Covenant University

Benchmarking the Quality and Relevance of Higher Education for National Development

Convocation Lecture

by

Prof. Michael O. FABORODE, Ph.D, FAEng, FNSE
Secretary-General, Association of Vice-Chancellors of Nigerian Universities (AVCNU) and the Immediate Past Vice-Chancellor, Obafemi Awolowo University, Ile-Ife

COVENANT UNIVERSITY
RELEASE of EAGLES 2016

ON THE OCCASION OF THE
ELEVENTH CONVOCATION CEREMONY FOR THE AWARD
OF FIRST AND HIGHER DEGREES OF COVENANT UNIVERSITY

Thursday, June 23, 2016

Covenant University

11th Convocation Ceremony and Award of First and Higher Degrees
and the Presentation of Prizes holding at Covenant University,
Ota, Nigeria, on Thursday, June 23, 2016

CONVOCATION LECTURE

BENCHMARKING THE QUALITY AND RELEVANCE OF HIGHER EDUCATION FOR NATIONAL DEVELOPMENT

By

Prof. Michael O. FABORODE, Ph.D, FAEng, FNSE
Secretary-General, Association of
Vice-Chancellors of Nigerian Universities (AVCNU)
and the Immediate Past Vice-Chancellor,
Obafemi Awolowo University, Ile-Ife

June 23, 2016

Prof. Michael O. FABORODE, Ph.D, FAEng, FNSE
Secretary-General, Association of
Vice-Chancellors of Nigerian Universities (AVCNU)
and the Immediate Past Vice-Chancellor,
Obafemi Awolowo University, Ile-Ife

Benchmarking the Quality and Relevance of Higher Education for National Development

PROF. M. O. FABORODE, PH.D, FAENG, FNSE

Introduction

I would like to acknowledge the great honour of being chosen to deliver the year 2016 convocation lecture of this great University, Covenant University, Ota. The noble tradition of special lectures during convocations started in earnest in this University in 2006 with four addresses; 3 lectures and an address to signal the release of the first set of Eagles, as you uniquely christen your graduands. The use of three convocations lectures continued in 2007, but by 2008, you had reduced the number to two, ditto in 2009. By 2010, Covenant seemed to have matured into one convocation lecture in addition to one keynote address at the actual release of the Eagles. This is thus the format this year, and I am being paired with Professor Jerry Gana, CON, a former Minister for Information of the Federal Republic, serving Pro-Chancellor and Chairman, Governing Council of the University of Lagos, etc as the Keynote Speaker. When one looks back at the array of very eminent and distinguished personalities who had blazed the trail in the slot between 2006 and now, from Professor Joy Ogwu, Professor Peter Okebukola, General Yakubu Gowon, Dr Mensa Otabil from Ghana, Professor Grace Alele Williams, Deacon Gamaliel Onosode (now deceased), Professor Michael Omolewa, Mr Jim Ovia, Professors Oye Ibidapo Obe, Dibu Ojerinde, Tade

Aina, Olusola Oyewole, Olugbemiro Jegede, as Secretary-General of the AAU, Naana Jane Opoku-Agyemang, former Vice-Chancellor of the University of Cape Coast and currently Ghanaian Minister of Education, Mrs Obiageli Ezekwesili, CFR, former Minister of Education, Professors Chinedu Nebo, Adebayo Olusoshi, Mrs Sarah Alade of the Central Bank of Nigeria, as well as Professor Yemi Osibajo in 2014 before he became Vice President of Nigeria, then my appreciation to the Chancellor, Vice-Chancellor, Senate and the Ceremonials Committee would be better understood.

In consequence, I am not taking the assignment, this golden opportunity lightly. A Convocation Lecture, unlike a shorter Commencement Address, affords the speaker the opportunity to espouse the intrinsic academic characteristics of erudition and boldness in the perception, dissemination and preservation of the truth, academics being "custodians of the unfettered search for truth". What is more, I am assigned to speak on **"Benchmarking the quality and relevance of higher education for national development"**. My reading of this charge is "to address higher education generally or specifically universities to their purpose and hence mandate", i.e. "relevance to human development". I am assisted in this definition of function by Professor Adam Habib, the Vice- Chancellor and Principal of the University of the Witwaterstrand in Johannesburg, South Africa in his keynote address at the just concluded Annual Conference of the Association of Vice- Chancellors

of Nigerian Universities, AVCNU, in Jos. He submitted thus: "Considering the subsisting serious manpower deficits and unabating development challenges of Africa, vis-a-vis festering poverty, hunger, food insecurity, general insecurity, climate change, lack of power and energy, etc, the challenge and mandate of African Universities now relate to:

(I) providing access to higher education for the teeming population of African youths who yearn for it. In this year's UTME Nigeria, for example, had 1,557,017 candidates for the universities, 1,053,979 (67.7%) scored 180 and above the general admission cut-off mark, whereas the total carrying capacity of all universities is 695,449 (PUNCH, June 14, p35).

(ii) producing skilled and creative graduates to tackle African development challenges, and

(iii) undertaking research to use science and innovation to provide solutions to tackle poverty, underdevelopment, and bridge the African inequality gap".

For me, these are key elements of "national development", as rightly captured in the goal of the AVCNU 2016 Conference: "to ensure that Nigerian universities imbibe the rudiments discussed in the thematic topics to enable them compete favourably in the global arena in the areas of learning and knowledge dissemination, research and

innovation, while remaining locally relevant and instrumental to national transformation through fruitful civic engagements. All of our teaching, research and civic engagement must be geared towards this overarching goal, lest we lose our essence and relevance as institutions of higher learning. As the conference noted and admonished further, "in all these areas, quality assurance is fundamental, thus requiring every institution to pay special attention to and institutionalize it". As a critical step in taking us away from the "valley of the shadow of death" in which we now find our institutions or higher education system in general, benchmarking has been suggested as a feasible step that we must embrace (Okebukola, 2010 & 2016; Marmolejo, 2016).

The Nigerian higher education system, especially the university system and indeed the nation itself are at cross-roads. The problem of relevance of higher education to national development aspirations, the delivery of good governance, and equitable distribution of the benefits of an 'expanded economy' (Nigeria now being the largest African economy), persists. The dilemma is compounded by falling crude oil prices (which almost nose-dived to $25 per barrel earlier this year), on which Nigeria's earnings largely depend, and the reticence/sluggishness in the diversification of the economy to embrace more productive sectors such as manufacturing, agriculture etc, which in any case is the inevitable way forward. This is not mentioning revelations of the inexplicable mindless plundering of the national

wealth by a few elites who had access to power in the last few years, and the on-going war against insurgents, terrorists and rascals of all shades. Now, the bubble is all bust, and the centre can no longer hold. At times like this in other climes, universities, as centres of knowledge generation, propagation and appropriation, have risen to the rescue of their nations (goggle examples in the university cities of Manchester, Liverpool, Coventry and Newcastle upon Tyne, to mention just a few). Even though the Nigerian university system suffered considerable structural, near irreversible damage in the period 1980-2000, the nation is learning to look up to her universities for succour in the management of its economy in what is now termed "post-oil era". In the course of the lecture, we shall elaborate on these keywords/key points. We shall start with the vicious cycle of Nigeria's underdevelopment tragedy.

Challenge of National Development and the Decline of the Nigerian Universities (1980-2000)

We have a vicious national dilemma of a badly managed and plundered mono-commodity economy and a self-afflicted and degraded higher education system that ultimately lost its once vibrancy and global reputation. The result is a web of complicated and sustained national ineptitude and failure, and disturbingly subsisting inability to apprehend our resultant underdevelopment and charge a new path to national prosperity. I will explain myself.

Let us examine the trajectory of the evolution of the

Nigerian university, vis-à-vis the changing role of its entities, by peeping into the fortunes of the Nigerian university system, as an example. The number of universities rose from 4 Federal universities (UI, UNN, UNILAG and ABU) and 1 regional university (UNIFE now OAU) in 1962 to the present figure of 40 Federal, 42 State and 61 Private universities, totalling 143 universities (NUC Monday Bulletin, 16th May, 2016). So instead of 4 universities in 1962, the Federal government now funds 40 universities. Apart from the funding implications of the increase, there are also some subtle but impactful changes that have occurred in the Nigerian university system in relation to the learning environment, as highlighted below:

- Rapid growth in student population, over the planned projected figures.
- Moratorium on building of student hostels, leading to more and more students living off-campus, and loss of the 'university hall culture'.
- Discontinuation of students feeding services, accentuating the emergence of the 'bukateria' system on campuses.
- Neglect/abandonment of university development in the 'holocaust years', leading to the collapse of infrastructures.
- Increased pressure on living and learning facilities, complicating maintenance issues and accentuating the collapse of university infrastructure and utilities.
- Gross underfunding, which aided the rapid collapse

of university cultures and traditions, as the economy of the teaching and non-teaching staff collapsed in the 1980s.

- Employment of various categories of non-prime academics into the system, when young graduates had great disdain for university teaching.
- Disappearance of staff development, whereby young academic and administrative initiates were sent overseas or locally to earn their Ph.Ds and Masters degree.
- Collapse of students funding support through scholarships, bursaries, loans, etc.

The overall decadence and systemic regression of Nigerian universities is better illustrated with the curve of the oscillating fortunes/reputation of the Nigerian university system as typified by the trajectory of the University of Ibadan from 1948 to date (Fig. 1). Three distinct periods can be identified; the early boom years when Nigerian universities had great reputation with considerable international flavour in terms of staff and students, from 1948, through 1962 to early 1970s. In the specific case of the University of Ibadan, this represented the University College (UCI) era with the solid foundation and culture of research which peaked with the very high global reputation till the early 1970s. At this time the quality of non-teaching staff was equally impressive, as we heard of highly skilled and dedicated Registrars, Bursars, Deputy Registrars, PARs, SARs etc, who delivered quality services to the

academia.

This period was followed by what is now referred to as the holocaust years which surreptitiously crept in signalling the disdain of the military oligarchy for the radical bent of university academics. From about 1975 signs of neglect of the education sector, along with agriculture began to show. The more the academics and students raised concerns about the direction of the national economy and military high handedness the more the anti-knowledge measures got reinforced. This period was typically between mid-1970s to the late 1990s, with the greatest damage being done in the predominantly military rule years. By the end of the 20th century, the Nigerian university system had been drained of all its great and enviable pre-1970 features, which had then been replaced with all manners of anti-intellectual attributes.

