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1. BACKGROUND AND CONTEXT

In September 2015, World leaders adopted Agenda 2030 and its attendant 17 Sustainable Development Goals (SDGs). The SDGs are a set of universal goals to address the social, economic, political and environmental challenges facing humanity. They are indivisible and interrelated; universally applicable across the globe; and are a clear statement of the level of ambition of the international community end poverty and deprivation, everywhere and for everybody, while conserving the environment. They represent a shift from a narrow focus on achievement of numerical targets to a focus of qualitative and durability of change in the lives of people, and the environment. They embody a transformative shift towards *people*, *prosperity* and *planet***;** underpinned by *peace* and good governance; and *partnership* for development – the Five Ps. They are about a prosperous and fulfilling lives for all, in harmony with nature. And yet the SDGs will not be realized by happenstance – governments and the global community must make conscious efforts to mainstream and integrate the goals into policy, planning and implementation frameworks and accelerate progress by identifying and tackling implementation bottlenecks; seizing new opportunities and trends; harnessing all available resources; and focusing on interventions with the highest multipliers across many sectors. Many

trends, factors, and developments have the potential to affect the development trajectory that individual countries and the global community will take as they journey towards the year 2030. This paper discusses some of these major shifts, or simply the Megatrends, that have the potential to shape global and national prosperity by 2030, with focus on Nigeria.

2. MEGATRENDS DEFINITION

Megatrends have been defined differently by different authorities and, generally, mean different things to different people. A Megatrend can be defined simply as an important shift in the progress of a society or simply a major movement. A Megatrend can also be defined as a long-term change that affects societies, governments and economies over a long period of time. The use of the term 'Megatrends' can be traced back to two sources in the early 1980s: the international news organization - the Christian Science Monitor and J. Naisbitt.

Nasbitt (1982) defines Megatrends as the large social, economic, political and technological changes that unfold gradually but have a lasting impact on our lives for seven to ten years. Armstrong (2006) identifies some of these trends with long term effect on societies, governments and economies to include: the global economy and globalization; politics; social trends and demographics; natural resources

and environment; and science and technology. Adopting a historical perspective, Zalega (2012) avers that Megatrends can be said to determine long-term socio-political, cultural and technological changes accompanying the transition from the industrial to post-industrial era, where specific empowerment of workers takes place with an increasing role of knowledge and creativity which are formed slowly but spread rapidly exerting a significant impact on human lifestyle, wellbeing and preferences. VicHealth and CSIRO (2015) have introduced a nexus approach to an understanding of Megatrends by stating that Megatrends occur at the intersection of multiple smaller trends, including geopolitical, economic, environmental, social and technological change, and have implications for current day decision making.

In the context of people, prosperity and planet or sustainable development, generally, and this paper, in particular, we adopt the definition of Megatrends as *the set of key global, national or localized forces, shifts and developments that have potential to affect, negatively or positively, the socio- economic well-being and prosperity of society, as well the condition of the planet earth over the medium to long-run*. These forces, trends and developments are mostly, but not always, gradual and cumulative occurring over extended periods of time. Megatrends are the outcome of conscious and sometimes unconscious human actions, environmental factors and can

be spread over wider geographic space or localized, but their effects are often felt beyond geographic locations in, and time periods during which, they occur.

In this paper we examine some of these trends, forces and developments that will likely shape national and global prosperity by 2030. Specifically, we examine the likely effects of Economic Growth and its Key Drivers; Demographic Dynamics and Urbanization; Climate Change; Science, Technology and Innovation, including Artificial Intelligence; Land Degradation and Biodiversity Loss; and Peace and Security; and Good Governance on global and national prosperity by 2030.

3. ECONOMIC GROWTH

High and sustained economic growth is a *sine qua non* for countries' efforts to reduce poverty and achieve prosperity and sustainable development. The global recession of 2008-09 led to a meltdown in economic activities affecting developing countries like Nigeria mainly through the fall in commodity prices. Nigeria's economy is characterized by the oil and gas sector, the major source of foreign exchange and fiscal revenues; and non-oil sector, which includes agriculture, trade, construction, telecommunications, manufacturing and other services. Between 1981 and 2015, revenues from the oil and gas sector accounted, on average, for 75% of total government revenues, with the non-oil

sector contributing, on average, the remainder 25%, albeit with wide annual fluctuations (CBN, 2015).

3.1 Sources of Growth Will Remain Important

As shown in Fig 1 below, the Nigerian economy was able to withstand the immediate adverse effects of the global economic crisis maintaining an overall positive growth trajectory during the crisis period and immediately thereafter mainly on account of its strong foreign reserves position. The high and sustained economic growth experienced during the 2000s and first part of 2010s however, could not be sustained primarily due the sharp decline in crude oil prices culminating in a recession in 2016, before rebounding in 2017, again, primarily, on account of recovery in crude oil prices in the global market.

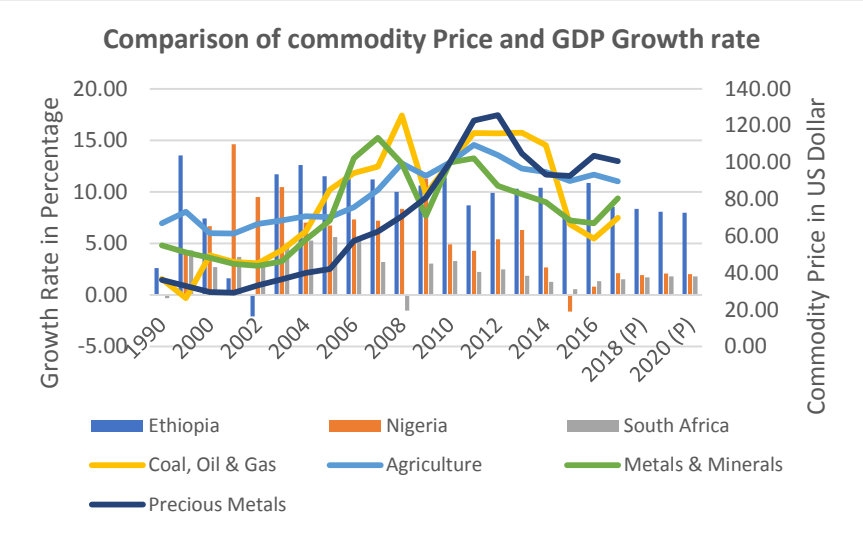

Fig 1: GDP Growth – Selected Countries and Global Commodity Prices. Sources: International Monetary Fund, World Economic Outlook Database, 2018.

As can be seen from fig. 1 above, the Nigerian and South African economies were most affected by the recent decline in global commodity prices, especially crude oil and gas and precious metals, respectively, while the Ethiopian economy maintained impressive growth rates during this period of depressed global commodity prices.

Looking forward to 2030, economic growth will continue to be a key driver of prosperity and sustainable development; but with a slightly changed global economic architecture – both in terms of major players and drivers of growth. More important however, will be the spread of the source of growth across the various sectors of the economy- primary commodities, manufacturing and services sectors. It is projected that China and India which will grow at relatively higher rates of 6.7 percent and 6.2 percent, respectively, by in 2020 and account for 38 percent of the global gross investments by 2030 (World Bank, 2013). The African region which is projected to double its GDP per capita over the next 20 years is however, projected to grow at a relatively slower pace with Sub-Saharan Africa (SSA) projected to register a growth rate of 5.4 percent by 2020 with the Nigerian

economy growing at a much sluggish pace of 2.4 percent by that that time before increasingly steadily to register a growth rate of 4.8 percent by 2030 (IMF, 2017).[1]

3.2 Trade Liberalization

A steadily growing global economy is, *ceteris paribus*, critical for the realization of national and global prosperity through increased global demand for goods and services. The nexus between increased trade and economic growth is important because trade boosts growth and *vice versa*. It was Adam Smith, the renowned Economist, Philosopher and Author who in 1776 stressed that trade enhances welfare and growth by acting as key driver of growth for many countries at different stages of development. David Ricardo, who popularized the theory of comparative advantage, argued by trade benefits growth by shaping growth from one part of the world to another, depending on the production and the demand characteristics of the countries. He argued that even when one country has an absolute advantage in the production of two goods against another country, it might still be more beneficial to both countries if each of them specializes in the production of only one of the goods which

[1] It is instructive to note that these projected growth rates for China, India and Africa and Nigeria will be significantly higher that the projected growth rate of 2 percent for Japan, USA and EU.

they then trade amongst themselves. He posited that a nation can produce and export a particular commodity in which it has comparative advantage, while importing a particular commodity in which it has comparative disadvantage, thereby capitalizing on its welfare.

Successive rounds of multilateral trade negotiations under the General Agreement on Tariffs and Trade (GATT), established in 1947 (later replaced by the World Trade Organization (WTO) in 1993 at the conclusion of the Uruguay Round of Trade Negotiations) have led to incremental trade liberalization with resultant growth of world trade relative to GDP. Exports have tended to grow fastest in countries with more liberal trade regimes, notably in South East Asia as a result of which these countries have experienced the fastest growth in their GDP against other regions of the world (Thirlwall, 2000)

Globally, trade relative to GDP has been on a general upward trajectory since the 1960s, with the greatest increase having been realized between 1960 and 2000. More recently, from a low of 20 percent in the 1990s, trade as a percent of GDP rose steadily during the 1990s and 2000s, peaking at just over 30 percent in 2008 before falling slightly to the current (2016) level of about 28 percent (IMF, World Economic Outlook -2018).

Fig. 2: Export of Goods and Services (% of GDP). Source: World Bank national accounts data, World Bank databases.

As stated earlier, Nigeria is heavily dependent on the oil and gas sector for revenues and foreign exchange earnings. Ranked the 8th largest oil exporter in the world, Nigeria exports approximately 1.5 million barrels of crude oil per day (CBN 2017). Due to the country's overreliance on crude oil as the major export commodity, balance of trade has witnessed severe fluctuations, leading to trade deficits at various points in time. In the recent past, Nigeria's trade hit a record high of $104 billion in 2014 as a result of the boom in global oil market but dropped to $80bn in 2016 (IMF 2018) when global oil prices dropped. Trade is however, projected to reach $200bn by 2030 due to increased trade liberalization

coupled with heavy investment in manufacturing, infrastructure, technology and agricultural sectors as the government seeks to diversify the country's export base and cushion the economy from the boom and busts associated with global commodity prices.

Fig. 3: Nigeria's Balance of Trade. Source: IMF World Economic Outlook 2018.

3.3 Some Emerging Sources of Growth and Prosperity

While trade in traditional goods and services will remain an important source of growth for many countries, Nigeria included, there are emerging sources of growth that will have a profound effect on future growth, prosperity and sustainable development. These sources could be considered unconventional or hitherto not adequately discussed in the literature. Here below we discuss some of these sources of growth and prosperity, especially in the context of Agenda 2030, and the SDGs.

