Internal efficiency of Public Technical Training Institutions in Bungoma County, Kenya

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Abstract
No country can develop without quality technical education. However, Technical institutions in developing countries and Africa have been faced with internal efficiency issues for some time. Over the years, TTIs in the region have had to innovate in order to cope with increased competition and diminishing capitation, amongst other objectives, TTIs are to facilitate the running of the parallel programmes for full fee-paying students at both certificate and diploma levels. This paper looks at the internal efficiency of public technical training institutions in Bungoma County, Kenya. The institutions under study were; Sangalo Institute of Science and Technology, Kisiwa, Matili and Musakasa Technical Training Institutes. The research was quantitative in nature. Data was collected through questionnaires and secondary data. The study found out that there has been continuous decline in internal efficiency level in public technical training institutions in Bungoma County.
The study recommends that there is need for public TTIs to closely monitor students' survival from year 1 to year 3 and make a follow up on the reasons that made students not to complete their study on time. Further, transformative resource mobilisation strategies need to be done to ensure internal efficiency levels are raised in public technical training institutions.

Key words: TVET, Internal efficiency, wastage rate, flow rate

Introduction
Technical, vocational education and training (TVET), has been used by several developed countries as an instrument of development. However, in Africa issues of internal efficiency has affected the attainment of TVET goals across various countries (Kamau, 2013). Evidence from the scholarly field indicates that there is limited access to technical vocational education for students in majority of developing countries compared to develop ones (International Labour Organisation [ILO], 2014; Marope, Chakroun, & Holmes, 2015). For instance, most technical training institutions are located in the big cities and it makes huge barriers to economic and geographical inequalities and gender inequalities (African Union 2007; Konayuma, 2008).

Internal efficiency of education is concerned with the provision of more education to produce a given output by using less input of resources. Internal efficiency of an education system is concerned with the relationship between the inputs and outputs of an education system (Coombs & Hallak, 1987:9). Abagi (1997) defines internal efficiency as the amount of learning achieved during the school age attendance, compared to the resources provided. In addition, take the percentage of entering students who completed the course''as its measure. Thus, internal efficiency refers to the measurement of performance of the education system by showing the proportion of students successfully completing a given level of the Education system without wastage. Therefore internal efficiency links inputs to outputs in a systematic fashion. It is possible to have school quality and school effectiveness without having efficient operation of the school. The internal efficiency analysis asks whether more outputs could be

achieved given the available inputs or, alternatively, whether fewer inputs could be used in providing the same level and mix of outputs (Chapman & Windham, 2005). Thus, the internal efficiency concept is much more inclusive than those of quality or effectiveness and places a strong emphasis on the scarcity of resources and their appropriate utilization in technical training.

Amedorme and Fiagbe (2013) indicate that internal efficiency is basically dependent on physical, monetary and human resources all of which can be expressed in monetary terms. Awuor, Wanjala and Muriithi (2016) state that internal efficiency as a measure for institutional effectiveness is seen in terms of the flow of students in a college system and their performance at the end of an educational cycle. This implies World Bank (2013) reported noted that majority of institutions in developing countries are grappling with the challenge of low internal efficiency levels. Factors of low internal efficiency in TVET are: poor performance, inappropriate curricula, weak management, ineffective teachers, under-utilisation of facilities and equipment, small teaching space or hostel accommodation for students, even timetables are factors promoting low internal efficiency in public technical training institutions (Haramoto, 2015). This paper looks at the internal efficiency level of public technical training institutions in Kenya.

Literature review

Internal efficiency is the extent to which resources made available to the educational system are being used to achieve the objectives for which the educational system has been set up. In this regard, the input into the system and the output from it need to be measured (Yang, 2014). The inputs include classroom, teachers, furniture, textbooks, etc. and all these can be quantified as the cost per student per year. Thus, the input has to be in terms of student years. The outputs of the educational system are the graduates from that system (Ithuta, 2014). The implication here is that there should be optimum enrolment of students in educational institutions so that the resources can be fully utilised. Khamala (2012) suggests that the resources used in education should be properly utilized by the enrolled number of students so that they can reap maximum from them and hence a given educational institution realizing internal efficiency.

