

“ACHIEVING ECONOMIC RECOVERY AND GROWTH PLAN(ERGP) THROUGH SCIENCE AND TECHNOLOGY” BEING A CONVOCATION LECTURE DELIVERED BY PROFESSOR CHINEDU NEBO, CON, AT THE CONVOCATION OF FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI ON FRIDAY, 5TH APRIL, 2019.

PROTOCOLS.

AN OVERVIEW

The theme assigned to me simply looks at how science and technology aid everyday life and national growth and development. Fact is: modern life without science and technology is inconceivable. The importance of Science and Technology in our lives and national development are both intertwined and total, as no aspect can be meaningful without the inputs of science and technology.

In order to understand the contribution of science to national development, I would like to define science and technology. Science is the study of knowledge which can be made into a system and usually depends on seeing and testing facts and stating general laws. Technology on the other hand is the practical application of scientific knowledge or inventions to the solving of everyday problems or facilitating tedious human activities.

I believe it is only proper we take a bearing and trajectory from an understanding of the world of science itself, then technology. And thereafter, establish the nexus between the two and extrapolate to national growth and development.

There is no aspect of modern existence that is free of the impact of science and technology. Science and technology are important for modern living because they influence most aspects of everyday life, including food, energy, medicine, transportation, leisure activities and more. Science improves human life at every level, from individual comfort through national to global issues.

Scientists attempt to achieve their goals by either providing information (i.e., educating policy makers about science) or by championing particular policy outcomes (e.g., by using persuasive arguments, political pressure, or positive incentives to achieve particular policy goals).

Science is about a whole lot more than that and to sum it up we believe that science is a way of helping the brain grow in finding new knowledge and helps us to defeat our curiosity of how the world develops and works today. Science is important because it has helped form the world that we live in today.

Scientific knowledge allows us to develop new technologies, solve practical problems, and make informed decisions — both individually and collectively as a nation. Because its products are so useful, the process of science is intertwined with those applications: New scientific knowledge may lead to new applications.

Science aims to explain and understand. Science as a collective institution aims to produce more and more accurate natural explanations of how the natural world works, what its components are, and how the world got to be the way it is now.

Science and technology are both closely related terms. Scientific studies and progress result into wonderful technologies! Science and technologies are not only subjects. Rather, they are the means that provide us with ways and objects that help us live a better life.

While science is the study of entire universe from the cellular level to the highest level, technology is the application arising from science. Hence, we need both of them in our life. You can also relate to science and technology by seeing the later as the application of the former – a perfect blend of theory and practice, you dare say!

While science involves explanation, phenomenon, analysis and predictions on various subjects, technology is something that simplifies all these things. For instance, computers help scientists by storing big data, analyzing and organizing it. Thus, science works better and keeps progressing when technology keeps on supporting it.

Almost everything that we see around us is the gift of science and technology. Be it the smart-phones, fan, wheel, vehicles, cloth, paper, toothbrush, electricity, microwave, vehicles, radio, television, laptops, etc., everything is the result of science and technology. A glance through the importance of science and technology will show that it helps us save time and money. Various contributions of science and technology have helped us save time and money.

Let us for a moment consider a simple practical example. While science has given us the knowledge why baked or steam-cooked food is better than the fried or oily food, technology has gifted us with microwave and steam-cookers that help us bake and steam-cook our food. Various objects

and devices like computers, modes of transport, washing machines or just anything else help us save our time and money and ensure optimal comfort. With the help of objects like A.C, microwave, and vehicles, science and technology have made our sleeping, cooking and commute process easier and faster.

In the area of Education, Science and technology have made significant contributions as well. Science has given us immense knowledge and therefore, we have got important matter to study. Technology has made education itself easier. It has provided us options like smart classes, multimedia devices, e-libraries, e-books, distant learning, etc.

Perhaps the eighth wonder of the world should be the Internet. Information communication technology, including internet, is an excellent gift of technology. With the help of the internet, we do not only get immense knowledge on science and other subjects, but we also get to stay connected with our friends and family, continuously. Internet forced globalization more than any other factor and has turned the entire world into a global village (apologies, Marshal McLuhan, the proponent of Global Village theory of communication).

In a nutshell, science and technology have made our life easier. It helps us live a better life. While science has made significant contributions in health by providing treatment for various chronic diseases, technology has benefited us in receiving those treatments through various ways and devices like X-ray, scan machines, operation devices, pacemakers and much more. We are also blessed with numerous exercising equipment,

various health apps, online doctor and other things that help us maintain good health and life, thanks to science and technology.

At nations' level, there is no aspect of national life that is not governed by science and technology. E-governance has been employed to reduce and improve bureaucracy and paper trails. This is most evident in the banking sector. Technology has made cashless society very possible through electronic transfers. This has ultimately led the Treasury Single Account (TSA), which has equally reduced corruption and sharp practices in the system.

