



Overhead Grants' Usage and Educational Institutions in Nigeria: Data Envelopment Analysis Perspective

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ABSTRACT

This study appraised the utilization of overhead grants' efficiency among federal educational institutions in Nigeria between 2011-2019. Data for the study were sourced from the Annual Audited Financial Statements of the public sector entities. The sampled size for the study comprised (25) federal educational institutions out of 69 federal educational institutions drawn across the country among four (4) geopolitical zones. Data were analyzed using Data Envelopment Analysis. The results of the average efficiency scores from both CCR and BBC models showed that the entities were averagely efficient in overhead grants' utilization. Overall results showed that federal educational institutions have high capacity to absorb sufficient overhead grants from the center. The study therefore concluded that there is need for an improved overhead grants releases to the federal educational institutions to achieve effective service deliveries of their core mandates. The study recommended a continuous assessment and periodic appraisal of the overhead grants' utilization among the institutions by their supervising ministry to achieve full efficiency.

Keywords: Decision Making Units, Federal Educational Institutions, Data Envelopment Analysis, Overhead Grants' Utilization

INTRODUCTION

Overhead fund release is one of the statutory responsibilities of the central authority to Decision-Making Units (DMUs). Federal educational institutions are parts of the major recipients of this fund. Educational institutions as DMUs are a set of organizations saddled with the responsibilities of carrying out functions of teaching, research, and extension for sustainable development of entire human life (Odewole & Salawu, 2021). They are the channels or links of central organized systems through which educational programs, ideas and innovations are communicated to the seekers of various forms of knowledge to accentuate their

dreams and attain the heights of academic standards. Generally, federal educational institutions rely solely on the central authority for funding to cushion the effects of insufficient internally generated revenue by the DMUs. These entities therefore, fall under the category of not-for-profit making organizations whose main objective is to provide affordable services to the entire citizenry. Basically, statutory allocations such as overhead fund allocations are released on monthly basis which are meant for routine running overhead expenses of the DMUs. The central overhead cost expenses among the federal educational institutions are the payment of utilities like electricity charges, telephone charges, building repairs, maintenance of equipment, training, and other non-personnel services etc. The efficient utilization of the overhead fund allocations to these entities therefore becomes a matter of concern for all the stakeholders for effective service deliveries and efficient public financial management (Enofe, Afiangbe & Agba, 2017, Cvetkoska & Savic, 2021). Different approaches have been adopted by authors to analyze the efficient overhead fund utilization to present the overhead cost estimations and usage of both private and public sector entities to a wide audience in both academic and professional circles. Elsayy, Hosny and Razek (2011) applied Neutral Network model in estimating site overhead costs for construction projects in the middle East. Also, Juszezyk and Lesniak (2016) adopted ABC technique in measuring overhead costs utilization of a going concern to determine the effective usage. Globerson (2017) engaged Earned Value Approach for controlling overhead costs in public projects. The focus of the present study however is the assessment of the efficiency of overhead grants' utilization by the central treasury to federal educational institutions in Nigeria. Data Envelopment Analysis (DEA) model – CCR and BCC was adopted in the determination of the efficient overhead cost usage in the entities. The study is driven by the public sector entity's allocative efficiency theory and public choice theory as major frameworks for the study.

