AN APPRAISAL OF RESEARCH IN NIGERIA’S UNIVERSITY SECTOR

A. K. Yusuf
Department of Basic and Applied Sciences, Hassan Usman Katsina Polytechnic, Katsina
E-mail: akyusufknk@yahoo.com

Abstract
The role of higher education research in national development cannot be overemphasised. However, research in Nigeria’s institutions of higher learning comprising the universities, polytechnics and colleges of education has yet to make a real impact on the technological advancement of the country and the socio-economic well-being of its citizenry. Constraints hampering the realisation of research goals in the higher education sector include inadequate and irregular funding, poor motivation, poor or obsolete research infrastructure, brain drain and rising workload resulting from deteriorating staff/student ratio. These constraints have also generally led to low research productivity. Against this backdrop, this paper appraises the research scene in Nigeria’s institutions of higher learning with emphasis on the university sector, and stresses the need to fill yawning gaps in such critical areas as funding levels, capacity building (including ICT requirements), research focus or specialty and tertiary institution-industry collaboration among others, as part of strategic national research and development (R&D) planning.

Keywords: Higher education; research; university sector; funding; constraints; outputs.

Introduction
It is universally recognised that teaching, research and community service constitute the main functions of institutions of higher learning. For the purpose of this discourse, the latter comprise all institutions (whether state-owned or private) that offer courses or programmes of study beyond secondary education. These include universities, polytechnics, monotechnics, colleges of technology, colleges of education etc, which we shall conveniently regroup into two sectors namely, the university sector and the non-university or sub-degree sector. There are currently 104 universities, 125 polytechnics and 98 colleges of education in the country.

With regard to high level research in Nigeria there are, side-by-side with the institutions of higher learning, the professional and specialised institutions notably the over 66 number research institutes (Exced.net, 2010), which are under the auspices of parent federal ministries – e.g research institutes under the Federal Ministry of Science and Technology (FMST), those under the Federal Ministry of Health (FMH) or those under the Federal Ministry of Agriculture (FMA). The main distinctive feature of the research institutes is that they are professionally oriented to undertake specific or specialised research works/projects (e.g in the industrial, agricultural and medical fields).

Higher education in Nigeria started with the establishment of the Yaba College in 1932, while the first Nigerian university (the University of Ibadan) was established in 1948. Thus, given almost a century of continuous research in our institutions of higher learning, one may ask: what has been the research output in these institutions both in terms of quantity and quality of research; and what is the impact of this research on the Nigerian economy? These questions are pertinent
because there are presumptions of very weak research culture especially in the non-university sector. Even in the university sector where several academics are known to have showcased the products of their research in the international intellectual scene, the bulk of this research is said to be conceived in terms of publications, career advancement and intellectual prestige of the individual researchers, often with very little social relevance (Musa, 1988). Moreover, many believe that Nigeria’s institutions of higher learning are very much left behind in the area of research and innovation. For instance, they need to collaborate their research efforts both domestically and on the international scene, but lack facilities for collaborative research.

Admittedly, poor motivation, poor and irregular funding, obsolete research infrastructure, inadequacy of qualified research personnel, general lack of research focus and poor linkage between researchers and the industrial sector are yawning gaps in Nigeria’s higher education research. These constraints constitute serious limitations to the research capacity and research capability of these institutions.

In this paper, we appraise the research scene in Nigeria’s institutions of higher learning with emphasis on the university sector and highlight key strategies or initiatives that ought to be adopted in tackling the problems of higher education research in the country.

**Research funding**
Research funding is critical to the ability of tertiary institutions to conduct research in the first place, and ultimately to the quality and impact of this research. Most research activities in Nigeria are sponsored by government through government funding agencies like the National Science and Technology Fund (NSTF), the Education Trust Fund (ETF) etc, as well as a number of federal/state ministries, boards and parastatals which directly fund researching institutions or research projects under them. In addition, research projects are occasionally funded by international and philanthropic organisations by way of sponsored research support, endowment funds, foreign aids, fellowships, donations, etc. Unfortunately, there is virtually no industry involvement in funding academic research in Nigeria (Donwa, 2006).