The advent of GSM, which completely transformed lives and businesses in Nigeria, is yet another example of the wonders of technology.

Undoubtedly, science and technology have made our life easier and faster. We should always hope, make an effort and ensure that the inventions and discoveries in these fields are always used for the benefit of entire human race. Henceforth, with the help of science and technology, let's make Nigeria a better place, for the benefit of all Nigerians.

If Nigeria has not developed, it is because science and technology have not taken their due places in our national lives. In fact, the difference between one country and another is the level they have attained in science and technology; for the ultimate technology attained by any nation could be development of nuclear weapons and very few countries have acquired that capability to date.

Science is important because it influences most aspects of everyday life, including food, energy, medicine, transportation, leisure activities and more.

Industrialization is simply the use of science and technology to transform the mode of production. For the avoidance of doubt, Industrialization can be operationally seen as the process by which an economy is transformed from primarily agricultural to one based on the manufacturing of goods. Individual manual labor is often replaced by mechanized mass production, and craftsmen are replaced by assembly lines.

Industrialization is therefore the process by which traditionally nonindustrial sectors (such as agriculture, education, health) of an economy become increasingly similar to the manufacturing sector of the economy. It is the sustained economic development based on factory production, division of labour, concentration of industries and population in certain geographical areas, and urbanization.

If Nigeria will become an industrial nation, science and technology, inescapably, will have to drive the process. An overview of the economic recovery and growth plan (ERGP) of the federal government launched since 2017, would reveal the natural place of science and technology in it if it would ever see the light of day.

A GLANCE AT THE ECONOMIC RECOVERY AND GROWTH PLAN(ERGP)

On Tuesday, March 7th, 2017, the Federal Government of Nigeria released the Economic Recovery and Growth Plan (ERGP). The plan, which is a medium term plan for 2017 to 2020, builds on the Strategic Implementation Plan (SIP) which was developed for the 2016 budget.

The objectives of the plan are to restore economic growth, build a globally competitive economy and invest in Nigerians by driving social inclusion, job creation, youth empowerment and improved human capital.

In a bid to achieve the objectives of the plan, the Nigerian government prioritized 5 steps which include:

1. Stabilizing the macroeconomic environment
2. Achieving agriculture and food security
3. Ensuring energy sufficiency
4. Improving transportation infrastructure and;
5. Driving industrialization focusing on SMEs

Across the priority areas, the ERGP laid out 60 strategies that will be utilized to achieve the stated objectives. According to this plan, the real GDP of the country is projected to grow by 4.62 percent over the planned period from 2017 – 2020. It is expected to grow by 2.19 percent in 2017 and eventually achieve a growth rate of 7 percent by 2020.

The government also hopes to drive fiscal stimulus by dedicating at least 30 percent of the federal budget to capital expenditure, while monetary stability will be promoted by curbing inflation, reducing domestic interest rates and improved implementation of a flexible foreign exchange rate regime.

With ERGP, the government plans create over 15 million jobs by 2020 and drive food security by achieving self-sufficiency in tomato (2017), rice (2018) and wheat (2020).

As stated in the plan, Nigeria plans to increase oil production in the country to 2.5mbd by 2020, privatize selected public enterprises and revamp local refineries to reduce importation of petroleum by 60 percent in 2018. According to the plan, again, the various MDAs will play key implementation roles and the coordination will be led by the Ministry of Budget and National Planning. In addition, a delivery unit was to be established in the Presidency to drive this plan.

Finally and most importantly, the ERGP is to be propelled by the implementations of the National Industrial Revolution Plan and the Nigeria Integrated Infrastructure Master Plan both of which are expected to play huge roles in achieving the set targets by 2020.

Therein lay the essence my treatise: Achieving the Economic Recovery and growth Plan using Science and Technology. National Industrial Revolution Plan is all about science and technology and some attitude change as well as the political will to do the right thing.

Make no mistake about this; History shows that no country has ever become rich by exporting raw materials without also having an industrial sector, and in modern terms an advanced services sector. The more a country specializes in the production of raw materials only, the poorer it becomes. Practice and experience have shown that industry multiplies National wealth.

While launching the National Industrial Revolution Plan (NIRP), President Goodluck Ebele Jonathan (as he then was) said:

Over the last 100 years, our country has made very significant progress in its political, social and economic development. We successfully transitioned to democratic rule in 1999 and have peacefully changed power through three Presidents between then and now – a veritable evidence of the growing strength of our political institutions...The Nigeria Industrial Revolution Plan (NIRP) is our national roadmap for real industrialization. It is already a living vision, as many elements of its implementation have since commenced. The goal is simple: to add about NGN 5 trillion to annual manufacturing revenues in the next three to five years. This will create jobs, generate wealth, diversify our economy, substitute imports, boost exports, and broaden our tax base. The NIRP has a limited time-frame within which we will accelerate industrial capacity expansions and reforms

For a fact, all developed and emerging economies have used industry as the key driver of modernization. Industry is what creates the platform that attracts capital and technology. Without industry, a country's economy cannot evolve, sufficient jobs will not be created and wages may not grow.

