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Full Length Research Paper

Institutional factors as predictors of students' academic achievement in colleges of education in South western Nigeria

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The enhancement of the academic achievement of the Nigerian students has continued to engage the attention of educational practitioners and policy makers. This paper investigated institutional factors as predictors of students' academic in the South-Western Nigeria. The study employed the ex post facto design using a survey design and a multiple regression model. The samples used for the study consisted of 1,100 (200 and 300) National Certificate of Education (NCE) students in Federal, State and Private NCE-awarding institutions in South Western Nigeria, using stratified sampling techniques. The validated research instruments used for the study had the following psychometric properties: Cronbach alpha (α) [0.79 (students) and 0.73 (lecturers); Guttman split-half 0.78 (students) and 0.71 (lecturers; and Spearman-Brown equal length results were 0.69 (students) and 0.70 lecturers)]. The study found that a number of institutional factors: student-teacher-ratio, lecturers' interest and commitment, school calendar stability and to a lesser extent, teaching method, were significant predictors of students' academic achievement in the colleges of education sampled. On the other hand, school leadership, school plant and library facilities were not found to be significant predictors of academic achievement. The study proffered a number of recommendations to improve the quality of educational policy outcomes geared towards improving students' educational performance and hence enhance the achievement of national economics goals.

Key words: Institutional factors, academic achievement, Nigeria, ex post facto design, stratified random sampling, multiple regression.

INTRODUCTION

There has been a consistent record of remarkable failure in public examinations, especially, in basic subjects like English Language and Mathematics. In most external examinations in Nigeria today, the results are usually sub-optimal. Information emerging from examination bodies in Nigeria (for example, WAEC and JAMB) shows that at every level of public examinations, a significant number of those who took part in the public examinations failed.

According to Uwadiae (in Dike 2007) the students'

performance in the West African Senior School Certificate Examination (WASSCE) from 2001 and 2005 has declined with mass failure recorded in the two basic subjects that form the foundation for good academic achievement in tertiary institutions. This, no doubt calls for concern of stakeholders. Dike passed a guilty verdict on government and parents for students' failure in English Language and Mathematics.

Financial Standard (2008) in an editorial captioned '*Mass failure in WAEC Examination*' described the performance of students in the May/June 2008 examination conducted by the Council as disturbing. Only 188,442 candidates, that is, 13.7 per cent of 1, 36,142 candidates who sat for the examinations made credit passes in English Language, Mathematics and three other subjects. A total of 232,755 results are yet to be released due to errors made by the candidates during registration. Of the pending results, 74,956 were being investigated for various examination malpractices. Available examination statistics from WAEC showed that the May/June 2008 WASSCE result was the worst performance in the last seven years. According to the Council's examination statistics, the average failure recorded in English Language and Mathematics between 2001 and 2005 was roughly 38 per cent of the total number of candidates that sat for the examination. It is upsetting that the results of the recently released May/June 2008 WASSCE showed that over 80 per cent of the candidates did not score credit in English Language and Mathematics. The result showed that the number of candidates that obtained credit in English Language, Mathematics and three other subjects in the May/June 2008 WASSCE actually plunged by almost 6 per cent from 2007 record. In the November/December 2007 examination, only 19.8 per cent scored the required five credits in the relevant subjects including English Language and Mathematics. The implication of this trend is that there is a lot of wastages at various levels of the country's educational system. These wastages are as a result of students' poor academic performance, which is a product of low achievement.

A number of other factors relating to examination bodies, government, parents, teachers and students have also been identified. Uwadiae (2000) attributed the poor performance of students in its examinations to a lack of adequate preparation, shortage of qualified teachers, inadequate teaching materials, lack of good school environment and infrastructural facilities, inability to understand questions requiring high level thinking and shallow answers to questions due to poor command of English Language.

Government was expected to create an enabling environment for effective teaching and learning to take place through the provision of necessary infrastructure, facilities and qualified manpower. The poor performance was also linked to factors such as lack of equipped laboratories, libraries, as well as population explosions in schools.

In addition to this, studies carried out by Onwioduokit (1996) and Olarewaju (1997) showed that insufficient manpower, lack of concentration during lessons, lack of commitment to and motivation to work, lack of equipment, poor attitudes of students, poor understanding of concepts, inability to study well, neglect of assignment and pleasure seeking attitude contribute to low academic achievement.

In the same vein, Bulus (2001) observed that the problem of mass failure in public examinations is a matter of grave concern in the present millennium. Ukeji (1999) was also of the opinion that Nigeria decay in public examinations is particularly grave, debilitating, degenerating, deteriorating and dehumanizing.

Ojerinde (1998) attributed the causes of low academic achievement in schools to factors such as: school environment, home background, economic, political and intellectual capability, social and entry qualification. Furthermore, records of students' poor academic performance in some colleges of education are not encouraging. No matter how well conceived a country's developmental plans may be, they would be thwarted due to low academic achievement. Indeed, poor academic performance and high failure rate are inimical to the development of any society.

The trend of record of low academic achievement is not limited to secondary schools but also rampant among students of tertiary institutions. This has been a subject of major concern to educational planners, administrators, stakeholders in education and the students themselves. In support of this, Falola (2008) commented that a total number of 39 students of the Niger state owned University, Ibrahim Badamosi Babangida University, Lapai have been expelled from the institution over poor academic performance, while two others have been expelled for examination malpractices according to the vice chancellor. Professor Muhammed Chado, the vice chancellor, further stated that the students were dismissed for failure to meet up with the minimum academic requirements after two academic sessions on probation.

Previous research in related studies pointed out many factors that may account for students' academic achievement. Some of these researchers concentrated on the Nigerian environment (Osarenren, 1996; Ogunkola, 2000; Ojerinde, 1998; Fabiyi and Fagbamiye, 2001; and Kabiru, 2003); and other studies (Nelson and Soli, 2000; Garzuk and Chagok, 2001; Mark, 2002; Bazaragan, 2002; and Sucharita, 2004) were based on foreign countries.

However, most of these studies have left out institutional factors in relation to colleges of education, especially in Nigeria. This might be due to the piecemeal approach to the research into academic achievement in the colleges of education in the country. This gap in

knowledge should not be allowed to continue uninvestigated if the country is to achieve the educational objective of providing qualitative graduates to power Nigerian economic and political development programmes. The quality of output of any operation is a function of the input that is processed. Consequently, the quality of output of primary and secondary school certificate holders depends, to a large extent, on the quality of trained teachers from colleges of education. This factor is recognized by the Nigerian National Policy on Education (2004:33), which states that the minimum qualification for entry into the teaching profession shall be the Nigeria Certificate in Education (NCE).

Statement of the problem

The consequences of not addressing the problem of students' academic achievement are many. Students by their nature do get involved in very many activities outside their studies. When students lose interest in their studies, failure rate will be higher. They may engage in very many unlawful activities like cultism, robbery, prostitution, and tyranny, among other vices. Furthermore, students' low academic achievement may result in failure. When failure becomes persistent, students may easily withdraw from the school system. Research finding has also shown that economic deprivation could lead to failure.

In addition to this, students may engage in all forms of disruptive behaviour in and outside the school system. Drug addiction is one of the problems likely to be encountered by the students. Research reports confirmed that more students are into drug addiction. Reports of survey carried out in Lagos and Kano showed that cannabis, heroine and cocaine are widely abused by Lagos and Kano students. The NDLEA drug force reports showed that the common drugs abused mainly by smokers were marijuana (86.9%), cannabis (66%), alcohol (22%) cocaine (18%) and heroine (13.8%) (*Vanguard,* February 21st 1994).

However, excessive alcohol consumption creates numerous health problems and shortens lifespan. Heavy drinkers are at greater risk of cancer, ulcer, heart disease, muscle wastage, malnutrition and cirrhosis of liver. These problems could lead to death. Low academic achievement could also lead to joblessness after the students have graduated. Hence, the students may find it difficult to compete with their colleagues who have passed out of the school system with very good grades. This may lead to further problems like robbery, prostitution, general violence, alcoholism, smoking, drug trafficking, among others.

Achievement is important in education. Despite the huge resources expended by government, results in the required quantum and quality are not forthcoming. It is in

view of these problems that research is currently being done to look into the institutional factors that are responsible for students' academic achievement among students in colleges of education so as to enable policy intervention and engender better performance.

Aim and objectives of the study

The broad objective is to investigate the institutional factors responsible for students' academic achievement in colleges of education in South-Western Nigeria. The specific objectives are:

i. to identify the level of students' academic achievement in federal, state and private colleges of education in that part of the country.
ii. It also includes a comparative study of institutional factors as they affect students in colleges of education under study.

Research questions

The study was designed to provide answers to the following questions:

i. Is there any difference in the influences of components of institutional factors affecting educational achievement across federal, state and private colleges of education in South Western Nigeria?
ii. What is the significance of institutional factors as predictors of students' academic achievement in the colleges of education in the South Western Nigeria?

The statement of the hypotheses

In order to answer the research questions, the following propositions are made:

i. Institutional factors are not significantly related to students' academic achievement in colleges of education in South Western Nigeria.
ii. There is no significant difference in the ranking of institutional factors among students.

Significance of the study

This study is significant in many respects. The study will help to reveal the components of institutional factors responsible for students' academic achievement in colleges of education in South-Western Nigeria. It will compare the relationship of the variables with one another as they affect students from the colleges used for

the study. Ranking of the factors will be done according to the perception of the students to make readers have an overview of the interrelatedness of the variables used for the study. This is of particular significance in a democratic environment where political parties attempt to improve educational performance in a competitive manner. The study therefore offers empirical support to assist educational policy makers, administrators and educators in the educational planning and implementation. Finally, students would also benefit from the study through suggestions offered on ways of improving students' academic achievement by the various interactions of the components of institutional factors identified in the study and the study will lay a solid foundation which subsequent researchers in similar studies may build upon.

Scope of the study

The study investigated the institutional factors responsible for students' academic achievement in Nigerian Colleges of Education in South Western Nigeria. It also reported how the factors related to one another among the Colleges are studied.

Theoretical framework/conceptual models

Theoretical framework: The study of comparison of factors responsible for students' academic achievement in identified Nigerian colleges of education cannot be complete without considering the theoretical background on which some of the factors are based. Consequently, this thesis is anchored on a number of fundamental theories. These include theory of achievement motivation; Watson's theory of learning; Thorndike (S-R) Reinforcement theory; Skinner's operant conditioning theory; and Hull's theory of learning. The theories are explained thus:

Theory of Achievement Motivation: This theory was propounded by McClelland (1951) of Havard University. According to the theorist, the psychological study of the individual and the nation can contribute a great deal to the problem of economic growth. Human beings differ from one another in the strength of achievement motive. It is this difference in the strength of motivation to achieve that is important in understanding the differences in the economic growth of nations. This theory can be related to the study and has been upheld by a number of researchers (Misanchuk, 1977; Dunham, 1973; and Ajila and Olutola, 2000) and is also relevant to the current study.