LITERATURE REVIEW

Public sector entities are grouped in order of dependence on central Treasury for funding (Abdulkareem & Oyeniran, 2011, Odewole & Salawu, 2020). In the categorization of public entities according to types, there exist fully funded, partly funded and self-funded public sector entities. In the fully funded public sector entities, the provision of adequate funding to finance core expenditure profile such as capital physical expenditure, personnel emolument costs and overhead cost expenditure comprising sundry repairs, maintenance of equipment, payments for utility charges like electricity charges, telephone charges etc, is the sole responsibility of the central authority (Odewole & Oladejo, 2020). The DMUs are fully funded when all financial allocations needed to finance statutory spending such as personnel emolument costs, physical capital development costs and overhead costs are wholly appropriated and made available by the central treasury. The fully funded entities are therefore expected to remit all internally generated revenue and inflows accrued to the entities. They are not allowed to keep such inflows within their coffers. The self-funded entities largely differ in the sense that they are expected to generate own funding to cover all its operating expenses and statutory expenses (Odewole, Salawu & Salawu, 2020). These DMUs are self-financing, self-sustaining and self-reliant. The entities provide all the financial resources needed within their operations to cover all statutory commitments. They neither receive allocations, bailouts nor financial assistants from the central. All expenses in both short-term and long-term nature are financed fully by the internally generated revenue from the operation within the entities. The last categorization are the partly funded entities which accommodates all the federal educational institutions. The bulk of their allocations are received from the central authority in addition to the meager

inflows accrued to the entities through the internally generated revenue. The last category is the focus of this study in relation to the efficient usage of their allocated overhead cost releases. Overhead costs are crucial in effective service delivery of the public sector entities. They are parts of relevant costs that are outside the major components of the direct cost structure in an organization. The costs are needed in the day-to-day running of an entity to support the organization's main activities to achieve their desired short-term and long-term objectives. Therefore, allocating overhead costs in federal educational institutions remains a challenging exercise in the organization cost structure (Huijben, Geurtsen, & Van Helden, 2014, Juszezyk & Lesniak, 2016). The profile of overhead cost in federal educational institutions entails supporting the entity's core processes, financing all administrative functions such as secretarial supports, legal affairs and facility services, finance and control matters, providing security services, general maintenance and repairs etc., (Verbeeten, 2011, Carvalho, Gomes & Fernandes, 2012, Banker & Park, 2021). Therefore, the measurement of the efficiency of overhead grants' utilization among federal educational entities is crucial to the various stakeholders. Data Envelopment Analysis (DEA) models was adopted as against the traditional accounting ratios. The preference of DEA over traditional ratios is precipitated on the fact that univariate nature of financial ratios analysis is restricted in appraising the performance of firms and corporate entities. The limited usage has necessitated the overwhelming adoption of the potentials of DEA in assessing entities' efficiency in resource utilization for a robust outcome (Yilmaz and Yurdusev, 2011, Yu, Barros, Tsac & Liao, 2014, Odewole, 2020). DEA, a linear programming technique, is commonly used in economics and finance research to appraise the relative, allocative, or service efficiencies of a going concern in both service centers and production processes. It is a non-parametric method with emphasis on the measurement of the entity's efficiency from a single input/output efficiency analysis. DEA also assesses multi-inputs/output interactions in production and service deliveries (Odewole, 2020, Odewole & Oladejo, 2020, Abdulkareem & Oyeniran 2011). Charnes, Cooper, and Rhodes (CCR) (1978) proposed original DEA which assumes no random mistakes. The introduction of both technical efficiency and allocative efficiency in the determination of efficient frontiers of an entity backdated to Farrell (1957). The model has been used in many fields of finance and economics ranging from schools, hospitals, finance houses etc., (Tao, Liu, & Chen, 2013, Kwon & Lee, 2015, Tsolas and Charles, 2015, Cvetkoska, & Fotova Cikovic, 2020). The focus of DEA is entities' efficiency measurements (Bogetoft & Otto, 2011; Cyrek, 2017; Stanickova, 2017). The usefulness of its adoption is popular among the healthcare and educational institutions in assessing the efficiencies of operations. Many scholars have employed DEA analysis in the assessment of operational efficiencies of the hospitals and educational institutions (Kazley and Ozcan, 2008, Ahn, Charnes & Cooper, 1988, Agasisti & Johnes, 2009, Jia and Yuan, 2017). Its advantage over the traditional ratios and the simultaneous use of multiple inputs and outputs for the determination of entity's efficiency occasioned the preference of DEA among researchers (Zypionka, Kraus, Mayer & Rohrling, 2014, Cheng, Cai, Tao, He, Lin & Zuo 2016). It has been frequently adopted in public sector entities to advance the determination of efficiency in resource usage in both educational institutions and healthcare efficiency outcomes (Samut & Cafri, 2016, Hernandez & San, 2014, Samut & Cafri, 2016, Sendek, Svital kova & Angelovicova, 2015, Rezaee & Karimdadi, 2015). The adoption of DEA is, therefore, a popular method in appraising the efficiency of all economic units in both private and public institutions. However, there is a caveat. Numerous studies on DMUs' efficiencies center largely on productive efficiency after Farrell's propositions (Farrell, 1957). The tripod of this study is the public sector's allocative efficiency as a complete departure from previous works.

