools adopted new innovativeness in resource utilization, and therefore improved technical efficiency change. However, 53 secondary schools experienced a decrease in technological change with a mean of 0.94.

The results indicate a decline in overall efficiency change mean of 0.905. This could be attributed to the drop in pure efficiency mean of 0.904. Scale efficiency change, which reflects improvement in school operation at optimal size, indicates a very small increase of 0.1 per cent with 192 secondary schools operating below optimal capacity with a mean of 0.836.

4.4 Econometric Analysis of the Determinants of Technical Efficiency

To further investigate the determinants that explain the differences in school efficiency, we regress the technical efficiency scores against variables not directly included in the DEA analysis. Using equation 5 in our model, where the transformed efficiency scores are used as a dependent variable in the Tobit estimation, the sign of each independent variable is inversely correlated with school efficiency. If the coefficient sign is negative, this suggests that there is a positive relationship between independent variables and school efficiency score. The regression results are presented in Table 7.

Table 7: Tobit regression results explaining school determinants of technical efficiency

Number of observations = 754 Log likelihood = 133.08577 LR chi²(3) = 126.51			Pseudo R² = -0.9059 Prob > chi² = 0.0000			
Technical Efficiency	Coefficient	Std. Err.	t	P>|t|	[95% Conf.	Interval
Gross Enrolment	0.0003	0.0002	10.95	0.000	0.0002	0.0003
School Type - Public	-0.1066	0.0176	-6.07	0.000	-0.1411	-0.0722
Location - Urban	0.0059	0.0163	0.36	0.005	-0.0103	0.0536
Constant	0.5759	0.0166	34.76	0.000	0.5433	0.6084
Sigma	0.1831	0.0050			0.1734	0.1929

Obs. summary: 0 left – censored observations

709 – uncensored observations

45 right – censored observations at te>=1

The log likelihood is estimated at 133.09. This is the log likelihood of the fitted model. The likelihood ratio chi-square of 126.51 (DF=3) with a p-value of 0.0000 tells us that the model as a whole fits significantly in explaining the determinants of technical efficiency. All the predictors are significant at 95 per cent level of confidence.

From the *p* values, the independent variables have a significant effect on calculated school efficiency scores. The coefficient for school size, which is measured by gross enrolment, is positive at 0.003 and significant at the 95 per cent confidence level. This means that an increase in school size by one point is expected to increase the technical efficiency score by 0.003 percentage points. The results show that

larger schools are associated with higher levels of efficiency, which could be due to prevailing economies of scale because larger schools absorb overhead and administration costs, implying that they have lower marginal costs and fully utilize the available inputs. The findings are in line with other technical efficiency studies reviewed in the literature section above, indicating larger schools are more efficient compared to smaller schools (Kirjavainen and Loikkanent, 1996; Kanina, 2012 and Kinara, 2014).

The coefficient for public schools is negative at 0.1066 and significant at 95 per cent level of confidence. This means that public schools are likely to be less efficient when compared to private secondary schools. This could be attributed to the effective management of private schools where school managers are selected based on qualified managerial expertise and experience and operate in a strong governance environment. In addition, private education financiers are entirely households; therefore, schools managers are accountable to the households. To this end, there are strong accountability mechanisms accentuated by the strong financial and education management information systems and reporting. This makes it easier to determine any resource wastages or leakages. The results are in line with other studies as reviewed in the empirical literature.

Another key environmental variable analyzed was geographical location of the school. Results show that urban schools have a positive coefficient of 0.0059, suggesting that urban-based schools have higher technical efficiency compared to their peers in rural localities. From the literature reviewed, this may be attributed to the differences in the socio-economic factors which have a significant effect on efficiency. Furthermore, urban schools are located near social amenities and are most preferred because they are easily accessible. This finding is consistent with reviewed literature that urban localities have positive influence on efficiency of education institutions, whereas rural schools operate less efficiently. These results are corresponding to findings of Zulal (2012).

5. Conclusions and Policy Recommendations

5.1 Conclusion

Cognizant of the constitutional requirement of providing compulsory free basic education to every Kenyan child and also in line with the Sustainable Development Goal (SDG) number four, free day secondary education (FDSE) was a milestone to achieve the overall goal of universal basic education. However, this programme is only implemented in public secondary schools. It is important to assess the efficiency in the education sector to ensure that the resources allocated to the sector are efficiently utilized to achieve the desired results. This paper has attempted to assess the technical efficiency of Kenyan secondary schools.