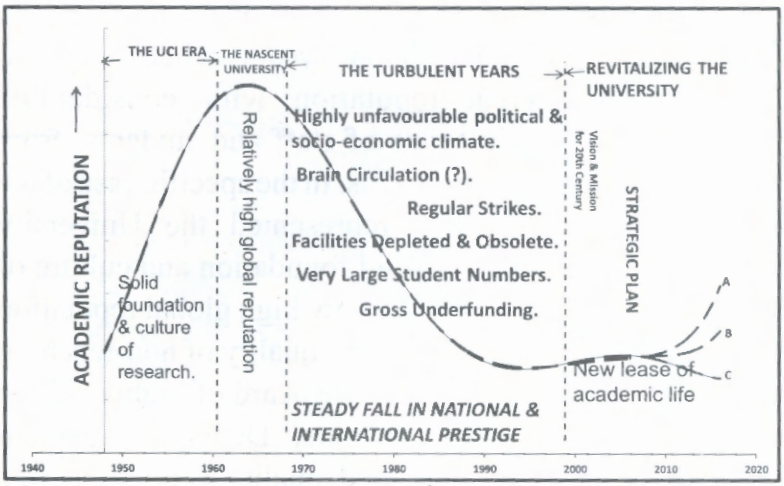

Fig. 1 UNIVERSITY OF IBADAN ACADEMIC REPUTATION (1948-DATE)

The decadent and severely traumatized larger society had finally brought the ivory tower to its level and her knees. The University of Ibadan regards this period as "turbulent years" during which many of her Faculty were drained out to greener pastures. The academia had been decimated almost beyond repairs, but for the eventual re-emergence of civil rule.

By the turn of the 21st Century, there was no way things could be allowed to degenerate further by the global community, and so there were brazen attempts to by-pass government to reach out directly to the institutions. Hence, the new phase/period of tepid renaissance occasioned by the intervention of some philanthropic partnerships from the early 2000, that University of Ibadan has dubbed the years of revitalization with gradual 'reconstruction' or re-tooling which have engendered gradual recovery in later years, signalling a new lease of life!, as clearly indicated in the UI curve of Fig. 1. It is this little but steady and hope-restoring recovery that has allowed the Nigerian university system the semantics of reforms that a number of our universities are witnessing today, in the form of strategic planning, internationalization, democratization of governance structures, etc.

Today, academic and non-academic staff saddle themselves with direct intervention and engagement with government by way of protests to call attention to the near decadence of the academic system. In a way, protests and 'struggle' have now replaced the culture of inquiry, debate and discuss

inherent in the academic cultures of universities. At the same time the culture of academic mentoring had waned, while a good number of young initiates to the academia climbed on board for want of nothing else to do, and not because of the burning passion of the academics of old. From the staff side therefore, various infractions and acts of gross misconduct such as plagiarism, sexual harassment, sorting, moonlighting, grades-for-favour (sexual and monetary), sale of hand outs, patronage of dubious publishing houses, establishment and running of fake publishing outlets, etc, hitherto unknown in the academia then became sad hallmarks of the system. Code of conduct for staff, examination regulations, university handbooks became more and more irrelevant to staff. Hence, the growth in staff disciplinary cases can thus be explained on account of the systematic collapse of academic cultures, and it is becoming increasingly clear that existing provisions fashioned out for ivory towers may no longer be able to cope with the current reality of a failed system. This is also true for the non-academic staff, with wild cases of indolence and idleness pervading the ranks of the once very effective university administration.

A similar scenario is also noted with students, where the nature, scope, content and methodology of students' protests and students' unionism have changed considerably. Students have shifted their attention from ennobling fights for the down trodden to destructive internal demonstrations at which considerable damage is done to the poor infrastructure of the universities, worsening an already bad situation. At the same time, cultism and other very nefarious

crimes (promoted by the off-campus system and overcrowding) invaded the students' ranks in our universities, while the hopeless job situation and crushing unemployment prospect de-motivates students from high hopes and big-thoughts. The sanctity of examinations now means nothing to students, as examination malpractices have become endemic and pervasive, and even encouraged by some parents, right from securing university admission to undertaking final year projects, where acute plagiarism has also infested the ranks of students. The overarching scenario is that more and more students now embrace crimes and misconduct that were alien to the university system before its collapse. In all, the sanctity of the academic environment has been greatly violated and depraved, with the ascendancy of gross misconduct, crime and criminality.

Let me purse briefly here to record my observations concerning Covenant University. This university admitted her first set of students (the Kings and Queens) in 2002, with the vision to "be a leading world-class university, committed to raising a new generation of leaders" with the seven core values of diligence, responsibility, integrity, sacrifice, spirituality, capacity building and possibility mentality. In difference to the new decadent features of the Nigerian university highlighted above, you have maintained your student population at not more than 10,000, even after 14 years of existence. You are fully residential for all students, with adequate feeding in cafeterias. You are known to be a well disciplined community, with zero tolerance for gross misconduct, as

students and staff who have had to be shown the way out would bear bitter witness. You have a good campus ICT network, with almost all your processes and systems e-compliant. Can all these be related to your being established in the post holocaust years, in the era of revitalization? Recall that the first set of Private universities (Babcock, Madonna and Igbinedion) were established in 1999, by which time there was a mass hysteria that we have had enough of the decadence, with initiatives that private universities should come to the rescue, as private nursery/primary schools and private secondary schools had done at those levels. This historical evolution of private universities should not be lost for us to aptly capture the place of private universities in our national education revitalization agenda. There are complimentary achievements of private universities that we shall examine further later in the lecture. It suffices to remark now that Private universities have indeed come to stay. As noted earlier, there are now 61 private universities in Nigeria, and more are in the works. Let us also examine the fortunes of Nigeria's industrial manufacturing sector in trying to gain a better understanding of our underdevelopment.

Understanding the Nigerian Economy

The current reality is that the Nigerian economy is not only just mineral-dependent but it is indeed a mono-cultural economy, with the dominance of oil, to the detriment of other more tradable and productive sectors such as agriculture and manufacturing, which were largely degraded when the oil boom lasted, a manifestation of a 'resource-curse' syndrome (Oyelaran-Oyeyinka, 2006 &

2012). The impact on development is such that when mineral dependence is combined with political rent seeking/inexplicable mindless corruption and wasteful public spending (mainly on recurrent expenditures in excess of 80% of receipts) as we have in Nigeria, the outcome is low welfare capacity, low employment, high inequality and hence high multidimensional poverty or the paradox of "poverty in the midst of plenty", the hallmark of "arrested development". Table 1 gives some basic facts on how Nigeria ranks on different developmental and social indices in comparative perspective (Oyelaran-Oyeyinka, 2012). It is estimated that while about 70% of Nigerians live below the poverty threshold in 1999 (some 69% actually lived on less than $1 per day), the figure was 60.9% by 2014 (NBS, 2014). Indeed, in real terms, according to a study: "Groping in the Dark – Poverty, the Nigerian Experience, the number of Nigerians living in poverty and extreme deprivation rose from 17 million in 1980 to 112 million in 2010 (PUNCH Editorial, February 1, 2016). That the Corruption perception index (Table 1) by Transparency International (TI) ranked Nigeria 130 out of 180 countries, is not the contentious issue, as much as the realization that it is a self-affliction by greedy, reckless and unpatriotic 'power and political elite'- "a small group of people who control a disproportionate amount of *stolen* wealth, privilege and access to decision-making of global consequence" (Oyelaran-Oyeyinka, 2012, PUNCH, 2016). A new analytical and empirical study by a global professional advisory firm, PricewaterhouseCoopers (PwC) has predicted that Nigeria may lose 37% of GDP to corruption by 2030, unless it is 'arrested or killed' (PwC, 2016), as the present government is doing to the chagrin of

the "Power and Political Elite".

Table 1: Comparing Nigeria's Prosperity Assessment Indices

Measure	Rank	Number of Countries Assessed
Legatum Prosperity Index	106th	110
Average Life Satisfaction Ranking	81st	110
Per Capita GDP Ranking	94th	110
WEF Global Competitiveness Index	127th	139
UN Human Development Index	158th	182
Heritage/WSJ Economic Freedom Index	106th	179
TI Corruption Perceptions Index	130th	180
Vision of Humanity Global Peace Index	137th	149

Source: Oyelaran-Oyeyinka, 2012

The report explains that "the cost of corruption is equated to about $1,000 per person in 2014 and nearly $2,000 per person in 2030, and that the boost in average income estimate, given the current per capita income, could significantly improve the lives of many in Nigeria".

Lack of diversification is made worse because the mineral sector is generally dominated by large-scale operations and transnational corporations that do not have substantial linkages with other sectors of the economy. And in the particular case of Nigeria, economic activities are focused

entirely on mineral extraction with little investment in manufacturing in the form of refineries and allied up and down-stream processing activities. In contrast to the characterization of a mineral-dependent economy above, manufactures-dependent and industrialized economies provide greater opportunities for diversification, higher productive capacity, employment and poverty reduction.

Studies have shown that economic development requires structural change from low to high productivity activities and that the industrial sector is the key engine of growth in the development process. Commodity exports can, in the short run, lead to high but evidently unsustainable economic growth, as we have experienced in Nigeria. The work of Oyelaran-Oyeyinka (2006 & 2012) indicates a close synergy, especially with respect to value-addition, between agriculture/natural resources and manufacturing. Indeed manufacturing can provide demand for primary products (as industrial manufacturing feedstock) and stimulate growth in those sectors. Primary commodity processing and resource-based manufacturing were very important for industrialization in second-tier South East Asian newly industrializing states; Malaysia's palm-oil refining, Thailand's agro-processing and Indonesia's plywood manufacturing featured prominently in their transition to globally competitive industrial countries, see Table 2. The impact on economic development and social welfare of the citizenry is indicated clearly in Table 3 which further highlights the indices for mineral-dependent and manufacturing dependent economies.

entirely on mineral extraction with little investment in manufacturing in the form of refineries and allied up and down-stream processing activities. In contrast to the characterization of a mineral-dependent economy above, manufactures-dependent and industrialized economies provide greater opportunities for diversification, higher productive capacity, employment and poverty reduction.

