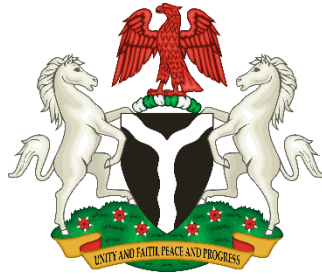


**DATAFICATION OF SOCIETY: ECONOMIC AND SECURITY ISSUES
IN PRODUCING AND USING PUBLIC AND PRIVATE DATA IN
NIGERIA**



BEING A CONVOCATION LECTURE

BY

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All Protocols duly observed.

May Peace, Mercy and Blessings be upon you!

I am highly delighted to deliver this Convocation Lecture today as we mark the achievement of the graduands. I would like to thank my brother, Prof Abdullahi Bala, the Vice-Chancellor of the University, the Governing Council, the Management Team and the entire staff for the honour and the opportunity to share some thoughts with you, celebrants and their families.

To the granduands I say, your labour is being rewarded today, Congratulations! However, please note that your graduation ceremony is only a starting point, so do not rest on your oars in the pursuit of a lifetime of significance. I encourage you to use the knowledge and skills you have acquired to make a positive difference in the nation, especially at a time when we are focussed on developing a Digital Economy for a Digital Nigeria.

The Importance of Data in a Digital Economy

His Excellency, President Muhammadu Buhari, GCFR, redesignated the Federal Ministry of Communications as the Federal Ministry of Communications and Digital Economy on the 17th of October, 2019. The change was officially endorsed at the Federal Executive Council on the 23rd

of October, 2019 and the process of implementing a digital economy for the country began on the 24th of October, 2019.

The redesignation reflects the focus of Mr President to lay emphasis on the need to build a digital economy. The new name addresses the new mandate of the Ministry; communications addresses the *channel*, digital addresses the nature of the *content* and economy reflects the *central focus* of the activities of the Ministry, which is the development of the economy in line with the Economic Recovery and Growth Plan (ERGP) of the Federal Government.

A digital economy generally refers to an economy that utilises digitised information and knowledge as key inputs to the economy. For simplicity, we refer to a digital economy as any aspect of the economy that is based on or driven by digital technologies. It has been widely accepted that a digital economy is the single most important driver of innovation, competitiveness and growth for any economy.

The National Digital Economy Policy and Strategy (NDEPS) for a Digital Nigeria was unveiled and launched by President Muhammadu Buhari, GCFR, on the 28th of November, 2019. The NDEPS is based on the following 8 pillars:

1. Developmental Regulation;
2. Digital Literacy and Skills;
3. Solid Infrastructure;
4. Service Infrastructure;
5. Digital Services Development and Promotion;

6. Soft Infrastructure;
7. Digital Society and Emerging Technologies; and
8. Indigenous Content Promotion and Adoption.

A focus on growing the National Digital Economy will also improve the nation's traditional economy and will enable us get a slice of the Global Digital Economy, which Oxford Economics values at \$11.5 trillion dollars or approximately 16% of the Global Economy. This value is expected to grow significantly over the coming years.

The World Economic Forum predicts that over 60% of global GDP will be digitized by 2022 and that over the next decade, digital platforms will be used to create close to 70% of new value. Furthermore, according to a Report by Ericsson titled "How Important Are Mobile Broadband Networks for Global Economic Development", 10% increase in mobile broadband penetration results in approximately 0.6% to 2.8% rise in gross domestic product (GDP). Our Pillar #3 on Solid Infrastructure will address this aspect and the recently inaugurated Presidential Committee on drafting a new National Broadband Plan (2020-2025) has almost completed its assignment.

Most nations are prioritizing the need to develop their digital economies because they realize the multiplier effects that this can have on all other sectors of the economy. For instance, the digital economy in the United States contributed 6.9% to the nation's GDP in 2017. It also contributed 5.1million jobs in that year. The 2019 Digital Trade and U.S. Trade Policy also noted

that almost two-thirds of all the jobs created in the United States since 2010 required medium or advanced levels of digital skills. In Nigeria, we are keen to develop a digital economy that will have a great impact on every sector of Nigeria's economy.

Data is critical to the success of the digital economy and scholars now refer to data as the oil, the lifeblood and the new currency of the digital economy. Data drives the digital economy and the digital economy drives the growth of the traditional economy.

The Power of Data

In the recent past, Nigeria's wealth was mainly measured by the minerals and natural resources it has been endowed with but we are now moving into an era where our wealth will be measured by our digital resources and the innovation of Nigerians. The expression "data is the new oil" is almost becoming a cliché but as a nation that has depended on oil for decades, it is important that we explore the expression more closely.

To start with, we will observe that the leading companies of today are not the Standard Oils of yesterday that made a fortune from natural resources, rather they are the Amazons, Googles, Facebooks and Microsofts of today who have a high level of valuation primarily because they warehouse and process massive amounts of useful data.

