

# POSTGRADUATE EDUCATION IN NIGERIA: WHICH WAY FORWARD?

*Sale, Peter*

## Abstract

It has become globally accepted that the position of university and other allied tertiary institutions as frontier of education is considered as a main index of development: information and knowledge are now the main vehicle for productivity, competitiveness, and increased health, wealth and prosperity. Available evidences reveal a dearth of literature on postgraduate education in Nigeria. However, several problems have been identified as affecting postgraduate education in Nigeria, including: funding, quality control, definition of purpose, increase in internal and external environmental complexities and so forth. This paper attempts to approach such problems facing postgraduate education in Nigeria from the perspective of cybernetics with specific reference to the application of Stafford Beer's Viable Systems Model.

## Introduction

The quality of development in any nation is directly related to the quality of and attention given to education by its citizens to its citizens. Former United States of America President, T. Jefferson stressed that, "If a nation expects to be ignorant and free in a state of civilization it expects whatever was and never will be" (Ibrahim, 2005). Education is thus elemental to national development. University and allied tertiary institution's education has come to be accepted globally as a foremost index of development, and information and knowledge have become the world's most important legal tender for productivity, competitiveness, and increased, health, wealth and prosperity (Ubaru, 2005; Mangvwat, 2005).

Fundamentally, university education is pigeonholed into two main classes, the undergraduate and postgraduate. These two classes, normally, have strong generic symbiotic relationships among themselves. However, postgraduate education is generally more research intensive, normally more purposeful and conducted with **the. paramount** sense of accountability. Also, postgraduate programmes form the bedrock for training of staff of tertiary and allied institutions and this account for the quality of teaching and research, which, in turn affect the eminence of the Nation System at all levels. The strength of postgraduate programme is thus, a major determinant of the worth of national development (Adediran and Faborode, 2005). Stressing this in even sharper and more qualitative terms, Abubakar (2005) stated that, "It is an indisputable fact that no nation can develop scientifically and technologically without strong Postgraduate Programmes and up to date research institutes."

Since I understand the university system more than other tertiary institutions, please permit me to select my examples from this. Available evidences reveal that Postgraduate studies in Nigerian universities started in January 1963 at the University of Ibadan Postgraduate School while other first generation universities started theirs in the 1970s. Those universities appeared to have received adequate postgraduate funding from the Federal Government of Nigeria and some other overseas organizations. Second generation and other universities started their postgraduate programmes later, but issues related to inadequate funding evolved sooner than their inception. Government funding of tertiary education gradually declined from the late 1970s until recently when the momentum of the issue of exploring other sources has been gaining considerable attention following the current specific policy of gradual withdrawal and eventual total disengagement as highlighted in the National Policy on Education (Elechi, 2005). It appears that the situation is not different from many other cases in Africa. Tarpeh (1994) observed that there was gross under funding of universities in Africa and "there appears to be little choice for the universities". Citing the results of studies on universities in Africa by Mbajourgu (1991) and Blair (1992), Tarpeh (1994), noted that they "strongly maintained that diversification of the sources of income must be a philosophy of university management" and he concluded that improving the level of non-governmental sources of funding might be the biggest challenge facing the universities (and their prediction appears to be currently most germane). The problem of funding has been observed, as noted by Mangvwat (2005), to have "impacts on university research generally, but more especially

on the content, scope and quality of postgraduate research." Similarly, Mshelia (2005), identified triple crises facing higher education programmes: funding, quality control and definition of purpose ...." He however, views precise definition of purpose as paramount to the solution of inadequate funding.

Whichever way the issue is viewed, this has proven to be an encumbrance, which has triggered a change in the philosophical and ideological positions of postgraduate research in Nigeria. Postgraduate programmes in Nigeria appear now to be reorienting, in line with global trend, towards responding to the forces of demand and supply as dictated by prevailing market situations. Although many developed countries are more progressively repositioning their universities and other tertiary institutions as key economic resources, such a move does not appear to have reduced their academic programmes to concentrating on only issues of profitability. Instead it has led to real partnership between the institutions, government and business organisations for the purposes of innovation and national development. The increasing credence of innovation in relation to teaching and community service appears to have amplified the complexities of the internal and external environmental conditions of the Postgraduate Programmes and these in turn are further necessitating the need for changes in their orientation in Nigeria especially. Aboho (2006) highlights that "since the society is a dynamic organization, the character and function of education change from time to time". Changes are necessary if the Postgraduate Programmes are to continue to be relevant to their environments as well as maintain efficient and effective viability. However, if changes are to be relevant and productive, much input on specific operational issues need to emanate from the primary transformations such as units/sections/departments and not to be imposed by higher levels policy functions. Therefore, periodic reviews of Postgraduate Programmes are necessary at the departmental levels.

