



THE EFFICIENCY OF THE LIBRARY IN NON-UNIVERSITY HIGHER LEARNING INSTITUTIONS IN TANZANIA: A CASE OF COLLEGE OF BUSINESS EDUCATION AND TANZANIA PUBLIC SERVICE COLLEGE

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ABSTRACT

Library performance has drawn the interest of researchers in different parts of the world and one of the aspects that have been studied is library efficiency which also implies resource utilization. This study examines the resource utilization in libraries of the College of Business Education (CBE) and Tanzania Public Service College (TPSC). The purpose of this study is to examine how academic library in each campus mobilizes resources to provide library services to the campus community, the study also aims to identify factors that might have contributed to the inefficiency of libraries. The study also investigates how to improve the performance of inefficient library at the campus level. A purposive sampling technique was used to pick four libraries from CBE and six from TPSC, ten campuses were included in the study and the study period covers 2015 -2017 and Data Envelopment Analysis (DEA) was adapted to perform efficiency computations. Findings revealed that only 30 percent of libraries was efficient during the period under review while the remaining 70 percent were found to be inefficient (had an efficiency score of less than 1). Only three libraries were performing above the average (50%) during the study period. Findings also record that for inefficient libraries inefficiency was largely caused by the technical inefficiency as evidenced by the average higher measure of relatively scale efficiency (80.9%) as compared to pure technical efficiency. Two libraries representing (20%) were found to be efficient in terms of pure efficiency as it was in the case of overall efficiency. As far as the scale efficiency is concerned findings show three libraries representing (30%) were experiencing scale efficiency over the study period, which means they were operating at their optimal scale during the study period. The study recommends a serious review of the library resource utilization concerning the size of library services across all inefficient libraries.

Keywords: *Efficiency, Library, Non-University, Tanzania*

1. INTRODUCTION

Higher learning institutions in Tanzania are categorized into major two categories, which is the university and non-university higher learning institutions. Libraries across higher learning institutions serve the purpose of supporting the realization of the objectives and expectation of stakeholders. However, library goal will differ depending on the nature of the library and expectations of the stakeholders. If the library correctly pursues its objective then there is a high

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chance for the stakeholders to consider it valuable, on the other hand, the stakeholders will consider the library to have no value if it cannot suffice the stakeholders' goals and expectations. Due to pressure from library stakeholders as well as customer's expectation of receiving quality services, it is obvious that striving for excellence and delivery of sustainable high quality services while keeping given the scarce library resources becomes quite imperative to the higher learning institutions, librarians and in charge of library services.

A library is considered to be a collection of different sources of information and similar resources such as books, periodicals, recorded music and films which are availed to the general public or institution members (Source needed). Therefore, the primary function of any library is to provide information to the users since information is a powerful tool through which we acquire knowledge and learn, and types of the information provided in the library will vary depending on the objective of its establishment as well as the nature of the users. According to Omosor (2014) libraries in higher learning institutions have been the major source of information and knowledge to students and staff which enhance quality teaching, learning as well as research activities.

The library can mainly be categorized into an *academic library* which provides information to students enrolled in the schools, colleges and universities. *Research library* which is an adequate collection of important materials on one or more subjects to support the scholarly or scientific research, generally it comprises both the secondary and primary source and ensures permanent collection and access to available materials. The other categories include the *specialized library* which provides specialized information services to the specialize cadre such as trade organizations, museums, hospitals, laboratory information while the *public library* provides varieties of information services to all people of all ages. In most cases, ownership of *academic libraries* such as those in the higher learning institution and university is in the hands of the host institution itself while ownership of the *Public* and *specialized* library may not necessarily be in the hand one specific institution and sometimes may involve multiple ownership. Like other firms in the service sector, the operation of the library involves inputs resources and outputs, and sometimes different inputs can produce unique or multiple outputs (Mc Laughlin and Coffey, 1990). In the course of evaluating library performance, one of the difficult challenges is to determine which inputs and outputs should be part of the efficiency computations. The extent to which library utilizes the scarcely available inputs to produce the given library services determines library efficiency. Generally, library performance can be glanced from two perspectives, which is "*effectiveness*" and "*efficiency*". According to Shim (2003), *effectiveness* means the extent to which the library delivers the desire services to its customers while *efficiency* implies how the library converts its minimum inputs to achieve a given level of outputs or how the library uses its given level of inputs to produce the maximum level of outputs. It should also be borne in mind that the management of any organization always consider efficiency as one of the sound performance indicators in the realization of the management objectives and goal of the firm (Bwana, 2014).