Watson's Theory of Learning: According to the theorist, the explanation of learning, understanding of brain and its functioning is very essential. This theory holds that people's behaviour is learned by interacting with external environment stimuli. Emphasis is laid on providing conducive environment in school for efficient and permanent learning. Sufficient practice and exercise are necessary to make the bondages between S-R permanent. This theory has relationship with the current study because academic and social integration affects students' persistence and achievement in colleges.

REVIEW OF RELEVANT LITERATURE

Institutional factors and students' academic achievement

Student-Teacher Ratio: Bassi (2001) conducted a study on students under achievement in schools and colleges and found that overpopulated classes, institutional materials for teaching and learning and teachers' pedagogy are significantly related to students' academic achievement. The researcher discovered that the degree course content in most cases has parallel relationship with the content of primary and secondary school curricula. Therefore, people employed to teach at the primary and secondary school levels should attend orientation in order to equip them with the academic content to be learnt. The researcher also observed that lack of teaching aids in most schools and inadequate preparation of most teachers on the effective use of teaching or instructional aids create serious learning barriers that can result to under achievement or poor performance in subjects taught in schools.

The findings of Rivera-Batiz and Martin (1995) also agree with the previous researchers. Rivera-Batiz and Martin carried out a study on the consequences of overcrowding. They surveyed 599 students and 213 teachers in overcrowded schools and discovered that 75 per cent of the teachers noted that overcrowding negatively affected both classroom activities and instructional techniques. About 40 per cent of the students reported that they had problems concentrating in their classes when learning something new. The study also showed that teacher burnout was much more common in overcrowded buildings than in underutilized buildings. The study further revealed that teachers in overcrowded schools have little time at their disposal to cover the basic materials and could not have any time for further exploration.

Finally, smaller schools are better in terms of academic achievement. Class size is equally very important in school design, and drives a host of costly facility-related issues that are part and parcel of the schools buildings, planning, design, construction, costs maintenance and operation. Given that education is labour intensive, class size is a big factor in determining the number of teachers needed and hence, how much education will cost. While

social scientists are engaged in an intensive debate over the effects of class size on educational outcomes, there is a widespread popular belief that smaller classes are better.

Lecturers' Interest and Commitment: Interest also contributes to students' academic achievement. Interest has to do with a learner's predisposition to react positively in certain ways toward certain aspect of the environment and interest is usually developed in relation to and remains allied to more basic motives. Interest reaction to any situation depends upon the situation's potential or actual fulfilment of personal needs and goals. Students' interest in courses has been cited as a partial explanation for overall course ratings, occupational choice and achievement.

Adetoro (1999) investigated the institutional factors that affect students' academic performance and found that variables such as peer-group influence, home-school distance, age, experience of the learner; interest and commitment to learning affect students' academic achievement. He adopted the ex post facto research method for the study and documentary evidence and personal assessment were also used. The findings of the study revealed a significant relationship between teachers' qualifications and students' academic achievement. The study also showed that interest and commitment of teachers had highest correlation among urban and large schools, followed by semi-urban and medium schools with the least correlation in rural or small schools.

Instructor's knowledge of Subject and Enthusiasm for Teaching: In a remarkable study by Broder and Dortman (1994), it was stated that factors such as instructor's knowledge of subject, preparation for class, ability to maintain interest and stimulate study, ability to clearly explain subject matter, enthusiasm for teaching, consideration and interest in students, ability to stimulate thinking, organization of lectures, tying information together and coverage of subject of examinations affect teaching quality. Other factors reported include: class characteristics, course characteristics, and instructor's characteristics, differences in instructor, course and class characteristics, perceptions of teacher and course attributes. The researchers used the statistical tools of ordinary least square to compute regression coefficients and descriptive statistics to examine the data. The findings of the study showed that students assume all courses to be of equal quality or potential. That is, students did not appear to favour one course over another in their overall ranking of the courses. In addition to this, the result of the study pointed to the fact that the students value the human capital component of classroom instruction. In other words, students place value on the courses' contribution to their human capital and future earning capacity.

Teaching Method - Instructional Effectiveness: Howard (1995) carried out an empirical research on the relationship of internal locus of control and female role models in female college students. The researcher found that instructional effectiveness and cooperative/competitive condition affect academic achievement. In support of this, Kingdom (1996) conducted a similar study on students' achievement and teachers' pay in India and found that teachers' remuneration affected students' academic achievement.

Teachers' attitude may make students to run away from school. Moreover, adopting a bad methodology, cursing and calling the students by derogatory names may lead to acts of truancy and absenteeism on the part of the students. Osarenren (1998) further observed that some teachers do not prepare their lessons well. The content of the lesson is in most cases not adequate to keep students in class. As a result of the inadequacy in the preparation of subject matter, students may loiter along the school compound looking for an opportunity to leave the school. Some of the students do not bother to come to school because they know their teachers will not teach well. This practice is also rampant among students of tertiary institutions.

School Leadership: Adegoroye (2004) conducted an investigation on the influence of Nigerian secondary school principals' personal attributes on teachers' job fulfilment and satisfaction. He found that friendliness at work, grasp of organizational policies, observing hierarchical structure, giving incentives for job performance are significantly related to the personal attributes of principals. The researcher used means, correlation coefficient in analyzing data. The findings of the study show that when teachers are satisfied with their boss attitude and promotion prospects, they will put in their best and ensure students' academic progress.

In a study conducted by Evans (2001) on morale, job satisfaction and motivation among education professionals, it was found that school leadership management, salary, educational policy and reforms, conditions of service significantly contribute to the satisfaction and motivation among education professionals. The researcher did a comparative analysis of the variables of study. He observed that the greatest influences on teacher morale, job satisfaction and motivation are school leadership and management.

School Calendar Stability: Pietro (2009) investigated the impact of academic calendar stability on students' performance in the United Kingdom. The researcher found that disruption in two-semester calendar structure had a negative impact on final examination scores. This result agrees significantly with the earlier findings in Patterson and King (2004).

In a similar study, disruption in school calendar stability

was found to increase the risk of academic failure and hinder educational achievement (National Centre for Mental Health Promotion and Youth Violence Prevention, 2010). Cooper et al. (2003) studied the effects of modified school calendar on students' academic achievement and on school and community attitudes. The researchers reported little or no effect of modified school calendar on students' academic achievement.

Savas and Gurel (2014) reported in a study of the variables affecting the success of students in Turkey. The researchers found that students who attended private institutions for a longer time are more successful than the ones who studied for a short time. In other words, the longer students attended private education institution, the higher their academic achievement is. The finding is consistent with those of Savas et al. (2010). In Nigeria, the School Calendar in private schools is generally more stable that in public schools and may tend to affect academic achievement accordingly.

School Plant: Good school environment is an essential ingredient in the attainment of quality education. Conducive learning environment improves students' performance in class work and examinations. Ukit (2003) defined school environment as the aggregate of external conditions or factors, which influence the activities of educational institutions. These conditions often include: economic, legal, political, socio-cultural, technological and physical factors.

In the same vein, Uwadiae (2001) described school environment as conditions (natural and man-made) prevalent in the school and include: climate, building and their structural designs, facilities/equipment for teaching and learning, library materials, recreational facilities, leadership style of the school management and the level of academic planning and involvement. Good school environment is very essential for the attainment of quality education and could influence students' academic performance. Good environment can lift one up and promote one's all round development and bad environment can let one down and make a person live a hopeless life.

In support of this, Mark (2000) reported that clean, quiet, safe, comfortable, and healthy environments are an important component of successful teaching and learning. According to him, poor indoor air quality makes teachers and students sick and sick students and teachers cannot perform well like healthy ones.

Moreover, Sucharita (2004) carried out a study on the effect of school climate on social intelligence and found that qualities of the school environment interacted with general intellectual ability of the students in the process of development of their social intelligence. He employed the usage of 2 by 2-factorial design in his research where the two levels of intelligence interacted with the two types of school environment. The findings of the study showed

that average students in enriched climate scored significantly higher on social intelligence tests than average students in non-enriched school climate. In addition to this, it was found that temperature and humidity affected indoor air quality, which invariably affected students' academic outcomes.

Kennedy (2001), McGovern (1998), and Moore (1998) observed that schools need especially good ventilation because children breathe a greater volume of air in proportion to their body weight than adults do. One of the first symptoms of poor ventilation in a building is a build up of carbon dioxide caused by human respiration. When carbon dioxide levels reach 1000 parts per million, headaches, drowsiness and inability to concentrate ensue. In support of this, Myhrvold et al. (1996) found that increased carbon dioxide levels in classrooms owing to poor ventilation decreased students' performance on concentration, tests and increased students' complaints of health problems as compared to classes with lower carbon dioxide levels.

Good acoustics are also fundamental to good academic performance. Earthman and Lemasters (1998) reported three key findings that higher student achievement is associated with schools that have less external noise, that outside noise causes increased student dissatisfaction within their classrooms, and that excessive noise causes stress on students.

There is also an evidence of cumulative effect of excessive classroom noise on a student's academic achievement level. These problems are more acute for students who may have hearing impediments and may affect the detection of such impediments (Nelson and Soli, 2000).

Fisher (2000) buttressed this view by observing that high noise level causes stress. Noise levels influence verbal interaction, reading comprehension, blood pressure and cognitive task success and may induce feelings of helplessness, inability to concentrate and lack of extended application to learning tasks.

Physical and Material Resources: Ayodele (1999) investigated resource situation in Nigerian schools as correlate of students' academic performance and found that inadequate resource situation in schools for teaching and learning may lead to low students' academic achievement. The study further showed that a positive and significant relationship exists between resource situation and students' academic performance. The findings of the study showed that there is no significant difference in the resources situation between old generation and new generation schools. The study also showed a positive and significant relationship between physical and material resource situation and students' academic performance. The findings of this study are consistent with those of Oni (1992), which stated that the presence of unqualified teachers in the school system

has the tendency to cause low students' performance since qualified teachers have been seen as the drivers of effective educational system.

Adequacy of Educational Infrastructure: Ajila and Olutola (2000) reported on impact of parents' socio-economic status on university students' academic performance and found that availability of suitable places to read, adequacy of educational infrastructure and well equipped laboratories had significant contributions to students' academic performance. The researchers made use of descriptive survey design. A self-designed questionnaire was also used and data analysis was done using analysis of variance.

Udoh (1990) holds consistent view with Fabiyi and Fagbamiye (2001) who state that physical and material resources contributed significantly to students' academic achievement. These findings are also in line with that of Ayodele (1999) who states that inadequate resources for teaching and learning may lead to low students' academic achievement. In addition to this, Bassi (2001) holds consistent view with Oni (1992) who states that the presence of unqualified teachers in the school system has the tendency to cause low students' academic achievement.

Library Facilities: Wilkins (2002) conducted an empirical investigation on linking resources to learning. The report suggested that resource management contributed to higher academic achievement. According to the researcher, pupils' number should be given increased emphasis as the determinants of school budgets with the intended consequences.