METHODOLOGY

Research Design

The study investigated panel data of (25) twenty-five federal educational institutions in Nigeria using quantitative analysis. The population of the study is the DMUs among the federal educational institutions in the four geo-political zones in Nigeria and Abuja. Taro Yamane statistical technique was adopted in the determination of the sample size. Secondary data were gathered for the purpose of the study directly from the offices of the Accountant-General of the federation, the Auditor-General of the federation and the Annual General Warrants of the Published Audited Financial Statements of the Public Sector Entities

Method of Analysis

Both Banker, Charnes, and Cooper (BCC) (1984) and Charnes, Cooper, and Rhodes (CCR) (1984) models were adopted to analyze the overhead grants data in determining the efficiency of utilization among the DMUs. Both variable and constant inputs/ outputs methods were adopted in the study. In the output-oriented version, the DMUs' efficiency score is between 1 – infinity, whereas, in the input -oriented version, the DMUs' efficiency score ranges from 0 and 1.

The DEA's proposition as given by Charnes *et al.*, (1978) and Cooper *et al.* (2007) model with m inputs variables, s outputs variables, and u DMU's, is as follows:

$$\max h_0(u, v) = \frac{\sum_r u_r y_{r0}}{\sum_i v_i x_{i0}}$$

Subject to:

$$\frac{\sum_r u_r y_{rj}}{\sum_i v_i x_{ij}} \leq 1 \text{ for } j = 1, \dots, n, \quad (1)$$

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

Charnes and Cooper (1962) proposition were applied for linear fractional programming model. This combines a selection of solution u, v for which $\sum_{i=1}^n v_i x_{i0} = 1$. It therefore transforms into the equivalent linear problem with variables from u, v to μ, v , which is a result obtained from the Data Envelopment Analysis model application. Charnes-Copper transformation can therefore be re-written as:

$$\max z = \sum_{r=1}^s \mu_r y_{r0}$$

Subject to:

$$\sum_{r=1}^s \mu_r y_{rj} - \sum_{i=1}^m v_i x_{ij} \leq 0 \quad (2)$$

$$\sum_{i=1}^m v_i x_{i0} = 1$$

$$u_r, v_i \geq 0$$

The linear programming dual problem is

$$\Theta^* = \min \Theta$$

Subject to:

$$\sum_{j=1}^n x_{ij} \lambda_j \leq \Theta x_{i0} \quad i = 1, 2, \dots, m;$$

$$\sum_{j=1}^n y_{rj} \lambda_j \geq y_{r0} \quad r = 1, 2, \dots, s; \quad (3)$$

$$\lambda_j \geq 0 \quad j = 1, 2, \dots, n.$$

The input-oriented model, which focuses on minimizing inputs at a given output level is another postulation (Cooper *et al.*, 2007; Zhu, 2009):

$$\begin{aligned}
 & \min \theta - \varepsilon \left(\sum_{i=1}^m S_i^- + \sum_{r=1}^n S_r^+ \right) \\
 \text{Subject to:} & \\
 & \sum_{j=1}^n \lambda_j x_{ij} + S_i^- \leq \theta x_{i0} \quad i = 1, 2, \dots, m; \\
 & \sum_{j=1}^n \lambda_j y_{rj} + S_r^+ = y_{r0} \quad r = 1, 2, \dots, n; \\
 & \lambda_j \geq 0 \quad j = 1, 2, \dots, n \\
 & \sum_{j=1}^n \lambda_j = 1
 \end{aligned} \tag{4}$$

From this model, x_{ij} stands for the i th input of the j th DMU, y_{rj} indicates the r th output of the j th DMU. λ_j and u_r are indications of the weight of the j th DMU. V_r is the efficiency score of DMU _{j} .