Therefore, the general objective of this study is to examine inter-campus library performance in the College of Business Education (CBE) and Tanzania Public Service College (TPSC). Specifically, the objectives are to examine library resource utilization efficiency across CBE and TPSC campuses and to identify factors that might have contributed to the inefficiency of CBE and TPSC libraries.

This study has been built on the microeconomic theory of the firm stresses that important objective of the firm is to operate at the best productive scale such that with a constant return to scale (CRS) the firm would be able to minimize cost and maximize revenue. In most cases, in the short run, the firm may operate under the increasing return to scale (IRS) or decreasing return to scale (DRS). However, for the firm to remain competitive in the market, in the long run, the firm will adjust towards the CRS either by becoming larger or smaller (Kumar and Gulati, 2008). Library efficiency has drawn the attention of several authors in different parts of the world, this includes different types of libraries such as the academic library (such as university library), public library and specialized library such as research libraries. For example in a study by Reichman (2004) a sample of 118 university libraries were randomly selected from Switzerland, Germany and Austria (these countries considered as German-speaking) and compared universities libraries from USA, Australia and Canada (English speaking). DEA model was employed in the computation where the inputs were the library staff and book held while the outputs were the number of subscriptions, regular weekly opening hours, total circulation and book acquired. Findings revealed out of 118 libraries only 10 were fully efficient, and there was no significant difference between English speaking and non-German speaking nations.

de Carvalho, Jorge, Russo, and de Sá, (2012) employed DEA technique to a sample of 37 university libraries in Rio de Janeiro. The researchers employed many employees, area and number of volumes) as inputs and consultations, loans, enrolments and user traffic as outputs for efficiency computations. DEA scores were used to quantify efficiency status for the library under review. The estimated scores were then used in the ranking and establishing the basis for the operation plans for each library, which was important in improving the performance of inefficient libraries. In another earlier study Chen, (1997) adopted DEA in a study which involved a sample of 23 university libraries, the researcher employed library visits, book circulation, reference transaction, inter lending services and on-line search as outputs while on the other hand library staff, expenditure on books acquisition and library space were considered as the inputs. Findings revealed that out of 23 university libraries 11 were found to be relatively efficient.

In a study conducted by Reichmann and Sommersguter-Reichmann (2006) an inter-country university library was carried out where university library from six countries (USA, Canada, Germany, Australia, Switzerland and United Kingdom) were analyzed using DEA technique. The inputs adopted were the number of library staff and the total number of book materials, while the outputs were the number of serial subscriptions, the number of total circulations, the number of regular weekly hours and the number of book materials acquired. The findings recorded that one-

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third of the libraries under the review were technically efficient, findings further revealed that there was a difference in technical efficiency between European and non-European university libraries. Sharma, Leung, and Zane, (1999) examined the efficiency of the public library using a sample of 47 public libraries in Hawaii using DEA model. Authors employed three outputs which are library visit, circulation, and reference transactions and while the inputs employed were library staff, library collection, days open, and library expenditures (which are non-personal). Findings revealed that out of 147 only 47 libraries were found to be efficient. The authors pointed out that the overall inefficiency was largely derived by technical inefficiency. Findings also contended that only the collection size, among the various variables that were considered, showed a positive and significant effect on the performance of the library.