In a study by Fabiyi and Fagbamiye (2001) on teaching resources and teaching effectiveness in selected colleges of education in Nigeria, it was discovered that teachers' welfare package, staff development scheme, promotion prospects are significantly related to students' academic achievement. The researchers made use of Pearson moment correlation coefficient and multiple linear regression in data analysis. The result of the findings showed that only one out of the six institutions used for the study recorded a significant relationship between the usage of physical and material resources and teaching effectiveness. The result further showed that students' achievement scores in mathematics, integrated science, English language and social studies are not significantly related to teaching effectiveness as this is confirmed for mathematics, English language and technical education, whereas teaching effectiveness is significantly correlated with students' achievement in integrated science and social studies. The findings also revealed no significant relationship between resource availability and their utilization. However, these findings are not consistent with those of Udoh (1990), which observed that the use of physical and material resources contributes signifi-

cantly to students' academic achievement. To buttress these findings, Oladele (1985) also observed that the quality, quantity and use of physical facilities could influence teaching effectiveness. However, it can be summed up that if physical and material resources were optimally used, teaching effectiveness would be better enhanced. The non-significance of utilization of resources on teaching effectiveness may not be unrelated to the sense of frustration experienced by teachers as a result of general inadequacies in the availability of resources. The study also showed that subject areas that recorded acute shortage of teaching personnel had the highest failure rates at the senior secondary school level.

Furthermore, Wilkins (2002) and Bazargan (2002) hold similar views that students' enrolment number, students' population, contributed significantly to students' academic achievement. Moreover, Mclaughlin and Driori (2002)'s findings are consistent with that of Evans (2001) who states that principal's leadership ability or school leadership management had a significant impact on students' academic achievement.

Finally, the findings of Franklin (1995) that institutional environment and organizational characteristics contributed to students' academic achievement are consistent with that of Dorman (1994) who states that enthusiasm for teaching, consideration, interest in students, instructor's characteristics had significant contribution to students' academic achievement.

RESEARCH METHODS

Research design

The research design employed for the study is *ex-post facto* using a survey design and a multiple regression design. This is because some of the variables of the study are already in existence. Asika (1991) stated that *ex-post facto* research is a systematic empirical study in which the researcher does not in any way control and manipulate the independent variables because the situation for the study already exists or has already taken place. The author further opined that the researcher could not manipulate the independent variables because they cannot be manipulated. However, the researcher can indeed create or contrive a situation that will generate the requisite data for analysis.

Population

The population for the study consisted of 1,900 lecturers and 12,420 200 Level and 300 Level NCE students in federal, state and private NCE-awarding institutions in South Western Nigeria: Ekiti, Lagos, Ogun, Ondo, Osun and Oyo States.

Sample and sampling technique

The sample for the study was drawn from the Colleges of Education in each of the six States of the South Western Nigeria. The population was stratified into the homogeneous groups of federal, states and private Colleges of Education. Subsequently, random

sampling technique was applied to pick the institutions for the study. In all, there are seventeen Colleges of Education in the population. On the basis of this selection process, the sampled Colleges of Education are listed in Appendix 1 of this research report.

Some States (Osun, Ekiti and Ondo) have no privately owned Colleges of Education at the time the study was conducted. Hence, the sample of privately owned Colleges of Education is limited to two States.

One hundred students were randomly selected for the study from each of the institutions and questionnaires were administered on them. In addition to this, questionnaire was administered on at least ten lecturers from each of the institutions in order to make the data robust.

The questionnaire required the students to rank the institutional variables that affect students' academic achievement from the most significant variable to the least. Students were also required to state other factors that are not listed in the instrument, which affect their academic achievement. Opinions of lecturers were also sought on factors they thought were likely to affect students' academic achievement.

Research instruments

Two similarly structured questionnaires were used for the study. The first questionnaire was designed for the students while the second was targeted at the lecturers. The instruments are 4-point likert scale questionnaires aimed at eliciting the respondents' perceptions of institutional factors that are likely to affect students' academic achievement in the State, Federal, and Private Colleges of Education in South Western Nigeria.

Part One of the questionnaires sought information on demographic data such as sex, age, name of institution, department, state of origin, level of schooling, qualifications, residential area, parental social-economic status, grade point average in school tests, exercises and assignments.

Part two of the questionnaire required the respondents to supply information on institutional factors that affect their academic achievement. The data gathered were analyzed using multiple regression.

Part three of the questionnaire requested the respondents to rank the institutional variables affecting students' academic achievement from the most highly ranked to the least. Such ranking enabled the comparison of the multiple regression results with the ranking of the variables by respondents. This aspect of the study represented a significant contribution of the study to knowledge as the theoretical multiple regression results are evaluated side by side with the rankings.

Instrument validation

Content Validity: Validation is the process of' ensuring the degree of effectiveness of each of the items in the research instrument. It is the process of determining the extent to which each of the items measures what it is designed to measure. The draft questionnaires were given to some advanced students in two Colleges of Education who were to serve as the representative sample of the population of subjects to be used for the study. Their comments were noted and these were considered in preparing the second draft. This approach was necessary to ensure that the items were clear enough and easily understood and to know whether there was a need to include more items.

The draft questionnaires were also given to lecturers in Olabisi Onabanjo University who are experts in the fields of education and

institutional management to enable them make their inputs. These were subsequently incorporated before the final questionnaires were printed.

Reliability of the Instrument: Reliability is necessary to ascertain whether the instruments are capable of reproducing consistent or similar results after a number of repeated administrations. Copies of the final drafts were administered to 30 students and 10 lecturers in Colleges of Education. Their responses were found to be consistent and reliable, after two administrations. Reliability tests were also carried out to determine whether the measuring instruments were consistent and reproducible. The results are Cronbach alpha (α) 0.79 (students) and 0.73 (lecturers); Guttman split-half 0.78 (students) and 0.71 (lecturers); and Spearman-Brown equal length results are 0.69 (students) and 0.70 (lecturers). Given these results, the questionnaires were considered reliable for the study.

Data collection

Primary and secondary data were generated and used for the study. The two sources of data were exploited to ensure that reasonably robust and reliable analyses were made.

Primary data collection

Primary data were derived from respondents' opinions on the items in the questionnaires to be administered. This was used to ensure that the researcher got direct information from respondents. The method would afford the researcher the opportunity to structure the questions in such a way that respondents would understand them. In addition to this, their responses would be easier to manage because the questionnaire items are structured.

This method however is not without some shortcomings. The researcher was not able to retrieve the entire questionnaire sent out. Respondents might have reacted similarly as the instruments were administered at the same time in the same environment. In addition to this, respondents might have been biased in their responses and this might make the findings to be subjective. However, the administration of the questionnaire was carried out as independently as possible from one respondent to the other. Also, the benefits of using the questionnaires appeared to outweigh the costs to be incurred.

Secondary data collection

The data realized from this source consist of relevant data not directly prepared for the current study. The most relevant of these is the students' Cumulative Grade Point Average (CGPA), which constitutes the dependent variable. The two sources of data (primary and secondary) were used in order to generate sufficient facts for the study.

Method/procedure for data analysis

Model development for the components of Institutional Factors Responsible for Students' Academic Achievement: Correlation and multiple regression techniques were employed to analyze the data obtained. These techniques have been employed in many prior studies (De Berard et al., 2oo4; Adesoji and Oladele, 2003; Fabiyi and Fagbamiye, 2001; Pascarella and Terenzini, 1996; Kallio, 1995). The model regressed ACADACH on institutional factors thus:

$$ACADACH = \beta_0 + \beta_1 STRATIO + \beta_2 LINTCOM + \beta_3 TEACHMET + \beta_4 SCHLEAD + \beta_5 SCALENDS + \beta_6 SCHPLANT + \beta_7 LIBFAC + \varepsilon$$

(1)

Academic achievement (ACADACH)
Student-Teacher Ratio (STRATIO)
Lecturers' Interest and Commitment (LINTCOM)
Teaching Method (TEACHMET)
School Leadership (SCHLEAD)
School Calendar Stability (SCALENDS)
School Plant (SCHPLANT)
Library Facilities (LIBFAC)
β_0 = constant term
ε = residual term

The variables of this study are operationalized by representing the dependent variable (Academic Achievement) by the cumulative grade point average collected from the students' records in the various institutions. The data for the independent variables are gathered through the responses to the questionnaire items.

Statistical tools/analytical procedure of survey data

The statistical tools that were used for the survey part of this study were means, variances and standard deviations. These enabled the researcher compare the variables identified easily. Parametric and non-parametric statistics were used to test for differences in perceptions of some of the independent variables while the differences between two means scores in pairs were also tested. Kendall's W (coefficient of concordance) was used. In addition, various weights were attached to the rankings of the institutional factors affecting students' academic achievement collected through Part Three of the questionnaires. The weights used are:

Ranking	Weights
7	7
6	6
5	5
4	4
3	3
2	2
1	1

These weights enabled the calculation of the total scores per variable, which were subsequently ranked for the purpose of determining the rank-order correlation coefficients.

RESULTS

Research Question 1: Is there any difference in the influences of components of institutional factors affecting educational achievement across federal, state and private colleges of education in South Western Nigeria?

Table 1 presents the descriptive statistics for 1,100 students' ranking of the seven components of institutional factors proposed to affect academic achievement (student-teacher ratio, lecturers' interest and commit-ment, teaching method, school leadership, school calendar stability, school plant and library facilities).

The ranks range from a minimum of 1.00 to a maximum of 7.00. This range of ranks applies to all the components of institutional factors. The table reveals that teaching method with a mean rank of 5.0973 and a standard deviation of 1.76215 is rated as the most important institutional variable. The next two highly ranked variables are lecturers' interest and commitment (mean = 4.9591; standard deviation = 1.72261) and student teacher ratio (mean = 4.7591; standard deviation = 1.82669). The least ranked components of institutional factors are school calendar stability (mean = 4.2791; standard deviation = 1.92236) and school plant (mean = 3.8445; standard deviation = 1.96799) respectively.

The inferential statistical test -- Kendall's W Test (coefficient of concordance) is applied to determine if there is any significant difference in the various rankings of institutional factors. The resulting statistic represents the level of agreement among the groups of Federal, State and Private colleges of education students in the South Western Nigeria. The result of this test is presented in Table 2.

From Table 2 Kendall's coefficient of concordance is 0.064. The p-value is 0.000. This shows that there is a significant difference among the rankings of the various components of institutional factors. The components are significantly different in accounting for students' academic achievement.

The descriptive statistics for lecturers' ranking of the seven components of institutional factors proposed to affect academic achievement (student-teacher ratio, lecturers' interest and commitment, teaching method, school leadership, school calendar stability, school plant and library facilities) are presented in Table 3.

The lecturers from the three groups of colleges of education, like their students are in agreement in their ranking of three institutional variables (lecturers' interest and commitment with a mean of 5.3727 and standard deviation of 1.61336; student-teacher ratio giving a mean of 5.3273 and a standard deviation of 1.67611; and teaching method with a mean and standard deviation of 5.2000 and 1.51929 respectively). In contrast, the students and the lecturers also returned a similar ranking of the two relatively insignificant institutional variables. These are school calendar stability (mean = 4.5455; standard deviation = 1.65145) and school plant (mean = 3.9273; standard deviation = 1.67392).