Some universities have enthusiastically identified with the necessity for reorientation. For instance, in its report on Curriculum and Pedagogical Review, ABU Zaria singled out the mounting of "flexible market-driven programmes" as a necessity for it to be able to fulfil its desire to achieve its aims on postgraduate training. Academic Staff Union of Universities (ASUU) Ahmadu Bello University, Zaria Branch however, criticized that document on Strategic Planning and Curriculum Review as having fundamental flaws in its drafting and the manner the issues were debated where the criteria of the review was reduced to "profitability, FGN directive and cost effectiveness, that leads to essential rationalization of staff..." (ASUU, 2002). Whatever the case is, it is worth noting that the content and focus of postgraduate programmes in Nigeria are gradually being dictated considerably by the philosophy of economic and marketing oriented members of the external environments of universities. Unfortunately, with possibly a few exceptions, the members of the external environments do not appear to have constructed any lasting effective mechanism developed for generating real partnerships, which could lead to increased relevance and viability of the Postgraduate Programmes. The apparent absence of such a mechanism may not be unconnected to the lack of specific guiding economic policies, since the current Nigerian Economic Policy (1999 - 2003), did not make any clear attempt to give any specific focus to Postgraduate education and Research (Elechi, 2005).

In view of the necessity for reorientation and reorganization in order to be more efficient and effective in meeting the challenges posed to postgraduate programmes in Nigeria by the pressures of changing needs and desires in economic globalization, technological advancements and funds generation, it is crucial to call for the review of the of packaging of such programmes to meet current demands.

It should be noted however, that while the attractiveness of a package may help raise sales at a moment, the content of the package is essential in determining its attractiveness and sustainable sales. Apart from environmental conditions, complexities and coordination, the contents of the package of Postgraduate Programme includes inputs and output. The inputs include enrolment of students, policies and plans, staffing, funding and so on. Output includes innovation, graduate output, research and research publications, community service and so on. The efficiency and effectiveness of interaction between and among the contents of the package are viewed in this study as indicators of the quality of the packaging of a Postgraduate Programme.

### **The Predicament of Postgraduate Studies in Nigeria**

A scan through research topics from Nigerian universities may reveal a dearth of comprehensive literature on postgraduate studies in general and more particularly on individual Postgraduate Programmes. Supporting this, Mangywat (2005), observed that Doctoral theses from School of Postgraduate

Studies in Nigeria are contented to look at lower levels and "pontificate" while ignoring higher education, particularly postgraduate education. An implication of the dearth of this kind of review on the one hand is inability to identify some pressing societal problems and concentrate on them to the level of excellence on their efficient and effective lasting solution by well coordinated postgraduate research in Nigeria. On the other hand, those postgraduate research results which indicate excellent breakthroughs do not seem to have been effectively packaged towards real situation application through appropriate communication with their relevant environments.

The predicament could be approached from diverse perspectives and the more variety in any one approach the better. But whatever the approach, it should of essence specifically, take account of any entire postgraduate programme in question with a view to determining the elements to be given emphasis to package it better. That is, towards the achievement of synergy within and between the various internal rudiments and the relevant external environments of any given postgraduate programme.

Apart from the necessary initial highly specialized focus on curriculum matters, the predicament identifies the need to approach individual postgraduate programmes at the outset from the point of view of communications and control. This calls for analysis of its communications mechanism as well as a review of the directions or orientations and particular points(s) of focus of the previous and current postgraduate research works. It also highlights questions with regards to environmental conditions and complexities as well as input and output of the sampled Postgraduate Programme with a view to increasing its viability. The predicament therefore, identifies the need to release the potentials of the operators of postgraduate research to enable them to handle autonomously the myriad of complexities they confront in their enquiries so as to give the entire package of the programme the flexibility it needs to cope with its environmental conditions, that is, maintaining homeostasis in multifaceted and very dynamic technology environment.