If the constraint $\sum_{j=1}^n \lambda_j = 1$ is adjoined, then the Banker, Cooper and Charnes model (BCC model) (Banker *et al.*, 1984) are evolved. The BCC model or Variables Return to Scale (VRS) assumption differs from the CCR or Constant Returns to Scale (CRS model) assumption. The BCC model favours the variation of efficiency and measures pure technical efficiency arising from the variables. Its assumption is used to measure the scale efficiency of an entity as follows:

$$\text{Scale Efficiency} = \frac{\text{Technical efficiency from CRS}}{\text{technical efficiency from VRS}} \tag{5}$$

The second important consideration used in measuring efficiency of the public entities is the determination of adequate model of variable inputs and outputs. Also, Cooper *et al.* (2011) and Paradi, David and Fai (2018) and Cooper *et al.* (2011) indicate that the number of DMUs should be multiples of the total number of inputs plus outputs used in the models. Cook, Kaoru and Joe (2014) suggested a balanced rule of relational ratios between the level of inputs and outputs which are expressed as follows:

$$n \geq \max\{m \times s, 3(m + s)\}, \tag{6}$$

Whereby m , s , and n stand for the numbers of inputs, outputs and DMU's in the functional relationship respectively.

RESULTS AND DISCUSSION

Table 1 presents the results for the efficiency scores for twenty-five (25) federal educational institutions on overhead fund utilization using CCR model. The average efficiency scores for the DMUs show a good overall performance on overhead grants' usage in the sector. The findings clearly reveal that the federal educational institutions were generally marginally inefficient in the usage of overhead fund allocations. The DMUs' overall average efficiency score for overhead grants utilization was stated at 89% for the entities in the sector, which was an acceptable resource utilization rate by a DMU. Although, the sampled DMUs could not attain a full efficiency of 100% throughout the research period of the study, whereby total overhead fund allocations to the entities were fully utilized. The utilization average efficiency rating for the DMUs was notwithstanding remarkable. The trend of efficient overhead grants utilization performance was recorded across the DMUs with a good number of DMUs achieving full efficiency scores of 100% in isolated years. The tide was however not sustained by the respective DMUs to the end of the research period. The efficiency utilization scores of DMUs within the research period revealed that some were either marginally inefficient or averagely inefficient, ranging from lowest score of 0.635 to highest marginally inefficient score rating of 0.999, signifying a performance between average-level efficiency and full efficiency frontiers in fund usage.

The high efficiency utilization rating among the DMUs reveals both general insufficient overhead grants to the DMUs that could not meet the rising overhead expenses in average educational institutions. It also reveals the level of overbearing overhead cost commitments in the DMUs over and above the availability of fund in given accounting year. The monthly overhead recurrent expenses of an average federal educational institution comprise of repairs on obsolete buildings, halls of residences, staff quarters, lecture theatres, worn- out equipment, payments of water supply, replacement of spare parts for plants and machinery, sponsorships for workshops and conferences, payments for electricity bills etc. The high efficiency rate in the utilization of overhead grants, therefore, could be largely attributable to the huge overhead cost expenses chasing limited available fund in the Nigerian federal educational institutions. Most of the federal educational institutions have been in existence since 1970 with foundational buildings and equipment heavily depreciated. Therefore, there is possibility of acute need for major repair works on such buildings, plants and equipment that would absorb a chunk of total allocated fund for overhead expenses. Besides, the monthly electricity bills consumed in most federal educational institutions constitute huge overhead recurrent costs with frequent upward review of billing system on consumption charges by the energy providers which can hardly be accommodated within the monthly overhead grants to the DMUs from the center.