Kendall's Coefficient of Concordance for lecturers' ranking of the components of institutional variable yields 0.146 and a p-value < 0.001. The resulting statistic represents the level of agreement among the lecturers in Federal, State and Private colleges of education in the South Western Nigeria. The result of this test is presented in Table 4.

This suggests that there is a significant difference among the rankings of the various components of institu-tional factors. The components are significantly different in accounting for students' academic performance.

Table 1. Descriptive Statistics of Institutional Factors (Students).

Descriptive Statistics					
	N	Mean	Std. Deviation	Minimum	Maximum
stratio	1100	4.7591	1.82669	1.00	7.00
lec_int	1100	4.9591	1.72261	1.00	7.00
teacmeth	1100	5.9073	1.76215	1.00	7.00
schlead	1100	4.3909	1.76919	1.00	7.00
schcal	1100	4.2791	1.92236	1.00	7.00
schplant	1100	3.8445	1.96799	1.00	7.00
libfacil	1100	4.2318	2.09811	1.00	7.00

Source: SPSS output.

Table 2. Kendall's W Test (Students' Ranking of Institutional Factors).

Ranks	
	N
stratio	4.23
lec_int	4.53
teacmeth	4.73
schlead	3.80
schcal	3.73
schplant	3.23
libfacil	3.74

Test Statistics	
	N
N	1100
Kendall's W[a]	.064
ChiSquare	425.188
Df	6
Asymp. Sig	.000

a. Kendall's Coefficient of Concordance.
Source: SPSS output

Research Question 2: What is the significance of institutional factors as predictors of students' academic achievement in the colleges of education studied in the South Western Nigeria?

The analysis undertaken to answer the second research question proceeds to regress CGPA on the components of institutional factors. The results of the multiple regression model for the CGPA (a measure of academic achievement) and the seven components of institutional factors are shown in Table 5. It is evident that the Variance Inflation factor (VIF) statistics are sufficiently low as to preclude the existence of multicollinearity.

The adjusted R^2 shows that 63% of the variance in the academic achievement of colleges of education students is accounted for by the independent variables included in this regression model. The regression model coefficients in Table 2 shows that STUDENT-TEACHER RATIO ($p < 0.01$), LECTURERS' INTEREST AND COMMITMENT ($p < 0.00$), and SCHOOL CALENDAR STABILITY ($p < 0.01$) were significant in explaining academic achievement. The result of the regression further suggests that SCHOOL LEADERSHIP ($p > 0.05$), SCHOOL PLANT ($p > 0.05$) and LIBRARY FACILITIES ($p > 0.05$) were not particularly significant as predictors. With the above results, hypothesis ii which states that there is no significant relationship in institutional factors and academic achievement of students in Colleges of Education in South Western Nigeria cannot be accepted.

DISCUSSION

This study found that a number of institutional factors (student-teacher ratio, lecturers' interest, school calendar stability and to a lesser extent teaching method) were significant predictors of academic achievement in the Colleges of Education. The findings regarding students' interest was similar to those of the findings of the current study, that student-teacher ratio is a predictor of academic achievement. It was corroborated by Bassi (2001) and Rivera-Batiz and Martin (1995). The significance of this predictor cuts across both developing and industrialized countries to underline its importance.

Lecturers' interest and commitment is not only found to be significant in the current research, it was also upheld by Adetoro (1999). In addition, teaching method was found to be a significant predictor of academic achievement in the current study at ten per cent level.

This corroborated the findings in Howard (1995), Kingdom (1996) and Osarenren (1998).

A number of other institutional factors were not found to be significant predictors of academic achievement in this study, for example, school leadership. The finding in the

Table 3. Descriptive Statistics of Institutional Factors (Lecturers)

Descriptive Statistics					
	N	Mean	Std. Deviation	Minimum	Maximum
Istratio	110	5.3273	1.67611	1.00	7.00
Iintcom	110	5.3727	1.61336	1.00	7.00
Iteacmeth	110	5.2000	1.51929	1.00	7.00
Ischlead	110	4.6818	1.45218	1.00	7.00
Ischcal	110	4.5455	1.65145	1.00	7.00
Ischplant	110	3.9273	1.67392	1.00	7.00
Ilibfacil	110	4.9182	1.70876	1.00	7.00

Source: SPSS output.

Table 4. Kendall's W Test (Lecturers' Ranking of Institutional Factors).

Ranks	
	Mean Rank
Istratio	4.71
Iintcom	4.81
Iteacmeth	4.49
Ischlead	3.60
Ischcal	3.61
Ischplant	2.64
Ilibfacil	4.14

Test Statistics	
N	110
Kendall's W[a]	.146
Chi-Square	96.274
df	6
Asymp. Sig	.000

a. Kendall's Coefficient of Concordance
Source: SPSS output

current study was contrary to those of Adegoroye (2004) and Evans (2001).

Although Lemaster (1998) found school plant to be a significant predictor of academic achievement, the current study did not find the factor to be statistically significant. This might be due to environmental difference in the study designs.

Policy Implications of Research Findings: The purpose of Nigerian educational policy is to provide the needed manpower development to stir the nation's socio-economic exigencies left by the colonial masters. The non-directional policy issues have been the bane of the educational system particularly with reference to the curriculum structure. So far, the country has had three different systems borne out of incessant changes in policies: 9-5-4 (nine years of elementary education, five years of secondary and four years of tertiary education); 6-3-3-4 (six years of elementary education, three years of junior secondary, three years of senior secondary and four years of tertiary education); and now 9-3-4 (nine years of basic education, three years of secondary and four years of tertiary education). It has become a tradition to abandon policy mid-stream. The effect of this policy somersault cannot be over-stressed. Lack of initiative, innovation, skills, independent/constructive mind and creative ideas has been held to characterize the current system of Nigerian education. This system encourages memorization in learning processes and theoretical explanation to areas that need practical illustration. The system favours cognitive development above other domains of education. Bolaji (2007) argues that Nigeria's school system is geared toward building students with cultural orientation with deficiency in problem-solving approach that requires more than simply recall or performance of rudimentary skills. Philosophers in the field of education are yet to come to terms with a national ideology with the cardinal objective to build a self-reliant nation contrary to what is apparent in the present system of education. Oduolowu (2001) opines that no positive impact whatsoever will be made with a system that promotes theoretical knowledge, places emphasis on paper certification rather than stressing the development of innate abilities in a learner evolving through training and practice. In other words, there exists an aberration in policy formulation and implementation. The need to revisit the existing educational policy has become neces-sary; hence the urgent need to save Nigeria's educational system from the gully of irrelevances, hopelessness that manifests in poor academic achievement. In all these policy changes, the services of high quality graduates of Colleges of Education are of great significance.

Conclusion

The current study has been able to ascertain some rele-vant institutional variables that educational stakeholders

Table 5. Model 1: Regression of CGPA on the Components of Institutional Factors.

Model		Unstandardized Coefficients				Collinearity
		B	**Std. Error**	**t**	**Sig.**	**VIF**
1	(Constant)	1.614	.378	4.274	.000	
	log_student-teacher_ratio	.681	.191	3.570	.000	2.300
	log_lecturer_interest_commitment	.468	.095	4.920	.000	1.000
	log_school_leadership	.612	.367	1.668	.961	1.210
	log_school_calender_stability	.274	.116	2.370	.020	1.175
	log_school_plant	-.149	2.340	.061	.949	1.000
	log_library_facilities	.062	.342	.181	.856	1.323
	log_teaching_method	.778	.200	3.880	.096	1.008

a. Dependent Variable:cgpa
Model Statistics: Adj. R^2 = 0.63; $F_{(7, 30.89)}$ $p < 0.001$.
Source: SPSS Output.

need to address in order to improve the quality of educational outcomes in the NCE students in Nigeria. Educational stakeholders, especially, the regulators, need to, as a matter of policy, commission research into the dynamic relationship among institutional factors and academic performance. This may involve the provision of research funds and the sensitisation of researchers to promptly access the required funds. There is also the need to set up a feedback mechanism to continually assess the extent to which policy objectives have been achieved. The current study focussed on Colleges of Education in the South Western Nigeria, though the study sample appeared to be robust, in order to improve the level of generalisation of findings future research should extend this frontier to cover all the educational institutions in Nigeria.

Conflict of Interests

The author(s) have not declared any conflict of interests.

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Full Length Research Paper

Enrichment and strengthening of Indian biotechnolgy industry along with academic interface

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For many years, humankind has been incorporating biosciences in different places- from agriculture to food and medicine. Today, the nomenclature of biology has been recoined as Biotechnology, a technological science with a perfect blend of sophisticated techniques, manuals and application of fast delivery equipment and vehicles. It encompasses chemical engineering, bioprocess engineering, bioinformatics (computer aided biotechnological science), biosensor, robotics and many more. Biotechnology is so advanced that it requires multiple phased regulatory system to check the ethical issues in industry. In raising the biotechnology industry, the government has extended support like financial assistance and infrastructure. But to transform any industry there is a great demand from industry/academia to come and share knowledge and upgrade the demands as industrial products and services. On this road map to industrial development and its strengthening, academia needs to focus on policies framework and plan for a better industrial maneuvers to achieve set goals.

Key words: Indian Biotechnology Industry, industry academia linkage, strengthening indian biotechnology, academic reforms.

INTRODUCTION

Biotechnology is today known as the revolutionary science; it has transformed the complete industrial scenario scaling from basic industrial outlook to a rejuvenation which has proved to be a turning point for life sciences industry.

With enoumous potential in every sector, Biotechnology industry also offers **E-factor** outputs like *Eco-friendly, Efficient, Economically Viable and Exclusive* options for in-situ waste treatment and degrades potentially hazardous toxic waste into harmless/relatively less harmful by-products. India is now recognised as technology generator and with the immense support of Department of Biotechnology and other allied bodies

techniques such as *Industrial Effluent Treatment, Paper and Pulp Mill Effluent Treatment, Oilzapper Technology, Chemobiochemical process, Biosensor for Detection of Pesticide Residues, Detection of Pathogens in Drinking Water, Biosurfactants from Wastes, and Bioscrubber for Removal of Odours from Industrial Emissions* have taken a lead.

Talking about sector, India is witnessing an exponential growth and it is playing a pivotal role in the Indian economy. In the years 2009-2010, the Indian biotech industry breached EUR 2,218.58 million mark with a staggering growth of 17% over the previous year. BioPharma recorded a growth rate of 17.69% with

Figure 1. Indian Biotechnology sector-wise growth 2002-13.

revenues of Rs. 14,923 crore; Bio Services, Rs. 4,329 crore; BioAgri, Rs. 3,210 crore; Bio Industrial, Rs. 772 crore; BioInformatics, Rs. 290 crore (www. ableindia.in/admin/attachments/newsletter/newsl112_ena ble_July13new.htm) (Figure 1).