In order to measure internal efficiency in education, a researcher needs to do a cohort analysis. The cohort analysis simply tells the history of a particular level of education to the time the group of students left the level. As such, it can show to what extent the educational system is able to use its raw materials (students) in the production of output (graduates). In this regard, the cohort analysis would show the flow rate in the system such as the promotion rate, repetition rate and the dropout rate of students. If the system is able to see the students through the system in the shortest possible period, then the system is efficiency. In another form, system is effective if the wastage rate of the system is low. The smaller the wastage rate the more efficient the system (Babalola, 2003). Abagi and Odipo (1997) point out that the internal efficiency of an education system is revealed by grade promotion, repetition and dropout rates. Lerotholi (2001) further asserts that the higher the promotion and completion rates, the better the system's efficiency. Galabawa (2008) also describes internal efficiency maximising the relationship between inputs and outputs. There must be a constant quest on the part of managers of the education system to see whether the same out-puts in terms of enrolments, successful completers, or measured learning achievement - can be achieved with fewer financial or 'real resource inputs' and whether greater outputs can be achieved by redeployment of the existing level of inputs. Lerotholi (2001) concurs with the above citation and remarks that since internal efficiency are calculated based on dropout, repetition and

promotion rates, when dropout and repetition rates are high before the end of each education cycle, then that portion of the education system is said to have serious internal inefficiency.

Succinctly, internal efficiency is a measurement of the use of resources to achieve the desired results. Effective strategic planning in the TVET could help to reduce wastage in the use of the available resources that, in turn, could help the universities achieve their goals. But inadequate or lack of effective planning and implementation of plans, inadequate academic staff as well as poor infrastructural facilities have been identified as factors militating against internal efficiency, and invariably effective management of TVET institutions (Yang, 2014). Kayanda (2015) examined factors affecting the internal efficiency of education in community secondary schools Tanzania. The study used mixed methods approaches involving 125 informants categorized into district education officer, head of schools, teachers and students. The study deployed purposive and stratified random sampling to select the sample. The study concluded that the current status of internal efficiency in community secondary schools in Kisarawe district is weak due to the presence of high dropout and low survival rates, poor performance in both Form two and Four national examinations a situation attributed to factors such as inadequacy of text books, shortage of teachers, students participation in rites of passage, early marriages and pregnancies, lack of libraries and laboratories. Therefore, there was need to examine the internal efficiency of public technical training institutions in Bungoma County, Kenya.

Materials and Methods

The selection of an appropriate research paradigm precedes the selection of a suitable methodology. The reason according to Denzin and Lincoln (2000) is that paradigm affects the whole research stages from determination of the research problems to the data analysis and interpretation. This study was quantitative in nature and it involved cohort analysis. Data was collected from public technical training institutions in Bungoma County. The target population for this study involved four TTIs located in Bungoma County, which are Sang'alo Institute of Science and Technology, Kisiwa Technical Training Institute, Musakasa Technical Training Institute and Matili Technical Training Institute. The data for the study was collected through questionnaires and observation checklist. Analysis of data was performed through use of descriptive statistics.

Results and Discussion

Flow Rate of Students in Public TTIs in Bungoma County

The researcher collected data on the flow rate of students in the four public TTIs from the year 2014 to 2016. The data on flow rate is shown in Table 1.