Studies have shown that economic development requires structural change from low to high productivity activities and that the industrial sector is the key engine of growth in the development process. Commodity exports can, in the short run, lead to high but evidently unsustainable economic growth, as we have experienced in Nigeria. The work of Oyelaran-Oyeyinka (2006 & 2012) indicates a close synergy, especially with respect to value-addition, between agriculture/natural resources and manufacturing. Indeed manufacturing can provide demand for primary products (as industrial manufacturing feedstock) and stimulate growth in those sectors. Primary commodity processing and resource-based manufacturing were very important for industrialization in second-tier South East Asian newly industrializing states; Malaysia's palm-oil refining, Thailand's agro-processing and Indonesia's plywood manufacturing featured prominently in their transition to globally competitive industrial countries, see Table 2. The impact on economic development and social welfare of the citizenry is indicated clearly in Table 3 which further highlights the indices for mineral-dependent and manufacturing dependent economies.

Table 2: Countries Export Typologies and Key Development Statistics

Country	Total Value Exports (US millions)*	Value of Top 5 Exports (US millions)*	% Top Five Exports*	Economic Typology	GDP per capita (current US$) 2010	Labour Productivity 2008
Ghana	3,809.9	2,826.5	0.74189	Mineral – High	1,287	3,647.095
Tanzania	4,050.5	2,030.9	0.501349	Mineral – High	527	1,571.786
Kenya	4,463.4	1,870	0.41896	Agriculture-High	769	2,453.106
Botswana	4,693.2	3,923.2	0.8359	Mineral-High	7,513	-
South Africa	71,484.3	29,041.8	0.406268	Mineral-High	7,280	11,984.32
Nigeria	86,567.9	78,548.2	0.907359	Mineral-High	1,224	4,670.761
Thailand	195,311.5	41,953.3	0.214801996	Manufacturing-High	4,679	15,547.95
Singapore	269,832.5	128,708.9	0.4769955	Manufacturing-High	43,324	45,786.45
Hong Kong	329,421.9	109,961	0.3337999	Manufacturing-High	31,877	58,605
South Korea	363,531.1	136,282.8	0.374886	Manufacturing-High	20,757	40,261.08
China	1,578,200	337,900	0.214104676	Manufacturing	-	-

Source: UN Comtrade and International Labour Organisation, Key Indicators of Labour Market (KILM), Oyelaran-Oyeyinka (2012) *Most recent year available

Table 3: Countries with Export Typologies and Key Development Statistics

Country	Economic Typology	Literacy (2010)	Multidimensional Poverty Index (2008)	HDI (2210)	GINI Index
Tanzania	Mineral-High	73.2*	0.367	0.398	34.6
Nigeria	Mineral-High	74.8*	0.368	0.423	43.7
Ghana	Mineral-High	67.3*	0.140	0.467	39.4
Kenya	Agrculture-High	73.6[†]	0.032	0.470	44.9
South Africa	Mineral-High	89.3*	0.014	0.597	65.0
Botswana	Mineral-High	84.8*	-	0.633	63.0
Thailand	Manufacturing-High	94.7*	0.006	0.654	43.0
China	Manufacturing-High	94.2*	0.056	0.663	41.5
Singapore	Manufacturing-High	95.2*	-	0.846	47.8
Hong Kong	Manufacturing-High	-	-	0.862	53.3
South Korea	Manufacturing-High	-	-	0.877	31.4

Source: Human Development Indicators and CIA World Factbook as compiled by Oyelaran-Oyeyinka (2012) GINI Index: is distribution of family income. *Most recent year available.

The Rise and Fall of Industrial Manufacturing in Nigeria

After independence, there were strident efforts to move the Nigerian economy away from commodity exports which the colonialists had foisted on it and began to undertake some industrialization for real growth. The establishment of

State owned manufacturing enterprises (SOEs) was the main feature of policy initiative, with huge capital investment in iron and steel industries and petro-chemical plants, fertilizer plants, etc. by government, as well as encouraging some private industries, in the chemicals and auto sectors – Voxwagon, Peugeot, Leyland trucks etc. There was really an attempt to lay the building blocks or basis for enduring industrialization. The efforts were guided by a succession of National Development Plans in the 70s and 80s. However, with notable defects of non-commensurate development of critical infrastructures, poor management of the SOEs, compounded by growing dependence on import of almost all essential industrial inputs (raw materials, skilled manpower, machinery and spares, etc.), and other fiscal and structural distortions, coinciding with global recession, things started to falter. The near total collapse of the economy which followed can be captured in the national industrialization curve of Fig. 2, tagged the rise and fall of the Nigeria's industrial manufacturing sector. It had been difficult since then for the country to regain its prosperity, as policy summersaults, in the midst of political instability, and collapse of values and virtues became the order of governance. Things appear to have turned full circle today, and history is being repeated. We are back at crossroads, in a manner akin to the plight of the biblical prodigal son.

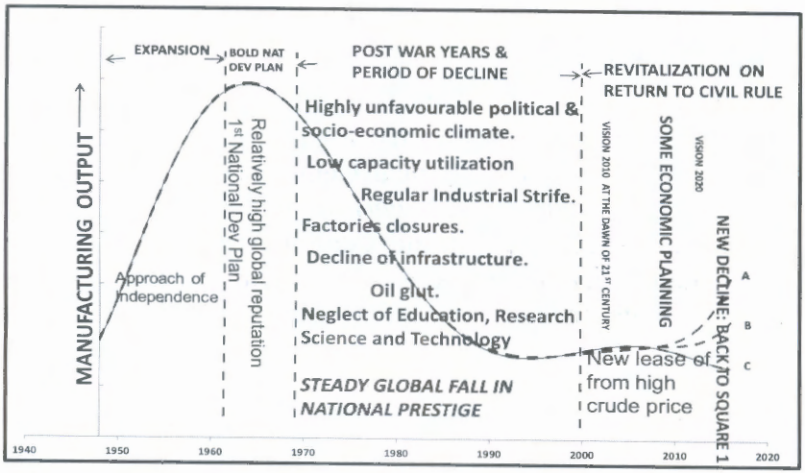

Fig. 2: Rise and Fall of Nigeria's Industrial Manufacturing Sector

The similarity of the curves in Figs 1 and 2 should be obvious. Indeed, Fig. 2 was modelled after Fig.1 in order to link the fortunes/fluctuation of the Nigerian economy with the collapse of its universities, to emphasize the symbiotic relationship between knowledge and development and the vicious cycle of our planlessness and misplaced emphasis. The way forward for Nigeria, as copious examples from South Korea, Singapore, Malaysia, India, and China, not mentioning the industrialized economies of Europe, Canada and the United States have shown, is a well chatted knowledge economy. The hallmarks of such an economy are what we now have to consider.

The Evolving Mandate and Mission of Nigerian Universities

No doubt, the scenario earlier painted of the current realities in the Nigerian university system, propel us to begin to re-evaluate the character of the Nigerian university. We can summarise the implications thus:

- We have had it so rough, and it still remains so:

universities must re-strategize to face the future, hence the need for strategic re-thinking.

- We need a new strong commitment to research: in the entire system, but particularly in science and technology. One cannot but identify a glimmer of hope in our performance in the African Centre of Excellence (ACEs) bid, and congratulate Nigeria for winning 10 slots out of a total of 22 in West and Central Africa. May we then advise that we work hard (especially the government through special financial commitment) to make these centres truly world-class Centres of Excellence for Nigeria and indeed the African continent. The performance of some of the Centres, especially the two Private University-based among them, so far inspire further hope of true recovery (see Table 4 for the list of the ACEs. More information on them is available at the NUC and CVC websites).

S/No	**Lead Institution**	**Project Title**	**Scientific Discipline**
1	Redeemer's University, Ede	ACE for Genomics of Infectious Diseases	Health
2	African University of Science and Technology, Abuja	PAN African Materials Institute	STEM
3	Federal University of Agriculture, Abeokuta	Centre for Agricultural Development and Sustainable Environment	Agriculture
4	Ahmadu Bello University, Zaria	ACE on Neglected Tropical Diseases and Forensic Biotechnology	Health
5	University of Jos, Jos	Phytomedicine Research and Development	Health
6	University of Benin, Benin City	ACE for Reproductive Health and Innovation	Health
7	University of Port Harcourt, Port Harcourt	ACE Centre for Oil Field Chemicals	STEM
8	Bayero University, Kano	Dryland Agriculture	Agriculture
9	Obafemi Awolowo University, Ile-Ife	National Science Technology and Knowledge Park Initiative	STEM
10	Benue State University, Makurdi	Centre for Food Technology and Research	Agriculture

- We need to intensify leveraging on ICT for total governance: (i) embrace integrated ICT solution for all university functions and (ii) mainstream it into governance structures. The first part, I consider one of my major achievements for OAU, through TTC Technologies – a US based Nigerian Diaspora Company, while the mainstreaming aspect is pending, but is inevitable. Rivers State University of Science and Technology could also boast of such stride, and I do hope they keep it up.

I would like to seize the opportunity of this lecture to call on Covenant University to sustain her leadership of the Private University system in the quest to reposition Nigerian universities for local relevance, global visibility and sustainability. The last UTME examination has revealed **Covenant as the Private University of first choice** with the greatest number of applicants, 2,586, though way behind the non-tuition public universities (PUNCH, June 14, p35), reinforcing your other notable accomplishments. These include; highly competitive first class graduates as revealed in the Presidential special scholarship scheme for innovation and development (PRESSID), enviable internationalization through the annual engagement with notable Nobel Laureates.

Universities and Global Societal Challenges

The subsisting global development agenda is encapsulated in the Sustainable Development Goals (SDGs), which the world has adopted to replace and complete the unfinished agenda of the 21st century Millennium Development Goals MDGs, commencing from January 2016. In coming to

terms with these goals (see Box 1) after an exhaustive and excruciating series of negotiations, it was noted that "the negotiations took place at a time of immense challenges to sustainable development of the world, with billions of our citizens continuing to live in poverty and are denied a life of dignity, with rising inequalities within and among countries. There are enormous disparities of opportunity, wealth and power. Gender inequality remains a key challenge. Unemployment, particularly youth unemployment, is a major concern. Global health threats, more frequent and intense natural disasters, spiralling conflict, violent extremism, terrorism and related humanitarian crises and forced displacement of people threaten to reverse much of the development progress made in recent decades. Natural resource depletion and adverse impacts of environmental degradation, including desertification, drought, land degradation, freshwater scarcity and loss of biodiversity, add to and exacerbate the list of challenges which humanity faces. Climate change is one of the greatest challenges of our time and its adverse impacts undermine the ability of all countries to achieve sustainable development. Increases in global temperature, sea level rise, ocean acidification and other climate change impacts are seriously affecting coastal areas and low-lying coastal countries, including many least developed countries and small island developing States. The survival of many societies, and of the biological support systems of the planet, was at risk".