The results obtained show that inefficiencies exist in all categories of secondary schools in Kenya, which display an average technical efficiency of 62.7 per cent. This implies that it is possible to improve learning outcomes for secondary education at current input resource level by 37.3 per cent. It is also interesting to point out that there are schools that, despite being efficient, do not achieve good performance in test score results. Other schools with similar characteristics and inputs displayed quite different results. Thus, the study further analyzed the reasons for these differences using Tobit model. The study found that urban schools are more technically efficient than their rural counterparts and also private schools are more efficient compared to public schools. This demonstrates that determinants of efficiency depend on the location and ownership of schools. Additionally, schools that are bigger in size tend to be more efficient than schools that are smaller in size.

In addition, using the Malmquist index analysis, the study shows a positive growth in annual total factor productivity. There was also a marginal positive technical change which could be explained by changes in innovations by the secondary schools. A drop in pure efficiency implies worsening contribution of management in operations of secondary schools.

5.2 Policy Recommendations

From the preceding conclusions, we propose policy recommendations that can be employed to increase efficiency and productivity of secondary education level in Kenya without necessarily increasing inputs. Malmquist results showed a decrease in pure efficiency. To this end, policies that ensure effective management and operations of schools should be implemented. This study therefore recommends continuous upgrading of the management skills for school managers and Boards of Management through training, and establishment of a mentorship system for

the school managers. Teacher motivation is also key in delivery of curriculum. This may be done through better terms of employment and also awards and recognition programmes.

The study also recommends implementation of policies that will ensure innovativeness in efficient utilization of existing teaching and learning facilities without incurring extra costs. This may include adoption of ICT in delivery of curriculum by digitizing textbooks, use of technology-based resources which will provide up-to date materials to inform and support teaching and learning, adoption of flexible learning hours whereby learners utilize the same resources, among others.

In addition, the study recommends merging small schools within the same locality and pooling resources together since bigger schools are more efficient than schools with smaller size. Deliberate effort should be made to establish and ensure schools are optimally-sized so that they can benefit from economies of scale. To achieve the overall goal of every child's basic right to access education without deteriorating performance in KCSE, the study recommends implementation of policies that will ensure balance of teaching and learning materials in all regions for effective utilization and equity. Therefore, the government should ensure all secondary schools have adequate infrastructure, teaching and learning materials for them to compete favourably. A close monitoring on efficiency changes should be done regularly with the aim of improving the desired outputs.

5.3 Limitation of the Study

The major limitation of the study is the availability of school level data on socio-economic variables to analyze other possible causes of inefficiencies in the schools. Schools are also dynamic, thus it is important to analyze efficiency for each individual school.

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Appendix

Table A1: Summary technical efficiency

SCHOOL	COUNTY	CRS TE	VRS TE	SCALE
Exeter Complex High School	Baringo	0.409	1	0.409
Kabarnet Boys High School	Baringo	0.576	0.873	0.66
Sacho High School	Baringo	0.653	0.877	0.744
St Peter's Girls Kaptere School	Baringo	0.439	0.551	0.796
Kabimoi High School	Baringo	0.525	0.611	0.861
Tangulbei Secondary School	Baringo	0.344	0.541	0.636
Tiriondonin Mixed Day School	Baringo	0.339	0.461	0.736
AIC Kapkelelwa Mixed Secondary School	Baringo	0.58	0.582	0.996
Mara Siongiroi Shinners Academy	Bomet	0.467	0.684	0.682
Emmanuel Boito Boys High School	Bomet	0.58	0.816	0.711
Kaplong Girls High School	Bomet	0.505	0.857	0.589
Longisa Boys High School	Bomet	0.474	0.683	0.694
Moi Siongiroi Girls' Secondary School	Bomet	0.554	0.845	0.655
Siwot Secondary School	Bomet	0.372	0.557	0.667
Tarakwa Secondary School	Bomet	0.451	0.527	0.855
Solyot Secondary School	Bomet	0.232	0.489	0.475
Kapkirwok Mixed Day Secondary School	Bungoma	0.464	0.489	0.949
Agape in Action Education Centre	Bungoma	0.377	0.518	0.727
St Josephs Academy Mukhuma	Bungoma	0.658	1	0.658
Webuye DEB Secondary School	Bungoma	0.536	0.638	0.841
St Paul's Nzoia R.C. Secondary School	Bungoma	0.295	0.408	0.723
St Kizito Mayanja School	Bungoma	0.509	0.639	0.797
Lugulu Girls Secondary School	Bungoma	0.679	1	0.679