Using science and technology to engineer the economic recovery and growth plan is therefore the journey Nigeria must undertake. I am confident that using science and technology to power the NIRP and ERGP will

industrialize our great country and that will create the much needed jobs and wealth to make Nigeria achieve the fullness of its potential and reach the heights of its glory.

The nexus between science and technology and national development.

GROWTH PLAN (ERGP) THROUGH SCIENCE AND TECHNOLOGY.

There is one persistent feature of the current discussion on the social function of science and technology which should be engaging everyone. One is simply the existence of an organized body of knowledge, accessible to those interested in it; for science, like every other intellectual discipline, is to be valued in itself for the truth which it contains. Another is the existence of a body of men trained to appreciate this knowledge, and acquainted with the arduous work of gathering data and interpreting them; good scientific work demands that the man of science should aim to be energetic, humble, both constructive and critical, neither sterile nor credulous, accustomed to think before he acts and to act upon his conclusions.

A third social benefit is conferred by the applicability of scientific knowledge to provide techniques for large-scale handling of data and matter, and hence for the improvement of the material conditions of life.

Properly used, this last function of science can confer real benefits, for example, by raising the life of the poor to a more tolerable standard and that concerns us most today

Dear friends and colleagues,

There is no doubt that economic recovery and growth plan (ERGP) had science and technology in view when it was conceived. Permit me to place this in perspective. An economic recovery is the phase of the economic cycle following a recession, during which an economy regains and exceeds peak employment and output levels achieved prior to downturn. A recovery period is typically characterized by abnormally high levels of growth in real gross domestic product, employment, corporate profits, and other indicators.

If you use this gauge to assess the Nigerian experience, you will agree with me that though the nation may be out of recession, growth and employment have not yet gained the quantum required for us to confidently say that the nation has economically recovered. So, efforts geared towards gaining a turning point from contraction to expansion and full economic recovery must be sustained through deft deployment of science and technology.

It is important to note that Nigeria went in and out recession recently, which necessitated the Economic Recovery and Growth Plan under reference. The decision of the Buhari Government to quickly come with an economic recovery plan (ERGP) is apt and needed and is a normal response of nations who pass through economic recession.

The United States of America experienced an economic recovery following the 'Great Recession' of 2008. The United States AMI (Average Median Income) put in place by that country as part of their response, has not quite statically changed in a dramatic manner but policies of that great country

have successively targeted steady growth and recovery. This is similar to what Nigeria's ERGP aims to achieve.

Nigerians expecting a quick fix for the nation's economy need to understand that recovery from economic recession is never a fast one. If America is still in the process of full economic recovery since its great Recession of 2008, Nigeria should not be expected to fully recover by now, in less than 2 or 3 years since exiting recession. So, relevant government agencies that are indispensable catalysts for industrial growth and development need to work harder and optimize capacities to hasten full economic recovery, by relying more and more on science and technology.

As indicated earlier, the Economic Recovery and Growth Plan (ERGP) is an economic plan that builds on the 2016 Strategic Implementation Plan, a short term plan that was aimed at tackling corruption, improving security and rebuilding the Nigerian economy.

This means the ERGP seeks to build on economic recovery by restoring growth, investing in people and building a globally competitive economy. This cannot be possible without stimulating the industries, and industries cannot be stimulated without science and technology. So, without a doubt, the search to find the place of science and technology in the economic recovery and growth plan is timely and apt and a university of technology such as FUTO undertaking that quest is also fitting.

National growth often focuses on macro-economic stability and economic diversification. Macro-economic stability ordinarily would be achieved by undertaking a fiscal stimulus through the manipulation of fiscal instruments such as tax and government spending. Diversification, on the other hand,

would be achieved through the diversification into the agricultural and manufacturing sectors, solid minerals, services, etc. Whether the nation goes for agrarian or industrial revolution, the process has to be science and technology-driven.

The role of science and technology can clearly be seen since the growth envisaged cannot be possible without industrial activities and all industrial activities, without any exception are powered by technology.

Even the second objective of the ERGP, which is investing in people, job creation and improving the human capital base of the economy such as investing in the health and education sectors, cannot be effectively pursued without science and technology. Construction is also involved. In fact the ERGP projects that as many as 15 m jobs would have created by the year 2020. Without full deployment of science and technology, such projections would remain empty dreams.

On the whole, The Economic Recovery and Growth Plan (ERGP), a Medium Term Plan for 2017 –2020, has been developed for the purpose of restoring economic growth while leveraging the ingenuity and resilience of the Nigerian people, inarguably, the nation's most priceless assets. It is also articulated with the understanding that the role of government in the 21st century must evolve from that of being an omnibus provider of citizens' needs into a force for eliminating the bottlenecks that impede innovation and market-based solutions.