This was the context in which the following landmark declarations were made:

1. "The announcement of **17 Sustainable Development Goals with 169 associated targets**

which are integrated and indivisible. Never before have world leaders pledge common action and endeavour across such a broad and universal policy agenda. We are setting out together on the path towards sustainable development, devoting ourselves collectively to the pursuit of global development and of "win-win" cooperation which can bring huge gains to all countries and all parts of the world.

2. **A commitment to ending poverty in all its forms and dimensions, including by eradicating extreme poverty by 2030.** All people must enjoy a basic standard of living, including through social protection systems. We are also determined to end hunger and to achieve food security as a matter of priority and to end all forms of malnutrition. We will devote resources to developing rural areas and sustainable agriculture and fisheries, supporting smallholder farmers, especially women farmers, herders and fishers in developing countries, particularly least developed countries.

3. **A commitment to providing inclusive and equitable quality education at all levels - early childhood, primary, secondary, tertiary, technical and vocational training.** All people, irrespective of sex, age, race, ethnicity, and persons with disabilities, migrants, indigenous peoples, children and youths, especially those in vulnerable situations, should have access to life-long learning opportunities that help them acquire the knowledge and skills needed to exploit

opportunities and to participate fully in society. We will strive to provide children and youths with a nurturing environment for the full realization of their rights and capabilities, helping our countries to reap the demographic dividend including through safe schools and cohesive communities and families.

4. **Seeking to build strong economic foundations for all our countries**. Sustained, inclusive and sustainable economic growth is essential for prosperity. This will only be possible if wealth is shared and income inequality is addressed. We will work to build dynamic, sustainable, innovative and people-centred economies, promoting youth employment and women's economic empowerment, in particular, and decent work for all. We will eradicate forced labour and human trafficking and end child labour in all its forms. All countries stand to benefit from having a healthy and well-educated workforce with the knowledge and skills needed for productive and fulfilling work and full participation in society. We will strengthen the productive capacities of least-developed countries in all sectors, including through structural transformation. We will adopt policies which increase productive capacities, productivity and productive employment; financial inclusion; sustainable agriculture, pastoralist and fisheries development; sustainable industrial development; universal access to affordable, reliable, sustainable and modern energy services; sustainable transport systems; and quality and resilient infrastructure".

Box 1: Sustainable Development Goals

Goal 1. End poverty in all its forms everywhere
Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture
Goal 3. Ensure healthy lives and promote well-being for all at all ages
Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
Goal 5. Achieve gender equality and empower all women and girls
Goal 6. Ensure availability and sustainable management of water and sanitation for all
Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all
Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
Goal 10. Reduce inequality within and among countries
Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12. Ensure sustainable consumption and production patterns
Goal 13. Take urgent action to combat climate change and its impacts*
Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

World university bodies, including the International Association of Universities (IAU), Association of Commonwealth Universities (ACU), the Association of African Universities (AAU), and indeed the African Union in its Agenda 2063 have keyed into these commitments. Nigerian universities, as members of IAU, ACU and AAU must necessarily follow suit and lead Nigeria's commitment to the SDGs.

The specific challenges for African countries and Nigeria in particular, have been summarized to include, but not limited to the following:

- Human Capital Development to mitigate serious deficits in the number of scientists, engineers, high-level expertise, and leadership. This is a serious "Next Generation Challenge" to which our universities must respond. The Nigerian National Science Technology and Innovation (STI) plan (2012), for example projects to produce 2000 Ph.Ds annually from 2013, yet no serious synergy exists between the Ministries of Science and Technology, Education and Communications Technology, not to talk of collaboration of the other key sectoral Ministries, such as Agriculture, Manufacturing, Transport etc.
- Bridging the innovation skills gap. Exploiting advances in ICT, business intelligence and analytics, leadership/planning, other generic skills, etc.
- Harnessing the youth bulge and the inherent demographic dividend to mitigate dangerously growing youth unemployment and hopelessness.
- Commitment to a Knowledge Economy where STI

drives planning and implementation, and where expertise and knowledge systems - Universities, Research and Innovation Institutes are accorded necessary priority, recognition and practical engagement.

- Harnessing Natural Resources for Sustainable Development, through good governance and transparency in the extractive industry sector, as well as integrated development of the industrial sector, through strategic growth of micro, medium and small scale enterprises and deliberate promotion of all-embracing knowledge-industry-government partnership.

THE CONCEPT OF WORLD-CLASS INSTITUTIONS

The concept of 'world-class' universities is not new, dating back centuries, as many medieval universities were, to all intent and purposes, international in character and flavour with students attending universities in Paris, Sienna and Bologna coming from various European countries and Africa. They were indeed considered 'world-class on account of their international flavour and status. In the same vein, the first generation universities in Nigeria all had a wide international spread of staff and students, and hence fitted into the 'world-class' description. However, "in the past decade (Salmi, 2009) the term has become a catch phrase not simply for improving the quality of learning and research in tertiary education, but also, more importantly, for developing capacity to compete in the global tertiary education marketplace through the acquisition, adaptation and creation of advance knowledge". Hence, the term 'world-class university' can also be taken to connote

globally competitive, elite, flagship, high-performing university.
Until recently, a number of basic features were considered by some scholars to define 'world-class' institutions over the 'regular' ones (Niland, 2007; Altbach, 2004).

These features include:

- highly qualified faculty,
- excellence in research,
- quality teaching
- high levels of government as well as non-government sources of funding
- international and highly talented students
- academic freedom
- well - defined autonomous governance structures
- well - equipped facilities for teaching, research, administration and student life.

See also Salmi (2009) Appendix D for fuller rendition of the characteristics identified by Alden and Lin (2004) and others.

For us to benchmark quality and relevance, we must identify all the essential parameters and matrices that define these attributes. Salmi (2009) has proposed a conceptual model of the alignment of 'key factor/features' (see Fig. 3) to summarise the characteristics of world-class universities into three broad but complimentary groups, namely:

- A high concentration of talent (faculty and students);
- Abundant resources (to offer rich learning environment and to conduct advanced research);
- Favourable governance – that encourages strategic vision, innovation, flexibility, and not encumbered by bureaucracy in decision making and resource management.

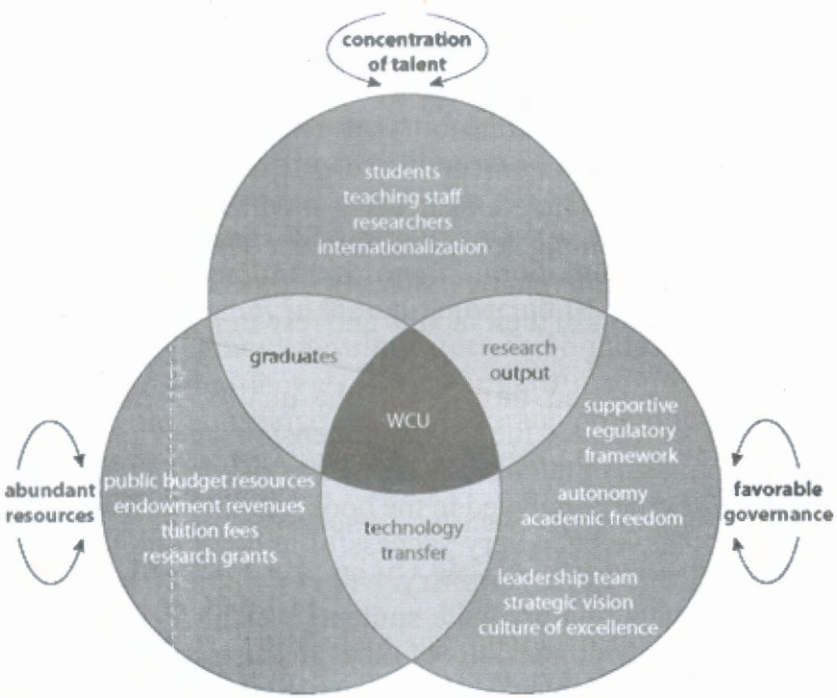

Fig. 3. Characteristics of a World-Class University (WCU): Alignment of Key Factors Source: *Salmi, 2009, p32*

Further work by Altbach and Salmi (2011) on the case studies of 11 universities from China, Hong Kong, Korea, Singapore Malaysia, India, Chile, Mexico, Russia and Nigeria indicate their concurrence with the model. All the case studies systematically illustrate that "a key success factor in building a top research university is the ability to attract, recruit, and retain leading academics", with notable emphasis on internationalization by the East Asian universities. Private universities in Nigeria have benefitted from the rich experience of matured and retired but not tired academics, especially professors from the older

universities. The other strategy was to develop new talent through capacity building of young next generation academics and researchers. This was also the strategy adopted by Nigerian universities impacted by the Carnegie and McArthur Foundations in early 2000. The Presidential initiative on training top first class graduates in the best ranked global universities was also aimed at benefitting from the richness of their faculty and research intensity.

The work revealed further that the quality of incoming students represented the second dimension when looking at "concentration of talent" as a key driver of success. In most of the cases they analyzed in the book, the institutions were found to "have been very successful in attracting the best students in their country. The balance between undergraduate and graduate students was also considered an important dimension of the discussion on talent concentration (Table 5). For example, the University of Ibadan's decision to transform itself to have more graduate students than undergraduates was an indication of its desire to strengthen its research focus and output, which is a key feature toward attaining world-class status. As expected, the more successful research universities tend to have a higher proportion of graduate students. Osarenren (2012) in agreeing with this contention, provided empirical data from the University of Lagos, Nigeria for the 2010/2011 academic session the total student enrolment figure was 33,401 made up of 21,477 for undergraduate students and 11,924 graduate students, with the graduate students consisting 36% of the student population. She noted further that world class universities oftentimes have many of their students from outside the country of operation, since international dimension is increasingly being

considered a key variable in determining institutions status. To her, this explains, to a very large extent, why some universities in Ghana are ranked higher than Nigerian universities, an estimated thousands of students from Nigeria making up the population of students in Ghanaian Universities.This heavy population comes with the attendant huge financial contribution from the students tuition fees. The same parents who resist the payment of any reasonable amount as tuition fees in Nigeria are moving their children in droves to Kwame Nkrumah University of Science and Technology, University of Ghana and University of Cape Coast among others.