### **A way Out of the Predicament**

A way out of the predicament from the perspective of communications and control will necessitate the fulfilment of several requirements such as development of a multimedia database for each Postgraduate Programme and examination of the communications processes between the academic units involved in the Postgraduate Programme as well as between them and their external environments. Also, it will require analysis of the directions taken and extent of research in the academic units involved in the Postgraduate Programme as well as the determination of the extent of the utilization of the postgraduate research results by the end users and subsequent researchers. These should be preceded by several questions. For instance, what is the identity of the Postgraduate Programme? What is the specific definition of purpose for the Postgraduate Programme? What input is the Postgraduate Programme transforming into what output? What are the primary transformations of the Postgraduate Programme? How is the internal operation of the Postgraduate Programme coordinated and what effect has this on its operation as interactive open system? How far and how effective has the Postgraduate Programme achieved its set objectives? What is the strength of the database of the Postgraduate Programme and how efficient is its operation? What is the orientation and how far have the research activities of the Postgraduate Programme gone? How has the Postgraduate Programme originally, been packaged and what is the current state of its packaging?

The Federal Government of Nigeria has recently been giving emphasis on the need for first generation Nigerian Universities to start concentrating more on postgraduate training. This issue has become very pressing that President Olusegun Obasanjo, gave it prominence in his speech at the 2006 convocation ceremony of the University of Nigeria, Nsukka. With such interest, every postgraduate programme would benefit immeasurably from a comprehensive review of their functions.

The functions of the Postgraduate Programme are judged essentially, by their quality rather than by any other thing. But if quality is targeted as an aim to be achieved, then processes and structures that lead to decision in real time must be created with the utmost urgency. This will assist in giving emphasis to effective planning, articulating points of focus, real time information transmission, and continuous measurement of eudemonic and managerial regulations, organization and coordination of postgraduate programme.

Planning is essential to the viability of any system or organization. Planning as Espejo (1989c), puts it, is a matter of taking decisions so that the future may be different from the future that would otherwise have been. Careful planning (normative, strategic and tactical) and decision taking could help a postgraduate programme to cope better with the complexities of its tasks in rapidly changing global technology

environment. Thus, the outcome of its events currently and in the future may exhibit more desired results. Furthermore, this could be of immense benefit in assisting curriculum planners and other relevant policy makers to identify how they can increase the likelihood that their visions about the identity of the programme will support its plans. It could also assist them to know the appropriate contribution of policy processes in order to make effective use of their limited information processing capacity and to increase the chances of every member of the programme to contribute to the best of their possibilities to the decisions necessary for a successful programme (Espejo, 1989c; Sale, 1999). This should also be relevant in determining what could be done when it is found that the programme is not steering its way as it should be in the environment.

To achieve desired result from planning requires taking decisions based on information that is relevant and current. There is a need to upgrade the quality of the database of postgraduate programme in Nigeria. The database of most, if not all are currently handled manually. The manual approach to data processing and management is very liable to information lag in decision taking processes. Information lag could have adverse effects on planning, especially tactical planning, which deals with future that will be almost immediately. This future for systems that handle large amount of data, such as Postgraduate Programme has already happened because the information itself is still being processed. Multimedia database is more efficient and may help to minimize the problems of coordination, minimize the chances of undue replication or unwanted duplication of research works, and ease the problem of tracking research so as to encourage more effective linkages with the relevant external environments, as well as guide subsequent efforts towards an envisaged direction. The database may also help postgraduate programme in Nigeria to supply most of the requirements of the National Universities Commission (NUC), the University Management Information System (MIS) and other relevant organizations in the external environment.

Effective planning and well-organized database could give postgraduate programme in Nigeria a better basis for the achievement of clearer, stronger and more current definition of purpose. A more precise definition of purpose is necessary for establishing and maintaining standards. Thus, Postgraduate Programme which focuses on specified areas of research is most likely to achieve a lot more than some others, which aim at many diverse issues without concentration. This is a main driving force behind the success of the Cavendish Laboratory of Cambridge University, which produces more Nobel Scientists in the first quarter of the twentieth century than all the Universities in the United States put together (Ibrahim, 2005). Specificity and consistency of purpose are therefore, far more likely to lead to breakthroughs in research.

Efficient and effective database is useful for highlighting particular discipline areas that require more precise definition or redefinition of purpose(s). This will help to identify the directions or orientations taken by the various earlier researchers and whether subsequent researchers have worked to make improvements on previous ones or they have been just so dispersed in their approaches.