3.3.1 Increase in Internet Penetration (*including the internet of things, cloud computing, big-data, e-commerce and online marketing)*

Unlike the situation in the past, presently some of the world's most valuable businesses deal in, not oil and gas, but data relying heavily on internet penetration. Apple with a market capitalization of $926.9 billion is ranked number one globally in terms of profit and value; Amazon with a market value of $777.8billion; Alphabet with $766.4billion market value; Microsoft $750.6billion market value; Facebook $541.5billion and Samsung with market capitalization of $325.9billion all deal in data in different forms (Murphy 2018).

Globally, internet penetration is expected to grow from the 2010 levels by 21 percent and mobile penetration is expected

to increase by 30 percent by 2020 (Evans 2011). Due to heavy investment in fixed broad band, Africa's global share of broadband subscriptions per 100 persons soared from 0.84 percent in 2001 to 12.47 percent in the year 2016 (World Bank 2018). Between 2010 and 2017, secure internet penetration per 1 million people in Sub-Saharan Africa and Nigeria increased from 3.64 to 594.57 per 1million people and 0.64 to 222.79 per million people, respectively (World Bank 2018). Based on these developments, internet usage and especially e-commerce is projected to be an increasingly significant channel for economic growth.

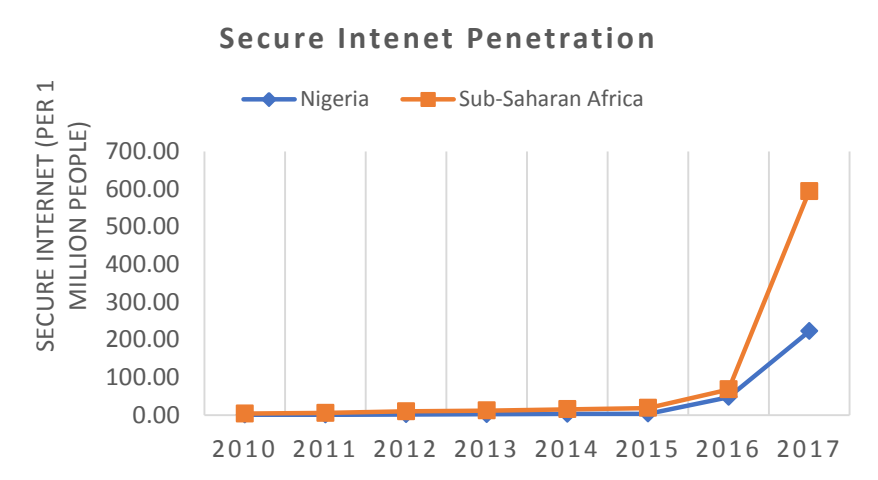

Fig. 4: Secure Internet Servers – Nigeria and SSA. Source: World Bank 2018: https://data.worldbank.org/indicator/IT.NET.SECR.P6?locations=NG-ZG&view=chart

Online retail revenues have doubled from the 2015 figure of $733 billion and are projected to triple to $2 trillion by 2030. Globally, it is estimated that by the end of 2020 internet usage will hit 50 billion users (Deliotte 2012). This will, among other things, enable the gathering of huge amounts of data as well sharing big data through cloud. These, together with other developments related to internet penetration and big data are projected to increase productivity by more than 60 percent. These developments will not only improve productivity, but also effectiveness and efficiency of service delivery in sectors like health, education, infrastructure, manufacturing and energy through cloud computing which is expected to grow from $40.7 billion in 2011 to over $240 billion in 2020 (Ried & Kisker, 2011), significantly contributing to the global economy.

3.3.2 Harnessing the Blue Economy

Whereas the exploitation of water bodies including rivers, lakes and, especially oceans for trade and other benefits is not entirely a new phenomenon, there is a growing recognition of the need to integrate innovative approaches to the exploitation of such water bodies to promote economic growth, while at the same time ensuring social inclusion and conservation and sustainable use of the environment. Beyond serving as the channel global trade; off-shore mining; fisheries and aquaculture; tourism; energy through

ocean waves; and a host of other related services, water bodies, especially oceans, generate economic benefits that are not always quantified including, but not limited to, being habitats for diverse flora and fauna; carbon sequestration; shoreline protection; and waste recycling and storage.

It was perhaps in recognition of these multiple functions that the 2012 East Asian Seas Congress adopted a holistic definition of *Blue Economy* as " *a sustainable ocean-based economic model that is largely dependent on coastal marine ecosystems and resources, but one that employs environmentally sound and innovative infrastructure, technologies and practices, including institutional and financing arrangements, for meeting the goals of a) sustainable and inclusive development: b) protecting the coasts and oceans, and reducing environmental risks and ecological scarcities; c) addressing water, energy and food security; d) protecting the health, livelihoods and welfare of the people in the coastal zone; and d) fostering an ecosystem-based climate change mitigation and adaptation measures*". UNECA (2016) however, views a *Blue Economy* as a *Green Economy* in a *blue world* and that *Blue Economy* incorporates a new approach to the economic utilization of the resources of our oceans, lakes, rivers and other bodies of water.

Based on the foregoing, *Blue Economy*, as a concept is in fact firmly embedded in Agenda 2030, specifically SDG target 14.7 which focuses on enhancing the economic benefits of

Small Island Developing States (SIDs) and Least Developed Countries (LDCs) from the sustainable use of marine resources, including through the sustainable management of fisheries, aquaculture, and tourism. *Blue Economy*, in effect, incorporates the principles of the *Green Economy* into a paradigm shift in the management of coastal water bodies and related resources in a sustainable manner by conceptualizing seas and oceans as "developing spaces" providing an opportunity for sustainable development.

Blue Economy is a Megatrend that if properly and sustainably harnessed could help shape global and national prosperity by 2030, not only through the economic growth channel but also social development and environmental sustainability channels. Ocean and coastal marine tourism, for instance, can create jobs and enhance economic growth. Coastal Least Developed Countries and Small Island Developing Countries presently receive in excess of 41 million visitors annually. And there is potential for more tourists visiting these and other countries with similar coastal resources, Nigeria included. Sustainable management and exploitation of fishery resources will lead to win-win benefits contributing more than UD$270 billion annually to global GDP while at the same time restoring the dwindling global fish stocks. Maritime transport is another area that can contribute to global and national prosperity because more than 80 percent of international goods traded are

transported via sea and the volume of sea-borne trade is expected to double by 2030 and quadruple by 2050.

With respect to waste management and environmental conservation, an estimated 80 percent of the ocean litter originates from land-based sources - better management of waste on land and within water bodies can thus help oceans recover and enhance conservation of their rich biodiversity. The relationship between climate change and sea level rise, as well as coastal erosion and changes in ocean current patterns is well documented. For instance, recent rise in sea levels has exacerbated flooding in low-lying towns in the USA towns three to nine times more often than they did 50 years ago in places like Miami, Florida. Relatedly, oceans are important carbon sinks and can help mitigate climate change. Other potential benefits of the *Blue Economy* include aquaculture, seabed mining, marine biotechnology, port infrastructure as well as rapid coastal urbanization and seaborne trade (UNEP 2015). There is therefore, a need for countries to invest in oceans, accurately value the contribution of natural oceanic capital and develop coastal and marine plans to guide in resolving conflicts over ocean space (World Bank 2017).

Nigeria faces myriad of challenges with respect to harnessing the *Blue Economy* including, but not limited to,

overfishing as a result of illegal and unregulated fishing activities; maritime terrorism, especially in the Niger Delta region; illicit trade in crude oil; piracy; human trafficking and arms smuggling; oil spillage and discharge; destruction of coral reefs; dumping of toxic waste; and receding waters of the Lake Chad. Focusing attention of the country's Blue Economy resources would go a long way in creating jobs, grow the economy and conserve the abundant ocean resources.

3.3.3 Innovative Financing for Development

During the Third International Conference on Financing for Development held in July 2015 in Addis Ababa, Ethiopia, Member States of the United Nations agreed on a wide range of initiatives and measures to overhaul global finance practices and generate investments for tackling contemporary economic, social and environmental challenges.[2] Regarding financing, the Conference Outcome Document emphasizes, *inter alia*, the need to build the capacities for domestic resource mobilization and highlights the fact that a multiplicity of financing sources, including private finance through blended finance, will be needed to achieve the SDGs.

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[2] The Conference Outcome Document, aptly referred to as the Addis Ababa Action Agenda (AAAA) can be found at http://www.un.org/ga/search/view_doc.asp?symbol=A/CONF.227/L.1

Mobilizing domestic savings is critical for public investments to achieve prosperity by 2030. Globally, savings as a percent of GDP are projected to rise marginally to the year 2023, mainly fueled by rises in the advanced economies and emerging and developing Europe while many regions including sub-Saharan Africa and Nigeria are projected to exhibit a general declining trend, albeit with small fluctuations, during this period. This development does not bode well for the mobilization of the necessary resources to fund the ambitious SDG agenda and ensure prosperity by the 2030.

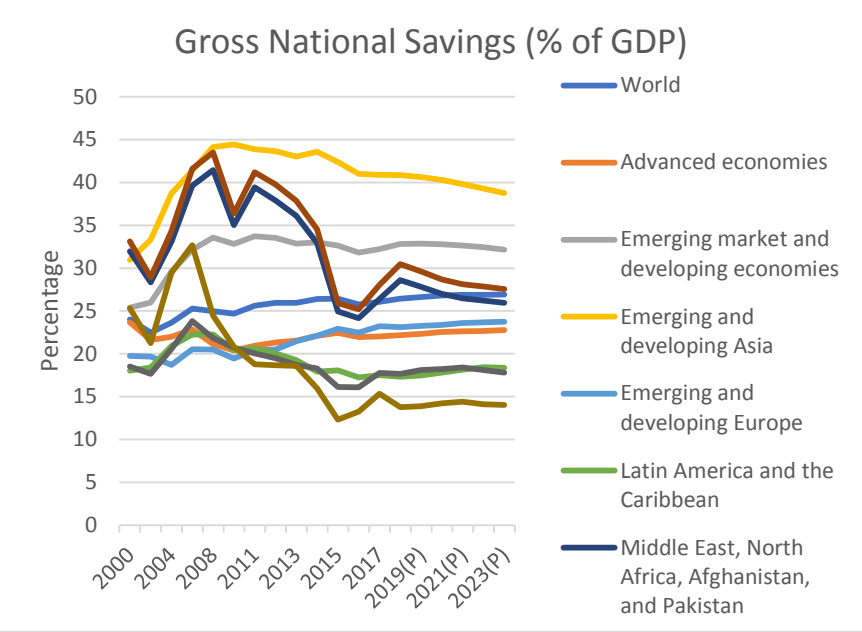

Figure 5: Gross National Savings (% of GDP) 2000 – 2023. *Source: IMF world Economic Outlook database. April 2018*

Foreign Direct Investment (FDI) is critical for job creation, economic growth and development. After a period of general increase, albeit with wide fluctuations, FDI as a percent of GDP has been on a general downward trend over the past two and half decades as shown in fig 6. Nigeria is the highest recipient of FDI in the West Africa region, receiving over 70 percent of the total FDI flows to the region (UNCTAD, 2018). Most of the investments, an estimated 90 percent, however, are in the oil and gas sector which is capital intensive and not job creating, followed by real estate as well as telecommunications and consumer goods.