Table 5: Weight of Graduate Students in Selected Universities

University	Undergraduate students	Graduate students	Total enrolment	% Graduate students
University of Ibadan	12,139	7,382	19,521	38
Harvard	7,002	10,094	17,096	59
Stanford	6,442	11,325	17,767	64
MIT	4,066	6,140	10,206	60
Oxford	11,106	6,601	17,707	37
Cambridge	12,284	6,649	18,933	35
LSE	4,254	4,386	8,640	51
Beijing University	14,662	16,666	31,328	53
University of Tokyo	15,466	12,676	28,142	45

LSE is London School of Economics and Political Science.
Source: Salmi, Jamil (2009, 2011), Bamiro, O. (2012)

Okebukola (2016), based on the work of UNESCO Expert Panel on Ranking, and the matrices of the major ranking bodies; Times Higher Education (THE), Academic Ranking of World Universities (ARWU), Ranking Web of World Universities (WEBOMETRICs), and African Quality Rating Mechanism (AQRM) identified the following parameters for benchmarking of universities towards enhancing their global ranking:

a. Abundant resources, as expressed by total annual income being about $751,139 (N 255 million) per academic staff
b. Concentration of talents, as expressed by having a staff-student ratio of 1:11.7 and hiring 20% of staff from overseas
c. Research excellence, as expressed by (i) having a total research income of $229,109 (N 102 million) per academic staff, and (ii) publishing 43% of all its research papers with at least one international co-author
d. International studentship and diversity, as expressed by having minimum of 19% international studentship.

Relevance or Fidelity to Mission

Another very illuminating perspective on the attributes of world-class universities was put forward by Oyelaran-Oyeyinka (2013), who relied on parameters that define the practical technological relevance of universities to the mission of national and human development. Four attributes, namely; Knowledge Creation and Knowledge Dissemination, Knowledge Infrastructure, Centre of Inventive Activities and Facilitation of Knowledge Convergent Systems were utilized.

Attribute 1: Knowledge Creation and Knowledge Dissemination: relates to the role of universities and their mandate in raising firm and organizational- level knowledge through research and development activities. Incidentally, this is an area in which African universities have fallen far short. As we shall show later on, there are so many justifications for university-industry-public research

institute (PRI) interfaces, including:

1. Lower R&D costs for companies: recent research conducted on university-industry alliances shows clearly that such collaboration is critical to bringing down R&D costs of companies while achieving a higher innovative output.
2. For the universities, collaboration enhances sources of public and private funding as well as helps partake in technology transfer and human training activities. It also helps enhance focus on secondary research of immediate industrial relevance.
3. Universities interact with PRIs and perform a supportive role in two stages of innovation, research and patenting. In research, universities collaborate with PRIs in providing the requisite knowledge base to the industry or higher research institutions. At the same time, they also utilize the supportive services provided by PRIs, to structure research more towards industrial applications.

Attribute 2: Knowledge Infrastructure

He submits further that world class universities possess key knowledge infrastructure and are characterized by three sets of factors that help guide inter-organizational interactions in a desirable way: institutional features, incentive structures and ancillary support structures to guide collaboration (for more on elaboration, see the text of Lecture at Mkar University, Faborode, 2015).

Attribute 3: Centre of Inventive Activities

Knowledge has heterogeneous sources including those coming out from universities that produce new discoveries in basic and applied research as well as that which flows out

of a combination of what is already known and arrived at through design or production. A world class university acts as a heterogeneous source of inputs and capabilities that feed into the creation of knowledge bases of firms and organizations and recent literature acknowledges the changing characteristics of knowledge bases, in terms of knowledge specialization and integration activities amongst firms.

Attribute 4: Facilitation of Knowledge Convergent System

Patterns of knowledge change are coming to be related to the increasing convergence in the different areas of science and technology. This development poses considerable challenges as well as opportunities for universities, with world-class universities leading the developments.

The Russell Group of Universities (2012) grouped the various approaches that have been used in defining the essential features of a world class university into three:

1. relative performance against a set of measures (for example, ranking within league tables).
2. demonstration of specific critical success factors, as in the work of Salmi and others.
3. delivery of a range of specific outputs and wider benefits (eg Oyelaran-Oyeyinka's), including:

- generating economic and social impacts through a large volume of excellent, leading research
- tackling global challenges through promoting and facilitating multidisciplinary research.
- providing international leadership, advising governments, business, media and accessing the latest breakthroughs in research.

- Knowledge exchange, such as
- forming high-tech innovation clusters of knowledge intensive activity.
- attracting investment from business and international sources.
- exploiting the findings of research and technological breakthroughs.
- learning and teaching outcomes, such as producing highly skilled, employable graduates and postgraduates through the delivery of high-quality research-led teaching and supervision

They noted however that the approaches are interlinked. For example, a world class university may demonstrate critical success factors, which enable it to deliver a wide range of outputs and benefits.

Excellence Accelerating Factors:

In road to academic excellence: the making of world-class research universities, Altbach and Salmi (2011) re-examined the Key-Factor-Alignment Model of Salmi (2009) and identified a number of factors accelerating the race to academic excellence. "The first factor is **relying extensively on the diaspora**, especially when establishing a new institution. As illustrated by the experiences of Pohang University of Science and Technology and Hong Kong University of Science and Technology, convincing large numbers of overseas scholars to come back to their country of origin is an effective way of rapidly building up the academic strength of an institution. **Concentrating on niche areas**, such as the science and engineering disciplines, is another convenient manner of achieving a critical mass more rapidly. Another factor is to **introduce significant curriculum and pedagogical innovations**. Hong Kong University of Science and Technology, for

example, was the first U.S.-style university in Hong Kong, which made it distinct in comparison to the existing institutions operating according to the British model. Higher School of Economics was among the first institutions in Russia to offer a curriculum that integrates teaching and research and to establish a supportive digital library. Yet another approach uses the keyword of this lecture, **benchmarking,** as a guide to orient the institution in its upgrading efforts. Shanghai Jiao Tong University, for instance, anchored its strategic planning work in careful comparisons with leading Chinese universities first and then moved to include peer foreign universities in the benchmarking exercise. These kinds of innovative features—part of the 'latecomer advantage'—are of great consequence for new institutions that need to be attractive enough to entice students away from existing universities and to get them to risk enrolling in an "unknown' programme". I notice that some Nigerian private universities have mastered the art of survival.

The Education Ecosystem

Before proceeding to examine the art of benchmarking, it is very useful, as Altbach and Salmi (2011) found with the outcome of their synthesis, to recognise the importance of the totality of education ecosystem on the quest of a university to attain excellence. In this regard, we note instructively that "the best universities in the world, or in a country, do not operate in a vacuum". An institution's full assessment cannot be made without taking into consideration some significant external factors of what could be called the higher education *ecosystem (see Fig. 4)*. The main dimensions of the ecosystem include the following elements (Altbach and Salmi, 2011, Ahmed, 2015):

- **Macro environment:** the overall political and

economic situation of a country, together with the rule of law and the enforcement of basic freedoms, which influence, in particular, the governance of tertiary education institutions (appointment of university leaders), their level of funding, academic freedom, and safety in the physical environment;

- **Leadership at the national level:** the existence of a vision and a strategic plan to shape the future of tertiary education and capacity to implement reforms;
- **Governance and regulatory framework:** the governance structure and processes at the national and institutional levels that determine the degree of autonomy that tertiary education institutions enjoy and the mechanisms of accountability they are subject to (especially important from the viewpoint of the human resources policies and management practices that allow emerging research universities to attract and keep qualified academics);
- **Quality assurance and framework:** the institutional setup and the instruments in place for assessing and enhancing the quality of research, teaching, and learning;
- **Financial resources and incentives:** the absolute volume of resources available to finance tertiary education in a country (mobilization of public and private resources) and the mechanisms through which those resources are allocated to various institutions;
- **Articulation and information mechanisms:** the links and bridges between high schools and tertiary education and the pathways and procedures integrating the various types of institutions that constitute a tertiary education system, all of which affect the academic characteristics of incoming

students and their academic results as they move through the tertiary education system;

- **Location:** the quality of economic, social, and cultural characteristics and infrastructures available in the specific geographical setting of a tertiary education institution that determine, in particular, its ability to attract outstanding scholars and talented students; these characteristics include public services, recreational amenities, housing, transportation, and environmental quality;
- **Digital and telecommunications infrastructure:** the availability of broadband connectivity and end-user devices to support the delivery of educational, research, and administrative services of tertiary education institutions in an efficient, reliable, and affordable way.

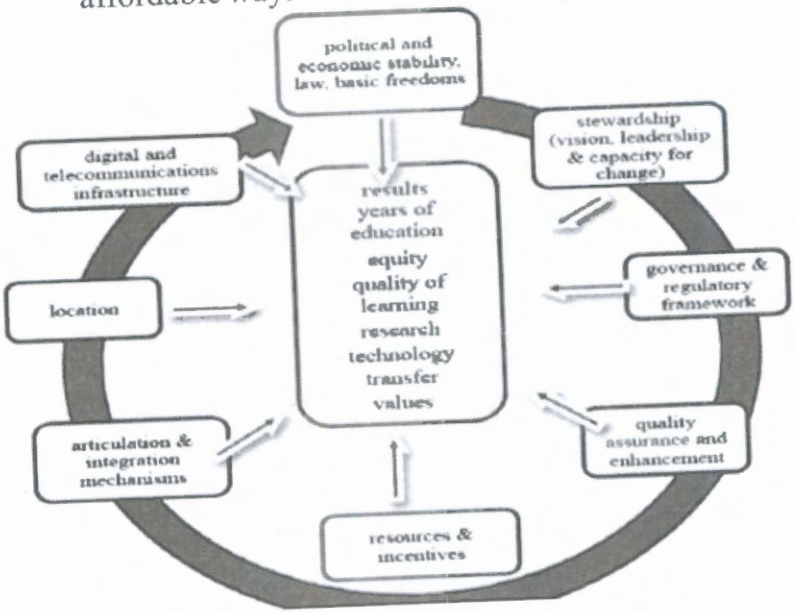

Fig. 4: Ecosystems Factors Determining University Performance

Benchmarking

Criticism of university rankings and the concept of world-class universities continue to rage. At the last Going Global conference in South Africa in May 3-5, 2016, a session was devoted to whether "rankings were helping or harming nation building". The contention of critics is that rankings are largely focussed on research power and reputation rather than on the wider issues of civic engagement and economic growth. In "the flaws in the world-class university paradigm" (University World News, UWN, No 396, 15 January 2016), Bekir Gur quoted John Douglass of the University of California, Berkeley to have remarked in his new book "The New Flagship University", that "global rankings distort the prime mission of universities which is to focus on regional and national needs and service to society". However, Gur noted that "many have criticised the pernicious effects of global university rankings, nonetheless, the same rankings are perhaps the most powerful tool influencing national higher education policies around the world". In a way, rankings have come to stay, and cannot be ignored, while a dynamic process of refining and perfecting them continues. We saw earlier in the approach of Oyeyinka-Oyelaran (2012) that adequate attention has been given to relevance or fidelity to mission, as a radical departure from the dominance of 'quality' in the rankings. In the same edition of UWN, Francisco Marmolejo, Lead, Global Solutions Group on Tertiary Education at the World Bank argued "if benchmarking is more useful than ranking" in helping universities to move up the ladder of global visibility. He contends that "the benchmarking approach allows for meaningful comparison of institutions that is based on their own needs, and includes some elements that are already incorporated in rankings, but allows institutions to customise comparisons based on their performance vis-a-vis the best, average or lowest performing

institutions of their type, and makes it possible for institutions to define their own niche, and reduces the pressure on them to blindly follow a unilateral definition of a 'good institution'. Though well said, some elements of ranking are still implied, and benchmarking is only a step in the institutional transformation agenda, as illustrated in Fig. 5 (Okebukola, 2010).