Research in federal universities, polytechnics and colleges of education is routinely funded through the relevant supervisory bodies namely, the National Universities Commission (NUC), the National Board for Technical Education (NBTE) and the National Commission for Colleges of Education (NCCE) respectively. It must be said though, the funding of research in these institutions has been generally poor and irregular. However, the federal institutions of higher learning are better funded and more autonomous than the state government owned institutions (Clark and Sedgwick, 2004).

In Nigeria, the traditional funding method for higher education research is formula funding based on inputs – staff size, enrolment etc (Salami and Hauptman, 2006). However, given the expenditure dynamics of higher education research against scarce state resources in a dwindling global economy, many countries around the world are now adopting the innovative, performance-based funding mechanism based among others on peer-reviewed outputs or outcomes, rather than inputs (Akintoye, 2008; OECD, 2010).

**Research in the university sector**
Bako (2005) defines research as a systematic search and investigation for increasing the sum of knowledge; and research and development (R&D) as the search and application of this knowledge for the development of new and improved products, services and industrial processes of capital development. In other words, research is the process of creating new knowledge or new insights on knowledge, or unlocking knowledge (Ibidapo-obe, 2010).

**Nature of research**
Research in the universities is definitely more rooted and more spirited than in the non-university sector and, quite often, borders on basic research, especially in the conventional universities. The specialised universities, notably the universities of technology and agriculture, are supposed to focus more on applied research and technology adaptation, but at present suffer from acute shortage of specialised research facilities and
inadequacy of qualified research personnel that could enable them fulfill this expectation.

Research in the universities may take the form of:

(i) **Individual research:** This is initiated and conducted by an individual researcher or a team of researchers who may seek funding from the University Board of Research or from alternative funding agencies, including international organisations, NGOs and the private sector.

(ii) **Institutional research:** This is initiated and supervised by the institution or a unit of the institution (faculty, department etc) and usually involves a team of researchers. Funding is internal, except where assistance is obtained from external sources.

(iii) **Commissioned or contractual research:** This is carried out at the instance of an external body, which may be government or a government organ, the private sector, NGOs etc, which also funds the research. The sponsor has right of ownership of the research results.

(iv) **Collaborative research:** This is a joint research effort with common objectives or goals and involving the sharing of ideas, methodologies, facilities etc between individual researchers or research teams, from same or different institutions, organisations, countries or regions of the world.

(v) **Student research:** This is an undergraduate or postgraduate research project undertaken by a student, supervised by the student’s department, and the results of which are reported in the student’s thesis or dissertation. Student research is usually jointly funded between the student himself (or his sponsor) and his department.

**Funding**

In Africa, the universities are among the most important institutions for the development of science and technology (S&T), and they consume a significant amount of national resources devoted to research (Alo, 1995). Funding is unquestionably the most critical factor in university research. In Nigeria, the NPST has recommended 5% of GNP be set aside for research, but Nigeria’s federal university system is said to spend only 1.3% of its budget on research (Harnett, cited in Saint et al., 2003). In the federal universities, routine funding from budgetary allocations is channeled through the NUC, which then disburses the funds to the University Boards of Research at the institutional level. However, research votes from the NUC were not disbursed regularly, and when disbursed, were often grossly inadequate to cater for the research needs of the large number of public universities in the country. This is understandable since the Nigerian higher education system is adjudged as the largest higher education system in Africa (ADEA, 2000). Current university enrolment of degree students alone is estimated at over 800,000 (Okojie, 2009).