Vitaliano (1998) employed DEA model to establish the relative efficiency in a sample of 184 public libraries in the United States. Author selected holdings of all library items (audiovisual, books, maps, etc.), total operation hours per week, new books acquired and total serial subscriptions which were currently active as inputs. The outputs employed were annual total circulation of all library materials and in-library material use which was measured by the number of reference questions answered. The findings revealed that the average library could reduce its inputs of holdings, new book purchases, serials and hours by about one-third and provide the same level of service if it were to organize itself as effectively as the best of its peers. In another study which involved public library, Worthington (1999) drew a sample of 168 local government libraries in New South Wales. The author employed DEA model in the analysis. Findings of the analysis revealed that only 9.5 percent of local government libraries were found to be technically efficient in the provision of library services, 47.6 percent were pure technically efficient and 10.1 percent were found to be scale efficient. The analysis further revealed that the exogenous factors and (size effect) scale effects largely contributed to the differences in observed efficiency between various local governments libraries included in the study.

In Cape Town University, De Jager (2002) took a sample of final year students and picks the highest and lowest marks scored in certain subjects and compared to student's library records of borrowing. Findings revealed that in most of the subjects with high scores students borrowed more books than the students with low scores, however, there were also some cases where some students with high marks did not borrow the books at all. Omosor (2014) assessed the effect of technology on librarians in an academic library in Nigeria, where 12 tertiary institution libraries in Delta state were employed. The researcher adopted a survey research design and findings revealed that librarians appreciate that technology improves their job performance. In Kenya, a study was conducted by Wachira and Onyancha (2016) the aim was to examine the extent to which the public libraries in Kenya have physical facilities and special library services designated for the remote library users. The researcher employed descriptive case study design in a sample of four universities (Nairobi, Moi, Kenyatta and Egerton University) and data was collected through questionnaires and focus group discussion. Findings revealed that universities under review did



not have adequate staff to serve the remote users as they were served by the same staff serving the normal users and that universities had enough physical facilities to serve the remote users.

Given the literature survey conducted on library efficiency, we have noted that it is little or no attention has been given to the efficiency of the academic library in non-university higher learning institutions in Tanzania. Literature also revealed that studies conducted on library performance in east Africa countries none of them employed DEA model in the analysis. With the ongoing trend where there is a growing concern of the *value, impacts and outcome* of the library in the higher learning institutions. The study is significant since it focuses on resources utilization efficiency in the context of library operations. It should be borne in mind that the worth of the library to its institutions in terms of value for money is represented by library efficiency. The study also tries to bridge the gap of DEA application in assessing academic library in east Africa and particularly in Tanzania. As Atkinson (2016) contended, excellence in library services is more likely to be achieved through strategic planning which is in line with key performance indicators that provide accountability. Therefore, the findings of the study are expected to be useful in setting up strategies on how to improve the performance of the library.



Figure 1: Conceptual framework showing relationships between inputs and outputs

According to Aday, (2004) efficiency are defined as the optimal allocation of resources, Figure 1 indicates how library resources are transformed into library services. Generally, efficiency measurements are usually very important steps in auditing the individual performance of production units such as the library.

2. RESEARCH METHODOLOGY

2.1. Data and Data Sources

This study employed a case of two non- universities higher learning institution with a total of ten campuses in different regions of Tanzania. The study focuses on the efficiency of the academic library of ten campuses, which implies that data used for the computation were drawn from the *academic library* and neither *specialized library* nor *public library*. Institutions involved were the College of Business Education (CBE) and Tanzania Public Services College (TPSC) altogether with ten (10) campuses. Four CBE campuses were CBE-Dar es salaam, CBE-Dodoma, CBE-Mwanza and CBE –Mbeya Campus, while the TPSC campuses were TPSC -Singida, TPSC -



Mbeya, TPSC -Tanga, TPSC -Mtwara, TPSC -Tabora and TPSC -Dar es salaam. Data were extracted from the respective campus library's annual reports covering the period from 2015 to 2017 and all data were aggregated at the campus level.