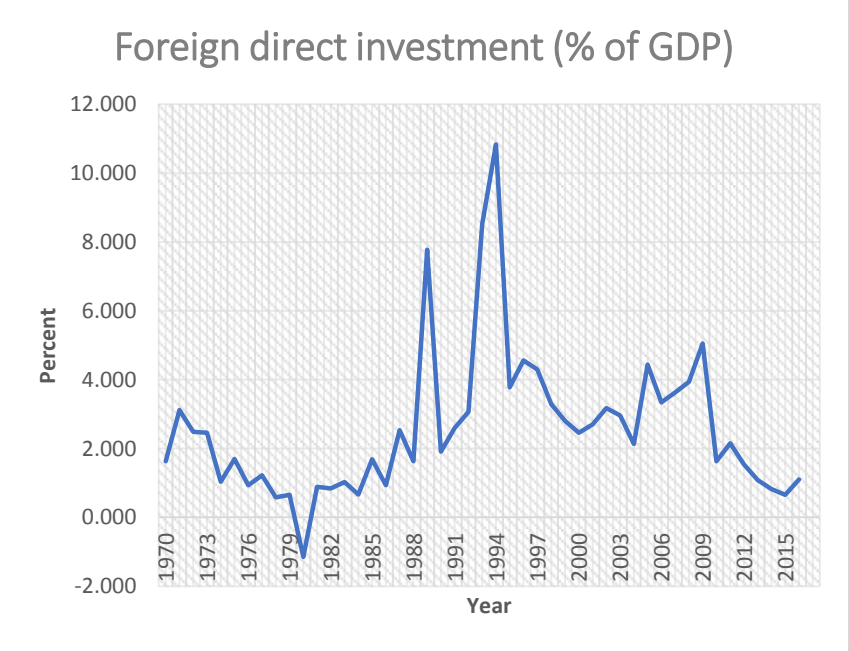

Fig 6: Nigeria- FDI as Percent of GDP: Source: World Bank

Factors such as political instability, insecurity, poor infrastructure, trade policies, and macroeconomic instability, all of which make the country unattractive to foreign investors have often been cited as being major contributors to the recent decline in FDI.

The foregoing does not however, imply that at the global level there is shortage of capital to finance the sustainable development agenda. For instance, in 2011 global annual public and private savings were estimated at US$22 trillion (UNGA 2014) while the total stock of global financial assets reached US$256 trillion at the end of 2014 (UN DESA 2016). What is needed is greater efficiency in channeling savings and investments to, and innovative financing mechanisms for, the sustainable development agenda. The mechanisms for achieving these include, but are not limited to, international cooperation in tax matters; widening the tax base; increasing foreign direct investments; increasing Official Development Assistance (ODA), including Aid for Trade; leveraging private sector funding and financial institutions; harnessing the benefits of trade liberalization; and remittances. Remittances to Nigeria, for instance, have recorded tremendous growth over the past one and half decades; from a total of $ 1.39 billion in 2000, the 2017 figure stood at $ 22.01 billion, which is 55.8 percent of the total remittances to Africa of $ 39.46 billion (World Bank, 2018).

Other sources of financing for sustainable development agenda include multilateral, regional and national development banks; financial safety nets, foreign direct investment, commercial banks; aid from philanthropic organizations and individuals; portfolio investments like the *Sukuk* funds; Sovereign Wealth Fund and Green Bonds traded through the stock market.

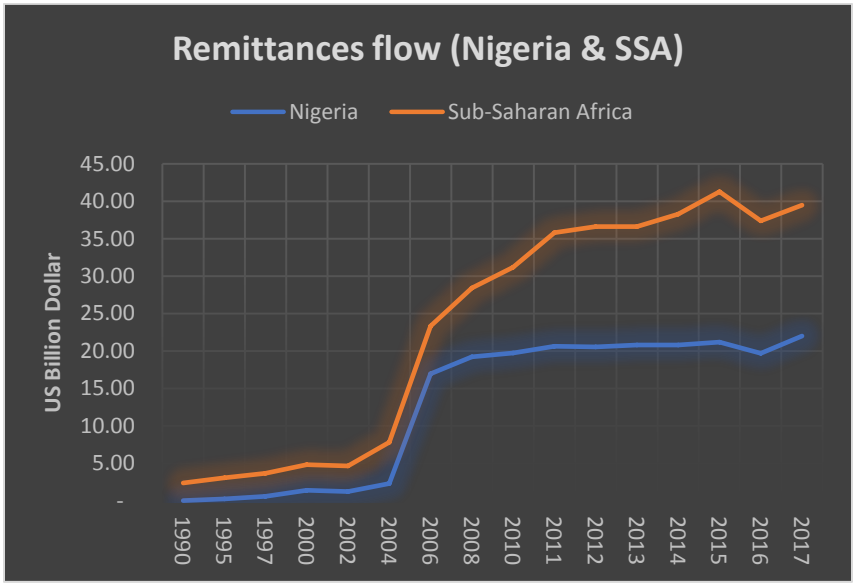

Fig.7: Remittances Flow – Nigeria and SSA. Source: World Bank Group 2018.

4. DEMOGRAPHIC DYNAMICS AND URBANIZATION

The global population, which currently stands at 7.3 billion people, is projected to reach 8.5 billion by 2030; that is, an

additional 85 million people being added every year. Africa, particularly Nigeria; and Asia, particularly India, are projected to be the largest contributors of this increase in global population while the population of regions like Europe, some part of Asia, especially Japan and North America, especially Canada are expected to shrink due to demographic dynamics such as low fertility rates and ageing, as well as urbanization. The global population is not evenly distributed across the various regions with India and China alone accounting for some 37 percent of the world's population (UNFPA 2017). Different countries and regions are faced with different population dynamics. While many developing, Nigeria included, are experiencing a youth bulge with an estimated 62 percent of the population below 25 years and 42 percent below 15 years of age – the so called 'youth bulge'; in the developed countries population ageing, low fertility rate, better health has led to a decline in population growth, and in some cases negative population increase (UNFPA, 2017).

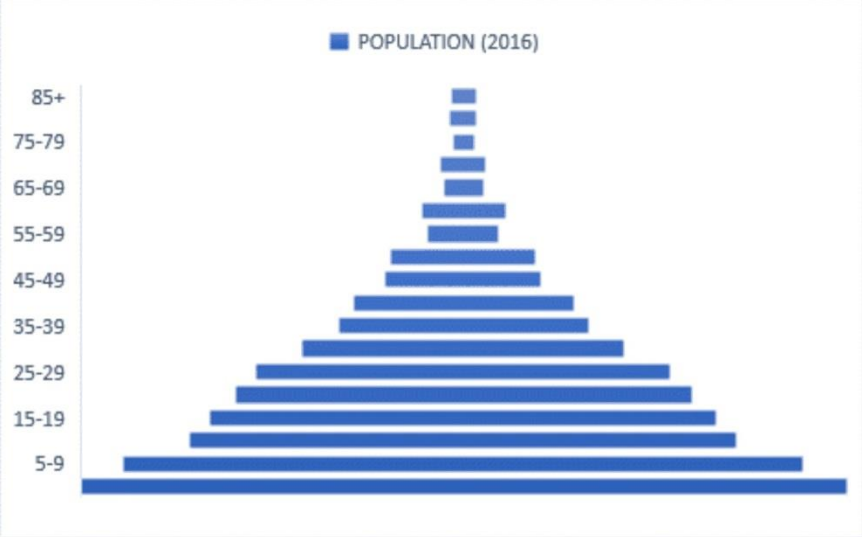

Fig. 8: Nigeria Age Distribution – 2016. Source: National Bureau of Statistics

Whereas the 'youth bulge' may present many challenges to governments, it can also be turned into a 'demographic dividend', especially if the youth are appropriately trained and skilled for the labour market and are engaged in productive activities. The 'youth bulge' can however turn into a 'demographic bomb' if this cohort of young people cannot find employment opportunities and earn descent incomes. Globally, the labour force participation for age-cohort 15 -24 years has been on the decline; although the rates are significantly lower for Nigeria pointing to a potential gradual slide towards a 'demographic bomb'.

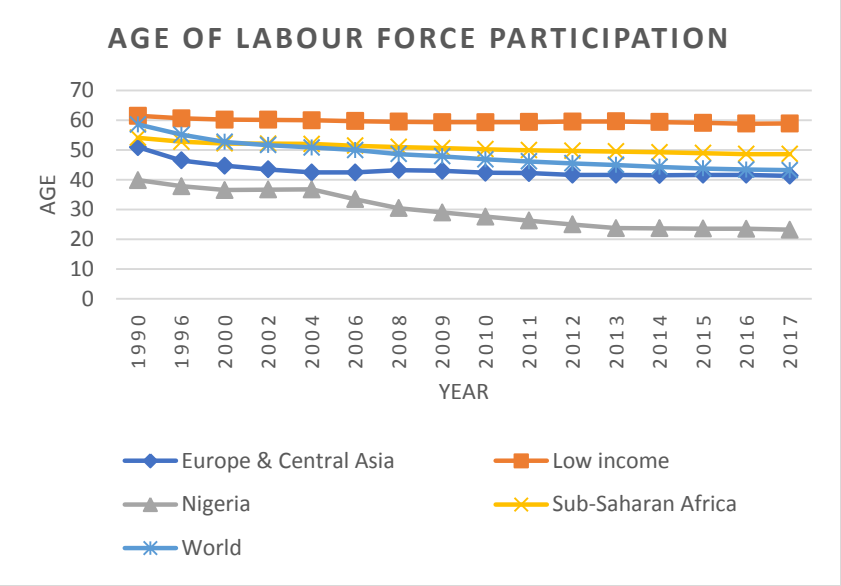

Fig.9: Labor Force Participation for Ages 15-24, total (%) (ILO Estimate). Source: World Bank 2018 based on ILO Estimates, 2017.