Table 1: efficiency scores in overhead grants utilization among dmus in educational institutions using ccr

S/N	DMU	2011	2012	2013	2014	2015	2016	2017	2018	2019	AVERAGE
1	UNIAB	0.845	0.845	1	1	1	0.96	0.915	0.871	0.347	0.865
2	FLVB	0.999	0.999	1	1	1	0.96	0.817	0.872	0.314	0.885
3	FUTA	0.884	0.884	1	1	1	0.96	0.938	0.816	0.359	0.871
4	WAEC	1	1	1	1	1	0.96	0.303	0.833	0.283	0.820
5	JAMB	0.98	0.98	1	1	1	0.96	0.88	0.827	0.283	0.879
6	UNIABUJA	1	1	1	1	1	0.96	0.813	0.706	0.958	0.937
7	NOUN	0.921	0.921	1	1	1	0.96	0.864	0.918	0.341	0.881
8	FPL	0.95	0.95	1	1	1	0.96	0.833	0.826	1	0.947
9	YCT	0.635	0.635	1	1	1	0.96	0.81	0.804	0.6	0.827
10	FCEAB	0.957	0.957	1	1	1	0.96	0.89	0.963	0.594	0.925
11	FCEAK	0.961	0.961	1	1	1	0.96	0.836	0.853	0.665	0.915
12	NLN	0.964	0.996	1	1	1	0.958	0.798	0.912	0.252	0.876
13	FCEOKENE	0.962	0.962	1	1	1	0.96	0.806	0.904	0.03	0.847

14	FCEONDO	0.95 4	0.95 4	1	1	1	0.96	0.80 2	0.94 3	0.56 3	0.908
15	FCTOYO	0.96 1	0.96 1	1	1	1	0.96	0.89 1	0.92 4	0.34 8	0.894
16	UI	0.66 9	0.66 9	1	1	1	0.96	0.84 2	0.83 3	0.33 2	0.812
17	UNILAG	0.79 2	0.79 2	1	1	1	0.96	0.89	0.82 9	0.65 7	0.880
18	OAU	0.78 2	0.78 2	1	1	1	0.96	0.81 2	0.84 5	0.33 7	0.835
19	UNIBEN	0.80 7	0.80 7	1	1	1	0.96	0.87 5	0.81 5	0.33 7	0.845
20	UNILORIN	0.91 7	0.91 7	1	1	1	0.96	0.83 6	0.38 4	0.43 9	0.828
21	FEDPOLYADO	0.95 6	0.95 6	1	1	1	0.96		0.90 4	0.23 3	0.876
22	FEDPOLYOKO	0.93 9	0.93 9	1	1	1	0.96		0.82 3	0.35 5	0.877
23	FEDPOLYOFA	0.95 4	0.95 4	1	1	1	0.96	0.82 2	0.83 1	0.24 7	0.863
24	FEDPOLYEDE	0.97 4	0.97 4	1	1	1	0.96	0.91 5	0.96 9	0.35 1	0.905
25	FEDPOLYAUCHI	0.94 2	0.94 2	1	1	1	0.96	0.81 7	0.82 8	0.35 1	0.871
	MEAN	0.90 8	0.90 9	1	1	1	0.96	0.93 8	0.84 1	0.42 3	0.887

Source: Author's Computation (2021)

Table 2 shows the ranking of mean efficiency scores in descending order on overhead fund utilization among the twenty-five (25) sampled federal educational institutions. DMU (FPL) had the highest average efficiency score ranking in the overall class of scores with 94.7% while FEDPOLYADO recorded the lowest average performance of 77.9%. The implication is that FPL demonstrated the highest capacity in utilizing overhead fund allocation received from the central treasury among the DMUs. The average efficiency scores performance of other DMUs were stated between the high and low extreme average efficiency frontiers. Generally, the performance of average efficiency scores was spread fairly across the DMUs indicating impressing and effective fund utilization rate. It therefore implies that the federal educational institutions manifested the high potentials in effectively utilizing total appropriated fund released for overhead expenditure in each given accounting year.