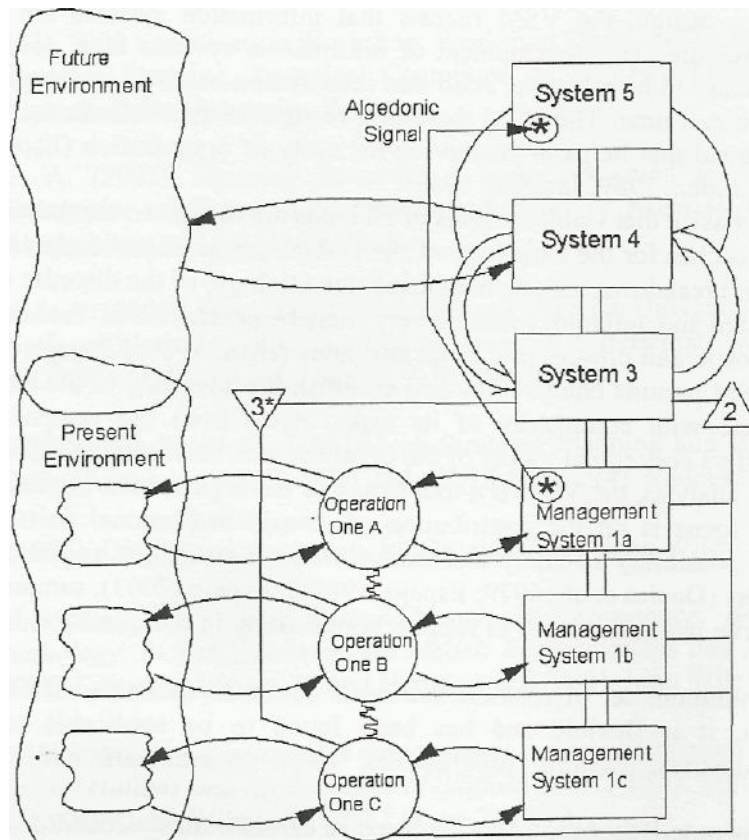
Most of the postgraduate programme in Nigeria is composite of some interrelated sub-disciplines, which by their nature make the multi-disciplinary approach to research necessary. Due to this inherent attribute therefore, efficient and effective interaction between the various sub-disciplines as well as between these and their external environments is necessary for the purposes of achieving better solutions to societal problems. Thus analyses of the communications mechanisms which guide a postgraduate programme in the interaction between its various internal units and between them and their external environments is necessary. Such analyses may thus have some positive unquantifiable implications for utilization of the research results, linkages, funding and the overall viability of postgraduate programme in Nigeria.

Overall therefore, the main strategy of the study is to establish a model, which may encourage individual Postgraduate Programmes in Nigeria to re-examine their organisational structure towards achieving greater efficiency and effectiveness in their responsibilities for processing their inputs into better output and to develop their own comprehensive autonomous multi-media database which may on the one hand service more efficiently the database of their School of Postgraduate Studies. Thus, in turn, encourage more efficient linkage with the NUC postgraduate research database. On the other hand, the model may encourage each postgraduate programme to interact autonomously with their relevant external environments towards increasing their participation in research activities and funding of the programmes. This strategy may help to improve the efficiency of the communications mechanisms of individual postgraduate programme, lead to increased exposure of their functions and encourage the development of their more specific identity, which means accomplishment.

## The Espoused Theoretical Framework

The espoused theoretical framework for the way forward in Postgraduate programme in Nigeria for this approach is based on the theory of cybernetics. Weiner (1948), declared that 'we have decided to call the entire field of control and communication theory whether in the machine or in the animal, by the name cybernetics'. Although there are numerous models of management cybernetics, Stafford Beer's Viable System Model (VSM) appears to be distinctively relevant for serving as a basis for the development of a fastidious model towards addressing the way forward in postgraduate programme in Nigeria.