There is thus a need to focus policy on effective management of the youth bulge. If harnessed properly, this abundance of human resource is an asset for a world we want to see by 2030 (UNDESA 2015). There need to integrate demographic variables in policy formulation and development planning with the ultimate goal of eliminating and/or minimizing poverty, unemployment and inequality. Equally important is the urgent to ensure that the population, especially the youth, are adequately skilled and tooled to participate

effectively in economic activities and benefit from globalization.

Rapid urbanization is fast emerging as one of most transformative trends in the world today. Cities are becoming the dominant force of economic growth, prosperity and sustainable development because they are *inter alia*, the hubs of government, commerce and transportation. In 2015, an estimated 54 percent (4 billion people) of the global population were residing in urban areas; in contrast to an estimated 30 percent in 1950. The total urban population is projected to be 5.1 billion people by 2030 and by 2050, owing to both demographic shifts and overall population growth, around 2.5 billion people could be added to urban areas due international and internal migration resulting in the rise of Megacities. This will, undoubtedly, present challenges and exert pressure on existing and new resources and infrastructure including housing, transportation and energy systems as well as for employment; and basic services such as education and health care, and particularly, water (UNDESA, 2018).

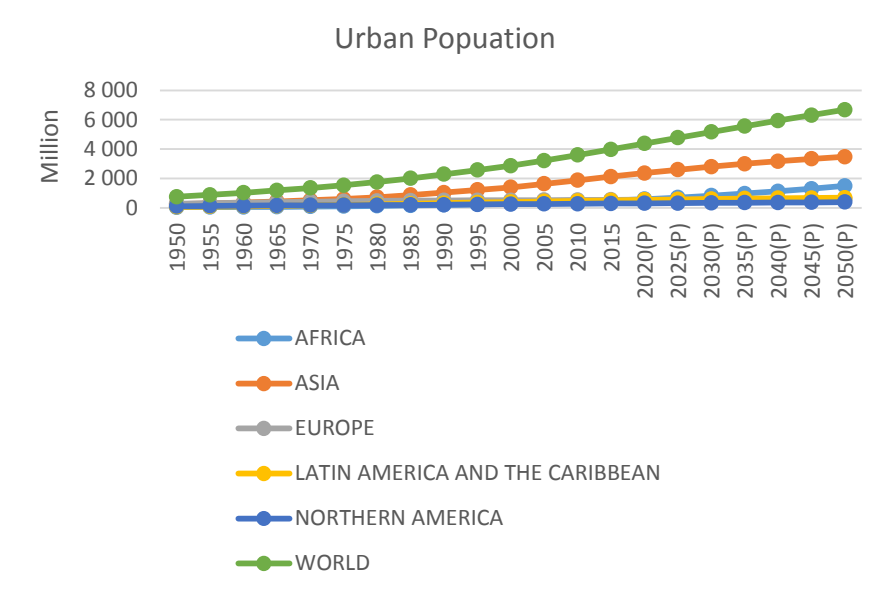

Fig. 10: Urban Population, by region. Source: UNDESA database 2018 https://esa.un.org/unpd/wup/Download/

Currently, Northern America, Latin America, the Caribbean and Europe are the most urbanized regions of the world, while Africa and Asia remain mostly rural, with 40 percent and 48 percent of their populations, respectively, living in urban areas (UN DESA 2015 cited in UNRISDA 2017). By 2030 however, Africa and Asia are projected to become 47 percent and 56 percent urban, respectively (UN DESA 2015). These two regions are projected to register the fastest growth of their urban population with China, India and Nigeria accounting for over one-third of global urban population growth between 2015 and 2050 (UNOCHA 2016). It is

projected that India will have added 416 million urban dwellers, China 255 million and Nigeria 189 million which will account for 35 per cent of the projected growth of the world's urban population by 2050 (UNDESA 2018).

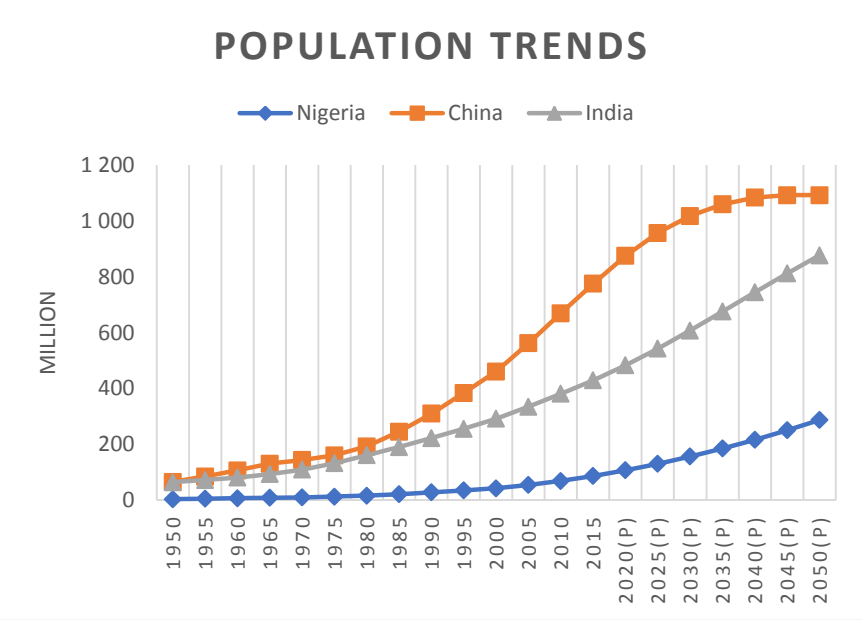

Fig. 11: Urban Population – Nigeria and Emerging Economies. Source: UNDESA database 2018 https://esa.un.org/unpd/wup/Download/

Despite its inherent challenges, urbanization presents many opportunities and can serve as a key driver of economic growth through the creation of employment opportunities and serving as an engine room for prosperity by fostering innovation and efficiency in production and service delivery.

To achieve inclusive, safe and resilient cities (SDG 11) however, mitigation measures to address the challenges of urbanization, along with the provision of housing, infrastructure and other social services such as strengthening social protection policy for ageing population, improvement of healthcare service delivery, the enactment of policies that transform the 'demographic bulge' into a 'demographic dividend' by investing in human capital development need to be accelerated while taking into account social integration and human rights.

5. EDUCATION, SCIENCE, TECHNOLOGY AND INNOVATION

5.1 Education as a driver foe Sustainable Development

Education is a key driver of prosperity and sustainable development. The promise of a peaceful, prosperous and sustainable world by 2030 can only be realized through the commitment of informed, skilled, competent and empowered people from all spheres of life, with deep understanding and taking full cognizance of the challenges and opportunities presented by contemporary and future socio-cultural, political, economic, scientific, technological and ecological conditions and realities. Since 1990, the United Nations Development Programme, through its signature publication – the Human Development Report- has that the growth and development of any nation should

be focused on human development through investment in education and health, as well as economic prosperity (UNDP 2004). The critical role of education in promoting national development is explicitly recognized in the SDGs target 4.7, as well as well as in the complementary approach Global Citizenship Education (UNESCO 2015).

However, the world is currently facing major challenges with respect to wide disparities in access to access to education and technological advancements based on geography, gender and socio-economic status. The existing disparities are exacerbated by entrenched social and cultural norms; natural and environmental hazards and shocks; and heightened vulnerability, growing insecurity and political instability around the world. There exist wide gaps in educational attainment and technological advancement especially in developing nations. A survey by UNESCO in 2016 indicated that despite decades of efforts to get every child into the classroom, 1 in every 5 children, adolescents and youth is still out of school, with sub-Saharan Africa having the highest rates of education exclusion. The survey revealed that that education exclusion is worse for children with the older age cohorts and for girls. Over one-fifth of children between the ages of 6 and 11 are out of school, followed by one-third of youth between the ages of about 12 and 14 while an estimated 60 percent of youth between the ages of about 15 and 17 are out of school. Across the region,

about 9 million girls between ages of 6 and 11 years will never go to school against 6 million boys.

Relatively low investments in education and training has been cited as a major causal factor of the low education attainment in the region. In Nigeria, for instance, over the 2015 -2016 fiscal periods, the Federal Government's budget allocation to the education sector declined from N392.4billion to N369.6 billion representing 15.05 percent and 9.32 percent, respectively, of the total budget. This is way below the 26 percent recommended by UNESCO for developing countries and is in sharp contrast to Ghana where the Government allocation to the education sector stood at 31 percent (Adetula et al 2017). As a consequence, frequent unabated clampdown on schools cushioned by industrial actions by teachers, paucity of instructional materials, poor infrastructural facilities the thus making teaching and learning un-conducive etc continue to plague the education sector

Investment in education is critical for human capital development and helps not only in driving economic growth but also strengthens rule of law, promote democracy and human rights, enhances global citizenship, tolerance and civic engagement as well as sustainable development. The four 'Asian Tigers' which implemented compulsory

education for the children and youth while at the same time investing heavily in industrialization, building major industrial estates, offering tax incentives to foreign investors as a result of which they become major exporters of textiles and toys, to plastics and personal technology in a relatively short period of time present perhaps the most classical case of the role of education in promoting economic growth and development.[3]

5.2 Science, Technology and Innovation

Science, Technology and Innovation (STI) has become an integral part of our lives and has been recognized a lever for economic transformation and prosperity; environmental sustainability; and good health & well-being. It is an all-inclusive cross-cutting pillar for achieving the SDGs (UN-OECD 2011). Recent technological advancements have created opportunities for, as well as threats to a prosperous world. Ramalingham *et al*, 2016, have argued that industries, businesses and other aspects of everyday life all need innovations and scientific discoveries to renew and develop their products and services for the realization of the SDGs. Indeed, rapid globalization, international trade,

[3] The term "Asian Tigers" refers to a group of South-East Asian countries that experienced a period of extraordinary growth from 1965 to 1995. Those countries are Hong Kong, Singapore, South Korea and Taiwan

environmental protection, inclusion and socio-economic activities all relate to (STI).

STI plays a key role in economic and human development and can help improve the state of many impoverished members of the society, especially in the developing world (Juma *et al*, 2000). The critical role of STI is fast gaining a global acceptance especially in sectors like health, education, agriculture, governance, policy and the environment. The ability to add value to agricultural production via the application of scientific knowledge to entrepreneurial activities, for instance, stands out as one of the most important lessons of recent economic history. The application of STI such as the green revolution played a strategic role in helping developing countries overcome chronic food shortages by using technology to improve agricultural production and productivity. For example, biotechnology and adoption of genetically modified (GM) crops helped produce new rice varieties in Africa and South Asia and pest- and disease- free bananas in the Western Hemisphere, East Africa, and South Asia (Juma, 2012).