Government and science and technology are the main enablers for making economic recovery plan work in Nigeria, as elsewhere. That is the ERGP

Plan also recognizes the need to leverage on Science, Technology and Innovation (STI) and build a knowledge-based economy.

The ERGP is also consistent with the aspirations of the Sustainable Development Goals (SDGs) given that the initiatives address its three dimensions of economic, social and environmental sustainability issues.

Dear friends and colleagues,

Since Nigerian economy is being reconstructed to be private sector-driven, industries are expected to be the highest absorbers of labour and to get the industries to be able to do so, a synergy with the science and technology component is only trite.

At the moment, the nation Nigeria is exporting primary products, ranging from palm produce, cocoa to crude. In turn, the nation imports vegetable oils, chocolates and premium motor spirit (fuel). By so doing, the nation adds nothing to the value chain. In fact, Nigeria is exporting labour and employments since the conversions of our primary products are done outside our shores by citizens of other countries.

Consequently, each import of secondary products such chocolates and fuel made from palm oil, cocoa and crude oil, we import unemployment and consign ours to a consumer economy.

You then ask: of what use are our universities, universities of technology such as FUTOS and other tertiary institutions and their graduates and

postgraduates if they cannot be made to produce the manpower needed for our industries? The answer to this question shall be fully provided in due course. Save to quickly hint here that it is all about political will. For Nigerians are intelligent and resilient people and found all over the world, helping to develop other countries, using science and technology. If that is not happening in Nigeria, it simply means the visionary leadership and requisite political will necessary to make that happen are not yet in place.

The economic recovery and growth plan is also supposed to develop a global competitive economy built by investing in infrastructure, improving the business environment and promoting a digital-led growth. A digital-led economy is simply an economy driven by Information Communication Technology.

THE ROLE OF SCIENCE AND TECHNOLOGY IN THE DEVELOPING OF NIGERIA

Developments in science and technology are fundamentally altering the way people live, connect, communicate and transact, with profound effects on economic development. To promote technology advance, Nigeria should invest in quality education for youth, and continuous skills training for workers and managers. Tertiary institutions of science and technology in Nigeria need to be properly engaged and challenged to focus on specific areas of science and technology intervention.

Science and technology are key drivers to development, because technological and scientific revolutions underpin economic advances, improvements in engineering, infrastructure, health systems, education and infrastructure.

The technological revolutions of the 21st century are emerging from entirely new sectors, based on micro-processors, tele-communications, bio-technology and nano-technology. Such products are already transforming business practices across modern economies, as well as the lives of all who have access to their effects. The most remarkable breakthroughs will come from the interaction of insights and applications arising when these technologies converge.

Nigerian scientists and technologists need to help the country key into the global science and technology innovations. A lot is already in the area of communication, e-commerce, e-governance and many more but a lot more needs to be done and urgently for our nation to benefit fully from science and technology interventions as is happening round the globe.

Through breakthroughs in health services and education, these technologies have the power to better the lives of poor people in Nigeria. Eradicating malaria, a scourge of Nigeria and the African continent for centuries, is now possible.

Nigerian scientists need to be seen in the forefront of the fight against malaria, collaborating with their counterparts abroad in the urgent search for new cures and vaccine, now that mosquitoes are growing resistant to many traditional anti-malaria drugs. Cures for other diseases which are endemic in Nigeria are also now possible if the right assistance and collaborations are sought by Nigerian scientists. Our people living with debilitating conditions can live healthy and productive lives if our researchers and scientists are helped to rise to the occasion.

Access and application are critical. Service and technology are the differentiators between countries that are able to tackle poverty effectively by growing and developing their economies, and those that are not. The extent to which developing economies emerge as economic powerhouses depends on their ability to grasp and apply insights from science and technology and use them creatively. Innovation is the primary driver of technological growth and drives higher living standards.

As an engine of growth, the potential of technology is endless and still largely untapped in Nigeria and Africa and other developing world regions across the globe. Less developed countries such as Nigeria not only lack skilled labour and capital, but also use these less efficiently. Inputs account for less than half of the differences in per capita income across such nations. The rest is due to the inability to adopt and adapt technologies to raise productivity.

Computing, for example, through unlocking infrastructure backlogs and managing integrated supply chains, can transform economic performance by enabling affordable and accessible services in education and healthcare. The combination of computers and the Internet, and mobile devices and the “cloud”, has transformed human experience, empowering individuals through access to knowledge and markets, changing the relationship between citizens and those in authority, as well as allowing new communities to emerge in virtual worlds that span the globe. This is the glory of the information super-highway.

According to the United Nations National growth Telecommunications Union (UN-ITU), by the end of 2010 there were an estimated 5.3 billion

mobile cellular subscriptions worldwide, including 940 million subscriptions to 3g services. About 90 percent of the world's population can access mobile networks, with three-quarters of mobile subscribers living in developing economies. Cellular technology has allowed Africa to leapfrog the age of fixed line telephony, bringing affordable access to millions of people.