SCHOOL	COUNTY	CRS TE	VRS TE	SCALE
Friends School Bokoli Boys High School	Bungoma	0.333	0.615	0.541
Brother Nicholas Mixed Day High School	Busia	0.611	1	0.611
Imprezza Academy	Busia	0.242	0.334	0.726
St. Paul's Igara Secondary School	Busia	0.582	0.634	0.919
St. Joseph's Chakol Secondary School	Busia	0.309	0.523	0.59
Bujumba Boys Secondary School	Busia	0.418	0.533	0.784
Busiada Girls Secondary School	Busia	0.355	0.539	0.659
Bishop Nicholas Stam Sikoma School	Busia	0.411	0.571	0.719
St Mathias Busia School	Busia	0.461	0.617	0.748
Maria Soti Secondary School	Elgeyo Marakwet	0.795	0.891	0.892
St Peters Itenyi Day Secondary School	Elgeyo Marakwet	0.298	0.52	0.572
St Augustine Secondary School Emsea	Elgeyo Marakwet	0.416	0.735	0.565
Soy Secondary School	Elgeyo Marakwet	0.247	0.408	0.605
Kabulwo Secondary School	Elgeyo Marakwet	0.406	0.428	0.949
Kimuron Secondary School	Elgeyo Marakwet	0.394	0.524	0.751
AIC Girls Secondary School Kessup	Elgeyo Marakwet	0.446	0.683	0.654
St Peter's Marakwet Boys High School	Elgeyo Marakwet	0.427	0.717	0.596
Kiamuringa Universal Secondary School	Embu	0.623	0.624	0.999
Don Bosco Technical Secondary School	Embu	0.333	0.504	0.66
Kyeni Girls High School	Embu	0.449	0.763	0.589
Macumo School	Embu	0.311	0.479	0.651
Kangaru High School	Embu	0.494	0.734	0.673
Gatunduri Mixed Day Secondary School	Embu	0.384	0.57	0.674
Itabua Secondary School	Embu	0.472	0.791	0.596
St John Kathunguri School	Embu	0.565	0.596	0.948
Al- Farouq Secondary School	Garissa	0.667	0.708	0.942

SCHOOL	COUNTY	CRS TE	VRS TE	SCALE
Hagadera Secondary School	Garissa	0.669	0.679	0.985
Ikhlas Intergrated High School	Garissa	0.655	0.867	0.756
NEP Girls School	Garissa	0.53	0.642	0.826
County High School	Garissa	0.429	0.553	0.775
Dadaab Secondary School	Garissa	0.516	0.549	0.94
Modogashe Secondary School	Garissa	0.392	0.511	0.766
NEP Girls School	Garissa	0.331	0.394	0.842
Oyugis Secondary School	Homa Bay	0.226	0.459	0.492
Jonemo Mixed Secondary School	Homa Bay	0.891	1	0.891
Agoro Sare Boys High School	Homa Bay	0.477	0.82	0.582
Kendu Muslim School	Homa Bay	0.426	0.531	0.803
Adiedo Secondary School	Homa Bay	0.449	0.795	0.565
Atemo Mixed Secondary School	Homa Bay	0.517	0.645	0.802
Asumbi Girls High School	Homa Bay	0.579	0.814	0.712
Andiwo Mixed School	Homa Bay	0.618	0.637	0.97
Bulawaso Sunshine Academy	Isiolo	0.48	0.677	0.709
Sacred Heart of Jesus Minor	Isiolo	0.529	0.722	0.733
St Pauls Kiwanjani Secondary School	Isiolo	0.234	0.396	0.591
Ngaremara Secondary School	Isiolo	0.407	0.484	0.841
Isiolo Barracks Secondary School	Isiolo	0.491	0.52	0.944
Isiolo Boys	Isiolo	0.534	0.555	0.962
Isiolo Girls	Isiolo	0.469	0.601	0.781
Kinna Secondary School	Isiolo	0.473	0.53	0.893
Orok Mixed School	Kajiado	0.564	0.595	0.947
Star Sheikh Academy	Kajiado	0.294	0.435	0.677
Ongata Senior School	Kajiado	0.606	1	0.606