Breakthroughs in technology and innovations in other fields as well play a key role in shaping future growth, development and prosperity. To date, scientific and technological breakthroughs, as well innovations in fields such as *Nanotechnology, Biotechnology, Information &*

Technology, Cognitive Science and Robotics, A*rtificial Intelligence a*nd *Quantum Computing* have had profound effects in the areas of health, nutrition and logistics and are fast re-shaping the world.

Some of these other technological fields are briefly explained here below:

- **Nanotechnology**: also known as 'micro' technology is the branch of technology that deals with the manipulation of very small particles, mostly atoms and molecules in various fields of Science, technology, Engineering and mathematics.
- **Biotechnology:** this refers to the application of scientific and engineering principles to the processing of materials by biological agents to provide goods and services.
- **Cognitive Science:** the interdisciplinary scientific study of the mind and intelligence, embracing philosophy, psychology, artificial intelligence, neuroscience, linguistics and anthropology. It seeks to understand how the mind works in developing theories about human perception, thinking and view of things.
- **Artificial Intelligence:** the simulation of human intelligence processes by machines, especially computer systems to imitate intelligent human behaviour.

- **Robotics:** the branch of engineering that deals with the design and application of robots in an actuated mechanism programmable in multiple degree of autonomy to perform intended tasks without human intervention in a precise and effective manner.

The development of these technologies and innovations in these and other fields are resource-intensive and can last for very long periods of time; requiring long-term public as well as private investments. It therefore follows that these technologies and innovations are more developed and applied in the developed countries which have more financial and better trained human resources and less in the emerging economies, BRICs[4] and the N-11 countries.[5] The foregoing notwithstanding, by 2030, technologies will affect the implementation of the SDGs and countries like China and India are projected to become major global players in the area of technology and innovation, especially in the field of food production and value addition; education and health; climate change; security; environment, etc (Praxi 2016) if not overtaking the developed countries altogether.

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[4] BRIC countries are Brazil, Russia, India and China.

[5] N11 countries or the Next 11 countries refers to a group of eleven countries - specifically Bangladesh, Egypt, Indonesia, Iran, Mexico, Nigeria, Pakistan, the Philippines, Turkey, South Korea, and Vietnam - which have emerging markets that could potentially become some of the world's largest economies for having laid the foundation for future economic growth.

Beyond the aforementioned areas, STI can be and has been applied in many and diverse fields to benefit humanity, including:

- Nano technological innovation is, for instance, an essential tool in waste reduction, enhancing agricultural production, improvement in water quality and resource conservation of saline water into fresh water. (ECOSOC 2015).
- In the Health sector, through the use of technology and innovation, patients and doctors connect easily; and doctors collect data and provide healthcare to the rural populations through mobile devices (UNRISD 2017, Adibi 2015). Innovations provide greater efficiency by reducing the cost of healthcare services and increase efficiency of health care delivery. As a result of increased adoption of technologies in the emerging and developing countries, the gap between the rich and the poor countries in health care is expected to reduce by 2030. Medical care in the developing world is projected to improve and biotechnology is expected to have a greater impact on developing countries than the developed countries.
- In the Education sector, innovation, creative thinking and new teaching methodologies are fast emerging. Investment in knowledge systems, including Research and Development (R & D), has expanded globally and technology is making a great impact on

education with the emergence of new actors thereby creating a more competitive global learning environment (UNESCO 2010). In parallel, there is a growing emphasis on the relationship between knowledge, innovation and growth especially in middle-income countries, with increasing focus on Science, Technology and Innovation against the traditional learning methods. The ways in which knowledge is created, processed, diffused and applied have been revolutionized in part through rapid developments in information and communication technologies leading to the creation of dynamic networks and cross-border collaborative processes such as mobile learning, webinars, online courses, video conferences, interactive applications and online videos. The internationalization of R & D has increased the mobility of skilled professionals, scientists and academics in a more flexible and affordable way, which is an important mechanism for knowledge sharing and technology transfer towards achieving the SDGs (UNESCO 2015). For instance, "The *Educopedia*" online platform created by Rio de Janeiro's Municipal Department of Education in 2010 to improve public school teaching provides materials for teachers and gives students access to multimedia learning resources, including videos, interactive

quizzes and digital libraries. Together with other reforms in the education sector, this particular innovation has contributed to better educational performance by students (Bruns and Luque 2014) cited in UNRISDA 2017).

- Other key sectors in which STI could be applied to enhance prosperity include: climate change mitigation through power generations that are efficient and free of emissions such as nuclear energy, hydro and renewables (WEF 2017); clean transportation such as electric vehicles to reduce the use of fossil fuel in the transport sector which represents 23 percent of CO_2 in the US and 14 percent of global emission (IPCC 2014); food consumption and innovative agricultural production and value addition- for example a company 'Beyond Meat' created the world's first ever meat burger that is entirely plant based; manufacturing sector through such as smog- reducing mechanisms; building and construction through building smarter cities by harnessing digital technologies to solve today's pressing urban problems; 3D printing which opens up opportunities for individuals and smaller companies to participate in decentralized production (UNDP 2015); use of drones especially in mitigating disasters, monitoring humanitarian activities and responses, for surveillance and security measures and

supplying medicine to remote locations; the internet of things for online businesses and marketing; and data revolution and good governance.

5.3 Artificial Intelligence

The evolution of Artificial Intelligence (AI), also known as 'Machine Intelligence', is attributable to recent advancement in the use of technologies such as calculators and computers. AI started to evolve when intelligent robots and algorithms starting to perform more complex and cognitive tasks such as reading, writing and understanding languages. While humanity's initial dream was to build a true machine intelligence, AI has since evolved beyond mere 'Machine Intelligence' into a much larger field with numerous applications. AI has transformed many industries especially the Information and Technology (IT) and is widely used by Tech Giants like Google, Apple, Microsoft, Amazon etc; as well in the transport sectors like Tesla self-driving vehicles. Indeed, AI is poised for rapid advancement and has the potential to transform many areas of human activities such as healthcare.

In some quarters, AI is currently viewed as growing threat to humanity by replacing the old ways of doing things and rendering old skills and organizational approaches irrelevant. A survey conducted by the British Science

Association, however, found that young people aged 18-27 seem more excited about AI technologies; a finding buttressed by a Stanford University report titled "*Artificial Intelligence and Life in 2030*" which highlighted the following eight key sectors where AI can prove pivotal:

- *Healthcare*: supporting diagnosis by detecting variations in patient data, early identification of potential pandemics and imaging diagnosis.
- *Automotive:* autonomous fleets for ride sharing, semi-autonomous like self-driving and driving assists, engine monitoring and prediction.
- *Financial Services*: personalized financial planning; fraud detection and anti-money laundering; and automation of customer operations.
- *Transportation and Logistics:* traffic control and reduced congestion; enhanced security; autonomous delivery; and enhanced safety.
- *Technology, Media and Telecommunication*: customized content creation, personalized marketing etc
- *Retail and Consumer Market*: anticipating customer demand, inventory management
- *Energy:* smart metering, more efficient grid operation and storage and predictive infrastructure maintenance

- *Manufacturing:* enhanced monitoring and auto-correction of processes, supply chain and production optimization.

AI is the key driver of improvements in computational speed, machine learning and has transformed computing in profound ways: computers are now capable of doing jobs that previously were assumed only humans could perform (Brynjolfsson & McAfee, 2011). AI has also led to learning innovation- innovations linked to platforms on new learning techniques through Massive Open Online Courses in a cost-effective manner; as well as intelligence of the social networks which is exponentially creating economic value in a variety of ways. AI is also facilitating several applications in many ways including the internet of things and automation of work to improve the efficiency of operations. An important example in this respect is smart homes using artificial intelligence for communication through sharing of big data. Big data can enhance service delivery at lower cost due to price transparency; cloud computing - cloud computing is a disruptive innovation that can drastically reduce ICT and energy costs and enhance the use of digital platforms, content and services. The global cloud computing market is projected to grow from $40.7 billion in 2011 to over $241 billion in 2020 (Ried & Kisker, 2011).

6. CLIMATE CHANGE

A few decades ago, climate change was viewed, in some quarters, as untrue, in the extreme; or at best, a problem for future generations with little bearing on today's world. However, recent experiences regarding the consequences of climate change on peoples' lives and the environment; and evidence of current and potential negative impacts based on sound science have thrust climate change into the limelight of global policy debate and contemporary geo-politics. The Intergovernmental Panel on Climate Change (IPCC) defines climate change as a change in the state of the climate that can be recognized by changes in the mean of its properties that persist for an extended period of say 10 years and above. Such changes in the state of climate can be the result of human action or natural changeability.

The United Nations Framework Convention on Climate Change (UNFCCC) on its part has defined climate change as a change in the climate that is attributed directly or indirectly to human activity which alters the structure of the global atmosphere or to natural climate variability observed over comparable time periods (UNFCC 2011). Although anthropogenic factors are the most important contributors of climate change, other factors such as deforestation and forest degradation which are estimated to account for 11 percent of

global climate change are also important contributory factors (GCEG 2014).

Climate change can be viewed as a Megatrend that will shape future development trajectories of countries as it has the potential to undermine the progress towards achieving prosperity by 2030 as a result of its negative effects. The recent global economic downturn, and consequently human wellbeing, can be attributed, in part to various environmental shocks and natural resource degradation. Climate change deepens inequalities and has a huge impact on most vulnerable countries and communities (UNDP 2011). But countries most affected by or at risk of suffering the consequences of climate change, because of their limited capacity to mitigate and cope due to a host of factors including lack of adequate infrastructure, public services and social protection systems are the least contributors (UNRISD 2017) and concentrated in sub-Saharan Africa and South Asia (Chen *et al*. 2015).

In Nigeria, the adverse effects of climate change are manifest in the sea level rise and changes in the rainfall patterns and its effects on agricultural production and productivity which lead to food insecurity (WFP 2015). Globally, it is projected that in the absence of mitigation, climate change could lead to an increase in the population living in extreme poverty by

122 million by 2030 (Hallegatte *et al*. 2016). This can be largely attributed to the negative consequences of climate change on incomes in the agricultural sector (FAO 2016), with global crop yield projected to decline by 5 percent by 2030 (Hallegatte *et al*. 2016).