However, the continued and equitable expansion of Information Communication Technology (ICT) depends on electricity. United Nations envisages that the real divide over the next 20 years will be between those who have access to reliable electricity to power these devices and those who do not. Nigeria is still far from attaining adequate electricity supply. This condition will seriously impede any effort at using science and technology to drive the nation's development, since all technology is electricity-driven.

Other technologies under development are interventions for cognitive enhancement, proton cancer therapy and genetic engineering. Revolutionary inventions include small underground nuclear power units called nuclear batteries that will be ultra-safe and maintenance-free; new types of photo-voltaics that will make electricity from sunlight cheaper than that from coal; and myriad nano-technologies, some of which lower the cost and increase the reliability of many products – even in the poorest areas of the developing world where Nigeria is lurked.

Managing technological revolutions poses challenges. Certain innovations and discoveries will raise fraught bio-ethical issues, as genetic modification of food crops and cloning of human embryos has already done. There is a

risk that their cost, particularly in the early stages of development, will worsen the present inequality by limiting access to wealthy individuals.

This already happens in health care in certain G7 countries, where the demand for very high-cost diagnostic equipment and surgical interventions enabling longevity and better quality of life for older wealthy people overstretches public health care budgets, and lowers service quality in poor neighborhoods.

In addition to this, science and technology has helped in easing stress, brought by the movement of goods and people from one place to another, by inventing easy transportation equipment like automobiles, aircrafts and so on.

Furthermore, science and technology has helped in the area of medicine. Some natural herbs are converted to drugs with the aid of modern equipment and these drugs are used in our hospitals and pharmacies.

Moreover, rural communities are transformed to urban settlements through science and technology. This is made possible through the availability of electricity, pipe borne water, good road, schools, hospitals and other social amenities, which makes these places developed, by an increased population.

Equally important is the fact that science and technology has helped in making work easier for people to do through the invention of computers and household machineries. It has also made communication faster, through the use of mobile phones, televisions, radio, used in communication.

Science and technology has aided so many sectors of the economy such as the advertising sector, sports and fitness (weight loss), transportation and so on.

To promote technological advances, Nigeria should invest in quality education for youth, continuous skills training for workers and managers, and should ensure that knowledge is shared as widely as possible across society.

In a world in which the Internet makes information ubiquitous, what counts is the ability to use knowledge intelligently. Knowledge is the systemically integrated information that allows a citizen, a worker, a manager, or a finance minister to act purposefully and intelligently in a complex and demanding world. The only form of investment that allows for increasing returns is in building the stocks and flows of knowledge that our country or organization needs, and in encouraging new insights and techniques.

Adopting appropriate technologies leads directly to higher productivity, which is the key to growth. In societies that have large stock and flows of knowledge, virtuous circles that encourage widespread creativity and technological innovation emerge naturally, and allow sustained growth over long periods. In societies with limited stocks of knowledge, bright and creative people feel stifled and emigrate as soon as they can, creating a vicious circle that traps those who remain in a more impoverished space. As has been the case with brain drain syndrome in Nigeria, such societies stay mired in poverty and dependency. Incidentally, Nigeria's greatest exports are brains, not oil!

Proper investment climate is crucial, as are the right incentive structures, to guide the allocation of resources, and to encourage research and development. Security situation in Nigeria has to be improved further while commending government efforts in this regard.

There is a direct correlation between security and foreign direct investment (DFI). Much of the technology needed across board will have to be sourced abroad and since funding is scarce, DFI is one source that needs to be encouraged. Poor security environment often scares off potential investors.

Successful countries have grown their ability to innovate and learn by doing, by investing public funding to help finance research and development in critical areas. Everyone is involved – big and small, public and private, rich and poor.

Nigerian government and Nigerian scientists need to understand that the benefits that are certain to flow from technological revolution in an increasingly connected world and knowledge-intensive world will be seized by those countries and companies that are alive to the rapidly changing environment, and nimble enough to take advantage of the opportunities. Those that succeed will make substantial advances in reducing poverty and inequality.

The way forward for Nigeria's science and technology and innovations

There is no doubt that science and technology has led to the development of great countries and indeed the whole industrial world. Nigeria cannot

reinvent the wheel, as they say; we can only replace or make it look and work better.

The products of science and technology have contributed to the development of countries such as America, Japan, and China and to an extent in some African countries such as South Africa, Egypt and perhaps one or two others.

Through the application of technology, scientific knowledgeable professionals have been able to invent equipment and machines being used in industries and even in our homes. Many of these technological applications are found in Nigeria. As a super consumer economy, best of cars find their ways into Nigeria just days after manufacture from developed economies, while the nation has allowed Peugeot and Volkswagen and other automobile assembly plants in Nigeria to die off. This is so sad.