The helpful sequence of self-explanatory activities suggested by Okebukola (2010) could be followed by nations or institutions that want to embark on the path towards global visibility (or world-class) status. Care should be taken in selecting the benchmark institution. Questions may arise in this. Why a particular institution? Is it merely because of reputation, or their missions and visions are similar to yours? Should it be an institution in the north like Oxford that is 900 years old, or like the 375 years old Harvard; or, an institution in the south that has challenges similar to yours but is doing well, like the National University of Singapore (92 years) and the University of Cape Town (183 years), or comparative regional universities as in the Shanghai Jiao Tong University example discussed earlier?.

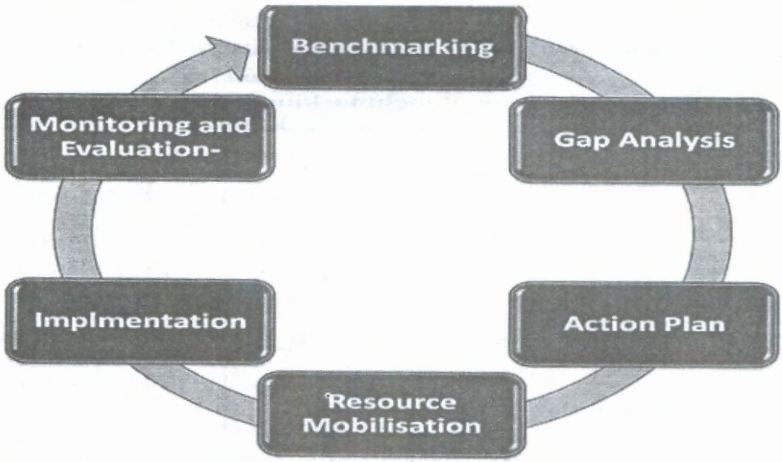

Fig. 5: Steps to Attaining Word-Class Status
Source: *Okebukola, 2010*

Okebukola (2010) had studied the gaps between a 'median-ranked' Nigerian university and one 'median-ranked' world-class university each in the United States and United Kingdom (Fig. 6). It is only in community service, howsoever defined, that the Nigerian universities came anywhere near their US and UK counterparts.

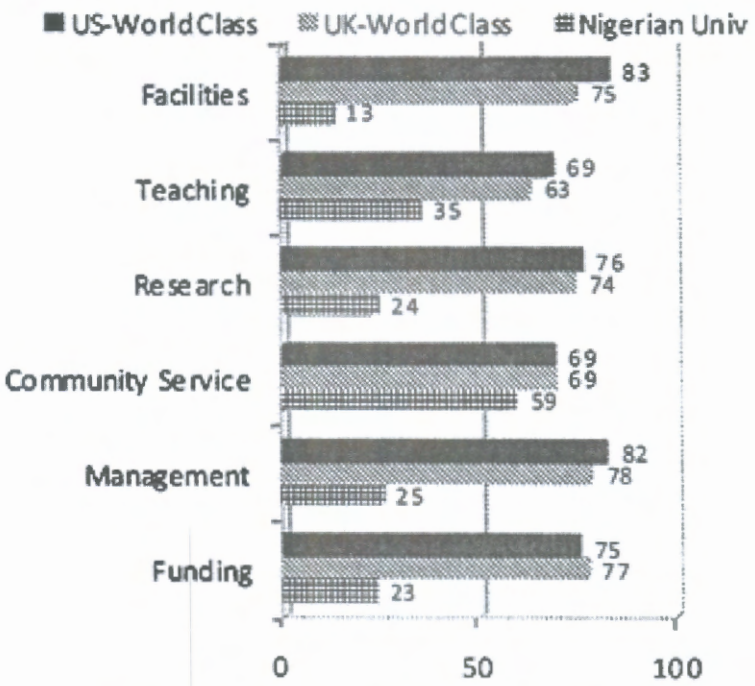

Fig. 6: Gap Analysis Between Nigerian University and World-class UK and US Universities
Source: *Okebukola, 2010*

We can also identify the gaps in the parameters he presented earlier to show that no Nigerian university measured up in any of the metrics of global ranking. For example considering abundant resources, Ahmadu Bello University, with the largest

academic staff population of 1,976 this academic session based on NUC statistics, would require **N**444 billion per academic session, whereas it currently does not receive more than **N**3 billion. Covenant with 442 academic staff in 2013/14 session should have received about **N**112.7 billion. No wonder our AVCNU Conference keynote speaker noted thus: "The level of collaboration and partnership between African universities is inadequate, whereas, no African university has the capacity to compete on its own at a global level; the only way that we can equalize the global playing field is if African institutions partner with each other". This prompted the conference, in its communiqué, to recommend as follows:

A) The time has come for African universities to create a global academy of commons – a global community of scholars, who although responsive to the local and national needs of our society, nevertheless transcend national polities to practice a 'science' that produces knowledge for the collective of the human community. Ultimately, we need an African higher education system that is accessible and transformed, nationally responsive and globally competitive, diverse and cosmopolitan. Such a system would allow our universities to develop and imbibe the corpus of scientific knowledge, apply it to our context, re-imagine and innovate it, and contribute it back to the global academy. It will also allow us to produce graduates who are simultaneously African and human; citizens of both the nation and the world. Nigeria and South Africa Vice Chancellors must partner to provide leadership for the emergence of this African Higher Education Commons, for it is only through such a well crafted alliance that we can compete with the best global universities.

B) To bridge the knowledge gap and close the global development divide, African governments, especially Nigeria, MUST increase the level of their investment in funding higher education, as well as embrace bold initiatives for diversified funding by other stakeholders. One of such is to mobilize resources from the private financial sector with government collateral support and institutional collaboration for the recovery of student loans. A necessary corollary is the adequate provision for scholarships and bursaries for brilliant and indigent students to remove inequity. The universities too need to accentuate their internal revenue generation through activities to raise resources from alternative sources, including entrepreneurial and commercialization engagements, uptake of applied research outputs, endowments, philanthropy, etc.

Benchmarking the Nigerian Research Base

The AVCNU had commissioned some studies of the Nigerian research base to benchmark the present state of research and its impact in the effort to adopt some proactive measures to enhance the research performance of Nigerian universities. It covers the following ***4 major strategic areas:***

- *Research output, growth and impact report*
- *Brain circulation report and list of Nigerian researchers abroad*
- *Research collaboration report*
- *Academic-corporate collaboration and knowledge transfer report*

The full reports (Pan, Lei, 2015a-d) are available on the CVC website, but just one snippet of the findings is briefly discussed here, the overall publications output and growth from 2004-2013, with some comparator countries, Fig. 7. The comparator

countries chosen include countries involved in similar studies being undertaken by our research partners, Trust Africa and the British Council, namely, Ghana, Uganda, and Tanzania. Also included are the two research leaders in Africa, South Africa and Egypt. South Korea and Malaysia were also chosen to represent those at par with Nigeria in the past, but have now used research and knowledge to advance their economies, to make up the seven comparator countries. Figure 7 shows that Korea leads the pack followed by South Africa and Egypt in sheer volume of publications. The compound annual growth rate for Nigeria is 11.99%, representing some progress since 2004, with the leading research field being agriculture and biological sciences. Please access the full report, which time cannot permit me to reveal in full at this lecture.

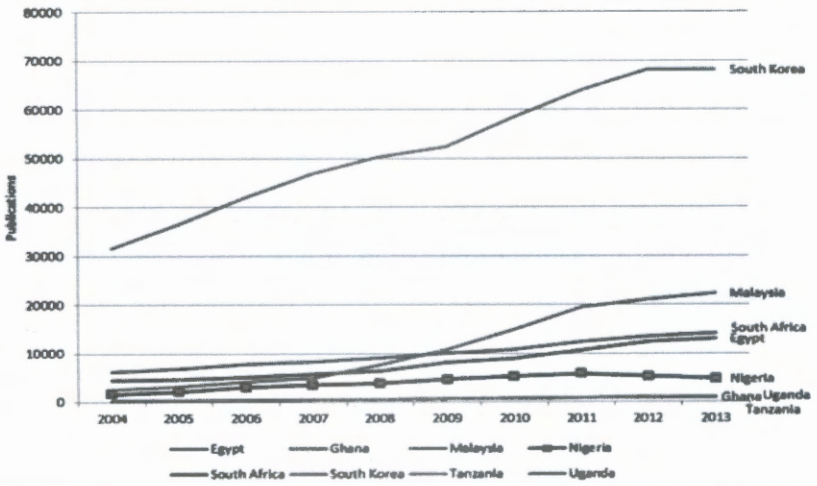

Fig. 7: Benchmarking Nigeria's Research Output and growth

What I can add is our **(CVC/AVCNU) Strategic initiative on** the Nigerian Research and Education Network (NgREN) which is to enable Nigerian universities leverage

on ICT for teaching, research and management of services. Also, the Nigerian Elsevier Partnership (NEP) is designed to complement this initiative by granting access to global e-resources. While the NgREN provides connectivity and internet bandwidth for optimal resource sharing at cheaper cost, the NEP grants access to journals, and books, enhanced citation and visibility, etc using the consortium model and publishing and hosting support for Nigerian journals (Table 6).