On the one hand, inaction on climate change will, undoubtedly, have a negative impact on the global and national prosperity as outlined in the preceding sections. On the other hand, climate change adaptation and mitigation, could positively influence national and global prosperity. The adoption of climate resilient agriculture and/or smart agriculture for instance, could increase food production and productivity while proven technologies could reduce food waste (UNDP 2012). Equally, construction of resilient buildings, continuous afforestation, adoption of climate smart innovation such as green buildings, renewable energy sources as well as low carbon emission vehicles and robust financing mechanism for climate change adaptation as stated in the Paris Agreement are all important considerations in climate change adaptation and mitigation (UNFCCC 2010; UNDP 2016). Regarding climate smart technologies, solar technologies that convert sunlight into usable energy forms can, for instance, potentially make electricity affordable to 1.2 billion people who do not have access to it currently (UNDP 2015). Indeed, the sun is predicted to become the world's largest source of electricity by 2050 (IEA 2014).

Climate change mitigation can also increase food security for the projected population of 8.5 billion people by 2030 to achieve a world of zero hunger (FAO 2015), besides multiplier effects on other sectors. In sum, climate change, especially adaptation and mitigation present many opportunities including in the area of renewables such as solar, wind, hydro by creating employment opportunities and start-up companies and industries, especially for the youth as well as strengthening scientific research and technology development (UNFCCC and Paris Agreement, 2015).

7. LAND DEGRADATION AND BIODIVERSITY LOSS

Terrestrial habitats and ecosystems such as forests, wetlands, drylands and mountains with their diverse flora and fauna are important for economic, scientific, educational, socio-cultural, recreational and aesthetic values and form part of our common heritage. Plants provide 80 per cent of human diet; and agricultural production, in addition to providing the necessary nutrition and food security, is also as an important means of livelihood, especially for rural agrarian communities in Africa. Forest ecosystems which account for 30 per cent of the earth's surface, provide vital habitats for millions of flora and fauna and serve as an important source of clean air and water which are critical for our sustenance. They also serve as carbon sinks and thus play a critical role

in combating climate change. Land is a vital resource for producing food and other ecosystem goods and services including conserving biodiversity, regulating hydrological regimes, cycling soil nutrients and carbon sequestration. Indeed, the most significant geo-resource or natural capital is productive land (UNECE, 2018).

Yet, many Africa's ecosystems are under threat of serious degradation. Desertification has been defined as a land degradation process in arid, semi-arid and dry sub-humid areas resulting from various factors, including climate variation and human activities (UN, 1994).[6] All African countries are prone to desertification, with the Sahelian countries on the southern fringes of the Sahara Desert, including Nigeria, being particularly vulnerable. Nicholson (2001) has stated that land degradation is exemplified by the replacement of diverse and nutrient-rich plant species with vegetation of poorer quality due to reduced soil quality. Land uses such as tree felling for fuel wood and timber; pasture and crop production; and agricultural 'extensification' and intensification have all been cited as important contributors to land degradation in Africa. Globally, between 1985 and 2010, human activities on land has expanded by 154 million hectares in 116 countries (UNEP 2014); while 70 percent of the grassland, 50 percent

[6] See http://www.unccd.int/Lists/SiteDocumentLibrary/conventionText/conv-eng.pdf

of savannah, 45 percent of temperate deciduous forests and 27 percent of tropical forest biome have been converted either for agriculture (FAO 2011) or due to population growth, technologies and unsustainable production and consumption patterns (UNEP 2015).

On the one hand, it estimated that the demand for food, energy, and water is expected to increase by at least 50 percent, 45 percent and 30 percent, respectively, by 2030 primarily on account of population increase, rising incomes and changes in consumption patterns (IFPRI 2012). On the other hand, continued land degradation could reduce global food production in the future.

The twin problems of land degradation and biodiversity loss are therefore an important Megatrend that could shape future prosperity. The United Nations Convention to Combat Desertification (UNCCD) which represents the first global attempt at linking environment and development to sustainable land management has called for "sustainable land use for all and by all":

The Red List Index (RLI), a temporal measure of the risk of extinction of major species of animals, coral reefs and cycads in the absence of any conservation efforts is a composite index depicting changes in the state of biodiversity within a

region.[7] A downward trend in the RLI means that the expected rate of future extinction of major species is worsening. The converse holds true, with a RLI of 1 indicating that habitat degradation and biodiversity loss have been halted. Like in all regions of the world, RLI for Africa has been on a downward trend in the recent past (over 2000 – 2017 period). From a high of 0.8 in 2000, the current (2017) figure stands at 0.74, a trend similar to the global pattern. This would mean that, *ceteris paribus*, the expected rate of future extinction of major species of animals is worsening in all regions of the world, including Africa.

[7] It is an index of aggregate survival probability for all birds, mammals, amphibians, coral and cycads in a given region, weighted by the fraction of each species' distribution occurring within the region.

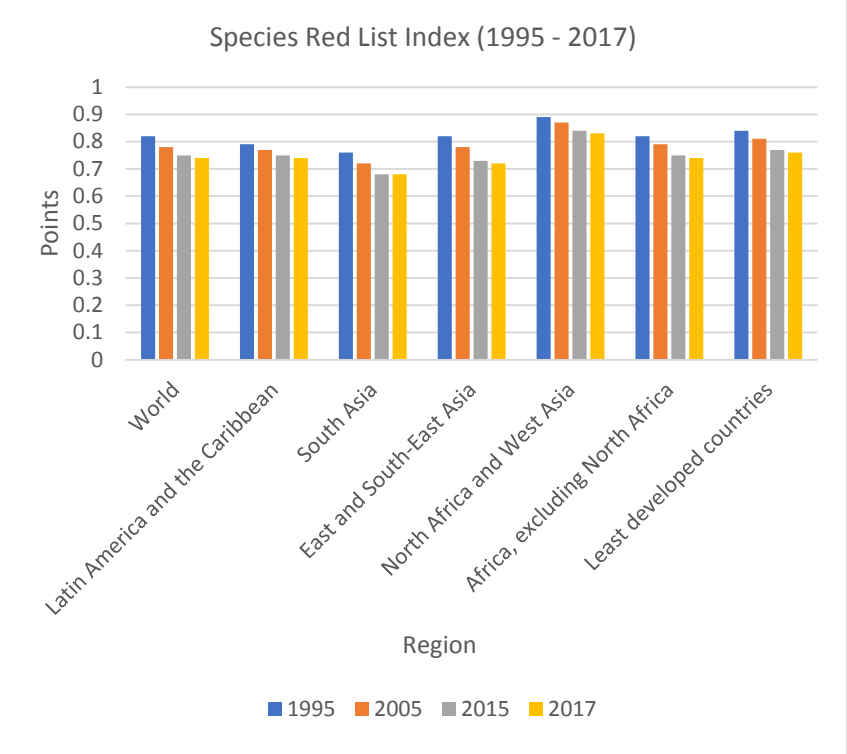

Fig.12: Red List Index Trends (1995 -2017). Source: https://unstats.un.org/sdgs/indicators/database/?indicator=15.5.1 based on BirdLife International and IUCN (2017)

The impact of human activity and climatic variation on land and land-based resources, especially the diverse species of fauna and flora, is one of the Megatrends that will shape both national and global prosperity by 2030. Conservation and sustainable management of these resources, coupled with deliberate actions to adapt to and mitigate the effects of climate change are therefore of paramount importance for

prosperity and continued sustenance of mankind on planet earth. To achieve these twin objectives there is need for strong partnerships at all levels for *inter alia,* sustainable management of the ecosystem; adoption of green and climate resilient agriculture; implementation of low-carbon technologies; innovative financing mechanisms and resource mobilization for biodiversity conservation and climate change adaptation and mitigation; social innovation for land and ecosystem protection; and implementation of the Paris Agreement through appropriate policies accompanied by normative and policy shift towards greater consideration of ecological and social objectives in development strategies.

8. PEACE, SECURITY AND GOOD GOVERNANCE

Peace is a pre-condition for sustainable human development and prosperity. In 2014, the immediate past UN Secretary General of the United Nations, Ban Ki Moon stated that "peace means access to education, health, essential services which must be nurtured through the dignity, rights and capacities of every man and woman". SDG 16 highlights the critical role of peace, justice and strong institutions in promoting sustainable development. Similarly, the Africa Union Commission's Agenda 2063 has emphasized the need for promoting peace, security and stability on the continent by focusing on measures that address such issues as widespread poverty, youth unemployment, poor governance, illiteracy and lack of free and fair elections.

The state of peace and an assured sense of security allows human development to be effectively nurtured and sustained (Singh, Jasjit 2000). The sources and nature of threats to peace and security however, are fast changing. Present-day security threats are significantly different from the security threats which existed when the United Nations was founded in 1945 when the primary threat was the need for nation states to practice tolerance and live together in peace with one another as good neighbours (UN Charter, 1945). The present-day threat to peace is no longer emanating from aggressive nation states, which forms the security scenario of the realistic school of international relations (Morgenthau 1963, Waltz 1979), but rather from local and regional distributive conflicts over access to and control over productive resources; terrorism; migration and ethno-politicized and privatized violence; crime; drug trafficking; and epidemics and natural catastrophes (Wellershoff 1999). This calls for new and innovative ways of tackling contemporary security problems.

Global peace declined for the fourth straight year, with the average level of country peacefulness deteriorating by 0.27 percent in 2017 as a result of growing authoritarianism; unresolved conflicts in the Middle East and North Africa; spread of violent extremism and terrorism in Sub-Saharan Africa; and an increase in political instability across the

world (IEP, 2018). Incidences of terrorism have grown steadily over the past decade particularly in Sub-Saharan Africa as a result of ISIS and *Boko Haram* (UNRISD 2017). The number of terrorist attacks reached its highest point in recent years, with 14,806 terrorist events and 38,422 fatalities reported in 2015 compared with 651 terrorist events and 171 fatalities in 1970 (National Consortium for the Study of Terrorism and Responses to Terrorism, 2016).

On a global scale, as a result of unrest, conflicts, violations of human rights and forced displacement, 68.5 million people around the world have been forced to flee from their homes in 2017 – a 75 percent increase over the past two decades rising from 37.3 million in 1996 (UNHCR 2018). An estimated 85 percent of the world's displaced persons are in developing countries, among them are nearly 25.4 million refugees, 68 percent of whom come from five countries - South Sudan, Afghanistan, Myanmar, Somalia and Syria- only, and over half of whom are under the age of 18.