Massive increases in enrolment in the universities by the year have apparently overwhelmed government’s capacity to maintain proportional financial support for research and other services. This has created funding shortfalls. Thus, despite substantial annual increases in government’s recurrent grant to federal universities (Table 1), the system has not had the financial resources necessary to maintain educational quality (Saint et al., 2003; Bako, 2005)
Table 1: Universities funding from 1997 – 2006 (recurrent only)

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount requested (N)</th>
<th>Amount allocated (N)</th>
<th>% of amount allocated</th>
<th>Amount received (N)</th>
<th>% of amount received</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>10,522,155,501.00</td>
<td>4,929,093,300.00</td>
<td>47%</td>
<td>3,697,817,940.00</td>
<td>35%</td>
</tr>
<tr>
<td>1998</td>
<td>17,427,030,158.00</td>
<td>5,415,461,292.00</td>
<td>31%</td>
<td>7,295,447,523.50</td>
<td>42%</td>
</tr>
<tr>
<td>1999</td>
<td>34,695,109,125.00</td>
<td>7,568,388,580.00</td>
<td>22%</td>
<td>10,362,430,271.98</td>
<td>30%</td>
</tr>
<tr>
<td>2000</td>
<td>47,346,272,832.00</td>
<td>28,206,218,865.91</td>
<td>60%</td>
<td>28,206,218,865.91</td>
<td>60%</td>
</tr>
<tr>
<td>2001</td>
<td>49,150,259,219.11</td>
<td>26,948,001,227.42</td>
<td>55%</td>
<td>28,419,719,502.84</td>
<td>58%</td>
</tr>
<tr>
<td>2002</td>
<td>57,545,682,641.00</td>
<td>26,425,549,500.00</td>
<td>46%</td>
<td>30,351,483,193.00</td>
<td>53%</td>
</tr>
<tr>
<td>2003</td>
<td>65,516,123,727.00</td>
<td>34,411,319,280.00</td>
<td>53%</td>
<td>34,203,050,936.33</td>
<td>52%</td>
</tr>
<tr>
<td>2004</td>
<td>199,677,706,206.00</td>
<td>41,051,218,783.61</td>
<td>21%</td>
<td>41,492,948,787.01</td>
<td>21%</td>
</tr>
<tr>
<td>2005</td>
<td>42,604,258,068.00</td>
<td>50,961,971,536.00</td>
<td>120%</td>
<td>49,453,098,168.72</td>
<td>116%</td>
</tr>
<tr>
<td>2006</td>
<td>71,090,382,041.00</td>
<td>75,400,267,475.00</td>
<td>106%</td>
<td>75,400,267,475.00</td>
<td>106%</td>
</tr>
</tbody>
</table>


Federal university revenues are received mainly from three sources (Bako, 2005):

(i) The Federal Government (84%)
(ii) Income generation activities (7%)
(iii) Student fees (9%)

There have been complaints of university authorities withholding and subsequently diverting research grants for other purposes. Bako (2005) claims that out of the totally accrued revenues, the universities use up to 98% of recurrent expenditure on paying salaries and allowances, 12% on maintaining services and zero allocation for research.

However, with the advent of the Tertiary Education Trust Fund (TETF) which replaces the overstretched ETF, the Fund is expected to focus on tertiary education matters. In particular, the fund has set out to resuscitate research activities in the tertiary institutions by among others upgrading research infrastructure and the award of scholarships. The TETF initiative, apart from its potential for boosting R&D activities, is also a capacity building measure that should impact positively on the research capacity and research capability of Nigeria’s tertiary institutions in the medium or long term.

Research output

It is difficult to appraise the research capacity of the universities because statistics on the research capacity of Nigerian universities are limited. However, data on research output such as productivity or publication count and citation count (Hertzel, 2003) is more readily available. Ochai and Nedosa (cited in Okafor and Dike, 2010) note that in universities the world over, recognition and advancement of academic staff rest largely on the quantity and quality of their research outputs. Research output has also become the main factor or criterion for ranking “world class universities” (Chiemeke et al., 2009). Okafor (2011) defines research output as the quantity of research in terms of publication output and supervision of students that an academic is able to carry out within a defined period. In other words, research output is a quantitative and measurable means by which academics contribute new knowledge to the existing body of knowledge.

Going by this definition of research output, academics of Nigerian universities during the 1960s to the mid 1980s (described as the “research boom” period) who had volumes of journal and textbook publications to their credit were certainly research productive. During this period, Nigerians became more widely known for their research, the products of which they strived to showcase on the international intellectual scene (Nduka and Falayojo, 1985). This research occurred in all the branches of science and in all fields of human endeavour - but involved mainly the first generation universities.