Analysts say that the industry is poised to grow but it needs strong support from investors and government regulatory authorities. To nurture this sector, industries have moved ahead with mergers, collaborations and innovative product galore, still a long journey is left untraveled. To boost the industry, a strategic road map was undertaken through DBT's *National Biotechnology Development Strategy* (NBDS) designed in consultation with stakeholders, regulatory authorities, universities, private players, government and international-domestic investors. The framework intends to come up with the challenging issues of Indian research and development, capital generation, technology development and transfer, intellectual property issues and human resource development with emphasis on industrial requirement. The authorities also aimed at developing a blend of industry and academia through several programme such as promoting the *Public Private Partnership* (PPP), *Biotechnology Industry Partnership Programme* (BIPP), promoting *Small Business Innovation Research Industry* (SBIRI), *Biotechnology Industry Research Assistance Council* (BIRAC) to nurture and catalyze the industrial research and development and also to empower the Indian human resource capital with advance skill sets and knowledge base.

The bioeconomy of the country is accelerated by two major driving forces that is *technological advancements* and *adaptive societal changes* development of scientific tools and products *viz.* artificial organs, target drug models, improvements in plant varieties along with enabling disease detection and gene level modifications to name a few. Another major accomplishment in biotechnological advancements is genetically engineered (GE) products galore like Bt-cotton, Bt-maize, etc.

Catalyzing the Indian biotechnology industry

To provide an impetus to the Biotech sector in India, the Government established Department of Science and Technology (DST), Department of Biotechnology (DBT), and Health Biotech Science Cluster (HBSC) under the Ministry of Science and Technology.

Government has extended immense support in form of funding like:

1. Funding ideas through the *Biotechnology Ignition Grant (BIG)* scheme (*www.dbt.nic.in*).
2. Establishing the early POC through *Small Business Innovation Research Initiative (SBIRI)* (*www.dbt.nic.in*).
3. Taking the products to market through *Biotechnology Industry Partnership Programme (BIPP)* (*www.dbt.nic.in*).

Based on the above, Government of India has launched several individual and collaborative schemes/projects to

Table 1. Some industrial partners who have enriched India's industrial values.

Advanced Enzymes Technologies Ltd.	Novozymes South AsiaPvt. Ltd.
Bharat Biotech International Limited	NuziveeduSeedsPvt. Ltd.
Bharat Serums and Vaccines Ltd.	OcimumBiosolutionsLtd.
BioconLimited	PanaceaBiotecLtd.
SyngeneInternationalLimited	PiramalHealthcareLimited
Dr. Reddy's Laboratories Ltd	Quintiles India
Eli Lilly and Company (India) Pvt. Ltd.	RasiSeeds (P) Ltd.
GlaxoSmithKline Pharmaceuticals Ltd.	Reliance Life Sciences
IndianImmunologicalsLtd.	Serum Institute of India Ltd.
Jubilant Life Sciences Limited	ShanthaBiotechnicsLimited
KrishidhanSeeds Private Limited	SIRO Clinpharm
Lambda Therapeutic Research Ltd.	Strand Life Sciences
Mahyco	VeedaClinicalResearchLimited
Monsanto	VimtaLabsLimited
Novo Nordisk India Pvt. Ltd.	

boost the biotechnology industrial growth and research facilities as:

1. Karnataka Biotechnology and Information Technology Services (KBITS) in collaboration with Scottish Development International (SDI) and Georgia Department of Economic Development at a mega event - Bangalore India Bio (www.biospectrumindia.com/biospecindia/news/174038/india-signs-biotech-mous-bangalore-india-bio).
2. Association of Biotechnology Led Enterprises (ABLE) and US-based Washington Biotechnology and BiomedicalAssociation (WBBA) have signed a MoUtoenableco-operation in the field of biotechnology encompassing healthcare, agriculture and clean energy system in country (http://www.thehindubusinessline.com/industry-and-economy/indiaus-biotechnology-tieup-to-invest-in-joint-research/article3974971.ece).
1. The Association of Biotech Led Enterprises (ABLE) is also leading an Indian delegation to Biotechnology Industry Organization (BIO) International Convention, to be organized at Boston, US. It would showcase the biotech parks established and in pipeline to attract global foreign biotech investors to India
2. The Government of India has extended Rs 205 crore (US$ 30.77 million) as scholarships for women scientists under the Women Scientists Scholarship Scheme (WSSS), Ministry of Science and Technology (Ministry of external affairs, Investment and Technology promotion (ITP) division, Govt. of India).
3. The Government of India plans to set up an Indian Institute of Agricultural Biotechnology at Ranchi with an investments of Rs 287.50 crore (US$ 43.16 million). The Institute will be a deemed university and will have

different schools to import knowledge in genomics, bioinformatics, geneticengineering, nano biotechnology, diagnostics and prophylactics and basic and social sciences and commercialization (www.ibef.org/industry/biotechnology-india.aspxCapacity building through investments).

The government is profoundly working on policy and frameworks to strengthen the industry deliberately. Strategic investments, outsourcing and exhaustive export capacity are also recognized as the key promoting agents for this industry. The government is poised to take 100% Foreign direct investment (FDI) through the automatic route for manufacturers of drugs and pharmaceuticals. According to data released by the Department of Industrial Policy and Promotion (DIPP), the drugs and pharmaceuticals sector has attracted FDI worth Rs 54,321.68 crore (US$ 8.15 billion) between April 2000 and June 2013.

Few highlighted investments in the sector in this year are:
1. World's first clinically proven conjugate Typhoid vaccine *'Typbar-TCV'* was successfully launched by *Bharat Biotech*, offering long-term protection and which is suitable for children as young as six months
2. Roselabs Biosciences Ltd. established fully integrated pre-filledsyringes (PFS) manufacturing unit in Ahmedabad (India) with an investment of Rs 400 crore i.e. US$ 60.04 million
3. Rose labs Biosciences Ltd also plans to raise Rs. 100 crore i.e. US$ 15.01 million in few months through private equity (PE) from a global investor in pharmaceutical sector for in-house research and development (R&D) of active pharmaceutical ingredients (APIs)
4. A modern computational systems biotechnology laboratory with state of the art infrastructure was established

at the Biotechnology Department, Sri Venkateswara College of Engineering, Sriperumbudur, Karnataka (India)
5. Biocon has launched a new biologic that could treat patients with psoriasis
6. Biocon entered into an agreement with *Mylan* for the global development and commercialization of Biocon's generic insulin analog products (longlastinginsulins), which has a global addressable market of US\$ 11.5 billion (www.ibef.org/industry/biotechnology-india.aspx).

Industrial enrichment

The Indian biotechnology industry has catalyzed itself from a nascent industry to a mid-maturity level stage industry. Over the last decade the industry has flourished and attained a CAGR of 20-22%. The sector comprising biopharma, bio-agri, bioservices, and many more has empowered the industry through its products/ technologies and services. In current scenario India is recognized as a global destination to start with respect to vaccines, increased contract bioservices, agribiotechnology to name a few. Indian organizations have improved quality productions in which Serum Institute, Bharat Biotech, Shantha Biotech have shown remarkable projections in terms of high quality and economical vaccines in which they are supplying more than 50% to world renowned organizations such as WHO, UNICEF etc.

Academic enrichment

In considering the Indian academia, there exists more than 400+ universities with funding and self financing options. The quality research output is expected from these academic infrastructures, but due to internal lacunae and lack of funds they are not performing as expected. India produces most of its graduates and postgraduates from these institutions but at some places these stuffs lack real bench work experience and analytical trainings. Enormous unorganized training centers with less equipped facilities are brewing in the market working as an agency with ready to serve projects without actual bench studies. Such agencies are a threat to the industry and its academic institutions.A strong need of remodeling and rejuvenation of course structure and content is demanded to enrich the BT-industry and skilled research pool.

  Another reformation was made by the government where India has now started with few fellowships/ collaborative schemes to buildup research facilities and advancements:

1. Indo-Australian Career Boosting Gold Fellowships
2. Stanford India Biodesign fellowship programme funded by Department of Biotechnology

3. Australia-India Strategic Research Fund (AISRF) helps Australian researchers from public and private sectors to participate with Indian scientists in leading edge scientific research projects and workshops.
4. India-UK Science Networking programme: Indian scientists visit various research facilities in UK and develop network with UK scientists for further research collaborations. (www.dst.gov.in)
5. India-Brazil-South Africa (IBSA) Cooperation to start research activities in '*AIDS*, *TB* and *Malaria'*, '*Biotechnology in health and Agriculture'*, '*Nano Science and Technology'* and '*Oceanographic Sciences'*.
6. Prime Minister's Doctoral Research scheme (A PPP Initiative of Science Engineering Research Board (SERB) and Confederation of Indian Industry (CII)

Such collaborations have definitely added value to the backbone of current scientific infrastructure in India.

Research idea transformation to business

Like USA, India may promote the researchers and academic scientists to establish their own venture with new products/ technologies that boost the industry. In case of capital scarcity the academician may call for establishment of a joint venture under *win-win* state. A strategic intellectual property reforms may be workable which saves the concept as well as the products. Government may promote the intellects of well established labs of Council of Scientific and Industrial Research (CSIR), Indian Council of Agricultural Research (ICAR), Indian Council of Medical Research (ICMR), autonomous labs and universities. Government has initiated some extensive training programmes in collaboration with management institutions like Indian Institute of Management (IIMs), Entrepreneurship Development Institute of India (EDI), Small Industries Development Bank of India (SIDBI) for enhancing entrepreneurship and awareness of Intelecual property amongst academicians.

Strengthening industry – academia interface

In Indian scenario, it is a hard truth but the industry – academia interface needs massive strengthening. The main reason for their weak bond is their basic setup and working machinery. A similar case that is happening at US and UK may be made where this gap is bridged through inter mobility schemes, thus promoting the industry-academia relationship in stronger direction. Academia has 2 major aspects: education (*basic and advanced*) and research (*basic and advanced*). To achieve desired goal a strong industry-academia inter-face along with necessary activities for mutual benefit is needed, with an aim to achieve global competitiveness.

One aspect must cover the basic and advance education and other must work on transforming that knowledge into skills and technology development. Industry has a good knowledge of competitive facts that it faces and the required knowledge and skills should then be incorporated in the course curriculum. It would then work as process machinery where raw materials with basic education and skills are transformed into highly skilled brains which have capability to think new and invent. Government has envisaged in XI plan (2007-12) where there is a provision in which young faculty is given a chance from 2 months to 1 year full time in industry to revive its knowledge and imbibe new skills from the knowledge pool.

Promoting science parks

India is blessed with intellects who have nurtured the pool of science and technology. Today the country is blessed with many cities generally known for research and development. Biotechnology city, Genome Valley, Silicon Valley are few tag names of those areas. Like US and European countries, India has moved forward in developing science parks which have proved to be a successful venture and assisted the technocrats to develop themselves from laboratory to industrial scale. DBT, DST and industrial funding agencies have extended helping hands to these ventures which can utilize the seed money and generate new products for mankind.