SCHOOL	COUNTY	CRS TE	VRS TE	SCALE
Olkejuado High School	Kajiado	0.59	0.855	0.69
Moi Girls Isinya School	Kajiado	0.455	0.65	0.7
Olkejuado High School	Kajiado	0.602	0.646	0.932
Oloolaiser High School	Kajiado	0.567	0.702	0.807
Oloolua School	Kajiado	0.472	0.675	0.7
Booker Academy	Kakamega	0.568	0.769	0.738
Mumias Academy	Kakamega	0.615	0.833	0.739
Rotary High School	Kakamega	0.209	0.434	0.483
Archbishop Njenga Girls High School	Kakamega	0.504	0.656	0.768
Kakamega Township School	Kakamega	0.23	0.406	0.568
Bukhakunga Secondary School	Kakamega	0.281	0.508	0.554
Bukolwe Secondary School	Kakamega	0.277	0.516	0.537
Butere Boys High School	Kakamega	0.471	0.652	0.723
Kabokyek Adventist Secondary School	Kericho	0.345	0.521	0.662
Mercy Girls Secondary School	Kericho	0.443	0.687	0.645
Barotion School	Kericho	0.54	0.55	0.981
Kericho Day School	Kericho	0.499	0.663	0.752
Kericho Township School	Kericho	0.355	0.591	0.602
Litein High School	Kericho	0.797	1	0.797
Londiani Boys Secondary School	Kericho	0.438	0.622	0.704
Londiani Township Secondary School	Kericho	0.452	0.452	0.999
Ruiru Saint Triza School	Kiambu	0.572	0.829	0.691
Muguga High School	Kiambu	0.551	0.555	0.993
Maria Immaculata Education Centre	Kiambu	0.558	0.674	0.828
Kihara Secondary School	Kiambu	0.232	0.336	0.69
Thika High Secondary School	Kiambu	0.588	0.786	0.748

SCHOOL	COUNTY	CRS TE	VRS TE	SCALE
Maryhill Secondary School	Kiambu	0.595	0.868	0.685
Gachie High School	Kiambu	0.51	0.523	0.975
Gichuru High Secondary School	Kiambu	0.423	0.435	0.972
Gichuru Memorial School	Kiambu	0.452	0.485	0.932
Chanagande Secondary School	Kilifi	0.499	0.526	0.948
Rabai Secondary School	Kilifi	0.264	0.356	0.743
Galana Secondary School	Kilifi	0.424	0.519	0.817
Godoma Secondary School	Kilifi	0.492	0.516	0.953
Holyways Technical School	Kilifi	0.381	0.402	0.946
Barani Secondary School	Kilifi	0.35	0.615	0.569
Kilifi Daystar Secondary School	Kilifi	0.281	0.408	0.689
Malindi Progressive Academy	Kilifi	0.665	0.819	0.812
St Elias And Goretti Secondary School	Kirinyaga	0.405	0.413	0.981
St James Kiaritha School	Kirinyaga	0.346	0.523	0.662
Baricho Boys School	Kirinyaga	0.58	0.832	0.697
Getuya School	Kirinyaga	0.397	0.453	0.876
Good Samaritan Mixed School	Kirinyaga	0.383	0.499	0.767
Kabare Girls Secondary School	Kirinyaga	0.553	0.789	0.701
Karima Mixed Secondary School	Kirinyaga	0.341	0.471	0.725
Thiba Mixed Secondary School	Kirinyaga	0.284	0.45	0.631
Gusii Highlights High School	Kisii	0.948	1	0.948
Nyachwa Adventist School	Kisii	0.84	0.841	0.998
Getembe Mixed Day School	Kisii	0.681	0.684	0.996
Irungu PAG Secondary School	Kisii	0.339	0.469	0.724
Amabuko Secondary School	Kisii	0.317	0.825	0.384
Bishop Mugendi Secondary Nyakegogi	Kisii	0.404	0.716	0.564