Also during this period, it was unanimously agreed by the World Bank, the NUC, the Academic Staff Union of Universities (ASUU) and industries that employ graduates, that in terms of quantity of research of tertiary institutions, Nigeria was the best and leading in sub-Saharan Africa (Karani, cited in Bako, 2005). Nigeria’s advancement of
knowledge through research then was phenomenal and mainly in the fields of human medicine, agriculture, veterinary science, metallurgy etc (Nduka and Falayojo, 1985). There were also technological inventions recorded notably the famous mechanised yam pounder (Obafemi Awolowo University) and a number of agricultural mechanisation equipment (IAR, Ahmadu Bello University and IITA, University of Ibadan) (Koleoso, 1989).

Systematic decline of research in Nigerian universities is believed to have started from the late 1980s (Bako, 2005). For instance, Nigeria’s total number of scientific publications in 1981 was 1062, but this number dropped to 711 by 1995 (Saint et al., 2003). In contrast, scientific publications (1995) were 3,413 for South Africa, 14,883 for India and 5,440 for Brazil. By 1996, the quantity and quality of research had declined to an all-time low (Okebukola and Solowu, 2001). In the period 2001-2004, Nigeria ranked fifth among eight selected African countries in scientific publications ( Table 2).

Table 2: Nigeria’s performance in scientific publications among selected African countries (2001-2004).

<table>
<thead>
<tr>
<th>Country</th>
<th>Total publication output</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>14,809</td>
</tr>
<tr>
<td>Egypt</td>
<td>9,895</td>
</tr>
<tr>
<td>Morocco</td>
<td>3,535</td>
</tr>
<tr>
<td>Tunisia</td>
<td>2,857</td>
</tr>
<tr>
<td>Nigeria</td>
<td>2,309</td>
</tr>
<tr>
<td>Kenya</td>
<td>2,067</td>
</tr>
<tr>
<td>Ghana</td>
<td>641</td>
</tr>
<tr>
<td>Senegal</td>
<td>618</td>
</tr>
</tbody>
</table>

Source: Oyewole,O.(2009)

Okafor (2011) who recently carried out a comparative analysis of research output of six federal universities in southern Nigeria (University of Benin, University of Ibadan, University of Agriculture, Abeokuta, Nnamdi Azikwe University, University of Nigeria, Nsukka and University of Uyo) in the period 1997-2006 based on both local and international publications found that the highest research output of 12.17 publications per head was recorded at the University of Benin and the lowest of 8.13 at the University of Uyo over the ten-year period. What to particularly note here is that even the best case scenario of a mean of 12.17 translates to only about 1 publication per academic staff per year.

In the state government owned universities which are grossly under-provided because of poor funding and poor support, the situation is definitely much worse. However, with regard to Nigeria’s newly established and upcoming private universities, not much is known about their contributions to research.

Declining research productivity in the Nigerian university system is attributable to the following constraints among others:

- Poor and irregular funding
- Declining research infrastructure
- Poor research motivation
- Rising workloads associated with deteriorating staff/student ratio, which leave little time for research.
- Lack of research skills in modern methods.
- Inadequate research personnel.
- Frequent industrial actions.

What university research in Nigeriaought to achieve

Research focus

The “publish or perish” syndrome associated with the higher education system in general and the university system in particular could be said to have plunged academics in these institutions into a career-long survival race for promotions and positions within their institutional hierarchies and perhaps beyond. For an academic to survive in such a race, they must obtain desperately needed publications to their credit through research and/or creative development. This means that the primary motive of competing in this race is no more than that of career prospects and intellectual prestige. The point being made here is that by orientation, content and primary intent, the bulk of research going on in our universities at present is neither related to nor determined by the demand and priorities of the Nigerian economy, society and polity, and therefore cannot be relied upon for achieving Nigeria’s overall objectives in R&D.
Teferra (cited in Okafor and Dike, 2010) notes that scientific and technological discoveries have become an index for measuring the social, political and economic well-being of a nation. Thus, if research output and findings from our universities are to be relevant to the Nigerian society and impact on industrial, commercial and administrative processes in the country, then they must be directed towards solving specific technological, economic or social problems of the country. This is the essence of the NPST (1986, 1999 & 2003) and other policy documents such as:

- National Policy for Engineering Infrastructure (1992)
- National Policy on Biotechnology (2011)
- National Policy on Space Research (1999)
- Presidential Council on Science and Technology (2002)

However, there is still a vacuum in these S&T policies – the absence of a strong innovation component (Okonkwo and Akpa, 2007). Innovation can be simply described as the means by which inventions, ideas, etc. are applied for the first time (Koleoso, 1989).

In other words, innovation cannot be measured in terms of scientific or technological outputs, but by the application of acquired knowledge or experience in the production of goods and services.

The research thrust of Nigerian universities as well as the research institutes therefore ought to be on science, technology and innovation (STI), with policy-relevant research constituting a substantial part of it. This is because ultimately it is the nation’s innovative capacity that can ensure sustainable development and global competitiveness, as well as wealth creation and poverty eradication. Furthermore, in order to bolster knowledge diffusion and achieve the desired results, collaborative research among the universities, as well as between the universities and the research institutes is necessary.

**Research motivation**

Chiemeke *et al.* (2009) argue that the foundations for research are good research training and motivation, availability of equipment and good library facilities. By their professional calling, academics in Nigerian universities have the mandate to do research – but there is need to raise the present level of research funding and improve on research motivation for effective performance. It is not only career advancement and payment of salaries that motivate academic staff to embark on research. Providing a conducive research environment, giving them opportunity for further (professional) training by way of scholarships, fellowships, sabbaticals etc and recognising and rewarding outstanding performance/result are perhaps more important. In South Africa, for instance, there are incentives for rated researchers for carrying out quality research, for publications and for postgraduate supervision, while still extending some support to non-rated researchers (Afolayan, 2009).

Government, being the major sponsor of research in Nigeria should make a deliberate and conscious effort to exploit key motivational factors as part of strategic planning for boosting and sustaining quality research.

**Integration of ICTs into teaching and research**

In today’s era of global technological advancement, information and communication technologies (ICTs) have become indispensable, and have been accepted as part of the contemporary world, especially in the industrialised societies. Even in Nigeria, the private and financial sectors have taken a giant stride in this respect, with more than 200 financial institutions (Banks, Insurance, Brokers etc) said to have turned to ICTs in order to improve their services and productivity (Osofison and Osunade, 2006). Nigerian universities should take a cue from the private and financial sectors by fully embracing and integrating ICTs into their learning and research. This is very important since ICTs are known to have impacted on the quality and quantity of teaching, learning and research worldwide (Ololube, 2006). Moreover, ICTs offer huge prospects for boosting research development and dissemination of research findings, and play a pivotal role as avenues for fast tracking the economic, social and political transformation of the nation. These prospects were what informed the development of the Information Technology (IT)

ICTs provide unique opportunities for research collaboration and networking among researchers and generally facilitate research in many other ways – they can be used for instance, to do complex mathematical and statistical calculations and simulations important to research, for data manipulation and analysis and for greater accuracy in research (Ogunkunle and Fomsi, 2010). Other advantages of ICTs in research are:

- availability of data for research
- increased research productivity;
- reduced duplication of research works.

ICTs are as yet not fully embraced by most institutions of higher learning in the country, including the research institutes. In fact, only about half of the research institutes are said to be ICT connected (Akintunde, 2006).

Obvious constraints to ICTs usage in Nigeria’s institutions of higher learning include:

- ICTs are very cost-intensive and challenging
- ICTs infrastructures often not well developed
- Lack of skilled ICT personnel, thus leading to low implementation and usage of ICT solutions.

Commercialisation of research results

Going by the research status quo in Nigeria today, higher education research could be said to be achieving the following among others (Yusuf, 2005):

1. Facilitating and enhancing the teaching-learning process through greater staff and student exposure.
2. Producing qualified research manpower.
3. Enabling the tertiary institutions to render a reasonable level of consultancy and extension services to their immediate localities, and the nation at large.
4. Affording the researchers the opportunity to publish their research results in national and international journals.