The VSM identifies extreme complexity and uncertainty in environments as the main challenges to the viability of organisations. The model identifies that the potential variety of the environment always threatens to overwhelm the organization. Therefore, complexities have to be carefully managed. The VSM is based on the recursive system theorem, which states, 'in a recursive organizational structure, any viable system contains and is contained in a viable system' (Beer, 1989a; Waelchli, 1989). That is, the structure of the whole is replicated in each of the elements. Beer (1985), explains that the first subsystem of any viable system consist of those elements that produce it and each element must exhibit five functions or subsystem that are interactively involved in maintaining the independent identity of the organisms within a shared environment. The five functions include: 1 - operation, 2 - control, 3 - coordination, 4 - intelligence and 5 - policy (Figure 1). Wikipedia (2006), summarizes the functions thus:



**Figure 1: System Five in the complete VSM Source:**  
Leonard (1999).

System 1, in a viable system, contains several primary activities. Each System 1 primary activity is itself a viable system due to the recursive nature of systems. These are concerned with performing a function that implements at least part of the key transformation of the organisation. System 2, represents the information channels and bodies that allow the primary activities in System 1 to communicate between each other and which allow System 3, to monitor and co-ordinate the activities within System 1. System 3 represents the structures and controls that are put into place to establish the rules, resources, rights and responsibilities of System 1 and to provide an interface with Systems 4/5. System 4 - The bodies that make up System 4, are responsible for looking outwards to the environment to monitor how the organisation needs to

adapt to remain viable. System 5, is responsible for policy decisions within the organisation as a whole to balance demands from different parts of the organisation and steer the organisation as a whole.

In this way the VSM has dealt with the problem of centralisation versus decentralisation by allowing the subsystems as much autonomy as is consistent with systemic cohesiveness. Also the VSM has been found to have the capacity to deal with organization whose elements are both vertically and horizontally interdependent (Jackson, 1989).

The VSM gives a set of guidelines to study and design information systems for all kinds of organizations. Espejo and Harnden (1989a), noted that the VSM 'provides a template to map all kinds of structure and offers a chance to detect inadequate structure.' Therefore, at the cybernetic methodological level for systems design, the VSM reveals that information systems are totally intertwined with organization structure. The development of information systems thus, need to be supported with organization structure to be effective. Also that information needs to be integrated at the right level of recursion and in real time. The VSM therefore, recognizes that information (in the service of planning) is the true bond that helps in preserving the unity of organization (Espejo and Harnden, 1989b; Beer, 1989b; Harnden, 1989; Jackson, 1989).

Cybernetic enquiries emphasize that viable systems of all kinds are subject to breakdown. The VSM provides well defined approaches for the pathology of the viable system. If prevention was not tenable before VSM intervention, breakdown may be diagnosed, the etiology, of the disorder may be traced, a prognosis may be prepared and antidotes (even surgery) may be prescribed in "real time". In this way the VSM is both diagnostic and prescriptive in its attributes (Beer, 1989a; Espejo, 1989c). Espejo (1989a) noted that the VSM permits one to study and establish the adequacy of the strategies used by an organisation to cope with complexity of its tasks. Also, from the perspective of information systems the VSM offers conceptual model of the organizations management information system. From the angle of policy analysis, the VSM is a tool to assess the organisation implication of alternative policies. Where the focus is on the contribution of several institutional parts to one enterprise, the VSM offers the possibility to study and design flexible structures and resultantly reduce the chances of costly errors (Davies et al., 1979; Espejo, 1989b). Espejo (2003), summed, "the VSM is primarily a tool to observe institutions and to support connectivity in the quest for desirable transformation."

The VSM provides a minimum set of relation that must obtain to maintain efficient and effective viability. As a result, it is flexible and has been found to be applicable to small organizations, large firms, industries, training programmes, local governments and national government (Sale, 2000; <http://www.cybsoc.org/contacts/people-Beer.htm>; [www.maths.ed.ac.uk/or41/talks\\_v26t/MM.htm](http://www.maths.ed.ac.uk/or41/talks_v26t/MM.htm)).

## **Conclusion**

The need to put postgraduate programme in Nigeria under intelligent focus has become imperative. The necessity to approach postgraduate programme in Nigeria from diverse perspectives have been stressed in order to appreciate the predicament in a holistic format. The need to recognize and take advantage of current directions in postgraduate research so as to have better plans (tactical, normative and strategic), clear identity and more specific definition of purpose which, in turn could be the first sure move towards effective quality control and funds generation has been emphatically highlighted from the point of view of cybernetics with a proposal for the application of Stafford Beer's VSM.