Table 2: Ranking of Average Efficiency Scores Among DMUs On Overhead Grants' Utilization in Educational Institutions Using CCR Model

DMUs	Efficiency scores	Efficiency Ranking
FPL	0.947	1 st
UNIABUJA	0.937	2 nd
FCEAB	0.925	3 rd
FCEAK	0.915	4 th
FCEDNDO	0.908	5 th
FEDPOLYEDE	0.905	6 th
FCEOYO	0.894	7 th
FLUB	0.885	8 th
NOUN	0.881	9 th
UNILAG	0.88	10 th
JAMB	0.879	11 th
NLN	0.876	12 th
FUTA	0.871	13 th
FEDPOLYAUCHI	0.867	14 th
UNIAB	0.865	15 th
FEDPOLYOFFA	0.863	16 th
FCEOKENE	0.847	17 th
UNIBEN	0.845	18 th
OAU	0.835	19 th
UNILORIN	0.828	20 th
YCT	0.827	21 st
WAEC	0.82	22 nd
UI	0.812	23 rd
FEDPOLYOKO	0.78	24 th
FEDPOLYADO	0.779	25 th

Source: Author's Computation (2021)

Table 3 explains the summary of the BCC results on the efficiency of twenty-five (25) sampled DMUs among the federal educational institutions. In 2011, the average efficiency scores for the 25 sampled DMUs is 0.91 (91%) which is close to the full efficiency frontier of 100% or 1. The implication is that out of 100% overhead fund allocated to all the DMUs, more than 90% of the resources were fully utilized on the various overhead expenses or commitments. The insignificant difference of 9% could be attributed to the unspent idle fund in the respective DMUs overhead fund accounts. Also, three (3) DMUs, UNIB, WAEC and UNIABUJA attained the full efficiency score of 100% or 1 in fund usage. This implies that the DMUs were fully efficient in utilizing total allocated overhead fund without slack fund balances. The efficiency scores of other DMUs ranged from the lowest score of 0.781 (78.1%) to 0.943 (94.3%). This trend continued throughout the research period with an increasing improvement in the average efficiency score among the educational institutions until a full efficiency frontier was reached whereby all input costs were transformed into output value without any slack or idle fund.

Table 3: efficiency scores in overhead grants among dmus in educational institutions using bcc