SCHOOL	COUNTY	CRS TE	VRS TE	SCALE
Cardinal Otunga Mosocho High School	Kisii	0.577	0.799	0.722
Gianchere Friends School	Kisii	0.791	0.865	0.914
Maseno School	Kisumu	0.662	0.969	0.684
Onjiko High School	Kisumu	0.468	0.696	0.672
St Augustine Secondary Kandege	Kisumu	0.361	0.583	0.62
Katolo Mixed School	Kisumu	0.275	0.579	0.475
St Stephens Menara School	Kisumu	0.297	0.475	0.626
Xaverian Mixed Secondary School	Kisumu	0.338	0.613	0.553
Oasis Of Hope Secondary School	Kisumu	0.276	0.602	0.459
Highway High School	Kisumu	0.389	0.413	0.943
Athi Mixed Secondary School	Kitui	0.953	1	0.953
Gankanga Secondary School	Kitui	0.289	0.467	0.62
Yumbisye Secondary School	Kitui	0.606	0.638	0.949
Lawson High School	Kitui	0.269	0.272	0.987
Thitani Girls School	Kitui	0.372	0.541	0.688
Waita Secondary School	Kitui	0.267	0.438	0.61
Mutito Boys High School	Kitui	0.343	0.348	0.985
Ngiluni Secondary School	Kitui	0.286	0.452	0.632
Redeemed Academy	Kwale	0.531	0.532	0.999
Mazeras Girls Memorial School	Kwale	0.576	0.59	0.976
Shimba Hills School	Kwale	0.45	0.59	0.763
Babla Diani Secondary School	Kwale	0.41	0.523	0.784
Kinagoni Secondary School	Kwale	0.27	0.542	0.498
Kwale Girls School	Kwale	0.614	0.728	0.844
Kwale High School	Kwale	0.488	0.729	0.67
Lukore Secondary School	Kwale	0.329	0.506	0.649

SCHOOL	COUNTY	CRS TE	VRS TE	SCALE
Thiru Secondary School	Laikipia	0.343	0.596	0.576
Likii Hill School	Laikipia	1	1	1
Usalama Girls School	Laikipia	0.556	0.568	0.979
Ndururumo High School	Laikipia	1	1	1
Njorua High School	Laikipia	1	1	1
St Loise Nanyuki Girls School	Laikipia	1	1	1
Thiru School	Laikipia	0.322	0.441	0.731
Tigithi Secondary School	Laikipia	1	1	1
Bright Girls Shella Secondary School	Lamu	0.455	0.591	0.769
Bahari Secondary School	Lamu	1	1	1
Lamu Boys Secondary School	Lamu	0.494	0.586	0.844
Matondoni School	Lamu	0.294	0.357	0.824
Mpeketoni Secondary School	Lamu	0.414	0.654	0.634
Witu Mjini School	Lamu	0.204	0.478	0.427
Bakanja Secondary School	Lamu	0.847	0.86	0.985
Sacred Heart Girls Secondary School	Lamu	0.382	0.575	0.664
Masii SDA Secondary School	Machakos	0.38	0.516	0.738
Sunrise Seconday School	Machakos	0.641	0.75	0.854
St Augustine Mlolongo School	Machakos	0.296	0.486	0.608
General Mulinge High School	Machakos	0.298	0.553	0.539
Kabaa High School	Machakos	0.632	0.922	0.685
Kithunguini School	Machakos	0.32	0.473	0.675
Kwanthanze School	Machakos	0.407	0.425	0.957
Machakos Girls High School	Machakos	0.452	0.763	0.592
Kathamboni Secondary School	Makueni	0.254	0.408	0.622
Matiliku Boys Secondary School	Makueni	0.539	0.67	0.805

SCHOOL	COUNTY	CRS TE	VRS TE	SCALE
Nthangu Mixed School	Makueni	0.368	0.5	0.735
St Mary's Ndovea Secondary School	Makueni	0.763	0.817	0.933
Thomeandu Boys Secondary School	Makueni	0.381	0.59	0.646
Utangwa Mixed School	Makueni	0.501	0.554	0.905
Kikima Secondary School	Makueni	0.418	0.577	0.725
Our Lady of the Assumption School	Makueni	0.589	0.589	1
Moi Girls Secondary School	Mandera	0.364	0.496	0.734
Sheikh Ali High School	Mandera	0.476	0.489	0.973
Border Point Secondary School	Mandera	0.429	0.587	0.731
Arabia Boys Secondary School	Mandera	0.286	0.46	0.621
Banisa Mixed Day School	Mandera	0.252	0.359	0.701
Takaba Mixed Day Secondary School	Mandera	0.254	0.355	0.715
Towfiq Mixed Day School	Mandera	0.47	0.735	0.639
Elwak DEB Mixed Day School	Mandera	0.413	0.583	0.708
Butiye Mixed Day School	Marsabit	0.381	0.571	0.667
Dakabaricha Secondary School	Marsabit	0.369	0.576	0.641
Goro Rukesa Mixed Day School	Marsabit	0.41	0.447	0.917
Loiyangalani Secondary School	Marsabit	0.412	0.453	0.909
Marsabit Boys High School	Marsabit	0.381	0.571	0.667
Moyale Girls School	Marsabit	1	1	1
Sololo Boys School	Marsabit	0.247	0.294	0.841
St Paul Secondary School	Marsabit	0.706	0.742	0.95
Consolata Girls School	Meru	0.678	0.699	0.97
St Pius X Seminary	Meru	0.598	0.866	0.69
Nthare Secondary School	Meru	0.504	0.508	0.992
Nturuba Secondary School	Meru	0.701	0.77	0.911