We can draw a lot of parallels between data and oil:

- First a few similarities:

- Both play a key role in powering economies; oil powers the industrial economy while data powers the digital economy;
- Time has shown that, to some extent, national and institutional wealth is directly proportional to the amount of the resource that they control;
- Both types of resources need refinement to be useful; with big data analytics and artificial intelligence, data is being refined to create impressive insights and great wealth.
- Next, let us explore a few differences:
 - Oil is finite while data is seemingly infinite;
 - Oil when used can barely be reused, whereas the same data can be used for different purposes at the same time.

Incidentally both oil and data can experience the negative effects of banditry and militancy. The effect of these vices as it relates to oil is well known to us as Nigerians. With regard to data, it can manifest as identity theft, loss of privacy, fake news, etc. The NDEPS anticipates these negative effects of data misuse and the Pillar #1 (Developmental Regulation) and Pillar #6 (Soft Infrastructure) address these challenges.

Datafication of Society

Datafication is not a standard word in a regular dictionary. Rather, it was introduced by Kenneth Neil Cukier, a Senior Editor at The Economist and Victor Mayer-Schoenberger, a Professor of Internet Governance and Regulation at the University of Oxford, in 2013, to describe the trend of

transforming everything to data. They noted that datafication of objects transforms their purpose and turns the information into new forms of value.

With the ubiquity of sensors and Internet-of-Things, basically everything can be converted into data. From the sensors that count your steps and track your health vitals, to those that monitor air pollution, to those that assess the radiation from cell sites, to those that detect cracks on roads, to those that predict crop yield. The list of possibilities that sensors and datafication provide are seemingly endless.

Once the right sensor exists, the physical value of interest can be converted to data for further processing. Even where the sensors do not exist, virtual sensors can be created to measure the signals of interest. An interesting example of a system that uses a customized sensor was developed by Koniku, a Silicon-Valley based company founded by a Nigerian. The device is able to sense and “smell” explosives and even cancer cells.

The Exponential Growth of Data and Storage Devices

The increased adoption of datafication has contributed to the exponential growth of data. According to Google, 5 Exabytes were generated from the dawn of civilization to the year 2003. It is now estimated that 2.5 Exabytes of data is generated every single day. An Exabyte is 1 with 18 zeros after it. A recent forecast by the International Data Corporation (IDC) estimates that 41.6 billion connected IoT devices will generate 79.4 Zettabytes of data in 2025. A Zettabyte is 1 with 21 zeros after it.

In addition to data generated from IoT devices, data is also generated by a plethora of social media platforms. The global Internet protocol traffic gives a good indication of global data. Based on a 2018 Whitepaper by Cisco on “Visual Networking Index: Forecast and Trends”, as at 1992, a total of 100 gigabytes traffic was generated daily, this became 100 gigabytes of traffic every second in 2002. It then surged to 45,000 gigabytes in 2017 and is expected to hit 150,700 gigabytes by 2022.

The storage devices are also keeping pace with the rapid growth of data. In 1956, the IBM 350 was the first disk drive introduced by IBM, it was the size of a large wardrobe but could only store about 3.75MB and cost \$3,200 per month! Today, Western Digital now sells a 20TB hard-disk that costs less than \$1,000 for a one-off payment and has a size equivalent to about 3 smartphones.

These trends show that data generation will keep increasing exponentially and emerging technologies will continue to take advantage of this to create innovative solutions. These emerging technologies include Virtual Reality (VR), Artificial Intelligence (AI), Big Data Analytics, Robotics, autonomous (driving) vehicles, 3D printing, nanotechnology, biotechnology, materials science, energy storage, quantum computing and much more.

Public and Private Data: Drawing the Dividing Line

In programming, public variables are variables that are visible to all classes, while private variables, are variables that are visible only to the class to which they belong. In much the same way, public data refers to data that should readily be available to the public. They include info like public holidays, process for obtaining a National Identity Number, etc.

On the other hand, private data is information concerning an individual that should be kept from the prying eyes of the public. Privacy is a key requirement for private data and the owners of such data need to have the assurance that their 'datafied' life is secure. Examples of private data include names, contacts, medical information, location, financial information and other personally identifiable information.

Sometimes, seemingly private data relayed on social media platforms are exposed to greater public view than most of the originators of such data expect. For example, with the basic info on many social media platforms, it is easy to find out personal info like name, interests, events attended, political disposition, home town, employment, educational status, etc. In fact there are a number of data brokers around the globe that buy and sell private data. The aggregated info can then become gold mines for hackers who can readily guess common security questions and increase the risk of transacting online.

In Nigeria, we are committed to ensuring that private data stays private. We aim to achieve this through the Nigeria Data Protection Regulation (NDPR). It provides an important framework to safeguard the rights of citizens to data privacy. It explicitly states that no data shall be obtained except the specific purpose of the collection is made known to the data subject. It also mandates that the data collectors obtain consent of the data subject before using their data.

There are also options for using private data for public good and there are many benefits to this. However, like I stated in an article I wrote for the British Computer Society on "Nigeria's Ethical Issues in the Use of ICT", it is safer to use anonymised versions of the harvested private data. These can be passed through data analytic engines to provide valuable insights that can be used for social good.