Conclusion

India has a potential to grow, provided there are stringent norms to follow - reforms and regulations, plans and policies, government and governance which are recognized as the pillars for better development of any scheme. The infrastructure built-in must have soul which makes it accelerated so that it leads to defined goals. India was always recognized to be motherland of knowledge intellects; however, since centuries it has been grooming its scientific knowledge and disseminated across the globe. After independence the country has surpassed in almost every sector where it is scientific or non-scientific. The output and competence are definitely enhanced by enhancing weightage of academics and its application in industrial development. Industry and academia have focused on nurturing the biotechnology industry which has been a nascent industry and just reached the mid-maturity stage. Still we can say that to be in the market, more initiatives, collaborations, mergers, and schemes are needed to compete the market. Government of India has launched several schemes to envisage a better industrial setup, but an initiative at global level is required where foreign investors join hand-to-hand and participate as knowledge exchange or network group for developing a novel drug or technology.

Conflict of Interests

The author have not declared any conflict of interests.

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Full Length Research Paper

Does the organizational structure affect the management of universities in Uganda? An empirical analysis

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The organisational structure of universities follows particular models that distinguish them from other learning institutions. This research investigated the effect of the organisational structure on the management of universities in Uganda using a sample of 361, 44 % of whom were members of academic staff, and the rest contained university top management officials, administrative and support staff of universities. The subjects were selected using stratified random sampling. Data were collected using a questionnaire as well as interview guide. Statistical data were analyzed by referential and descriptive statistical processes with SPSS software. The findings reveal that the organisational structure of universities significantly affects the management. While the staff in universities require a more flexible approach which enhances more creativity, innovations and autonomy, the present organisational structure of universities contains high levels of formalization characterised by rigidity and centralised decision making processes. The staff feel that universities can operate between the two theoretical polarities (bureaucratic and collegial) in order to remain competitive.

Key words: Organizational structure, management, bureaucracy, collegial.

INTRODUCTION

Today, the management of universities in Uganda is at a crossroad; the inappropriate organisational structures are threatening the survival of universities. Universities are increasingly becoming more unstable; a condition that has deterred success and requires immediate redress to avert crisis in management. Kezar and Eckel (2004) emphasises that the management of universities has changed during the last decades with more emphasis put on high stake issues and more incremental decisions made in a less collegial mode. The reasons for this stem from trends that have devalued the notions of partici-

pation and also from the external pressures for more accountability and demands for quicker decision making (that sometimes is achieved through bureaucracy). Dearlove (2002) added that under the conditions of mass higher education, today no university can avoid the need for some sort of bureaucratic management and organisation.

When universities are established, their overall functioning is supposed to be controlled by the established structure. The university organisational structure is an important guide such that it gives all the important

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information about the activities that take place at the institution along with details of the management plans. The organisational structure encourages efficient communication, team work and overall institution's goal attainment.

Weihrich and Kootnz (1993) pointed out that the organisational structure of any organisation is established to achieve corporate goals. This implies that for an institution to thrive, it must have an appropriate organisational structure. It is important to note that the variance in size, ideology, objective or steering policy of universities does not give them a leeway to operate haphazardly though Sanyal and Martin (1998) argue that the management of universities is always influenced by the type of government steering policy in force. The four major types of governmental steering policies include: systems operating under self-regulation with a broad framework of accountability with greater use of free market incentives; systems in transition from centralized planning to self-regulation; systems operating under self-regulation but experiencing difficult; and systems under direct centralised planning and control. These four types of steering policies led to four types of decision making models in a university which include: collegial or consensus model; political decision model; bureaucratic model; and entrepreneurial model. Given the fact that in an ideal situation a university makes a combination of the above models to suit its own context, this study intends to examine the effects of some of these models on the management of universities in Uganda.

Background to the study

University management in Uganda can be traced back to 1922 when Makerere, started as a humble technical school with only 14 students. It expanded and in July 1970, Makerere became a fully fledged university of the Republic of Uganda. However, from the late 1980s, other new universities were established and these include private not- for profit, private for profit and public institutions governed by differentiated structures of management. It should be noted that by the 1980s, universities particularly those in Africa grew from elite institutions to large ones which now provide most higher education.

A pertinent and fundamental observation to note is that each university deals with management concerns in a way that makes sense of it as confirmed by Watson (2007) that each university is autonomous, with a distinct history and culture. Nevertheless, the competitive academic environments universities are experiencing today regardless of their history require an appropriate organisational structure to become effective. Truthfully, universities are facing new challenges, they are exposed to changes in their operation; such changes predispose

universities to re-organize and adopt an appropriate system that can lead the university to goal attainment. A well organised system for example, can stimulate creativity and innovation (Martins and Terblanche, 2003); attract good staff, students and donor funding; lead to prestige; as well as reducing staff turnover. In support of the argument, Schermerhorn (2002) said that the structure of a successful organization contributes to her long term performance. Certainly, an organisational structure that leads an organisation to flourish encourages practices such as participatory decision making, team work and cohesion, creativity, commitment and flexibility.

CONCEPTUAL AND THEORETICAL FRAMEWORK

The organizational structure of a university refers to the hierarchy through which delegation of responsibility is accomplished. This gives employees and students a sense of direction. The organisational structure consists of activities such as task allocation, coordination and supervision which are directed towards the achievement of organisational goals. It can also be considered as the viewing glass of perspective through which individuals see their organisation and environment.

The concept of management was recognised many years ago by early practical scholars of management such as Henri Fayol and Chester Bernard (Koontz, O'Donnell and Weihrich, 1980). Management may be seen as a science or as an art. The two perspectives enhance organisational effectiveness. The image of management as a science brings out the notion of management processes which Musaazi (1982) described as planning, organizing, staffing, directing, coordinating, reporting and budgeting. In this perspective, we see that the first task of management is to plan – that is setting targets or goals for the future, establishing detailed steps for achieving those targets, and then allocating resources to accomplish those plans. This is followed by organizing and staffing. Here, management creates an organisational structure, sets job requirements, staffs the job with qualified individuals, communicates the plan, and devises systems to monitor implementation. Finally, management ensures plan accomplishment by controlling and monitoring results versus the plan in some detail, both formally and informally, by means of reports, meetings, and other tools; identifying deviations and then planning and organising to solve the problem.

The study is interested in examining the effect of organisational structure on the management of universities in Uganda as modeled by the conceptual framework (Figure 1). This framework focused primarily on how two forms of organisational structure influence the management of universities and the overall outcome as goal attainment.

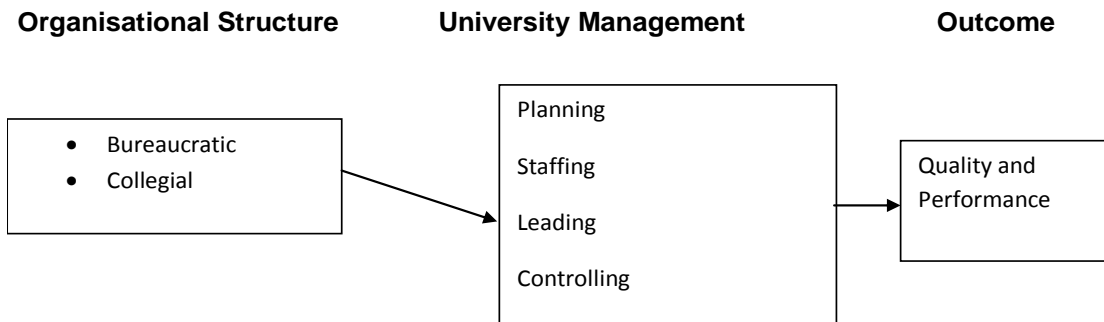The conceptual model portrays the two selected

Organisational Structure   **University Management**   **Outcome**

Figure 1. Conceptual framework on the effect of organisational structure and the management of universities in Uganda.
Source: Adapted from Sanyal and Martins (1998).

dimensions of organizational structure (i.e. bureaucratic and collegial models). These constructs are highly suitable for the purposes of this investigation for several reasons. First, they are hypothesized to have a greater influence since most universities have adopted them in their daily operations. On the other hand, management is conceptualized as a variable whose success is dependent on a prevalent organizational structure. In the conceptual framework, management is measured under the four main constructs- planning, staffing, leading and controlling. Though this framework outlines the management constructs, in this study management refers to the means by which the universities are organized and managed.

Contingency theory, at times called the situational approach was developed by managers, consultants, and researchers who tried to apply the concept to real- life situations (Stoner et al., 2002). The theory claims that there is no best way to organize a corporation, to lead a company or to make decisions. These managerial functions depend on a prevalent situation. The contingency notions differ greatly from the belief of classical organizational theorists of scholars like Henri Fayol (1841-1925) and Max Weber (1864-1920) who contend that there is always a best way of doing things.

The concept of contingency enables the researcher to make sense of the dynamics of managing universities more especially today, where university education in Uganda is faced with increased enrolment, institutional and functional differentiation of universities and other issues that come along with globalization. A very relevant perspective on contingency here in the study is the notion of recreating and adapting which are advocated for by contingency theorists. Truthfully, universities are experiencing a lot of changes in admission, marketing, pedagogy, internal interactions, academic programmes and leadership. These changes require a university to re-position, recreate and adapt strategic plans that will lead the university to thrive.

The contingency theory is central in the management of a university. This means that the management orientations of a university should fit the situation. Further this can lead to the assertion that the organisational structural models adapted should vary to fit the situation. Watson (2007)'s assertion that the modern university is expected to be many contradictory things simultaneously is a useful contribution to understanding the linkage of management to contingency theory. Watson contends that the university should be both: competitive and collegial; private and public; conservative and radical; local and international; traditional and innovative.

The problem

The organizational structure of universities is assumed to play a significant role in the overall functioning of the institution. Though widely known that the characteristics of organisational structure of universities follow particular models that distinguish them from other institutions of learning (Sanyal and Martins, 1998); and for a university to succeed there must be deliberate strategy to integrate organisational structural models in order to enhance quality and performance, universities in Uganda have failed to adopt that approach.

As a result, managing universities has become problematic. All stake holders more especially the employees are dissatisfied with the organisational structural models which inhibit staff's innovations, creativity, academic freedom and autonomy. The staff's failure to participate in activities that enhance quality leads to university anarchy, hence, a need to investigate how the organisational structure affects the management of universities in Uganda.

Research questions

To examine the effect of organisational structure on the management of universities, the researcher posed the following questions:

1. Is the university organisational structure bureaucratic?
2. Do these university members have the freedom to decide what to be done or to handle issues in their departments?
3. Does the management involve staff in decision making?

LITERATURE REVIEW

Organizational structure and the management of universities

Research has shown that institutional structures, the way things are organised, influence both behaviour and norms (Bjorkman, 2007), hence, affects the management of the institution. The structures referred to are characterized by the size, specialization, integration, configuration of positions, information flow and location. Like other factors, size determines much of what goes on in organisations. It is easier to control a small organisation than large one- big organizations; like that universities have many faculties and departments that require adequate organisation in order to achieve the purpose and short of that it obviously leads to chaos.