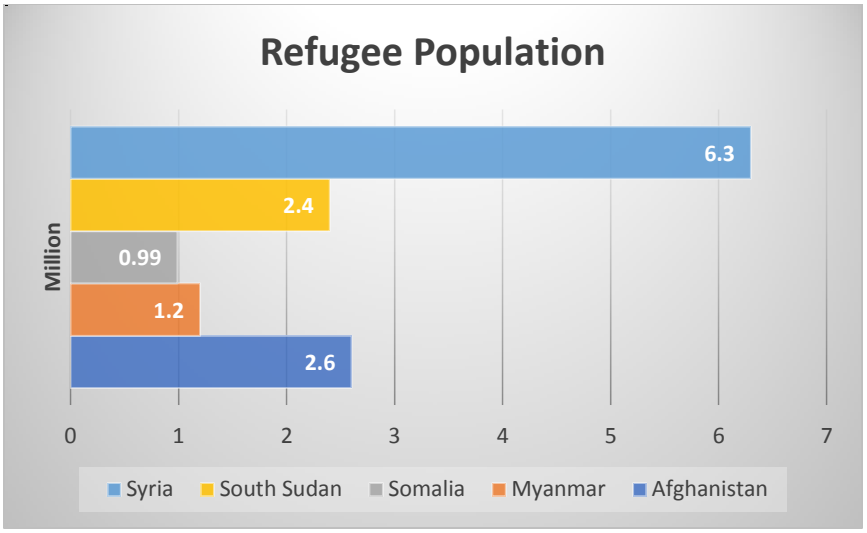

Fig. 13: Refugee Population -2017.Source: UNHCR Data base 2018

Globally, the economic cost of violence was estimated at $14.76 trillion PPP in 2017, equivalent to 12.4 per cent of global GDP (IEP 2018); a 16 per cent increase since 2012. This increase in economic cost of violence was mainly fueled by rising cost of violence in Syria, Afghanistan and Iraq which stood at 68, 63 and 51 per cent of GDP, respectively (IEP 2018).

On the 2018 Global Peace Index (GPI), 92 countries deteriorated while 71 countries improved, with the global average deteriorating by 0.27 per cent (IEP 2018). This is the highest number of countries to deteriorate in peacefulness in a single year since 2010. Regionally, Europe, North America,

Asia-Pacific and South America remain the top most peaceful regions in the world, while South Asia, Middle East and North Africa are considered the least peaceful regions. This is mainly a reflection of the declining geographic influence of ISIS and *Boko Haram*.

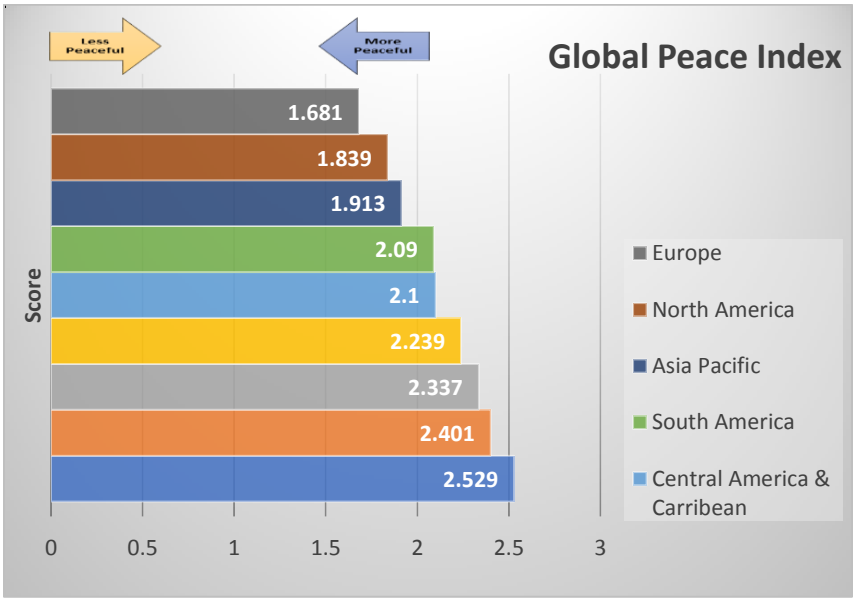

Fig. 14: Global Peace Ranking – by Region. Source: Global Peace Index 2018.

The relative Peace Index for Sub-Saharan Africa's remained unchanged at number six, despite a slight decline in its overall score. At the same time, internal displacements and fatalities associated with insecurity and terrorism have been on the rise in the recent past in Africa. An estimated 2.2 million people have been displaced in the Lake Chad Basin, over 1.7 million (77 percent) of whom are in Nigeria

(UNHCR 2018) while fatalities as a result of *Boko Haram* insurgency increased from 700 in 2009 to 11,535 in 2015 and currently stand at 15,231 (CFR 2018).

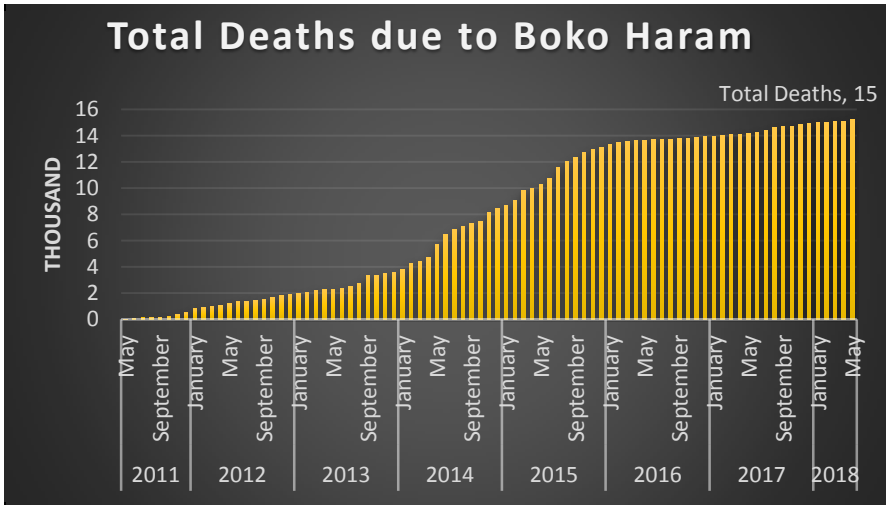

Fig.15: Cumulative deaths due to Boko Haram. Source: Council on Foreign Relations 2018

In addition to the reported fatalities and destruction of property, other consequences of insecurity and pervasive governance deficit in Nigeria include poverty, food insecurity, spread of diseases, loss of lives and destruction of properties, pollution, for instance, in the Niger Delta.

9. CONCLUSIONS

The SDGs reflect the commitment of the international community to end poverty and deprivation, everywhere and for everybody, while conserving the environment. They represent a promise for prosperity for all, in harmony with nature. For this promise to be realized however, national governments and the international community must make conscious efforts to mainstream and integrate the goals into policy, planning and implementation frameworks and accelerate progress by identifying and tackling implementation bottlenecks; seizing new opportunities and trends; harnessing all resources; and focusing on sectors with the highest multipliers across many sectors. The Megatrends discussed in this paper have the potential to affect the development trajectory that individual countries and the global community will take as they journey towards the year 2030. They present major opportunities as well challenges for the realization of global and national prosperity by 2030. They are inter-connected and inter-related, presenting multipliers across the various domains of prosperity, as well as trade-offs. Importantly, they are a clear testimony of the inter-dependence of today's world as action or inaction in one part of the world or sector could lead to consequences in a different part of the world or a completely different sector.

As is clearly demonstrated in the paper, there are many opportunities for the realization of prosperity for all by 2030. They are however dependent on or defined by specific historical, geographic, economic, technological and ecological contexts. At the same time challenges abound, especially if no corrective measures are taken. There is thus a need for greater cooperation, partnership and collective action by all actors at international, national and sub-national levels to address those challenges and minimize the potential negative consequences while harnessing the opportunities presented by the Megatrends in order to achieve prosperity for humanity by 2030. The concept of Megatrends is dynamic and new trends keep emerging, while old trends keep evolving. It is therefore incumbent upon governments and other stakeholders to keep track and harness and adapt to the opportunities presented by present and future Megatrends.

REFERENCES

Adetula, D., Adesina, K., Owolabi, F., Ojeka S., (2017): *Investment in Education for the Nigerian Economic Development*. Journal of Internet Banking and Commerce, April 2017, vol. 22, no. 1. Available on http://www.icommercecentral.com/open-access/investment-in-education-for-the-nigerian-economic-development.pdf

Adibi, S., ed. (2015). Mobile Health: A Technology Road Map. Cham, Switzerland: Springer International

Ansuategi, A. and others (2015). The Impact of Climate Change on the Achievement of the Post-2015 Sustainable Development Goals. Climate and Development Knowledge Network. Available from www.gwp.org/Documents/Impact-ofclimate-on-SDGs-technical-report-CDKN.pdf

Armstrong, M. (2006) A handbook of Human Resource Management Practice, 10th ed., Kogan Page, London. Cited in MEGATRENDS UNDERPINNING TOURISM TO 2020 Analysis of key drivers for change: by Larry Dwyer, Deborah Edwards, Nina Mistilis, Carolina Roman, Noel Scott and Chris Cooper 2008

Bruns, B. and J. Luque (2014). Great Teachers: How to Raise Student Learning in Latin America and the Caribbean. Washington, DC: World Bank.

Brynjolfsson, E. and A. McAfee (2011), Race against the machine: How the digital revolution is accelerating innovation, driving productivity, and irreversibly transforming employment and the economy, Digital Frontier Press

Bull, A. T., Holt, G., and Lilly, M. D., Biotechnology: International Trends and Perspectives (Paris: Organisation for Economic Co-Operation and Development OECD, 1982)

Deloitte (2012), "Measuring Facebook's Economic Impact in Europe", January 2012

Evans D. (2011), "The Internet of Things: How the Next Evolution of the Internet Is Changing Everything" CISCO white Paper

FAO, 2011. The state of the world's land and water resources for food and agriculture (SOLAW) - Managing systems at risk. Food and Agriculture Organization of the United Nations, Rome and Earthscan, London.

Food and Agriculture Organization of the United Nations, International Fund for Agricultural Development and World Food Programme (2015). The State of Food Insecurity in the World 2015: Meeting the 2015 International Hunger Targets: Taking Stock of Uneven Progress. Rome: Food and Agriculture Organization of the United Nations.

Food and Agriculture Organization of the United Nations, International Fund for Agricultural Development and World Food Programme (2015). The State of Food Insecurity in the World 2015: Meeting the 2015 International Hunger Targets: Taking Stock of Uneven Progress. Rome: Food and Agriculture Organization of the United Nations.