S/ N	DMU	201 1	201 2	201 3	201 4	201 5	201 6	201 7	201 8	201 9	AVERAG E
1	UNIAB	0.84 5	0.84 5	1	1	1	0.96	0.91 8	0.87 4	0.35 4	0.866
2	FLVB	1	1	1	1	1	0.96	0.81 9	0.87 5	0.32 7	0.887
3	FUTA	0.88 4	0.88 4	1	1	1	0.96	0.94	0.81 8	0.36 7	0.873
4	WAEC	1	1	1	1	1	0.96 1	0.30 4	0.84 3	0.29	0.822
5	JAMB	0.98	0.98	1	1	1	0.96	0.88 6	0.83 3	0.28 3	0.880
6	UNIABUJA	1	1	1	1	1	0.96	0.81 3	0.71	1	0.943
7	NOUN	0.92 1	0.92 2	1	1	1	0.96	0.87 1	0.92 3	0.34 1	0.882
8	FPL	0.95	0.95	1	1	1	0.96 1	0.83 9	0.83 1	1	0.948
9	YCT	0.63 5	0.63 5	1	1	1	0.98 5	0.81 3	0.80 6	0.61 8	0.832
10	FCEAB	0.95 7	0.95 7	1	1	1	0.96 1	0.89 5	0.96 4	0.61 5	0.928
11	FCEAK	0.96 1	0.96 1	1	1	1	0.96 1	0.84	0.86	0.68 1	0.918
12	NLN	0.96 4	0.99 6	1	1	1	1	0.79 9	0.91 3	0.26 1	0.881
13	FCEOKENE	0.96 2	0.96 2	1	1	1	0.96	0.80 8	0.90 7	0.04 9	0.850
14	FCEONDO	0.95 4	0.95 4	1	1	1	0.96	0.80 3	0.94 5	0.58 5	0.911
15	FCTOYO	0.96 1	0.96 1	1	1	1	0.96	0.89 3	0.92 9	0.36 2	0.896
16	UI	0.66 9	0.66 9	1	1	1	0.99 6	0.84 5	0.83 4	0.34 2	0.817
17	UNILAG	0.79 2	0.79 2	1	1	1	0.96 1	0.89 2	0.83 2	1	0.919
18	OAU	0.78 2	0.78 2	1	1	1	0.96 4	0.81 5	0.84 8	0.34 4	0.837
19	UNIBEN	0.80 7	0.80 7	1	1	1	0.96	0.88	0.81 8	0.34 5	0.846
20	UNILORIN	0.91 7	0.91 7	1	1	1	0.96 1	0.83 8	0.38 6	0.60 2	0.847
21	FEDPOLYADO	0.95 6	0.95 6	1	1	1	0.96	0.84 1	0.90 7	0.24 1	0.873
22	FEDPOLYOKO	0.93 9	0.93 9	1	1	1	0.96	0.91 0	0.82 5	0.36 2	0.781
23	FEDPOLYOFA	0.95 4	0.95 4	1	1	1	0.96	0.82 6	0.83 5	0.25 7	0.865

24	FEDPOLYEDE	0.97 4	0.97 4	1	1	1	0.96	0.91 5	0.96 9	0.35 1	0.905
25	FEDPOLYAUC HI	0.94 2	0.94 2	1	1	1	0.96	0.81 7	0.83	0.35 9	0.872
	MEAN	0.91	0.91	1	1	1	0.97	0.80	0.85	0.46	0.890

Source: Author's Computation (2021)

Table 4 showed the ranking of average efficiency scores in descending order on overhead fund utilization among the 25 sampled federal educational institutions with the application of BBC. DMU (FPL) had the highest average efficiency score in the overall class of scores with 94.8% while FEDPOLYADO recorded the lowest average performance with 78% efficiency score. This implies that FPL demonstrated the highest capacity in overhead fund utilization among the sampled size. The average efficiency scores performance of other DMUs were stated between the high and low extreme average efficiency scores performance which is well above average.

Table 4: Ranking of Average Efficiency Scores Among DMUs on Overhead Grants' Utilization in Education Sector Using BCC Model

DMUs	Efficiency Scores	Efficiency Ranking
FPL	0.948	1st
UNIABUJA	0.943	2nd
FCEAB	0.928	3rd
UNILAG	0.919	4th
FCEAK	0.918	5th
FCEDNDO	0.911	6th
FEDPOLYEDE	0.905	7th
FCEOYO	0.896	8th
FLUB	0.887	9th
NOUN	0.882	10th
NLN	0.881	11th
JAMB	0.88	12th
FUTA	0.873	13th
FEDPOLYAUCHI	0.872	14th
UNIAB	0.866	15th
FEDPOLYOFFA	0.865	16th
FCEOKENE	0.849	17th
UNILORIN	0.847	18th
UNIBEN	0.84	19th
OAU	0.837	20th
YCT	0.832	21st
WAEC	0.822	22nd
UI	0.817	23rd
FEDPOLYOKO	0.781	24th
FEDPOLYADO	0.78	25th

Source: Author's Computation (2021)