Table 6: Nigerian Journals Selected To Join NEP Production And Hosting Initiative

Title	ISSN
Nigeria Medical Journal	0300-1652
Journal of the Nigerian Mathematical Society	0189-8965
Nigerian Food Journal	0189-7241
Nigerian Journal of Genetics	0189-9686
Nigerian Journal of Pharmaceutical Sciences	0189-823x
Nigerian Journal of Physiological Sciences	07945-859x

The aim is to strengthen local journals and enhance their global visibility (access to network of over 400,000 scientists worldwide). I am happy to acknowledge that the Vice Chancellor of Covenant University is one of the key drivers of this initiative as the Chair of our ICT sub-committee. Sadly, I must place on record that it is unfortunate that we are not getting adequate support for

these, otherwise, laudable initiatives.

Science, Technology and Innovation: Convergent Technologies and Latecomer Advantages

There are three opportunities that can help accelerate making the proposition of knowledge-based national development using our universities a reality: global advances in science, engineering, technology and innovation; the creation/emergence of regional markets; and the emergence of a new crop of entrepreneurial leaders dedicated to the Africa's economic improvement. Advocates of scientific and technical research in developing countries have found champions in the innovation platforms of nanotechnology, biotechnology, information and communication technology (ICT), and geographic information systems (GIS). Through these platform technologies, Nigeria has the opportunity to promote its agenda concurrent with advances made in the industrialized world. This opportunity is superior to the traditional catching-up model, which has led to slower development and kept African countries from reaching their full potential. These so called "convergent technologies", as will be espoused later, are able to enhance technological advances and scientific research while expanding storage, collection, and transmission of global knowledge.

What can we additionally learn from some emerging economies? At least three key factors contributed to the rapid economic transformation of emerging economies. First, these countries invested heavily in basic infrastructure, including roads, schools, telecommunications, energy, water, sanitation, irrigation, and clinics, with

the investments used to serve as foundations for technological learning. Second, they nurtured the development of industrial manufacturing mainly in small and medium-sized enterprises (SMEs). Building these enterprises necessitated the development of local vocational competence in operation, repair, and maintenance and hence a pool of local technicians and tech-servy artisans. Third, government supported, funded, and nurtured higher education institutions as well as academies of engineering and technological sciences, professional engineering and technological associations, and industrial and trade associations. Since the early 1960s for example, South Korea has transformed itself from a low-income agrarian economy into a middle-income industrialized "miracle", with highly motivated young high-tech population. Access to broadband is challenging Africa's youth to demonstrate their creativity and the leaders to provide a vision of the role of infrastructure in economic transformation. The emergence of Safaricom's M-PESA service—a revolutionary way to transmit money by mobile phones—is an indicator of great prospects for using new technologies for economic improvement. In fact, these technologies are creating radically new industries such as branchless banks that are revolutionizing the service sector.

Knowledge Convergent System

The emergence of ICTs and other new technologies has helped in the coming together of several technological techniques to provide wider applications in industry and society (see Table 8).

Healthcare	ICT infrastructure
◣ Nanoscale machines for medical intervention ◣ New imaging techniques ◣ Biochips ◣ Biosensors ◣ Biomaterials ◣ Pharmaceutical genomics ◣ Regenerative medicine ◣ Targeted drug delivery and release	◣ Environmental monitoring through ambient devices (e.g hazard alert, alert of pollutants, etc) ◣ Mobile devices with integrated medical services ◣ Software for multiphenomena and multiscale simulations
Environment and energy	**Robotics**
◣ Addressing problems at a systems level ◣ Development of new technologies for the generation, storage, transport and use of energy	◣ Neuro-prosthetics – e.g bionic hand or an adaptive retina implant ◣ Emotional-intelligent agent technology ◣ Homecare robots
Education	**Military**
◣ Learning support through converging technologies	◣ Development of new technologies for the response to biological, chemical and explosive threats ◣ War fighting systems

Source: OECD, Information Technology Outlook 2006, based on Roco and Bainbridge, 2003.

The term "convergence technologies" (CT) has been used to describe this phenomenon defined as "the synergistic combination of nanotechnology, biotechnology, information technology and cognitive sciences" (Roco and Bainbridge, 2003), and GIS (Juma, 2011). For instance if we take the biological sciences and biotechnologies knowledge base, there is a convergence of techniques and practice that encompass genomics, molecular biotechnologies, agricultural and industrial biotechnology. In the material sciences and technologies, we have advances

in nanotechnology, smart materials, high-performance materials and advanced catalyst materials. The benefits attending to convergence include new organizational production structures and gains in communication.

The main point to stress in the analysis of knowledge is that this observed scientific and technological convergence has brought about fruitful vantages to the different fields of science but more important for developing countries, these technologies are being applied in traditional sectors in ways that could not be imagined a decade ago, and these have salutary implications for the transformation of universities and research centres to top-class entities. Relatively technologically backward countries have gained foothold in regulated and competitive markets and are realizing significant export revenues from traditional sectors such as fish, cut flower and fruits. DNA techniques are being applied to convert oil palm, once known only as a consumption item to produce bio-diesel; molasses from sugarcane is used to produce ethanol and methanol all of which have great potential to reduce reliance on and to replace petroleum based fuels.

These new and emergent *distributed knowledge bases* will translate to new forms of industrial organization in developing countries as well as new institutional arrangements. For instance, the fish farming sector, a notably low-tech activity presently employs new materials, design concepts employed in satellite communications, and sonar technologies among others. Another area of significant change is the inclusion of advanced digital techniques in what used to be purely mechanical

instruments. While scientific instruments may have become costly in certain respects, they provide opportunities for transforming traditional sectors in which developing countries have comparative advantage. One of the most promising applications of nanotechnology is low-cost, energy-efficient water purification. Nearly 300 million people in Africa lack access to clean water. Water purification technologies using reverse osmosis are not available in much of Africa, partly because of high energy costs. Through the use of a "smart plastic" membrane, the U.S.-based Dias Analytic Corporation has developed a water purification system that could significantly increase access to clean water and help to realize the recent proclamation by the United Nations that water and sanitation are fundamental human rights. The capital costs of the NanoClear technology are about half the cost of using reverse osmosis water purification system. The new system uses about 30% less energy and does not involve toxic elements. The system is modular and can be readily scaled up on demand. It is gratifying to see that RMRDC has already keyed into the use of some of these new materials in its engagement in the design, synthesis and characterization of nano-porous materials for water purification. Collaboration with the new Pan African Materials Institute (PAMI) at the African University of Science and Technology (AUST) also in Abuja will enhance this positive development.

Knowledge Networks and Industrial Research Alliances: the Triple Helix

The key role of STI Policy is to fuel Industrial progress. Though innovation fuels manufacturing, innovation is not

an activity for or by itself, hence we need to properly establish this link; a firm innovates to create a new product, process or gain a new market superior to what exists in quality and price. STI policy essentially links the laboratory, the design offices to the factory through the convergence of scientists, engineers, entrepreneurs and consumers to create new markets locally to raise GDP. Thus, we need to build a professional alliance to turn the current crisis in Nigeria into an opportunity to revive industrial production.

The emergence of the World bank sponsored African centres of Excellence and their performance has ignited hope that we really can have top rated research institutes that will be able to compete favourably with others in Africa and indeed the world. The ACEs are to be developed as top rated research universities, in consonance with the Bank's notion of world class universities. To the World Bank, "All world-class universities are research universities, and they always play a critical role within the tertiary education system in training the professionals, scientists and researchers needed for the economic development and generating new knowledge in support of the national innovation system" (World Bank, 2002).

It is instructive as indicated in Redeemer University Vice Chancellor's 7th Convocation Address that the University Centre for the Genome of Infectious Deceases (ACEGID) is instrumental in the diagnosis of the first case of Ebola virus decease (EVD) in Nigeria. ACEGID scientists also successfully sequenced the Ebola virus from Sierra Leone, and have indeed developed a rapid response diagnostics tool

that could detect Ebola virus in 15 minutes. Publications from their work are finding space in top impact journals such as *Science, Nature, New England Journal of Medicine* and *Cell*. They have so further assisted the University to secure global research partnership and funding in excess of three (3) million Dollars, that may soon position it as an international hub of academic and research excellence in microbial infections and human genomics. Indeed, there is much to celebrate and learn from this development.

The ACE centre in Benue State University is for food technology and research, and I see it as a potential ally of RMRDC. Working with the Federal University of Agriculture also in Makurdi, they will take advantage of the convergence knowledge and practices in genomics, molecular biotechnologies, agricultural and industrial biotechnology, as well as, material science and technology advances in nanotechnology, smart materials, high-performance materials and advanced catalyst materials, etc to chart new frontiers in food science and technology. Benue State being the conceptual food basket of the nation, can have a strategic partnership with the Federal Government/RMRDC and its three universities can be positioned as the agriculture and food processing and technology centre of Nigeria. Let me briefly recall a Ph D thesis I examined late last year at the Federal University of Agriculture. It was on Food packaging, a very good work with great promise of industrial uptake. I recommended that the University pursue this prospect so that the benefit of that research will not remain on the shelf but permeate into practice in the community and the nation at large. That is what universities are there for.

Partnerships between research institutes (universities or otherwise) and industries are crucial to encourage increased research and promote innovation. Recent efforts in China to reform national innovation systems serve to demonstrate the importance of "motivating universities and research institutes (URIs), building up the innovative capacities of enterprises, and promoting industrial linkages." Trends in research-industry linkages (RILs) illustrate three ways such collaboration has been experienced in the Nigerian agro-food processing sector, and represent glimpses of hope demonstrating that universities and firms in Nigeria can be made to work together to build capacity for innovation. The first mode of RIL identified as "principal agent demand-driven" is the UNAAB-Nestle Soyabean Popularization and Production Project which has been a case of interaction between the University of Agriculture, Abeokuta (UNAAB) and Nestle Nigeria since 1999. Nestle employed UNAAB to help address its challenges in demand for soybeans. Nestle Nigeria employs about 1,800 people and soybeans are one of its major raw materials used especially for baby foods. The firm has been the only major external donor and industrial partner with UNAAB. A number of benefits derived from the linkage. Learning by interaction between UNAAB scientists and Nestle Nigeria farm managers and farmers contributed significantly to building capacity for innovation especially at the farm level. It produced improved quality seeds and grains and a new process for growing soybeans. Nestle Nigeria saved costs by finding alternative to the inefficient Nestle Nigeria farms located in northern Nigeria and secured a regular supply of high-quality soybeans from the linkage farmers. The system boosted UNAAB's extension activities resulting in the

popularization of its model of soybean cultivation in southwest Nigeria, which in turn became an important soybean producing region. Overall, the linkage improved the livelihoods of the people in the region and enhanced technology adoption for soybean processing, especially threshing technology.