Organisational structure of a fully fledged institution of higher education according to Sanyal and Martin (1998) consists of four areas: a central administration; centrally provided services; specialized teaching and research departments; and non academic services. Today, large universities are moving away from a centralized to a decentralised system. The concepts of centralisation and decentralisation in a university context focus upon the relationship between the senior management and budget centres that are primarily academic departments, although some administrative departments are also maintained as budget centres (Jarzabkowski, 2002).

The degree of centralization or decentralization, particularly in relation to decision making, is a critical issue in the management of universities in Uganda. Basically, more decentralisation may be expected with a group of autonomous departments but can also be tried out to groups that are dependent; for instance in small universities with few faculties and departments. Once in a while dependent groups can be given chance to make and implement their decisions. In so doing, they would gain confidence and realize that their in-put is beneficial to the entire institution.

On the other hand, centralization is associated with universities that have somehow homogeneous departments which are also few in numbers. A centralized system is more less a bureaucratic one, with a culture of formalized and accountable strategic directions and controls. In a centralized system, power concentrates at the top and the senior management controls and influences the programmes and decisions. Control can be

at the top but members within a university, faculty or department can be encouraged to exercise power to a certain degree by allowing them to make decisions on issues that directly affect them. However, it is believed that stable environments favour decentralised culture and competitive environments increase centralization as universities resort to management controls in order to improve co-ordination, monitor quality and reduce costs.

Though universities in Uganda are traditional known as professional bureaucracies, loosely coupled systems and resistant to formal direction and control, the increasing competition in the academic market is greatly affecting their functioning and not certain whether the university cultures are in transition from the traditional bureaucracy to more flexible corporate form of organisation. This still leaves a need to understand better the cultures adopted and their impact on effectiveness of universities in Uganda. However, Watson (2007, p.372)'s assertion is a useful contribution to this issue.

"The modern university is expected to be many contra-dictory things simultaneously. The university should apparently be both: competitive and collegial; private and public; conservative and radical; local and international critical and supportive; traditional and innovative…………"

There is an argument on the above point, and it is clear that universities can have both systems as Jarzabkowski (2002 p. 6) put it;

"It is most likely that most universities operate between centralisation and decentralisation".

It is argued that though each system has its own merits and demerits; integration of systems enhances quality and performance. Here the specific implications of the culture of centralisation and decentralisation in universities can be pointed out.

Centralized universities may be associated with longer term goal setting and management control at the centre, which at times inhibit some high-quality innovations. Such universities are characterized by bureaucratic procedures and could be difficult to change the system of operation.

Decentralized universities may be associated with flexibility and the faculties and departments are able to be locally responsive to initiatives and to generate, deploy and allocate their own resources. However, too much decentralisation affects the quality of a university unless there is a uniform monitoring system for quality of control. These ideas are theoretical polarities and it is likely that most universities will operate between centralised and decentralised systems.

Other literature on organisational structure is concerned with the structural design and individuals filling various positions. Hodson (2005) observed that the structural design of any organisation affects not only

productivity and efficiency, but also the morale and job satisfaction of the workforce. Though there is little research literature on the structural designs of universities in Uganda, the literature on universities worldwide revealed that the traditional bureaucracy (mechanistic) structure still guides the operations within the university, according to Sisaye (2005). The mechanistic structures exhibit hierarchical differentiation with several chain of command levels, concentration of power in top management and centralised decision making (Sisaye, 2005). The traditional bureaucracy is very tight, rigid and inhibits creativity. Sincerely, too tight a central control could inhibit the flexibility and initiative of the academic communities (Fielden and Greenop, 2000) and increase their sense of alienation from the centre.

Bureaucratic and top-down authority is weak in any consent-based organisation of professional employees and it is especially weak where there is a system of professional authority which limits bureaucratic authority. Universities tend to be bottom heavy, with solid professional authority held by academics down the departments. Dearlove (2002) adopts a similar line, arguing that 'universities are too much bottom-heavy, too resistant from the bottom-up, for tycoons to dominate very long and top-down planning involves a control that drives out commitment and trust. Data on universities have shown that they have faculties and departments that are loosely coupled into a system in which the central administration lacks the capacity to give an order and ensure compliance. Nevertheless, it is also arguable that too loose a control could risk the integral identity of the institution and allow factions to develop (Locke, 2007).

While Shattock (2003) views the existing bureaucratic system in universities as inflexible for innovation, Mintzberg (1979) argues that the conventional professional bureaucratic structure of the university is an organic structure. The characteristics of an organic structure are loose structures, flexibility, continual redefinition, subordinates with autonomy, teams and decentralised decision making. That means universities with organic structure are flexible, continually recreate and revise programmes to suit the academic market; they have a culture of encouraging people to think or create and implement the ideas. There is an emerging consensus that this organisational structure is the way universities to go. This is described as move from traditional to modern culture that emphasizes promotion of new values that enable universities become competitive. However, to date, very little is known about the kind of organisational structure which exists in universities of Uganda.

From the literature, it can be inferred that universities, being highly complex (Jarzabkowski, 2002); autonomous, and each with a distinct history and culture (Watson, 2007) follow not just one but at least more structural designs. For instance, when Makerere University was faced with unexpected and rapid expansion of student enrolment and diversification of funding partners it had to decentralise power and responsibilities to the faculties (Epelu-Opio, 2002), and by becoming more decentralised, it is believed tensions and mistrust have reduced. Liu and Dubinsky, (2000) supported the argument when they confirmed that too much centralisation can possibly cause internal tension. Decentralisation of power and responsibilities is an organic dimension.

However, decentralisation should be devolved only to the level that it has capacity and potential to handle the delegated responsibility. This therefore, calls for the need for at least some degree of centralisation of power in persons like the vice chancellor, the academic registrar or the university secretary, who are expected to act as main channels of communication between colleagues and the outside world.

Though some scholars like Liu and Dubinsky, (2000) criticize the co-existence of more than one structural design, definitely, there is need for a coordination of views at a number of different levels, and hence for a hierarchy of responsibilities, if not of power. The existence of the two cultures in this era is essential to minimize inefficiency and maintain high quality. The culture characterized by collegiality, with loosely defined and negotiable strategic direction and control may not be appropriate in this era where universities are facing a very stiff competition, hence, need to integrate the organizational structures. Nevertheless, the structural designs in universities of Uganda need to be established, since they are important aspects and can greatly affect attainment of goals.

METHODS

Research design

The study was carried out following a cross sectional survey, using quantitative and qualitative approaches. The cross sectional survey design involved the administration of questionnaires to a sample of 361. Also, interviews to 72 informants were carried out. Collecting data using a multiple approach system necessitated a triangular approach (Sarantakos, 1988). The examples of educational and management scholars such as Amin (2005), Gall et al. (2003) and Glatthorn and Joyner (2005) also provided justification for the usage of this research design in studying problems in education. However, the design was helpful to this study in such a way that independent variables that were associated with and even those directly impacting on the management of universities were established.

The study targeted all the 6494 people who were working in the 20 universities that had been registered by the National Council for Higher Education by 2007. The first category of targeted population included top management officials who comprised members on the executive committee (vice chancellors, deputy vice chancellors, academic registrars, deans of students and university bursars), and they add up to 156. The second category constituted the deans of faculties and directors of schools and institutes. That category had 92 members. The category of administrative staff had 973

Table 1. Demographic characteristics of universities.

University	Date of establishment	Type	No. of faculties
1. Mbarara university of Science and Technology	1989	Public	03
2. Islamic University in Mbale	1988	Private	05
3. Uganda Martyrs	1993	Private	07
4. Kyambogo university	2002	Public	
5. Bugema University	1994	Private	04
6. Makerere university	1922	Public	22
7. Gulu university	2003	Public	04
8. Ndejje university	1992	Private	04
9. Kampala International	2001	Private	07
10. Uganda Christian university	1997	Private	06
11. Busoga university	1999	Private	03

Source: National Council for Higher Education, 2007.

members; the academic staff were 2905 and the support staff were 2368. Students of the sample universities were, however, left out of the study because the correct information leading to their represen-tation was generally unavailable.

The samples of universities and university respondents were chosen by a combination of random and stratified sampling. The use of random sampling by picking randomly minimized the sampling bias though it is criticized for having included all the public universities in the survey. Table 1 presents information on demo-graphic characteristics of the final sample of universities and Table 2 presents information on distribution of the sample subjects by designation.

The size of the university in terms of number of faculties and programmes was seriously considered. These factors are almost unique features of institutions which would imply that all universities are different. The focus on institutional control was also considered. That is, there are universities under direct influence of government, commonly known as public universities; and those that are private; in this context they can mean non-profit or profit oriented universities. The main difference when compared with the public universities is that the private universities' activities are based on a certain philosophy or religion and that government allows universities sovereignty with respect to religious or philosophical issues. Noticeably, it is the fact that all the four public universities were selected; and only seven out of the sixteen private universities that had been registered by 2007 were selected.

Data were collected using a structured questionnaire based on a Likert scale of 1 to 5 (i.e. 1=strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree}. The questionnaires were administered to three hundred and sixty one university members. The data source also included an interview guide which was responded to by seventy two informants.

To ensure validity of research instruments, content validity index was used. Amin (2005) states that content validity index focuses upon the extent to which the content measures what is designed to measure. The experts' judgments formed the basis for the computation of content validity ratios for the various instruments using the formula:

CVR = (VR+R)/Total. The questionnaire was valid given the

respective content validity ratio of 0.8; and the content validity ratio for the interview schedule was 0.7.

The data collection process was entered after establishing a sound investigative approach that ensured that the data collected was highly representative and unbiased. For instance, the purpose and scope of the study was clearly specified; information about the populations considered for involvement in the study was obtained; samples were prepared and instruments were pilot tested and validated to ensure that they were fit to collect relevant information. The analyses of quantitative data were done at three levels: univariate, bivariate and multivariate. At the univariate level, the study opted for the use of simple statistics (i.e. frequency counts); while at the bivariate level, Correlation Analysis was used. At the multivariate level, the study selected Multiple Linear Regression Analysis that assisted in establishing the strength of each construct variable against the management of universities. 'The choice of the above technique was in consistent with the research objectives that aimed at establishing the effects of organisational structure on the management of universities in Uganda. Qualitative data mainly interview responses were tallied; then interpreted and analyzed according to themes.

FINDINGS

To measure whether organisational structures affect the management of universities, descriptive statistics were computed using percentages. Table 3 shows that the 13 Likert items, with 1 *as strongly disagree* and 5 as *strongly agree,* both groups average near *agree*. However, there were few notable concerns on the scale scores. The respondents' ratings on issues related to organisation structure indicate that universities have appropriate struc-tures (responses of approx. 65% of the respondents). The results indicate that all universities are governed by two main bodies: council and senate. At the head of each university are the Chancellor and Vice chancellor. The

Table 2. Distribution of the sample subjects by designation.