CONCLUSION

The objective of this study is to examine the efficiency of the federal educational institutions in the utilization of overhead fund releases. Data Envelopment Analysis techniques (CCR and BCC) were adopted for the comparative analysis of the results from the DMUs. The findings from the

two models show the uniform evidence in favor of FPL with the highest capacity in utilizing overhead fund above other DMUs by emerging in the first position on the efficiency ranking lists under both models. The results of the findings also reveal that FEDPOLYADO presents the lowest utilization rate under both BCC and CCR models. However, the results from both techniques showed that federal educational institutions demonstrated good efficiency scores in the overall utilization of overhead fund centrally released to the entities. The implication is that there were insignificantly less sticky or unspent overhead fund balances with the DMUs or unremitted overhead allocated fund balances during the research period. The spread of average efficiency scores showed that the overall efficiency frontiers in the sector are more skewed to full efficiency of 100% or 1. This implies that the DMUs displayed superior potentials in overhead fund utilization with no retention. The entities had wide area of overhead cost commitments which were absorbed with overhead fund releases. However, full efficient frontier position was not evidently achieved by all the DMUs. Some institutions had sticky and unspent fund balances, though insignificant, in their coffers which were not channeled on overhead cost commitments in the sector. The paper therefore concluded that in order to achieve full efficiency in overhead fund releases to the educational institutions, the adequate central authority's control, oversight functions of the supervising ministries, in conjunction with the budget office of the federation and office of the Accountant-General of the federation, are compelling necessities among the DMUs in the sector.

RECOMMENDATIONS

To enhance and achieve full efficiency in the utilization of total overhead fund allocation among the federal educational institutions in Nigeria, the following recommendations are necessary: The budget office of the federation should set up the monitoring team to regulate the activities of all federal educational institutions to enhance optimum overhead fund usage. Also, the central authority should on monthly basis adopt a policy of regular mopping up of unspent overhead fund releases to federal educational institutions and re-channel the unspent balances to the areas of need among the DMUs. Overhead grant allocations to the DMUs should be based on needs assessment of the entities rather than political considerations. Overhead allocation review should be strictly on the level of utilization of the previous releases. Accounting for the monthly overhead fund releases to the DMUs should be made compulsory and immediate after the end of each month by the Ministry of finance from the heads of each educational institution. It is the continuous and regular assessment of the utilization of the overhead fund releases to the DMUs that can guarantee a full utilization efficiency of overhead fund usage among the federal educational institutions in Nigeria .and step down the slacks in the effective usage

ACKNOWLEDGEMENTS

We express my gratitude to Offices of the Accountant-General of the federation and Auditor-General of the federation and the relevant MDAs for the maximum supports and cooperation received from the offices in making available the data used for this study.

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APPENDIX 1

S/No.	Decisions Making Units	Selected Federal Institutions in Nigeria
1	UNIAB	University of Agriculture Abeokuta
2	FLVB	French Language University, Badagry, Lagos'
3	FUTA	Federal University of Technology Akure.
4	WAEC	West Africa Examination Council, Nigeria
5	JAMB	Joint Matriculation Board
6	UNIABUJA	University of Abuja
7	NOUN	National Open University
8	FPL	Federal Polytechnic Ilaro.
9	YCT	Yaba College of Technology
10	FCEAB	Federal College of Education Abeokuta
11	FCEAK	Federal College of Education Yaba, Lagos
12	NLN	National Library of Nigeria
13	FCEOKENE	Federal College of Education Okenne
14	FCEONDO	Federal College of Education Ondo
15	FCTOYO	Federal College of Education, Oyo
16	UI	University of Ibadan
17	UNILAG	University of Lagos
18	OAU	Obafemi Awolowo University. Ile-Ife
19	UNIBEN	University of Benin
20	UNILORIN	University of Ilorin
21	FEDPOLYADO	Federal Polytechnic Ado-Ekiti
22	FEDPOLYOKO	Federal Polytechnic, Oko
23	FEDPOLYOFA	Federal Polytechnic, Ofa.
24	FEDPOLYEDE	Federal Polytechnic Ede
25	FEDPOLYAUCHI	Federal Polytechnic. Bauchi