Science and technology (S&T) capabilities are fundamental for social and economic progress in Nigeria; for example, in the health sector, scientific research led to the development and introduction of oral rehydration therapy, which became the cornerstone of National growth efforts to control diarrheal diseases. Interdisciplinary research is also critical and helps researchers to think outside their own boxes.

Adapting technological advances to conditions and capabilities of poor countries, especially Nigeria would take quite a lot beyond mere will power and taking tough political decisions. S&T capabilities have become even more important for all countries in addressing traditional development issues and in coping with increased National growth flows of goods and services and dealing with the rapid spread of diseases and contaminants,

the Government should play a central role in promoting the S&T-related programmes to be adopted by the Nigerian government and Nigerian scientists.

Unfortunately, Nigeria and other particularly poor countries of Africa, do not have the human resources (unless Nigeria should bank on the diaspora), physical and economic infrastructures, and access to capital to take full advantage of the S&T expertise and achievements of industrialized countries. Nigerian trained experts, particularly the newer ones, may not be fully competent for no fault of theirs but owing to their environment and dwindling quality of education, obsolete equipment and so on.

The world is moving at supersonic speed with Nigeria still toddling behind in science and technology. Nevertheless, we must recognize that at our level of development, the nation has shown a strong desire for more robust S&T capabilities, including a romance for the use of nuclear technology to generate electricity. And some capacity to understand the potential and limitations of S&T, to select and effectively utilize suitable foreign technologies, and to develop local innovations that are needed in our country are not so much in place.

There is a great disarticulation between town and gown in Nigeria – between theory (academia) and practice (industry). Nigerian scientists and technologists must train graduates to fit into industry needs. For me, producing graduates that have no place in the industry is a great disservice to both the individual and society. (The TU Delf experience).

Industry leaders and the Nigerian scientific society must sit down and agree on how gown can be of benefit to the town. Nigeria is grappling with this

great reality and has to set out with more purposive steps to develop science and technology capabilities. In my Convocation Address at UNIBEN in November 2017, I opined that Nigeria has decapitated her technological arrowhead by destroying the technical education system.

Our science and technology interventions must be real and practical. We have to focus on small aspects of our national life that matter the most. Any solutions proposed should ensure a broad significance and must also address these other five development challenges that affect millions of Nigerian people. These challenges are:

- Child survival;
- Safe water;
- Agricultural research;
- Microeconomic reform; and
- Prevention of and response to natural disasters

Such solutions should target health, food production, environmental, and other problems omnipresent in Nigeria. Focusing on agriculture even for the next decade may be a good starting point.

Beyond foreign assistance funds provided by foreign governments in form of aids, other financial flows to Nigeria with S&T implications are growing. As hinted earlier, they include foreign direct investment by the private sector, remittances to friends and relatives in Nigeria sent home by émigrés who are resident in the industrialized countries, contributions to development projects by private foundations, and initiatives designed to benefit local populations supported by multinational companies.

As reported by Elizabeth Adegbesan quoting the World Bank, in the Vanguard newspaper of April 24, 2018, Nigeria tops remittances to Sub-Saharan Africa with \$22bn- World Bank. Nigerians living abroad (Diaspora) sent home \$22 billion in 2017, the highest in the Sub-Saharan region and the fifth highest in the world. This represents 10 percent increase when compared to the \$19.64 billion sent home in 2016. The amount sent home by Nigerians in Diaspora represents the highest in the Sub-Saharan Africa region followed by Senegal and Ghana with \$2.2 billion each for the year.

The World Bank disclosed this in a report titled, Migration and Development Brief. According to the report, remittances to low and middle-income countries rose by 8.5 percent from \$429 billion in 2016 to \$466 billion in 2017 while global remittances appreciated by 7.0 percent to \$613 billion in 2017, from \$573 billion in 2016. The rebound in remittances, the World Bank said was driven by growth in Europe, the Russian Federation, and the United States. It stated: “Remittances to low-income and middle-income countries rebounded to a record level in 2017 after two consecutive years of decline, says the World Bank’s latest Migration and Development brief.” The Bank estimates that officially recorded remittances to low- and middle-income countries reached \$466 billion in 2017, an increase of 8.5 percent over \$429 billion in 2016. Global remittances, which include flows to high-income countries, grew 7.0 percent to \$613 billion in 2017, from \$573 billion in 2016.

The stronger than expected recovery in remittances is driven by growth in Europe, the Russian Federation, and the United States. The rebound in remittances, when valued in U.S. dollars, was helped by higher oil prices

and a strengthening of the euro and ruble. According to the statement, globally, India emerged top remittance recipients with \$69 billion, followed by China (\$64 billion), the Philippines (\$33 billion), Mexico (\$31 billion), Nigeria (\$22 billion), and Egypt (\$20 billion).