Table 1 Flow Rate of Students in Year 1 to Year 3 from 2014 to 2016

2014	I	II	II	Sangalo Graduation	Graduation rate	Cohort wastage rate	Survival rate	Average completion rate
E	3392	3090	3006	2500	0.765			
R	102	120	100					
Year 2015								
E	3404	3201	3002	2614	0.870		0.877	
R	15	225	92					
Year 2016								
E	3500	3302	2920	2572	0.88	0.17	0.826	3.69
R	110	105	116					

Kisiwa								
Year 2014								
E	1568	1528	1512	1192	0.788			
R	50	102	49					
Year 2015								
E	1420	1348	1105	1009	0.822		0.791	
R	101	107	50					
Year 2016								
E	1602	1400	1284					
R	78	79	68	1213	0.789	0.22	0.730	4.097
Matili								
Year 2014								
E	1751	1720	1625	1103	0.679			
R	92	71	80					
Year 2015								
E	1708	1670	1648	1250	0.758		0918	
R	19	62	82					
Year 2016								
E	1820	1650	1540	1125	0.73	0.18	0.915	4.409
R	72	75	102					
Musakasa								
Year 2014								
E	713	707	691	520	0.753			
R	22	45	21					
Year 2015								
E	729	673	614	514	0.873		0.858	
R	52	61	65					
Year 2016								
E	742	692	633	517	0.817	0.15	0.846	3.905
R	13	25	30					

Key: E –   Enrolment
       R-   Repeaters

Table 1 data on flow rate of students in the system for the three year diploma period show a decrease in students' transition from one year to another. For instance, at Sangalo TTI, out of 3392 who registered in year one of study, only 3201 continued in year 2 showing a survival rate of 0.877. The same is witnessed in Kisiwa, Matili and Musakasa TTIs recording survival rates of 0.791, 0.918 and 0.895 for same year of study. Data on cohort wastage over the three years showed that Sangalo lost 17% of students, Kisiwa 22%, Matili 18% and Musakasa 15%. Average completion rate shows that students are taking longer than expected to finish their diploma programmes. For instance, those in Kisiwa, Matili and Sangalo students finish at four years instead of three. The result can also be presented graphically as shown in Figure 1 below.
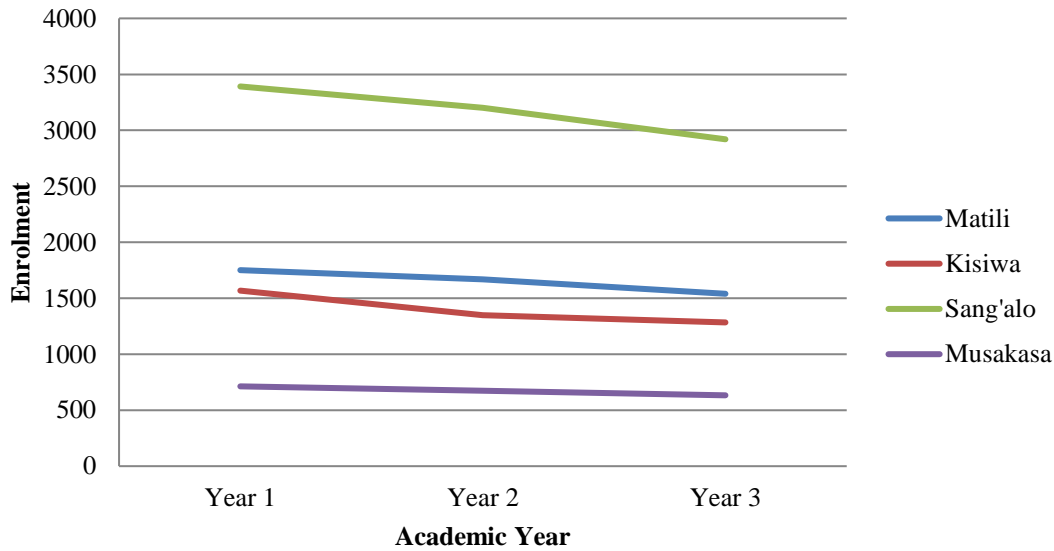
Figure 1 Flow rate of students in public TTIs in Bungoma County

Data from Figure 1 shows that there is a decline in the flow rate of students from year 1 to year 3. This implies that internal efficiency appears to be on a declining trend in most public technical institutions in Bungoma County. More details and statistics on the years are presented in appendix IV on institutional observation checklist results.