If this presentation has in its own tiny little way stimulated your interest to pay intelligent attention to few or more specific aspect(s) of postgraduate programme in Nigeria, then it would have made me confident to come up with, and report to you a particular application of the VSM to a sampled postgraduate programme in Nigeria. But a popular Nigerian maxim states - a head cannot carry a roof- maybe we could work together in our own similar and or diverse ways, but in unity, point the way to go in postgraduate programme in Nigeria.

## **References**

Aboho, D. A. (2006). *National Chairman's Address*. An address Presented at the 5<sup>th</sup> National Conference of National Association for Research and Development (NARD) held at Kano, Nigeria, 11-15 September 2006.

- ABU (2002). 2002 Sensitization Workshop. Workshop Document Number 1: Questions to Assist with Strategic Planning. Technical Committee on Strategic Planning and Curriculum Review. Ahmadu Bello University, Zaria.
- Abubakar, A. (2005). *Opening Remarks*. A paper presented at the 3<sup>rd</sup> National Workshop of Committee of Deans of Postgraduate Schools in Nigerian Universities (CDPGS) held at Abuja, Nigeria, 7-10 March 2005.
- Adediran, A. A. (2005). Postgraduate Linkages and Nigerian Universities. A paper presented at the 3<sup>rd</sup> National Workshop of Committee of Deans of Postgraduate Schools in Nigerian Universities (CDPGS) held at Abuja, Nigeria, 7-10 March 2005.
- ASUU (2002). The Position of ASUU on Strategic Planning and Curriculum Review in Ahmadu Bello University. ASUU SPECIAL BULLETIN 2(4) Wednesday 14<sup>th</sup> May, 2002.
- Beer, S. (1985). *Diagnosing the system for Organisations*. John Wiley, Chichester.
- Beer, S. (1989a). *The Viable System Model: its provenance, development, methodology and pathology*. In *The Viable System Model: Interpretations and Applications of Stafford Beer's VSM*. Edited by Espejo, R. and Harnden, R. (1989). John Wiley and Sons Ltd. pp.11-37.
- Beer, S. (1989b). *The evolution of a management cybernetic process*. In *The Viable System Model: Interpretations and Applications of Stafford Beer's VSM*. Edited by Espejo, R. and Harnden, R. (1989) John Wiley and Sons Ltd. pp.211-270.
- Blair, R. D. D. (1992). Progress and Potential for Financial Diversification among Selected African universities. A report prepared for the World Bank, January. 1992.
- Davies, C. Demb, A. and Espejo, R. (1979). *Organisation for Programme Management*. Chichester: John Wiley.
- Elechi, E. N. (2005). Keynote Address on the Theme Moving Nigeria Forward Through Postgraduate Education - The Journey so far. A paper presented at the 3<sup>rd</sup> National Workshop of Committee of Deans of Postgraduate Schools in Nigerian Universities (CDPGS) held at Abuja, Nigeria, 7-10 March 2005.
- Espejo, R. (1989a). *The VSM revisited*. In *The Viable System Model: Interpretations and Applications of Stafford Beer's VSM*. Edited by Espejo, R. and Harnden, R. (1989) John Wiley and Sons Ltd. pp.77-100.
- Espejo, R. (1989b). *A cybernetic Method to Study Organisations*. In *The Viable System Model: Interpretations and Applications of Stafford Beer's VSM*. Edited by Espejo, R. and Harnden, R. (1989) John Wiley and Sons Ltd. pp.361-404.
- Espejo, R. (1989c). *P.M. Manufacturers: The VSM as a Diagnostic Tool*. In *The Viable System Model: Interpretations and Applications of Stafford Beer's VSM*. Edited by Espejo, R. and Harnden, R. (1989) John Wiley and Sons Ltd. pp.103-120.
- Espejo R. and Harnden, R. (1989a). *The VSM: an ongoing conversation*. In *The Viable System Model: Interpretations and Applications of Stafford Beer's VSM*. Edited by Espejo, R. and Harnden, R. (1989) John Wiley and Sons Ltd. pp.441-460.
- Espejo, R. and Harnden, R. (1989b). (Eds.) *The Viable System Model: Interpretations and Applications of Stafford Beer's VSM*. John Wiley and Sons Ltd.