Equally significant is the fact the World Bank also projected a 7 percent growth in remittances to countries in Sub-Saharan Africa to \$41 billion in 2018. Remittance inflows improved in all regions and the top remittance recipients were India with \$69 billion, followed by China (\$64 billion), the Philippines (\$33 billion), Mexico (\$31 billion), Nigeria (\$22 billion), and Egypt (\$20 billion). Remittances are expected to continue to increase in 2018, by 4.1 percent to reach \$485 billion. Global remittances are expected to grow 4.6 percent to \$642 billion in 2018.

What is more, remittances to Sub-Saharan Africa accelerated 11.4 percent to \$38 billion in 2017, supported by improving economic growth in advanced economies and higher oil prices benefiting regional economies. The largest remittance recipients were Nigeria (\$21.9 billion), Senegal (\$2.2 billion), and Ghana (\$2.2 billion). The region is host to several countries where remittances are a significant share of gross domestic product, including Liberia (27 percent), The Gambia (21 percent), and Comoros (21 percent). In 2018, remittances to the region are expected to grow 7.0 percent to \$41 billion.

Nigerian government can partner with Nigerians in diasporas in the area of science and technology development and driving development generally. The average sum being remitted to Nigeria shows reliable significance and more importantly shows some potential in such remitters to invest in

technology-driven areas if only the necessary confidence can be inspired and guarantees worked out by the Nigerian government.

The point being made is that Nigeria Diasporas holds so much promise in partnering Nigerian governments across board to develop the economy by helping to pull in the necessary funds to compliment DFI and other sources. Nigeria is rated as one of the most educated and successful immigrant populations in many advanced countries, especially in United States. What this means is that Nigeria equally has a large reservoir of experts in all areas of life, including science and technology. There are certain Nigerian ICT experts and world acclaimed scientists in the diaspora, who helping the world as a whole. Philip Emeagwali , arguably the father of internet, is a Nigerian. These Nigerian experts can be negotiated home to help anchor the inputs of science and technology in national development.

Private funds flows often support technical education and vocational training. Private foundations sometimes support long-term research programmes in search of breakthroughs in advanced countries. Of special significance are public-private partnerships in mobilizing financial and technological resources for use in Nigeria. For example, results achieved by the Global Development Alliance, which links USAID and many private company capabilities, have demonstrated the positive effects of well-designed technology-oriented partnerships in the US.

Unfortunately, there are no such foundations in Nigeria. Many Nigerians are described as philanthropists. Such men and women need to focus on funding research and sponsoring scientific innovations and inventions. There is a need for well-to-do Nigerians to set up foundations to specifically

tackle the gross deficiencies suffered by Nigeria nation in the area of science and technology.

Some forms of rudimentary efforts are being exerted by the Nigerian government, past and present. But obviously, not much has been achieved in making the nation's economy science and technology-driven.

Something has to be done on a much grander scale. For example, the independent Millennium Challenge Corporation (MCC), which was established by the US government in 2002, has a multibillion-dollar development programme directed to 23 countries. Nigeria needs a similar special, endowment fund set aside for science and technology.

Science and technology education in Nigeria needs to be rejigged and made more practical. I cannot understand why institutions with electrical engineering departments cannot take initiative to power their Institutions using even solar panels. Something is definitely wrong in a system that produces mechanical engineers who cannot change plugs in their own cars or architects who cannot design houses they will be proud and confident to live in.

There is now a great need for a technical committee or committees to carry out the diagnoses of the technological needs of our country, sector by sector and appropriate measures prescribed. Our nation's goal to improve Health as a Developing country should aim to set up world class reference hospitals to reverse medical tourism as is happening now with India today.

Nigeria has world class medical consultants and experts all over the world that can be incentivized to come home to man such hospitals where merit should be given unfettered place.

I am particular about agriculture, education and health. Food, education and health will produce a sound mind and in a healthy body. Associated efforts in health should give due attention to improved childhood vaccines, making a strong move to develop vaccines in Nigeria, even vaccines that do not require refrigeration, needle-free vaccine delivery systems and research to start creating new vaccines and devise testing systems for new vaccines.

Other challenges I believe Nigerian scientists home and abroad can be challenged to confront are: designing antigens for protective immunity and learning about immunological response to say little about controlling insects that transmit agents of disease and develop genetic and chemical strategy to control insects and to develop versatile diagnostic tools and cure latent and chronic infections. Given the right push and incentives, all these are possible.

In recent years, the Government has lost much of its direct-hire medical staff to the brain drain syndrome. The effect is that many qualified doctors and nurses and just like other topflight professionals in Nigeria including the academia are leaving the country in search of better working conditions. The reasons they are leaving in droves are all too well known. There is no light, no housing scheme, no pipe borne water, no security, no decent schools for their children. Most basic amenities which even some African countries now take for granted are still a far cry in Nigeria.

Like many often say, solving the problem of electricity in Nigeria would take off about 50% of the nation's problems, the reason being that the reason Nigerians cannot solve most of their problems by themselves and without waiting for government is largely due to lack power supply.