SCHOOL	COUNTY	CRS TE	VRS TE	SCALE
Ambaru Secondary School	Meru	0.048	0.361	0.134
Bishop Lawi Imathiu School	Meru	0.305	0.492	0.62
Lubunu Day Secondary School	Meru	0.57	0.914	0.624
Muthara Mixed Day School	Meru	0.252	0.477	0.527
Othora High School	Migori	0.173	0.325	0.534
Kenyasrega Nyokal School	Migori	0.503	0.568	0.887
Anjego Mixed School	Migori	0.379	0.503	0.753
Gokeharaka School	Migori	0.575	0.64	0.898
Koderobara School	Migori	0.342	0.628	0.544
Oruba Mixed School	Migori	0.264	0.409	0.645
Kadika Girls School	Migori	0.571	0.741	0.771
Migori Township Complex Secondary School	Migori	0.436	0.61	0.715
Changamwe Secondary School	Mombasa	0.635	0.806	0.789
Mvita Boys Secondary School	Mombasa	0.687	0.7	0.981
Bi Nuru School	Mombasa	0.454	0.746	0.608
Mombasa Baptist School	Mombasa	0.514	0.572	0.898
Miritini High School	Mombasa	0.915	1	0.915
Golden Chariot High School	Mombasa	1	1	1
Shimo- La -Tewa School	Mombasa	0.588	0.853	0.689
The Aga Khan High School	Mombasa	1	1	1
Chomo Secondary School	Murang'a	0.322	0.522	0.616
Gakui Mixed Secondary School	Murang'a	0.386	0.491	0.787
Itaaga Mixed School	Murang'a	0.271	0.456	0.595
Kangui Mixed Secondary School	Murang'a	0.623	0.69	0.903
Kiaguthu Boys School	Murang'a	0.454	0.758	0.599
Matuto Seconadary School	Murang'a	0.394	0.466	0.847

SCHOOL	COUNTY	CRS TE	VRS TE	SCALE
St. Augustine Mutundu Secondary School	Murang'a	0.281	0.423	0.664
Kagwathi SDA School	Murang'a	0.36	0.521	0.692
Aquinas High School	Nairobi	0.603	0.848	0.711
Dagoretti High School	Nairobi	0.608	0.796	0.764
Elite Visionary High School	Nairobi	1	1	1
Galaxy High School	Nairobi	0.569	0.58	0.98
Loreto Convent Msongari School	Nairobi	1	1	1
Olympic High School	Nairobi	0.647	0.87	0.744
Dandora Secondary School	Nairobi	0.489	0.632	0.773
Kenya High School	Nairobi	0.632	0.877	0.721
Moi High School Kabarak	Nakuru	0.937	1	0.937
St Francis Secondary School- Lare	Nakuru	0.663	0.919	0.721
Afraha High School	Nakuru	0.645	0.648	0.995
Bavuni Secondary School	Nakuru	0.413	0.716	0.577
Gituru High School	Nakuru	0.331	0.465	0.712
Lanet Day Mixed High Secondary School	Nakuru	0.173	0.458	0.376
Mogoon Secondary School	Nakuru	0.34	0.459	0.742
Njoro Boys Secondary School	Nakuru	0.521	0.714	0.73
AIC Kamanyinya	Nandi	0.504	0.575	0.876
Chepkuny School	Nandi	0.545	1	0.545
Kamimei Mixed Secondary School	Nandi	0.598	0.86	0.696
Kamobo Secondary School	Nandi	0.295	0.539	0.547
Kapsabet Boys High School	Nandi	0.568	0.917	0.619
Kimaren Secondary School	Nandi	0.325	0.573	0.568
Our Lady of Victory Girls Kapnyeb	Nandi	0.369	0.693	0.533
Segero Baraton Adventist School	Nandi	0.955	1	0.955