2.2 Data Envelopment Analysis (DEA) and Its Application in Library

There are different approaches to estimating firms' efficiency (including parametric and non-parametric) (Bwana, 2015). However, this study opted to employ Data envelopment analysis (DEA) which is a non-parametric approach to measure the efficiency of the library in four campuses of CBE and six campuses of TCSP. The approach is much appropriate for efficiency performance and benchmarking; the method applies linear programming to establish relative efficiencies in the set of homogeneous units. DEA model usually seeks to identify the decision-making units (DMUs) which define an envelopment surface that represents the best practice. It should be noted that DEA involves only relative efficiency measures; in this study it implies that relative efficiency of each library under the review is calculated with all other libraries, using the actual observed values for the outputs and inputs of each library.

Efficiency computation using DEA aims at maximizing the relative efficiency score of each DMU, constrained to the condition that the set of weights obtained in the computation for each DMU must also be feasible for all the other DMUs employed in the efficiency calculation. DEA establishes a piecewise empirical external production surface, which reflects best practice production frontier – the maximum output empirically obtainable from any DMU in the observed population, given its level of inputs (Charnes, Cooper, Lewin and Seiford, 1994). DEA model was first introduced by Charnes, Cooper, and Rhodes in 1978. The technique has been widely used in different areas, such as health care, financial sector, education, transportation, ports, the airline industry as well as courts has been adequately documented in operations research as well economics literature (Shim, 2003). Systematic and extensive literature review revealed that there are more than 4000 articles published in journals or book chapters that adopted DEA (Emrouznejad, Parker and Tavares, 2008).

The literature on the assessment of library performance is comparatively inadequate. The first research work to adopt DEA in the analysis of library efficiency was Easun's PhD dissertation (1992). The research work aimed at measuring efficiencies in resource utilization in selected school libraries in California. As far research article is concerned one of the earliest articles which employed DEA was authored by Kwack (1993). The researcher examined the efficiency of libraries for three years (1989-1991) using the sample of 20 national state university library. The researcher used *library staff*, *library space*, and *the number of library books* as input variables while *library visits and circulation of books* were employed as output variables (Kwack, 1993).

2.3. Model and Variables Selection

Variables were selected based on the availability of data and experience from the literature. This study employs *library visits* and *total circulation* as the outputs while the inputs are *library staff*,

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weekly hours, book titles and volume held. The study follows Chen, (1997) and Sherma et al, (1999) by adopting Total circulation and library visit as the outputs. The study also follows Reichman (2004) by selecting library staff and volume held as the inputs in the computation of library efficiency.

Table 1: Meaning and Application of the Variables Selected

Variables		Meaning of the variables	Application of the variables in previous studies
Inputs			
1.	Library visits	It is the number of annual library visits by members of the academic library excluding library staff.	Sharma, Leung, & Zane (1999), Chen, (1997)
2.	Total circulation	Is an annual material borrowed/lent for use outside the library by the members of the academic library?	Shim (2003), Worthington (1999)
Outputs			
1	Library Staff	It is the number of staff in full-time equivalents. (FTEs), It includes professional staff, qualified staff, project staff and assistants.	Reichman (2004), Sharma, Leung, & Zane (1999)
2	Volume held	Refer to the number of print volumes held by the library or it relates to the number of volumes or units in the library's collection.	Shim (2003), Reichman (2004)
3	Book titles	This refers to the list of all types of books and book collections currently available in the academic library, it may be print or electronic.	Sharma, Leung, & Zane (1999), Chen (1997)
4	Weekly hours	It is the number of library staff in full-time equivalents (FTEs) multiplied by hours per person and multiplied by the number of days in a week.	Vitaliano (1998), Hammond, C.J. (2002).