Internal Efficiency of Public TTIs in Bungoma County

The purpose of the study was to establish the level of internal efficiency of public TTIs based on tutors responses in the four technical training institutions in Bungoma County. Awuor et al. (2016) measured internal efficiency of public secondary schools using school performance index, completion rate and students' retention rates.

In this study internal efficiency was measured through; students completion rate, success of graduates in the job market, enrolment trends in Technical institutions, KNEC examination performances, flow-rate of students in TTI system, perceptions of industry members on the quality of graduates, prudential financial management and approval of the institutions by certified bodies. Through these IE measurements, the respondents (tutors) were asked to rank the level at which various indicators had been achieved as very low (1), low (2), moderate (3), high (4) and very high (5). The findings are presented in Table 2

Table 2 Internal Efficiency in Public TTIs in Bungoma County

Aspect	Very low	Low	Moderate	High	Very High	Mean	SD
Students completion rate	0 (0%)	14 (10.8%)	74 (56.9%)	36 (27.7%)	6 (4.6%)	3.2615	.71043
Success of your students in the job market (industry)	0 (0%)	29 (22.3%)	87 (66.9%)	14 (10.8%)	0 (0%)	2.8846	.56561
Enrolment trend in your institution	0 (0%)	17 (13.1%)	71 (54.6%)	23 (17.7%)	19 (14.6%)	3.3385	.88531
Examinations performance (credit	0 (0%)	20 (15.4%)	94 (72.3%)	15 (11.5%)	1 (0.8%)	2.9769	.54935

and pass)							
Flow of the students in the system	0 (0%)	19 (14.6%)	97 (74.6%)	14 (10.8%)	0 (0%)	2.9615	.50430
Public perceptions on the quality of your graduates	1 (0.8%)	26 (20.0%)	96 (73.8%)	7 (5.4%)	0 (0%)	2.8385	.51042
Prudential financial management	33 (25.4%)	28 (21.5%)	62 (47.7%)	7 (5.4%)		2.3308	.91828
Approval and certification e.g. ISO, TVETA	0 (0%)	1 (0.8%)	28 (21.5%)	36 (27.7%)	65 (50.0%)	4.2692	.82395
						3.1077	0.68346

Key: SD-Standard Deviation

Research findings on students completion rate in Table 2 shows that 74 (56.9%) rated it as moderate, 36 (27.7%) said it was high, 14 (10.8%) said that it was low and 6 (4.6%) indicated that it was very high. The computed mean shows that the level of student completion level to be moderate (M=3.26 and SD=0.71). This implies that students could be facing various challenges (failures, lack of fees) which impede their college completion levels hence affecting internal efficiency of their institutions. The finding is supported by Yang (2014) research that showed that the trend of dropout rate has been evident in all grade levels in South Sudan schools. This implies that the problem of non – completion of schools does not happen in Kenya alone.

On the level of students success in the job market, 87 (66.9%) said that it was on moderate, 29 (22.3%) said that it was low while only 14 (10.8%) indicated it to be high. This also shows that only half (M=2.88 and SD=0.56) of students are succeeding in the job market. The issue could be on the inability of the education systems to instruct students on all aspects of careers (job creators and employees). Moreover, the situation of churning high number of graduates to the job market coupled by low opportunities for jobs could be the reason for this situation. This coincides with Esongo (2017) research that revealed that a good number of candidates trained by the education system were not able to effectively integrate into the national production sector (job market). This is an indication of low internal efficiency level. This result generally indicated that the performance of the TVET system in Kenya does not orientate to jobs, its performance is low because the TVET system does not encourage creativity and the quality of training is low for job seekers.

With regard to enrolment trend, 71 (54.6%) said that it was on average, 23 (17.7%) said that it was high, 19 (14.6%) said that it was very high and 17 (13.1%) indicated it to be on lower level. The descriptive statistics shows that the level of enrolment is on average (M=3.33 and SD=0.88) in the four public TTIs in Bungoma county. This state of affairs could be due to lack of awareness by secondary school leavers on the opportunities that TVET education offers for future career growth and development. Institutions with high enrolments are able to raise more funds since the amount is collected per student. Institution enrolment determines the resource base of an institution since the more the number of students the more fees a college is likely to collect. In addition, institutions with more financial resources will not only acquire more learning resource but will enjoy the advantages of economies of scale. The

institution size determines other quality of education aspects like teacher/student ratio and textbook/student ratio.