SCHOOL	COUNTY	CRS TE	VRS TE	SCALE
Emurua Dikirr Secondary School	Narok	0.314	0.575	0.546
Moi Naikarra School	Narok	0.332	0.437	0.759
Narok Boys High School	Narok	0.658	0.689	0.954
Oloomirani School	Narok	0.635	0.684	0.929
Salabwek School	Narok	0.624	0.64	0.976
Simotwet Secondary School	Narok	0.38	0.467	0.814
St Marys Girls School	Narok	0.339	0.518	0.653
St Mary Stephen Nkoitoi School	Narok	0.43	0.732	0.587
Ekenyoro Technical School	Nyamira	0.356	0.403	0.883
Gesure Elck School	Nyamira	0.372	0.474	0.784
Kenyoro Luth Elck School	Nyamira	0.251	0.427	0.588
Nyamiranga SDA School	Nyamira	0.306	0.548	0.559
Nyaikuro SDA Secondary School	Nyamira	0.419	0.674	0.621
Nyankoba SDA School	Nyamira	0.418	0.53	0.788
St Peters Nyakemincha School	Nyamira	0.639	0.746	0.858
Omosaria Glory School	Nyamira	0.639	0.642	0.995
Goa High School	Nyandarua	0.288	0.401	0.717
Kisima Mixed School	Nyandarua	0.473	0.546	0.866
Baari Mixed Secondary School	Nyandarua	0.266	0.571	0.465
Geta Secondary School	Nyandarua	0.439	0.539	0.814
Githunguchu Secondary School	Nyandarua	0.381	0.506	0.754
Karima Girls Secondary School	Nyandarua	0.531	0.874	0.608
Magumu Secondary School	Nyandarua	0.585	0.612	0.956
Turasha Secondary School	Nyandarua	0.321	0.516	0.622
Nyeri Baptist School	Nyeri	0.391	0.719	0.544
Temple Road School	Nyeri	0.569	0.688	0.827

SCHOOL	COUNTY	CRS TE	VRS TE	SCALE
Naromoru Mixed School	Nyeri	0.316	0.479	0.659
Rware High School	Nyeri	0.312	0.592	0.528
Bishop Gatimu Gandu School	Nyeri	0.469	0.827	0.567
Endarasha Boys High School	Nyeri	0.469	0.662	0.709
Ihithe Secondary School	Nyeri	0.279	0.371	0.753
Kiamuya Secondary School	Nyeri	0.436	0.569	0.766
Longewan Mixed Day Secondary School	Samburu	0.452	0.482	0.937
Wamba Boys Secondary School	Samburu	0.381	0.534	0.713
Good Shepherd Minor Seminary	Samburu	0.98	1	0.98
AIC Moi Samburu School	Samburu	0.29	0.452	0.642
Kirisia Secondary School	Samburu	0.299	0.518	0.577
Kisima Mixed Day School	Samburu	1	1	1
Maralal High School	Samburu	0.448	0.572	0.782
Kisima Girls School	Samburu	0.339	0.501	0.677
Boro Mixed School	Siaya	0.282	0.565	0.498
Rarieda Mixed Secondary School	Siaya	0.421	0.574	0.733
St Charles Humwend School	Siaya	0.365	0.611	0.597
St Marys High School Yala	Siaya	0.51	0.826	0.617
St Marys Lwak Girls School	Siaya	0.582	0.854	0.681
Ulumbi Secondary School	Siaya	0.403	0.545	0.74
Usenge High School	Siaya	0.54	0.79	0.684
Ramogi Academy	Siaya	0.99	1	0.99
Bura Girls Schools	Taita Taveta	0.495	0.875	0.565
Kenyatta High School	Taita Taveta	0.584	0.764	0.764
Marungu Secondary School	Taita Taveta	0.278	0.42	0.661
Murray Girls High School	Taita Taveta	0.516	0.717	0.72