Extracting Insights from Big Data

The exponential growth of data, also known as big data, has inspired computer specialists to explore the prospects of extracting insights. Big data is usually characterised by '5 Vs'- Volume, Velocity, Veracity, Value and Variety. The volume addresses the incredible amounts of data that find it difficult to fit into traditional databases, the velocity refers to the high frequency at which data is generated, veracity is the quality of trustworthiness of the data, value refers to the worth of the data being generated and variety covers the type of data- structured and unstructured.

Extracting such insights from big data sources is not trivial and is almost akin to the search for a proverbial needle in a haystack. The demanding process involved in data analytics has been simplified by the use of specific algorithms and the high speed processors that are commonplace in many computers. Nations and organisations have been able to extract useful insights from big data.

Prospects and Perils of Data

The possibility of extracting valuable insights from data present an interesting prospect for embracing datafication. In many cases, these data mines can become a gold mine of resources. Jeffrey Bezos of Amazon, Bill Gates of Microsoft and Mark Zuckerberg of Facebook are modern day examples of those who have been able to mine data and transform the insights into fortune.

Another unlikely example is the famous footballer known as Cristiano Ronaldo. Ronaldo has mastered the art of monetizing social media data even more than he has monetized his skills on the soccer field; he makes an estimated \$47.8 million (about 43.4million EUR) per year from paid-Instagram posts, which far exceeds his 31million EUR annual salary from Juventus.

There are several ways that countries and companies are benefiting from the use of big data, few examples are shown below:

- Netflix has over 100 million subscribers and has been able to create a recommender system for movies that is well regarded in the industry;
- Working with Kenya's Ministry of Agriculture, NASA provides real-time information on crop types, agricultural insurance, and weather. This is helping the Kenyan government to boost the productivity of small farmers;
- Ghana is using big data from the mobile phones of citizens pinging local towers to track the migration of people and plan for internal economic migration and access to social services; and
- Hospitals are creating risk scores based on biometrics, lab tests, patient-generated health data, and the social determinants of health can give healthcare providers some insight into which individuals might benefit from enhanced services or wellness activities.

I wish I could assert that big data only provide prospects. However, I must admit that they can also come with their perils. Some high profile cases of the perils of big data include the following:

- According to a six-month study, by an Enterprise Security company called Proofpoint, and released in March 2019, over 70% of some major cloud service tenants have experienced the perils of data breaches at least once with 40% of the data subjects acknowledging that their accounts were compromised;
- Troy Hunt, a security researcher discovered a massive 87GB dataset comprising more than 772 million email addresses and 21 million passwords in a package of 12,000 files. It contained 1,160,253,228

unique combinations of email addresses and passwords, including "dehashed" passwords converted to plain text;

- FIFA also experienced a breach in November 2018 with over 3.4 terabytes and 70 million documents exposed which contained numerous allegations of corruption;
- Cathay Pacific Airline suffered a major data breach affecting up to 9.4 million passengers in October 2018;
- In September 2018, about 90 million Facebook user accounts were exposed by a security breach, aided by a vulnerability in the code of Facebook's "View As" tool. The breach affected Facebook's founder Mark Zuckerberg, its chief operating officer, Sheryl Sandberg, and its European vice-president, Nicola Mendelsohn and thousands of users in the UK; and
- Uber was asked to pay £133m to settle all legal action over the data breach that affected 57 million customers and drivers in 2016.

In Nigeria, we are developing and implementing policies, standards, guidelines and frameworks that will enable us enjoy the prospects of datafication while also protecting ourselves against the perils. The NDEPS, NDPR, Open Data Policy, Open Government Partnership, Mobile Data Analytics, are some of the instruments that we are using.

Plan for Harnessing Data in the NDEPS and the Role of the Academia

The National Digital Economy Policy and Strategy (NDEPS) has a very strong data theme and datafication is an important aspect of the implementation across all the 8 pillars.

The Developmental Regulation pillar addresses the need for instruments that ensure that the Digital Economy thrives and this includes the need to protect data subjects. The Digital Literacy and Skills pillar educates Nigerians on how to keep themselves and their data safe online. The Solid Infrastructure pillar focuses on creating the channel for unhindered flow of data.

The Service Infrastructure pillar supports Nigerians and the government to create robust platforms upon which data can be presented to a wider audience. The Digital Services Development and Promotion pillar enables the right data-centric services to be put on the platforms created through the Digital Services platform.

The Soft Infrastructure pillar addresses the issue of cybersecurity and makes sure Nigerians can feel safe while transacting online. The Digital Society and Emerging Technologies pillar supports the development of high level emerging technology skills that can enable Nigerians use public data and anonymized private data for social good. This pillar also supports the promotion of Innovation Driven Entreprises that can create wealth from data.

Finally, the Indigenous Content Promotion and Adoption pillar is to ensure that we promote our local data solutions and give preference to keeping our data local.

Conclusion and a call to partnership

In conclusion, I would like to say that datafication has come to stay in Nigeria and we are committed to taking advantage of it to develop our Digital Economy for a Digital Nigeria. The academia has a key role to play and so do our young innovative Nigerians, such as those of you graduating today. I call on all of us to join hands to build a nation where data prospers our economy, rather than divides our people.

Once again, I thank you all for your kind attention and wish you a very successful graduation ceremony.