- Ibrahim, A. A. (2005) *Meeting Postgraduate Needs for National Development*. A paper presented at the 3<sup>rd</sup> National Workshop of Committee of Deans of Postgraduate Schools in Nigerian Universities (CDPGS) held at Abuja, Nigeria, 7-10 March 2005.
- Jackson, M.C. (1989). *Evaluating the managerial significance of the VSM. In The Viable System Model: Interpretations and Applications of Stafford Beer's VSM*. Edited by Espejo, R. and Harnden, R. (1989). John Wiley and Sons Ltd. pp.407-439.
- Mangvwat, M. Y. (2005). Funding and Facilities for Research for Nigerian Universities. A paper presented at the 3<sup>rd</sup> National Workshop of Committee of Deans of Postgraduate Schools in Nigerian Universities (CDPGS) held at Abuja, Nigeria, 7-10 March 2005.
- Mbajourgu, M. S. N. (1991). Innovative Response to the Problem of Under-funding of Universities. Paper Prepared for AAU and Presented at the ECA/AAU Senior Policy Workshop on Mobilization and Management of Financial Resources in African Universities, December 2-6, 1991
- Mshelia, B. S. (2005). Structure, Organization and Management of Postgraduate Programmes in Nigerian Universities. A paper presented at the 3<sup>rd</sup> National Workshop of Committee of Deans of Postgraduate Schools in Nigerian Universities (CDPGS) held at Abuja, Nigeria, 7-10 March 2005.
- Sale, P. (1999) The Impact of Communication on the Performance of Public Sector Enterprise: A Case Study of Maiduguri Investment Company Limited (BICL). Unpublished Master of Public Administration (MPA) Project, University of Maiduguri, Nigeria.
- Tarpeh, N. (1994) Study on Cost Effectiveness and Efficiency in African Universities. Phase II: n Overview. A report prepared for the Association of African Universities, December, 1994.
- Ubaru, M. O. (2005) Role of Information Technology (!T) in Post Graduate Education in Nigeria. A paper presented at the 3<sup>rd</sup> National Workshop of Committee of Deans of Postgraduate Schools in Nigerian Universities (CDPGS) held at Abuja, Nigeria, 7-10 March 2005.
- Waelchli, F. (1989). *The VSM and Ashby's Law as Uluminants of Historical Management Thought. In The Viable System Model: Interpretation and Application of Stafford Beer's VSM*. Edited by Espejo R. And Harnden, R. (1989). John Wiley and Sons Ltd. pp.51-75.
- Weiner, G. (1948). *Information, Language and Society. In Cybernetics; or Control of Communications in the Animal and Machine*. John Wiley and Sons Inc. New York.

### **Internet**

- Leonard, A. (1999). A Viable System Model: Consideration of Knowledge Management Journal of Knowledge Management Practice, August 1999, Retrieved May-18-06 from <http://mvw.tlainc.com/articll2.htm>
- Espejo, R. and Harnden, R. (1989). The Viable Systems Model: Interpretations and Applications of Stafford Beer's Viable Systems Model (Chichester: Wiley). [users.ox.ac.uk/~econec/systems.html](http://users.ox.ac.uk/~econec/systems.html)
- Espejo, R. (2003). The Viable System Model: A Briefing About Organisational Structure Retrieved June, 21, 2006 from <http://www.svncho.com/pages/pdf/INTRODUCTION%20TO%20THE%20VIABLE%20SYSTEM%20MODEL3.pdf>
- Support systems at small mine in the USA using a framework based on stratified systems theory, the viable systems model and soft systems methodology. Retrieved June, 21, 2006 from [www.maths.ed.ac.uk/or41/talks\\_v26t/MM.htm](http://www.maths.ed.ac.uk/or41/talks_v26t/MM.htm)



Vervard Projects: Selected Modelling Languages. Retrieved on Jan, 27, (2006). From <http://www.users.globalnet.co.uk/~rxv/sebpc/langiiages.htm>

Cavendish Software Ltd. (1995). Organization: Viable System Model Retrieved on June, 21, 2006 from <http://www.users.globalnet.co.uk/~rxv/orging/vsm>. Last modified 10:54, 11 March 2006.

Wikipedia (2006). VIABLE SYSTEM MODEL. Retrieved on June, 21, 2006 from [http://en.wikipedia.org/wiki/Viable\\_System\\_Model](http://en.wikipedia.org/wiki/Viable_System_Model)". Last modified 10:54, 11 March 2006.