Global Commission on the Economy and Climate. 2014. Better Growth, Better Climate: The New Climate Economy Report: The Synthesis Report. Washington,

DC: World Resources Institute. Available from http://newclimateeconomy.report/2014/wpcontent/uploads/sites/2/2014/08/BetterGrowthBetterClimate_NCE_Synthesis-Report_web.pdf

Hallegatte, S. and others (2016). Shock Waves: Managing the Impacts of Climate Change on Poverty. Washington, DC: World Bank.

http://www.europarl.europa.eu/RegData/etudes/IDAN/2018/614547/EPRS_IDA(2018)614547_EN.pdf

http://www.worldbank.org/en/topic/environment/brief/oceans 2017 accessed on June 5, 2018

https://www.oav.de/iap-22016/artikel-213.html

IMF 2018 world economic outlook database http://www.imf.org/external/pubs/ft/weo/2018/01/weodata/weorept.aspx?pr.x=23&pr.y=8&sy=2000&ey=2023&scsm=1&ssd=1&sort=country&ds=.&br=1&c=001%2C110%2C163%2C119%2C123%2C998%2C200%2C901%2C505%2C511%2C903%2C205%2C440%2C406%2C603&s=NGSD_NGDP&grp=1&a=1#download

Institute for Economics & Peace. Global Peace Index 2018: Measuring Peace in a Complex World, Sydney, June 2018. Available from: http://visionofhumanity.org/ reports (accessed on 12 July, 2018).

Intergovernmental Panel on Climate Change (2015). Climate Change 2014: Synthesis Report. Geneva.

International Energy Agency (2014). Technology Roadmap: Solar Photovoltaic Energy: 2014 Edition. Paris.

International Food Policy Research Institute and others (2016). Global Hunger Index: Getting to Zero Hunger. Washington, DC, Dublin and Bonn.

International Food Policy Research Institute, 2012. 2011 Global Food Policy Report. International Food Policy Research Institute. Washington, DC

International Monetary Fund (2017). World Economic Outlook Update: A shifting global economic landscape.

International Monetary Fund 2017 https://www.imf.org/external/pubs/ft/weo/2018/01/weodata/weorept.aspx?pr.x=20&pr.y=10&sy=2000&ey=2023&scsm=1&ssd=1&sort=country&ds=.&br=1&c=694&s=TM_RPCH%2CTX_RPCH&grp=0&a=#download

International Organization for Migration (2010). Background paper. International Dialogue on Migration: Intersessional workshop on Migration and transnationalism: Opportunities and challenges. 9–10 March. Geneva. Available from www.iom.int/jahia/webdav/shared/shared/mainsite/microsites/IDM/workshops/migration_and_transnationalism_030910/background_paper_en.pdf.

IPCC, 2014: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA

Juma C, Jayashree W, 2000: Global Governance and Technology: Paper prepared for the United Nations Development Programme.

Juma C, 2012. Technological Abundance for Global Agriculture: The Role of Biotechnology. HKS Faculty Research Working Paper Series RWP12-008, John F. Kennedy School of Government, Harvard University. Available from http://nrs.harvard.edu/urn-3:HUL.InstRepos:8506827

Luis G Echeverri 2013 "Evolving Trends in Climate Change and Energy & Their Impact on Development Cooperation", August 2013 https://cic.nyu.edu/sites/default/files/echeverri_evolving_trends.pdf

Nicholson, S. (2001). Climatic and Environmental Change in Africa During the Last Two Centuries. *Climate Research*, 17, pp.123-144.

OECD Daejeon Ministerial Declaration on Science, Technology and Innovation policies for the Global and Digital Age, 21 October 2015 OECD DSTI/STP/MIN(2015)1 (http://www.oecd.org/science/sci-tech/stiministerial-2015.htm).

Organisation for Economic Co-operation and Development (2011). Divided We Stand: Why Inequality Keeps Rising. Paris.

Ramalingham, B. and others (2016). Ten Frontier Technologies for International Development. Brighton, United Kingdom: Institute of Development Studies.

Rohloff, C. (2000), Global Governance - A Framework for Peace and Security. Paper presented at the 18th General International Peace Research Association (IPRA) Conference, 5-9 August 2000, Tampere Finland

The Role of Science, Technology and Innovation Policies to Foster the Implementation of the Sustainable Development Goals Report of the Expert Group "Follow-up to Rio+20, notably the SDGs" Enrico Giovannini Ingeborg Niestroy Måns Nilsson Françoise Roure Michael Spanos

Tomasz Zalega 2012. "Consumption Megatrends in the Conditions of Globalization". Nierówności Społeczne

a Wzrost Gospodarczy 47:53-69.https://www.ceeol.com/search/article-detail?id=441310

UNDESA (United Nations Department of Economic and Social Affairs). 2008. Achieving Sustainable Development and Promoting Development Cooperation. Dialogues at the Economic and Social Council. United Nations, New York. 2014a. Blue Economy Concept Paper. United Nations, New York.

UNECE 2011 United Nations economic Commission of Europe http://kg.one.un.org/content/unct/kyrgyzstan/en/home/we/agencies/unece.html accessed on June 21, 2018.

UNEP 2015. Blue Economy—Sharing Success Stories to Inspire Change. UNEP Regional Seas Report and Studies No. 195. Nairobi.

UNESCO Science Report, 2010, and World Intellectual Property Report The Changing Face of Innovation, 2011

United Nations (2015). Addis Ababa Action Agenda of the Third International Conference on Financing for Development. New York.

United Nations Conference on Trade and Development (2018). Country Profile database. Available from (http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx) accessed on July, 2018

United Nations Department of Economic and Social Affairs May 2018 report available from https://www.un.org/development/desa/en/news/population/2018-world-urbanization-prospects.html (Accessed on 11 July, 2018)

United Nations Department of Economic and Social Affairs: World Urbanization Prospects 2018. Available at https://esa.un.org/unpd/wup/Download/ (Accessed on 6 July, 2018)

United Nations Development Programme (2012). Africa Human Development Report 2012: Towards a Food Secure Future. New York.

United Nations Development Programme (2016). Adaptive Farms, Resilient Tables: Building Secure Food Systems and Celebrating Distinct Culinary Traditions in a World of Climate Uncertainty: Apple-teaser Version. New York.

United Nations Educational, Scientific and Cultural Organization and others (2015). Education 2030: Incheon Declaration: Towards Inclusive and Equitable Quality Education and Lifelong Learning for All. Available from www.uis.unesco.org/Education/Documents/incheon-framework-for-actionen.pdf.

United Nations Environment Programme (2015). Adoption of the Paris Agreement. 12 December. FCCC/CP/2015/L.9/Rev.1.

United Nations Framework Convention on Climate Change (2010). Report of the Conference of the Parties on its fifteenth session, held in Copenhagen from 7 to 19 December 2009, Addendum, Part Two: Action taken by the Conference of the Parties at its fifteenth session. 30 March. FCCC/CP/2009/11/Add.1.

United Nations Framework Convention on Climate Change (2015). Adoption of the Paris Agreement. 12 December. FCCC/CP/2015/L.9/Rev.1.

United Nations Framework Convention on Climate Change 2011 Factsheet Fact sheet: Climate change science - the status of climate change science today: available at https://unfccc.int/files/press/backgrounders/application/pdf/press_factsh_science.pdf

United Nations High Commissioner for Refugee 2018. Available on http://www.unhcr.org/nigeria-emergency.html

United Nations Office for the Coordination of Humanitarian Affairs (2016) World Humanitarian Data and Trends 2015. New York.

United Nations Populations Fund 2017: Available at https://www.unfpa.org/data/world-population-dashboard (Accessed on 29 June, 2018)

United Nations Research Institute for Social Development 2017 *Global Trends: Challenges and Opportunities in the Implementation of the Sustainable Development Goals*

United Nations, Department of Economic and Social Affairs (2011). The Global Social Crisis: Report on the World Social Situation 2011. New York.

United Nations, Department of Economic and Social Affairs (2015). World Population Prospects: 2015 Revision. New York.

United Nations, Department of Economic and Social Affairs (2015b). Population 2030: Demographic Challenges and Opportunities for Sustainable Development Planning. New York.

United Nations, Department of Economic and Social Affairs (2016). Climate Change Resilience: An Opportunity for Reducing Inequalities: World Economic and Social Survey 2016. New York

United Nations, Economic Commission for Africa (2015a). Achieving Sustainable Development in Africa Through Inclusive Green Growth: Agriculture, E, Energy, Industry and Trade: The Sustainable Development Report on Africa: Fifth Edition. Addis Ababa

United Nations, General Assembly (2014). Report of the Intergovernmental Committee of Experts on

Sustainable Development Financing. 15 August. A/69/315

VicHealth & CSIRO (2015) Bright Futures: Megatrends impacting the mental wellbeing of young Victorians over the coming 20 years. Victorian Health Promotion Foundation, Melbourne

World Bank Group (2017). Global Economic Prospects: Weak Investment in Uncertain Times: January 2017. Washington, DC: World Bank.

World Bank Group 2017: International Labour Organization, ILOSTAT database. Early release of the 2017 ILO Labour Force Estimates and Projections, retrieved in November 2017 Labor force participation rate for ages 15-24, total (%) (ILO Estimate) https://data.worldbank.org/indicator/SL.TLF.ACTI.1524.ZS?locations=NG-BD-BR-CA-ZG&view=chart

World Bank Group 2017: Personal Remittances Received in US Dollars Nigeria and West Sub-Saharan Africa https://data.worldbank.org/indicator/BX.TRF.PWKR.CD.DT?locations=NG-ZG&view=chart

Centre for Sustainable Development

ABOUT CENTRE FOR SUSTAINABLE DEVELOPMENT (CESDEV)

The Centre for Sustainable Development (CESDEV) was established by the University of Ibadan through Senate paper 5386 in May 2010 as a demonstration of the University's commitment to Sustainable Development. It was based on the need to provide intellectual platform for identification of issues germane to sustainable development, critically analyse them, and provide leadership in finding enduring solutions that will enhance sustainable development.

The establishment of CESDEV was sequel to series of events, paramount among which was the winning of a USD 900,000 grant from the MacArthur Foundation to establish the Master's in Development Practice (MDP) Programme. The University of Ibadan was one of the ten original Universities that won the grant in a global competition involving over 70 Universities. Further brainstorming led to defining the composition of the emerging Centre beyond the MDP Programme. It was resolved that a number of development programmes that were "hanging in the balance" be moved to the Centre. The **Centre for Sustainable Development** (CESDEV) thus became a Teaching and Research Centre with a mandate in multi- and inter-disciplinary approach to Sustainability issues affecting not just our continent but the whole universe. The Centre is designed to be a Teaching, Research and Development unit in the University. Presently, CESDEV has the following academic and outreach programmes:

- Development Practice Programme (DPP)
- Tourism and Development Programme (TODEP)
- Indigenous Knowledge and Development Programme (IKAD)
- Sustainable Integrated Rural Development in Africa Programme (SIRDA)
- Climate and Society Programme (CSP)
- Environmental Protection and Natural Resources Programme (EPNARP)
- Leadership and Governance Programme (LGP)
- Annual Ibadan Sustainable Development Summit (ISDS)

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