SCHOOL	COUNTY	CRS TE	VRS TE	SCALE
Mwakitawa School	Taita Taveta	0.296	0.508	0.584
Ngami School	Taita Taveta	0.353	0.54	0.654
Voi Boys High School	Taita Taveta	0.363	0.519	0.699
Heartbeat High School	Taita Taveta	0.62	0.677	0.916
Garsen Secondary School	Tana River	0.204	0.388	0.526
Hirimani Secondary School	Tana River	0.267	0.335	0.797
Hola Boys Secondary School	Tana River	0.45	0.493	0.912
Huruma Day Secondary School	Tana River	0.285	0.411	0.692
Madogo Secondary School	Tana River	0.309	0.529	0.584
Ndura Mixed Secondary School	Tana River	0.321	0.345	0.93
Ngao Girls Secondary School	Tana River	0.293	0.407	0.719
Marvel Education Centre	Tana River	0.394	0.406	0.971
Karimba Day Secondary School	Tharaka-Nithi	0.513	0.74	0.694
Kianjagi Mixed Secondary School	Tharaka-Nithi	0.479	0.527	0.908
Makawani Secondary School	Tharaka-Nithi	0.337	0.523	0.644
Mukuuni Mixed School	Tharaka-Nithi	0.61	0.703	0.867
Njuri Mixed School	Tharaka-Nithi	0.634	0.742	0.856
Thigaa Day Secondary School	Tharaka-Nithi	0.423	0.603	0.701
Materi Girls School	Tharaka-Nithi	0.579	0.934	0.62
Kajiunduthi Secondary School	Tharaka-Nithi	0.545	0.735	0.742
Masaba Friends Secondary School	Trans Nzoia	0.29	0.478	0.606
Namanjalala School	Trans Nzoia	0.474	0.6	0.79
Goseta Secondary School	Trans Nzoia	0.296	0.723	0.409
Kwanza Friends School	Trans Nzoia	0.371	0.574	0.647
St Maurice High School - Lunyu	Trans Nzoia	0.41	0.543	0.755
St Philips' Grassland Secondary School	Trans Nzoia	0.786	1	0.786

SCHOOL	COUNTY	CRS TE	VRS TE	SCALE
St Columbans' High School	Trans Nzoia	0.363	0.71	0.511
Innami Education Centre	Trans Nzoia	0.442	0.49	0.902
Kainuk Secondary School	Turkana	0.249	0.582	0.428
Lodwar High School	Turkana	0.475	0.677	0.702
Moi High School Kalokol	Turkana	0.431	0.51	0.846
AGC Lokichar Secondary School	Turkana	0.165	0.403	0.408
PAG Lodwar Secondary School	Turkana	0.429	0.656	0.654
St Kevin's Secondary School	Turkana	0.579	0.712	0.814
Tarach Secondary School	Trans Nzoia	0.31	0.466	0.664
Kakuma Refugee Secondary School	Turkana	0.227	0.478	0.474
AIC Kapsang High School	Uasin Gishu	0.529	0.616	0.858
Bishop Muge Secondary School	Uasin Gishu	0.17	0.438	0.387
Moi University Secondary School	Uasin Gishu	0.328	0.469	0.699
Paul Boit School	Uasin Gishu	0.595	0.815	0.73
Sugoi Girls School	Uasin Gishu	0.311	0.495	0.628
Cengalo Secondary School	Uasin Gishu	0.293	0.572	0.511
Wareng High School	Uasin Gishu	0.465	0.601	0.773
St Elizabeth High School	Uasin Gishu	0.596	0.661	0.903
Bunyore Girls High School	Vihiga	0.604	0.837	0.721
Nyang'ori High School	Vihiga	0.531	0.713	0.745
Ebubayi Secondary School	Vihiga	0.398	0.56	0.711
Ebusiloli Secondary School	Vihiga	0.283	0.512	0.552
Lusengeli Secondary School	Vihiga	0.547	0.591	0.925
Hobunaka Secondary School	Vihiga	0.662	0.706	0.937
Mbale High School	Vihiga	0.521	0.654	0.796
Mudasa Academy	Vihiga	1	1	1

SCHOOL	COUNTY	CRS TE	VRS TE	SCALE
Abakore Mixed Day School	Wajir	0.469	0.553	0.85
Ahmed Liban Mixed Day School	Wajir	0.361	0.513	0.705
Biyamathow Mixed Day School	Wajir	0.514	0.608	0.844
Furaha Mixed Secondary School	Wajir	0.377	0.596	0.632
Kutulo Girls School	Wajir	0.319	0.542	0.589
Sabunley Secondary School	Wajir	0.253	0.426	0.593
Waberi Mixed Day Secondary School	Wajir	0.171	0.447	0.382
Iftin Mixed Day Secondary School	Wajir	0.201	0.201	0.998
Chewoyet Boys High School	West Pokot	0.414	0.715	0.579
St. Mulumba Mixed Day Secondary School	West Pokot	0.487	0.589	0.828
Karas Mixed Day School	West Pokot	0.352	0.665	0.529
Nasokol Girls School	West Pokot	0.377	0.645	0.584
St Anthony Of Padua Sina School	West Pokot	0.4	0.546	0.732
St Stephen Chepkono Mixed Day Secondary School	West Pokot	0.417	0.592	0.704
St Theresa's Tartar Girls School	West Pokot	0.347	0.668	0.52
Weiwei Boys Secondary School	West Pokot	0.341	0.459	0.744
Mean		**0.47**	**0.627**	**0.743**

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