Respondent category	Estimated parent population	Target sample size	Actual sample size	% response turn up rate; Actual/Target x100%
Top management officials	156	8	7	87.5
Deans/directors	92	5	3	60
Administrative staff	973	54	24	44.4
Academic staff	2905	162	124	76.5
Support staff	2368	132	79	59.8
Total	**6494**	**361**	**237**	**65.7**

administrative and support departments support the management of universities and contribute to their growth and development. On staff deployment, it was found out that the staff are deployed according to their areas of specialization as pointed out by approximately 71% of the respondents. Also noted is that the staff individual autonomy is questionable since the respondents who disagreed with the statement (approx. 37%) were slightly higher than those who agreed (30%). These results are also in agreement with the findings which indicated that little action is taken before supervisors' approval (47.8%). This means that the staff cannot take any decision unless the supervisor consents as agreed by 48% of the respondents.

With regard to issues related to decision making process, 40% of the respondents agreed that staff is often involved in decisions that concern them while approximately 46% of the respondents disagreed. However, there is an assurance of individual decisions being encouraged (as pointed out by 49% of the respondents). Eminent also in Table 3 is the fact that universities are characterized by high standard rules and procedures as observed by 72% of the respondents. The high standard rules and procedures represent a hierarchical structure. The structure designed or adopted affects the behavior, motivation, performance, team work and interdepartmental relationships. This finding was backed by 73% of the respondents who agreed that formal channels are emphasized in getting work done; and the form of communication followed is mainly formal (67%).

The results presented indicate clearly that universities in Uganda are mainly following a bureaucratic structural model. This is an organizational structure.

The analysis also assessed the effect of organisational structure on the management of universities in Uganda as hypothesized in the conceptual framework (Figure 1). The results are indicated in Table 4.

The analysis produced a significant positive relationship between organisational structures and the management of universities (r= 0.464, sig =000).

Organisational structure emerges as an important aspect that improves the management of universities. Any improvement in organisational structure improves the management of a university. This implies that a good organisational structure is fundamental; it can improve the overall performance of a university; allows members to take right decisions at the right time and inhibits confusion and conflicts among the staff arising from issues related to reporting, centralization and goal ownership.

The qualitative response on organisational structure threw further light on how universities are organised. From the interviews conducted, it was pointed out that observing high standard rules and procedures is constantly emphasized in universities; most resources are received by the centre, and allocated, managed and administered from the centre (the pure bureaucratic model). These were opinions of the majority of staff members though quite a few asserted that universities are flexible and a member can test his ideas without hindrances. However, one senior academic staff stated clearly how things are done in universities.

> "……….procedures and guide lines are followed strictly to ensure quality of programmes. It is very rare to act outside the guidelines".

In addition, one of the administrative staff warned of trying out new ideas without following university channels and procedures. The lady warned:

> "Rules and regulations must be followed strictly. A university is not a market place where traders have different products and varied means to market them".

However, one member who was bitter and talked strongly against the rigidness in universities which has made them incompetent, less creative and innovative suggested:

> "Universities should be a little bit more flexible to allow us try out our minds."

Table 3. Respondents' ratings on organisational structures of universities.

Established structure is appropriate	Disagree	29	28.4%
	Neutral	7	6.9%
	Agree	66	64.7%
Division of functions in depts based on specialization	Disagree	45	19.3%
	Neutral	23	9.9%
	Agree	165	70.8%
University emphasizes individual autonomy	Disagree	46	36.8%
	Neutral	41	32.8%
	Agree	38	30.4%
University often changes personnel	Disagree	36	35.0%
	Neutral	22	21.4%
	Agree	45	43.7%
High standard rules and procedures	Disagree	30	12.9%
	Neutral	36	15.5%
	Agree	166	71.6%
Staff/I'm often involved in decisions concerning them/me	Disagree	107	45.7%
	Neutral	33	14.1%
	Agree	94	40.2%
Individual workers use judgment in solving problems	Disagree	36	35.0%
	Neutral	21	20.4%
	Agree	46	44.8%
Members free to decide what to do & handle issues in dept	Disagree	45	34.6%
	Neutral	28	21.6%
	Agree	57	43.8%
Little action taken before supervisor's approval	Disagree	73	31.5%
	Neutral	48	20.7%
	Agree	111	47.8%
Individual's/my decisions are encouraged	Disagree	25	23.8%
	Neutral	28	26.7%
	Agree	52	49.5%
New ideas always tried out	Disagree	47	20.1%
	Neutral	36	15.5%
	Agree	150	64.4%
Formal channels emphasized in getting work done	Disagree	32	13.6%
	Neutral	32	13.6%
	Agree	172	72.8%
Formal communication mainly followed	Disagree	41	17.5%
	Neutral	35	15.0%
	Agree	158	67.5%
Our expectations of staff/mgt communicated in detail	Disagree	86	37.1%
	Neutral	47	20.3%
	Agree	99	42.6%

Table 4. Correlation between organisational structures and the management of universities.

		Organizational structures	Management of universities
Organisational structures	Pearson Correlation	1	.464**
	Sig. (2-tailed)		.000
	N	236	236
Management of universities	Pearson Correlation	.464**	1
	Sig. (2-tailed)	.000	
	N	236	237

** Correlation is significant at the 0.01 level (2-tailed).

The suggestion made above indicates that universities are highly formalized and members see it as inflexible. Flexibility in universities promotes creativity, innovation and autonomy in the staff. However, one academic staff member pointed out;

> "Today's uncertainness requires diversity in managing universities, there is need for participatory planning in order to provide better services to the public".

As indicated above, the concept of diversity is very crucial and at one point may necessitate the university to a certain degree allow its members to generate ideas on how best to address the phenomenon. If universities for instance have no culture of flexibility, good new ideas for improvement would be rejected; hence, detrimental to their efficacy. It should be noted that at times the use of bureaucratic structural model in the management of universities acts as barriers to the staff's creativity, for it may take one a bit of time and patience to get his or her brilliant idea(s) through and thus frustrates potential people. These findings are in line with the proposition driving this work, namely that a high standardized rule and procedural culture, correlated with bureaucratic model could be associated with the management of universities.

DISCUSSION

The main objective was to establish the effect of organisational structure on the management of universities in Uganda. The dimensions of organisational structure were bureaucratic and collegial structural models. The findings from this study are consistent with Weihrich and Koontz (1993) whose theory has it that organisational structures are established to achieve corporate goals. Organisational structure was found to have a positive significant relationship with the management of universities. This could be attributed to the fact that the effect appeared to be quite reasonable (r= 0.464; sig = .000; Table 4). This

must be considered a rather fair effect although it should be acknowledged that the magnitude of this effect is inversely proportional to the inconsistency of the sample studied. In this study, the sample has maximum variability because it represents the population of private and public universities. Perhaps, if the study was more focused with less variable samples (e.g. only public universities), the effect size produced may have been larger.

Generally, the results indicated that whenever the organisational structure improves, the management of a university also improves. In practice, organisational structure that improves the management of universities is usually a mix of more than one organisational structural model. The models as pointed out by Sanyal and Martin (1998) are best seen as points of a continuum. At one extreme all decisions are made centrally and at the other extreme departments are autonomous, make their own decisions and implement them.

Some universities are very near to the top end of this continuum and others are at the bottom. Getting closer to the top is an indication of being very bureaucratic. Bureaucratic systems are characterised by highly formalised rules and procedures, less consultations, top-down planning and top-down decision making; and too much of it can wrought many negative factors, one of which is bad policies which tend to emphasize too much rules and procedures to the extent that members of the organisation lose morale; and thus affect the management. In fact, Dearlove (2002) argues, "Bureaucratic practices drive out commitment and trust of members" and Kauju (2004) pointed out that bureaucratic organisational structures hinder organisational innovativeness and should be abandoned. According to Singla (1999), non bureaucratic structures are more apt to organisational change than bureaucratic.

Backed up with studies such as those of Liu and Dubinsky, (2000) which came to similar findings, this study concludes that too much of bureaucratic structures can possibly cause internal tension; and this means that the traditional core values of going through a hierarchy to get an idea through and high formalisation could be seen as injurious because of the rigidity and conservativeness

of the whole organization. High formalisation, rigid rules and regulations and centralized decision making, are all inflexible factors for creativity and innovation, and thus creates tribulations in the management of universities. This argument is in conformity with Dearlove (2002)'s theoretical assertion that top-down planning (i.e. bureaucratic) drives out commitment and trust of members; and contrary to propositions of contingency theorists that where conditions are unstable, organisations would shape their cultures around values that help them outpace their competitors. For instance, universities would cherish values such as flexibility and achievement; and it is quite surprising, the world is changing, yet some universities are still stuck with outdated or obsolete practices though Sanyal and Martin (1998) pointed out that many African universities had made some shift towards devolution downwards of financial management. For instance, in most public universities in Uganda, income is earned by departments and retained by them; they buy central services as they are needed. However, in some universities, this kind of procedure has brought internal conflicts among departments or faculties. Some faculties, by institutional design find it extremely hard to generate income. In reality, of course, such departments hardly get any extra money to spend in their department as needed**.** As a result, members begin advocating for a procedure of income earned by departments but administered from the centre for the benefit of all employees; the notion seriously opposed by the direct beneficiaries.

Taking Watson (2007)'s view that a modern university is expected to be flexible, the study concludes that universities can balance their structures; have centralized and decentralized services; very few rules and regulations; little or no hierarchy; but each member struggling to achieve the set goals. If universities balance the structures, probably the staff can become more confident, creative and innovative. As long as the university staff is neither creative nor innovative, it seems quite unlikely that universities would even produce competent people (products) who will deliver services to communities appropriately. The challenge therefore, is to find ways of operating between the spectrums. Perhaps integrating the less bureaucratic organisational structure into the system of organising universities would be a practical proposal.

Policy implication

An important implication is that universities need to address the significance of appropriate organizational structures in order to manage universities effectively. Indeed universities would thrive if there is a perfect mixture of organizational structural models.

Conclusion

In reality, an organisational structure is fundermental for every university. It has hierarchy and reporting system which comes with authority, responsibility and accountability. A good organisational structure improves the overall performance and allows members to participate in decision making and also take right decisions at the right time. All issues are streamlined leaving no room for confusion. However, though in practice, the organisational structure aligns strongly with the university vision and strategy; and equally, on the other side, the structure drives jobs and roles which in turn is linked with goals and their delivery, sometimes, the structure fails to fit into the prevalent situation. Usually, the failure to align the structure with other important university systems creates confusion and conflicts, hence affecting the management of universities. Unless the structures are designed to meet the emerging needs and strategies, universities may continuously operate in state of confusion and conflict. Universities can thrive in the context of seemingly competitive higher education by ensuring that their structures are effective and supportive. Universities can as well integrate organisational structural models to improve the overall performance.

Conflict of Interests

The author(s) have not declared any conflict of interests.

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