This study adopted DEA model with the constant return to scale (CRS) assumptions, the aim of CRS model is the maximization of the ratio of weighted numerous outputs to numerous inputs. Any library compared to others should have maximum efficiency score of 1 or less. In this study, the computation of efficiency score is done using DEA model which is briefly explained by mathematical notations adapted from Cooper et al. 2007. Efficiency scores (θ_0) for a group of peer DMUs ($j=1 \dots n$) are calculated for the outputs employed ($y_rj, r=1, \dots, s$) and inputs ($x_{ij}, i=1, \dots, m$) are used in fractional programming formula below:

$$\text{Maximize } \Theta_0 = \frac{\sum_{r=1}^s u_r y_{rj_0}}{\sum_{i=1}^m v_i x_{i0}}$$



$$\frac{\sum_{r=1}^s u_r y_{rj}}{\sum_{i=1}^m v_i x_{ij}} \leq 1$$

Subject to

$$u_r, v_i \geq 0 \text{ for all } r \text{ and } i$$

In the formula above, U_r and V_i represent the weights of the outputs and inputs variables respectively, and “ o ” denotes a focal DMU (in this case each library) (i.e., which in turn, becomes a focal academic library when its efficiency score is being calculated relative to others). It should be noted that input and output values, as well as all assigned weights, are assumed to be greater than zero in the formula stated in the previous session.

3. FINDINGS AND DISCUSSION

Summary statistics for the inputs and outputs for the year 2015, 2016 and 2017 are presented in table 2.

Table 2: Descriptive Statistics

	N	Range	Min	Max	Mean	Std. Deviation
Technical Efficiency Score(CRS)	30	.969315	.030685	1.000000	.51229873	.381122395
Pure Technical Efficiency Score(VRS)	30	.942232	.057768	1.000000	.64269513	.343898659
Scale Efficiency Score	30	.964932	.035068	1.000000	.80907370	.300895613
Valid N (list wise)	30					

Efficiency computation for the College of Business Education (CBE) and Tanzania Public Service College (TPSC) were solved using Max DEA5. The overall technical efficiency (based on the CRS DEA model) for each of ten (10) library involved in this study are found in table 2. Table 2 also reflects referenced libraries set for the inefficient library as well as the number of times (frequency) of which the particular library appears in the efficient sets of other libraries. The DMU (in this case the library) is considered to be efficient if acquired maximum efficiency score is 1 (one) otherwise it is inefficient. Result revealed that observed efficiency score varies from the 0.03068 to 1 with a mean score of 0.512299 (51.23 %). Out of ten (10) libraries, only three (30%) had efficiency score of 1 meaning they were the most efficient libraries during the different period under review (CBE-DAR_2015, TPSC-SING_2015-2017, TPSC-MTWR_2015-2017) while the rest libraries (70%) had efficiency score of less than 1. Findings also revealed that only three (30%) of libraries under the review were manifesting efficiency score above the average (50%) during the study period (TPSC-TANG_2015-2017, CBE-DSM_2016&2017, TPSC-TBR_2017). TPSC-



MBY_2016&2017 (0.2164 & 0.2165), CBE-DOM_2016&2017(0.1910&0.1911),CBE-MBY_2015; 2016&2017 (0.0306; 0.1073 &0.1073) and CBE-MWZ_2015; 2016&2017 (0.05072; 0.08035&0.08035) were experiencing lower efficiency scores, implying that the libraries were relatively less efficient. We use frequency in the reference set in table 1 below to discriminate most robust relative to other libraries (Kumar and Gulati, 2008).

Table.3: Technical Efficiency of Libraries Based on CRS DEA Model

S/N	Library	TE Score	Benchmark(Lambda)	Frequency
4	CBE-DSM_01	1	CBE-DSM_01(1.000000)	11
16	TPSC -SI_01	1	TPSC -SI_01(1.000000)	11
18	TPSC -SI_03	1	TPSC -SI_03(1.000000)	10
22	TPSC-MTR_01	1	TPSC-MTR_01(1.000000)	2
23	TPSC-MTR_02	1	TPSC-MTR_02(1.000000)	2
24	TPSC-MTR_03	1	TPSC-MTR_03(1.000000)	2

Generally, a library which tends to frequently appears in the efficient set of other libraries (times as the benchmark of other libraries) is considered as the good example of the best practices or well rounded-performer (Chen, 1997). In this case, out of most efficient libraries, CBE-DSM and TPSC-SING (Ref Table 1) were found to appear most frequently in the efficient set of inefficient libraries. Therefore, CBE-DSM and TPSC-SING are the good examples to most of the inefficient libraries in terms of resource utilization while those libraries that appear seldom in the efficient sets are not good examples to be followed by inefficient libraries.