The problem of what to do with commercialisable research results or inventions from university research in Nigeria stems from the inability of the universities to effectively link with industry. It is this critical linkage especially between STI and the productive sector that could translate R&D results or inventions into finished products for the benefit of the nation. However, for research results to be patentable and commercialisable, they must have quality, novelty and industrial applicability. Oyewale (2006) notes that despite claims of inventions and breakthroughs from Nigerian universities, polytechnics and research institutes, there is no commensurate registration of patents from these institutions. A patent is the legal protection that is placed on technological activities embodied in inventions to prevent their unauthorised usage or exploitation (Papon and Barre, cited in Oyewale, 2006). It is a major constituent of intellectual property (IP), which forms a cornerstone of the knowledge economy, and which is covered under Nigeria’s intellectual property rights (IPR) policy (still in draft form).

There are complaints that our institutions of higher learning do not have a vibrant patent and innovation culture. Oyewale (2006) believes that inadequate information on patent matters, lack of institutional infrastructure and unfavourable patent ownership structure were what led to the poor patenting culture among Nigeria researchers generally.

Quite often, the researchers are content with getting their research results published in reputable journals, and therefore do not go further to seek for their patenting and commercialisation. Some argue that many Nigerian researchers are ignorant of patenting and commercialisation procedures and worse still, there are no patent offices to consult in their institutions. Others cite general apathy of the researchers to patent generation. These are perhaps the main reasons why most of commercialisable industrial R&D in Nigeria is said to be carried out by government-owned research institutes and only a limited amount of university research (about 10%) for instance, reaches a commercial state (Igwe, 1990; Chiemeke et al., 2009). Patent based statistics are important because they are often used to reflect the inventive capacity or performance of countries, regions, firms etc. (Oyewale, 2006).

Other arguments centre on the willingness of the private sector to patronise university research on the one hand, and the general lack of effective and
willing cooperation between the two sectors on the other. Akpochafo (2009) opines that government ought to intervene decisively in this matter by forcing and forging linkages between the universities and the productive sector in order to fast track Nigeria’s technological advancement and economic development. This would also bring about increased research funding from the private/industrial sector.

So far, the efforts of Nigerian universities to ensure the application of research results through their consultancy firms have generally been inadequate. However, the National Office for Technology Acquisition and Promotion (NOTAP), a parastatal under the FMST has been trying to promote patent and innovation culture in Nigeria’s tertiary institutions, having established intellectual property and technology transfer offices (IPTTO) in universities, polytechnics and the research institutes. NOTAP is encouraging patenting of R&D results and the further translation of such inventions into finished products through:-

i) commercialisation of viable R&D results emanating from both private and public research institutions;

ii) establishment of network of linkages among researchers, inventors, industry and research institutions; and

iii) promotion of intellectual property rights and encouragement of innovation among Nigerian scientists, researchers and inventors.

For NOTAP to succeed in realising these objectives with regard to higher education research, it must liaise and collaborate effectively with the research institutions and their supervisory/regulatory bodies—NBTE’s Polytechnic Research Committee (polytechnics) and the Research and Innovation Department of the NUC (universities).

**Conclusion**

Research is an indispensable avenue for finding solutions to Nigeria’s social, economic and technology related problems; and our institutions of higher learning in general and the universities in particular have an important role to play in this process. However, at present both the quantity and quality of research output from these institutions are generally too low to make the desired impact on national development. Worse still, there is a general lack of research focus by the higher education sector in relation to Nigeria’s national R&D needs. As a result of this, and given the large number of public and private tertiary institutions in the country today, the research scene has become unwieldy.

Higher education research in Nigeria in the 21st century and beyond must be knowledge- and demand-driven (not research for research sake). In this regard, policy-oriented applied research needs to be stressed by among others making the research needs of the industrial sector the subject of research focus in the nation’s tertiary institutions.

**References**


Mlawa Eds.– A publication of the International Development Research Centre (IDRC), Ottawa, Canada.