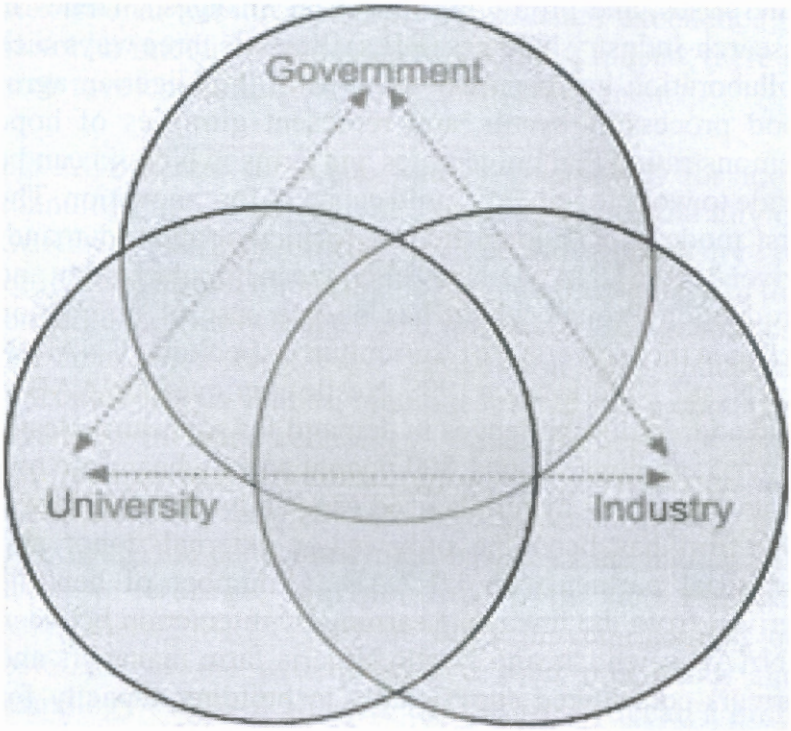

Fig 8: The triple helix model: Knowledge/Research – Industry – Policy/Government Partnership

The second is the "multi-stakeholder problem based" Cassava Flash Dryer Project, which involved RMRDC. The

project involved one large privately owned integrated farm (Godilogo Farm, Ltd.) that had an extensive cassava plantation and a cassava processing factory; three universities including the University of Agriculture, Abeokuta, the University of Ibadan, and the University of Port Harcourt; the IITA; and RMRDC. The main outcome is the celebrated local design and fabrication of the first medium-sized cassava flash dryer in Nigeria. The technological learning generated was unprecedented in local fabrication of agro-food processing equipment, and there is evident improvement in capacity for innovation in agro-food processing. In the course of the project, there was interactive learning through experimentation by the research team. The impact of government policy through the Presidential Initiative on Cassava production and Export (PICPE) and government support for the project through RMRDC demonstrated the crucial role of government as a mediator or catalyst for such linkages and innovation, with knowledge flows and user feedbacks also playing important roles in the success of the partnership – a practical demonstration of the Triple Helix (Fig. 8).

Understanding and learning from the Korean Miracle

To be able to draw important lessons from the superior performance of South Korea, Table 8 tries to explore some of the key policy actions adopted by Korea over the years. The picture here concurs with the macro-environment explanations of Juma (2011) concerning the central role of Government in instigating and sustaining the triple helix of university-industry-government mediated collaboration. As I had noted in another forum (Faborode, 2014):

Programme	Purpose/Rationale	Year
Excellent Research Centre (ERC)	Enhance and accelerate technological development capabilities and innovation of firms. Well qualified R&D staff and activate basic research capabilities. 30 since 2003	1989
Regional Research Centre (RRC)	Extends ERCs to regional level. Conduct research strategic regional technology areas. 112 since 2002 in 15 regions	1995
Technology Innovation Centre (TIC)	Develop region-specific technologies by aggregating the technological regional resources. Activate start-ups and promote innovation in SMEs 39 by 2003, merged with RRC in 2005	1997
Technology Business Incubator (TBI)	Encourage creation of start-up Coys, linked to universities. 166 by 2003. 930 Coys applied for funds, 322 succeeded.	2000
Business Incubators (BI)	Selects business incubators in universities, RDIs and Private Coys to support entrepreneurs to enhance star-up rate. By 2003, 283: 238 in Universities, 20 in RDIs and 7 in Private Coys & 18 others.	1993
The Techno-parks	Makes virtuous cycle out of technological innovation: university idea-technology development-firms innovation & commercialization-profit re-investment in technological development. 6 by 1996.; additional 6 since 2003 for intensification.	1997
Industry-University-Institute Consortium	Boost technological capabilities of SMEs thro knowledge support. At least 7 SMEs to a regional university to form a consortium. By 2004, 218 consortia formed to support 2,900 SMEs. Between 1993-2000, from 1421 SMEs, 1911 patents applied, 4852 prototypes & 3,350 process improvement.	1993

Summary

I would like to conclude this lecture as follows, that:

1. "the embrace of industrial production or manufacturing is a compelling logical way forward for the Nigerian Economy" and this must be the

feature of the post-oil era.

2. "research, new knowledge/innovation and partnerships are the keys to unlocking the inherent potentials of the Nigerian university system, as many aspire to attain "world-class" status.
3. "there is a need to build an effective platform and alliance for the revitalization of the Nigerian higher education system and identifying appropriate reform issues and strategies related to its diversity, differentiation and quality assurance for greater relevance to the country's emancipation and sustainable development". Benchmarking will be an appropriate tool for institutions in this quest.

References

1 **African Union (2012).** Harnessing the Demographic Dividend for Africa's Socio-Economic Development. State of the African Population Report, Addis Ababa: 2012, 57p

2 **Ahmed, Hanaa Khadri (2015).** Strategic approach for developing world-class universities in Egypt. Journal of Education and Practice, Vol 6(5): 125-145

3 **Alden, J. and Lin, G. (2004).** Benchmarking the characteristics of a world-class university: Developing an International strategy at university level. London: Leadership Foundation for higher education.

4 **Altbach, Philip. G. 2004.** "The Costs and Benefits of World-Class Universities." *Academe* (January-February).http://www.aaup.org/AAUP/CMS_Templates/ Academe Templates/ Academe

Article.aspx?NRMODE=P/

5 ***Altbach, Philip G.; Salmi, Jamil. (2011).*** The Road to Academic Excellence: The Making of World-Class Research Universities. *Washington, DC: World Bank,* Directions in Development Series.

6 **Anaka, Bill (2014).** Development of packages for marketing of some selected fresh horticultural products. Ph.D Thesis, University of Agriculture, Makurdi.

7 **Bamiro, Olufemi A. (2015)**. The Nigerian university system and the challenges of building a world-class science and technology institution. Convocation Lecture, August 14 2015, Modibo Adama University of Technology, Yola, Nigeria. 79 p.

8 **Bamiro, Olufemi A. (2012).** Sustainable funding of higher education in Nigeria: funding models. Paper presented at the CVC Consultative HE Policy Dialogue, Abuja, Nigeria, 6-7 Nov, 2012.

9 **Faborode, M. O. (2015).** Building a world class university: Imperatives, realities and strategies. Convocation Lecture, Unioversity of Mkar, Mkar, Nigeria, November 27, 2015, 35p

10 **Faborode, M. O. (2014).** Enhancing university-industry research partnership. Keynote Paper, 8th WARIMA International Conference, Elizade University, Ilara-Mokin, Nigeria. Nov. 24-26, 2014

11 **Juma, Calestus (2011).** The new harvest: agricultural innovation in Africa. New York: Oxford

University Press Inc, 268 p.

12 **PwC, (2016). Price Water House and Coopers**

13 **Niland, J. (2007)**. The challenge of building world-class universities. In the World Class University and Ranking: Aiming beyond status, ed. J. Sadlak and N. C. Liu. Bucharest: UNESCO-CEPES.

14 **Okebukola, P (2010)**. World-Class Status for Nigerian Universities: Goals, Challenges and pathways. *In* 50 years of University Education in Nigeria: Evolution, Achievements and Future Directions, pp. 535-551. Okojie, J, Oloyede, I, Obanya P (Eds). University of Ilorin and National Universities Commission.

15 **Osarenren, Ngozi (2012).** Future and relevance of Nigerian universities and other tertiary institutions: Towards HE transformation. Paper presented at the CVC Consultative HE Policy Dialogue, Abuja, Nigeria, 6-7 Nov, 2012.1

16 **Oyelaran-Oyeyinka, Banji (2012).** The power elite, Nigeria's mineral economy and arrested development. Meiden Convocation Lecture, Caleb University, Imota, Lagos, 29 p

17 **Oyelaran-Oyeyinka, Banji (2013).** Towards Relevant World Class African Universities: A Model. Paper presented at the Conference of the Committee of Pro-Chancellors of Nigeria on "Repositioning Nigerian Public Universities for Global Competitiveness in the 21st Century" in Abuja, 1-2 July 2014.

18 **PUNCH (2016).** "Groping in the Dark – Poverty, the Nigerian Experience", Editorial, The PUNCH Feb 1.

19 **Roco, M. C. and Bainbridge, W. S. (2003).** Converging technologies for improving human performance: Nanotechnology, biotechnology, information technology and cognitive science. NSF/DOC-sponsored report. Dordrecht, The Netherlands: Kluwer Academic Press (now Springer), 482 p.

20 **The Russell Group of Universities (2012).** Jewels in the crown: The importance and characteristics of the *UK's world-class universities, Russell Group Papers - Issue 4*

21 **Salmi, Jamil. (2009).** The Challenge of Establishing World-Class Universities. *Washington, DC: World Bank,* Directions in Development Series. http://portal.unesco.org/education/en/files/55825/12017990845Salmi.pdf/Salmi.pdf.

22 **Tagoe, C. N. B. (2012).** Future and relevance of Nigerian universities and other tertiary institutions: Towards higher education transformation. Paper presented at the CVC Consultative HE Policy Dialogue, Abuja, Nigeria, 6-7 Nov, 2012.

23 **World Bank (2002).** Constructing Knowledge Societies: New Challenges for Tertiary Education. *Washington, DC: World Bank.*