Table 4: Decomposition of Overall efficiency (TE) into Pure efficiency and Scale Efficiency

S/N	LIBRARY	TE Score(CRS)	Pure Technical Efficiency(VRS)	Scale Efficiency (SE)	RTS
1	CBE-DOM_01	0.225573	0.346591	0.650833	Increasing
2	CBE-DOM_02	0.191096	0.352594	0.54197	Increasing
3	CBE-DOM_03	0.191096	0.352594	0.54197	Increasing
4	CBE-DSM_01	1	1	1	Constant
5	CBE-DSM_02	0.75283	0.75283	1	Constant
6	CBE-DSM_03	0.75283	0.75283	1	Constant
7	CBE-MBY_01	0.030685	0.875	0.035068	Decreasing
8	CBE-MBY_02	0.107373	1	0.107373	Decreasing
9	CBE-MBY_03	0.107373	1	0.107373	Decreasing
10	CBE-MWZ_01	0.057253	0.057768	0.991088	Decreasing
11	CBE-MWZ_02	0.083524	0.084268	0.991169	Decreasing
12	CBE-MWZ_03	0.083524	0.084268	0.991169	Decreasing
13	TPSC -DAR_01	0.196912	0.282976	0.695862	Increasing
14	TPSC -DAR_02	0.266667	0.533333	0.5	Increasing
15	TPSC -DAR_03	0.284932	0.569863	0.5	Increasing
16	TPSC -SI_01	1	1	1	Constant
17	TPSC -SI_02	1	1	1	Constant
18	TPSC -SI_03	1	1	1	Constant
19	TPSC-MBY_01	0.3	0.39212	0.765072	Decreasing
20	TPSC-MBY_02	0.216423	0.22113	0.978712	Decreasing
21	TPSC-MBY_03	0.216516	0.22125	0.978603	Decreasing
22	TPSC-MTR_01	1	1	1	Constant
23	TPSC-MTR_02	1	1	1	Constant
24	TPSC-MTR_03	1	1	1	Constant
25	TPSC-TANG_01	0.940293	1	0.940293	Decreasing
26	TPSC-TANG_02	0.927819	0.939131	0.987955	Decreasing
27	TPSC-TANG_03	0.979677	1	0.979677	Decreasing
28	TPSC-TBR_01	0.476685	0.479556	0.994012	Decreasing
29	TPSC-TBR_02	0.476685	0.479556	0.994012	Decreasing
30	TPSC-TBR_03	0.503196	0.503196	1	Constant
	Average	0.512298733	0.642695133	0.8090737	

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The overall efficiency of the library (table 4) can further be decomposed into pure efficiency and scale efficiency to examine the sources of inefficiency in 70% of libraries employed in this study. Findings revealed that for almost all inefficient libraries inefficiency was largely caused by the technical inefficiency as evidenced by the average higher measure of relatively scale efficiency (80.9%) as compared to pure technical efficiency (64.3%). Pure technical efficiency score for the inefficient libraries range from 0.0577(5.77%) to 0.939 (93.9%) on other hands the scale efficiency score of the inefficient libraries ranges from 0.0350 (3.5%) to 0.9940(99.40%). Two libraries namely TPSC-SING and TPSC-MTWR were found to be efficient in terms of pure efficiency as it was in the case of overall efficiency during the period under the review (2015-2017). It was further found that three libraries namely CBE-DSM, TPSC-SING as well as TPSC-MTWR were experiencing scale efficiency over the study period. When analyzing the scale efficiency of any DMU (in this case Library) we compare the efficiency score obtained under the constant return to scale (CRS) assumptions and that obtained under the variable return to scale (VRS) assumptions.