On the flow rate of students in the TTI system, 97 (74.6%) mentioned that it was on average, 19 (14.6%) indicted it to be low with only 14 (10.8%) saying that it was high. The result therefore shows that there is an average (M=2.96 and SD=0.50) flow rate of students in TTIs system in Bungoma county, Kenya. This implies that most TTIs have moderate flow rate (enrolment, retention and completion) of students in their institutions. With a high survival rate, an institution system is said to be internally efficient because very few students would have repeated or dropped out.

On the examination performance, 84 (72.3%) said that it was on average, 20 (15.4%) said that it was low, 15 (11.5%) said that it was high and 1 (0.8%) said that it was very high. The result therefore shows that average (M=2.97 and SD=0.54) performance has been recorded in the four institutions in recent years. The study coincides with Awuor et al. (2016) found out that performance of the schools in KCSE was average in relation to the national mean during the period under consideration. In addition, Pitan (2012) research in Nigeria found out that the performance of students in the public examination examined revealed that there were lots of wastages (students' failure) in the system.

With regard to public views on the quality of graduates churned from the institutions, 96 (73.8%) said that it was on moderate level, 26 (20.0%) indicated it to be low and 7 (5.4%) mentioned that it was high. The descriptive scores (M=2.83 and SD=0.51) suggests that the students graduating from the TTIs have average level of acceptance as being qualified by members of public and therefore a lot needs to be done by stakeholders to improve the rating. On the prudential financial management front, 33 (25.4%) said that it was very poor, 28 (21.4%) said that it was very low, 62 (47.7%) indicted to be on average level and only 7 (5.4%) said that it was high. This shows that prudential financial management practices in the four TTIs to be low (M=2.33 and SD=0.91). This therefore implies that all the four training institutions are grappling with issues of financial mismanagement that affects the internal efficiency level. This state of affair could also explain why there are moderate indicators from the internal efficiency areas discussed above.

On the approval and certification level by ISO and TVETA, 1 (0.8%) said it was low, 28 (21.55) indicated it to be on average, 36 (27.7%) said it was high and 65 (50.0%) said it was very high. The findings therefore shows that the level of certification to offer TTI programmes by recognised bodies is high (M=4.26 and SD=0.82). Composite statistics on the level of internal efficiency shows that it is on average (M=3.10 and SD=0.68) in all the four technical training institutions in Bungoma County. In agreement with the findings, Esongo (2017) found out that internal inefficiency of the Cameroon school system on the was characterised by a pedagogy that fosters knowledge reproduction rather than production, high drop-out rates, irregular attendance, high repetition and failure rates, and poorly adapted and overloaded programmes; worsened by poor quality teaching and irrelevant curriculum content that do not match with local or workplace realities.

Conclusions and recommendations
Research results on internal efficiency showed that most of the institutions were at moderate level (M=3.1 and SD=0.68). Only approval and certification from the relevant authorities was found to be high (M=4.26 and SD=0.82). The lowest internal efficiency indicator was on prudential financial management as it was ranked to be low (M=2.33 and SD=0.9. This is

because when funds were not properly utilised, managed and accounted for, institutions were incapable of ensuring effective Technical training was provided. In terms of flow rate of students, the research found out that there had been a significant reduction in retention of students from year one to year two and year three of study. This meant that difference between students enrolled and students who completed within the prescribed academic period (2-3 years) was huge as some students dropped out of TTIs while others had to defer their studies. The paper concludes that internal efficiency appears to be on a declining trend in most public technical institutions in Bungoma County. To address internal efficiency challenges, there is need for public TTIs to closely monitor students' survival from year 1 to year 3 and make a follow up on the reasons that made students not to complete their study on time.

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