It is estimated that Nigeria needs about 50 to 70 megawatts of electricity to be fully powered. Today, going by government figures, the nation generates less than five thousand megawatts and distributes even less than that due to obsolete transmission and distribution lines.

From my experience in the power sector as minister, I believe the nation can easily generate at least 20 thousand megawatts of electricity if we take a different route. Casting the national grid in iron in Nigeria is perhaps the reason the nation has not achieved self-sufficiency in electricity generation. It is time to emphasize embedded generation and distributed power.

The way to go for me is: Remaining in the national grid should be made optional for states. States that have the desire and capacity to develop their own power supply as obtains in other federal systems should be freed from the present constitutional arrangement where states can generate power but cannot transmit and distribute for the reason that electricity transmission is still on the exclusive list of the federal government.

Generally speaking, the absence or decline of technical expertise in Nigeria coupled with poor living conditions and lack of incentives is the single most important reason why Nigeria has lost much of its S&T capability and reputation, which is critical in providing leadership in applying S&T to overcome development problems. Many of the experts to provide leadership in the various subsectors of science and technology have taken

flight to other climes where their competencies can be better appreciated and utilized. Lack of electricity is a central reason why most Nigerian industries cannot grow here.

Nigerians also need reorientations. Superstition is not correlated with scientific existence. In Nigeria, superstition governs and colours even the national life. Ritual killings are pointing to the fact that some believe that money can be acquired through rituals with human blood.

Another aspect of our national life that needs to be reexamined is our life of extravagance. Unknown to many, Nigeria is only potentially rich. In actuality, the nation's annual budget may be upto that of New York City in the US.

What this means is that while Aliko Dangote may be the richest man in Africa (for which we should be happy and proud), the income per capita of Nigeria compared to other countries even in Africa is just about average. Take for instance the new minimum wage being dragged by the state governments that is so paltry. Yet, it has put our nation so much on the edge and on the verge of yet another nationwide strike over it. ASUU was on a long strike for non-implementation of agreements with government that date back to 2009.

Since the nation's current minimum wage cannot even purchase a bag of rice, it is obvious that the Nigerian worker is not paid a living wage. Corruption thriving under such arrangement is only necessary since survival comes before morality.

A nation's economic health is not measured by the number of private jets, sources of which may be questionable. Or by its offshore resources which are either above or under the economic radar and therefore not made taxable. The real economic measure for healthy economy is its GDP.

Though much of the nation's economy is still outside the dragnet in the informal sector, what we have officially clearly shows that when distributed, the nation is really a poor country.

While I may not totally agree with the recent rating of Nigeria as the poverty capital of the world, no matter the indices used, I still believe Nigeria cannot be the very last in this regard; there is enough cause for concern because our severely disarticulated economy is not pulling its right weight.

The National Assembly should come to the party in supporting government's established programme framework of governance and humanitarian assistance, reconstruction in war-torn areas, global health, and broadly defined economic growth, stimulated by science and technology.

Let us help our small innovative firms in agriculture extensions, and information technology. The strategies should emphasis institution building, including establishment of research, education, training, and service capabilities, as well as revamping our decaying technical education system.

Most of my recommendations and suggestions are general and cut across development sectors. As noted earlier, while carrying out the Government's many programmes, efforts should also begin to focus on several areas of

emphasis and available resources concentrated in these areas within the framework of the recommendations.

Government has to increase financial support for applied research and outreach, including extension, at technological institutions.

Government has to provide increased financial support for development of local capacity to deliver public health services, including support for the establishment of strong schools of public health in Nigeria;

Government has to assist important institutions in Nigeria in using broadband access to Internet and other modern technologies to strengthen their information acquisition and processing capabilities in support of S&T specialists; and Government has to sponsor expert assessments of the S&T infrastructures across Nigeria.

Development of an S&T culture within tertiary institutions, with the leadership continually articulating in policy papers, internal discussions, and interactions, strengthening S&T capabilities, integrating these capabilities within a broad range of development activities.

CONCLUSION

Realization of this vision will not be easy. In the competition for access to limited foreign assistance funds in the effort to get Nigeria to embrace accepted approach to technology transfer, stimulation of economic growth, and diffusion of benefits to the general population from innovative nodes in

the economy and in society, the best route to success is S & T development.

The nation must be persuaded that S&T are crucial enablers of development and not simply endpoints. S&T must be recognized as an essential platform for transforming aspirations for better lives into durable and practical reality.

Summarily, realizing the goals of Economic recovery and growth plan is not possible without driving it with science and technology, as has been proved by the examples of both developed and developing countries.

Luckily, however, the human resource needed can be found among Nigerians at home and in the diaspora. Lacking, however, is the critical enabling environment and requisite political will and motivation. Yes, Nigerian scientists and technologists can turn Nigeria around if only those in power can do the needful.

Thank you for your kind attention. God bless Nigeria. God bless us all.