Based on the analysis of the two, the scale efficiency can tell whether the firm is operating at an optimal size or not. The library which is operating at its optimal size usually depicts the constant return to scale, which implies that all capacity has been exhausted and the library neither experience the economies of scale nor diseconomies of scale, this also implies that outputs of the production process (library services) increase or decrease simultaneously and in steps with growth or decline in the inputs. Four (4) libraries (CBE-MBY, CBE-MWZ, TPSC-TANG and TPSC-MBY) manifested inefficiently large scale or decreasing return to scale (DRS), while two libraries (TPSC-DSM and CBE-DOM) demonstrated inefficiently small scale or increasing return to scale (IRS). Findings imply that libraries with IRS have a room (opportunity) to enjoy economies of scale (i.e when the input is increased by n the outputs increases by more than n) while those with DRS are expected to experience diseconomies of scale in any attempts to add more inputs (i.e when the input is increased by n the outputs increases by less than n). Library from CBE-MBY depicted the lowest scale efficiency score over the study period, this is evidenced by the smallest book collection or maintained by the campus which was less than 376 (<376).

4. CONCLUSION AND RECOMMENDATIONS

The study aims at examining the resource efficiency of academic libraries at the College of Business Education(CBE) and Tanzania Public Service College (TCSP). Findings record that only three (30%) libraries were found to be efficient while the rest (70%) were inefficient. The result further indicates that only three out of inefficient libraries were manifesting the technical efficiency score above the average. It was also observed that for almost all inefficient libraries inefficiency was largely caused by the technical inefficiency as evidenced by the average higher measure of relatively scale efficiency as compared to pure technical efficiency. Pure technical efficiency score for the inefficient libraries range from 0.0577(5.77%) to 0.939 (93.9%) on other hands the scale efficiency score of the inefficient libraries ranges from 0.0350 (3.5%) to 0.9940(99.40%). Two

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libraries namely TPSC-SING and TPSC-MTWR were found to be efficient in terms of pure efficiency as it was in the case of overall efficiency (Technical efficiency) during the period under the review (2015-2017). It was further found that three libraries namely CBE-DSM, TPSC-SING as well as TPSC-MTWR were experiencing scale efficiency over the study period.

When analyzing the scale efficiency of any DMU (in this case Library) we compare the efficiency score obtained under the constant return to scale (CRS) assumptions and that obtained under the variable return to scale (VRS) assumptions. Based on the analysis of the two, the scale efficiency can tell whether the firm is operating at its optimal size or not. Four (4) libraries (CBE-MBY, CBE-MWZ, TPSC-TANG and TPSC-MBY) manifested inefficiently large scale or decreasing return to scale (DRS), while two libraries (TPSC-DSM and CBE-DOM) demonstrated inefficiently small scale or increasing return to scale (IRS). The study recommends that in terms of overall efficiency management of campuses with inefficient libraries should revisit library resources utilization (this is for all campuses except CBE-DAR, TPSC-SING and TPSC-MTWR). Since the poor performance of inefficient libraries was largely influenced by the managerial related issues as evidenced by the average higher measure of relatively scale efficiency, this study recommends that to improve overall efficiency all inefficient libraries (in terms of pure efficiency) should analyze managerial related issues (except TPSC-SING and TPSC-MTWR), it should be noted that managerial related issues imply managerial inefficiency which involves poor utilization of library inputs.

The study further recommends that all library except CBE-DSM, TPSC-SING and TPSC-MTWR should revisit their size as the result revealed that only three libraries were operating at their optimal size or scale and the rest were either large or small in terms of the relationship between the size and activities (library services offered). Generally, the study adds that although libraries in the two colleges offer similar services they do differ in terms of resource utilization. From the enterprise perspective, a library professional library staff is supposed to provide the operating conditions for transforming library resources (inputs) into library services (outputs) while keeping in view the library budget constraints. This study suggests that the natural extension of this study should focus on the comparison between university libraries and non-university libraries.

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