



CSC Newsletter

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IT, Knowledge Economy and National Development: The Inseparable Triplets

Agitation by the Nigerian government on knowledge economy (KE), as a strategy for revitalising the development of our nation, is becoming louder every day. To overcome the present economic challenges as a developing nation, KE is a necessary approach for national development. A **knowledge economy** is defined as an economy in which the production of goods and services is based primarily on knowledge-intensive activities. National development can be defined in terms of overall development or the collective socio-economic and political advancement of a country. It is a country's development agenda, which is the collection of various categories of objectives and goals that are set out to be achieved by the government. According to Innocent and Odoh (2014), national development is people-oriented and its success is evaluated in terms of the impact it has had on improving the lot of the masses. The authors referred to the Third National Development Plan (1975-1980), which provides that development means the development of man, the unfolding and realisation of his creative potentials that enable him to improve his material conditions of living through the use of available resources. Despite the existence of global development plans such as the United Nations Sustainable Development Goals (SDGs), there are still gaps or problems with most African countries including Nigeria. These problems include poverty, food insecurity, health issues, poor sustainability of water and sanitation, lack of peace and inclusive societies, and widespread injustice.

In this context, I will like to share the views of the following erudite scholars on national development plans. Firstly, Somoye (2018) in his inaugural lecture at the Olabisi Onabanjo University, Ago-Iwoye, made few suggestions that for sustainable development goals to be actualised in Nigeria, there is need for stable investment policy on human development, information technology, education and peace. Furthermore, Prof. Oluwafemi Olaiya Balogun (4th Substantive Vice-Chancellor of FUNAAB), at his valedictory lecture and official handing-over ceremony, titled "Driving National Development Through Higher Education: FUNAAB Modest Contributions" had said, "With the several decades that I have personally invested into academic endeavours, either as a scholar or professional, I am adequately convinced of the potency of education, particularly at the higher level, as an effective elixir to the recurring issue of national development with its attendant socio-economic indices".

Prof. Balogun further laid emphasis on the slow responsiveness of the African continent to development when compared to other emerging world economies like Malaysia, Korea, Singapore and India in combating underdevelopment and finding appropriate remedies to educational problems. Hence, if emerging world economies have been able to find solutions to their socio-economic problems, there is need to examine the

strategies they used to overcome their own recurring challenges that impeded national development. In the knowledge economy, a large portion of economic growth and employment results from knowledge-intensive activities. A **knowledge-intensive activity** involves the collection, analysis, and synthesis of information (Studycom, 2018).

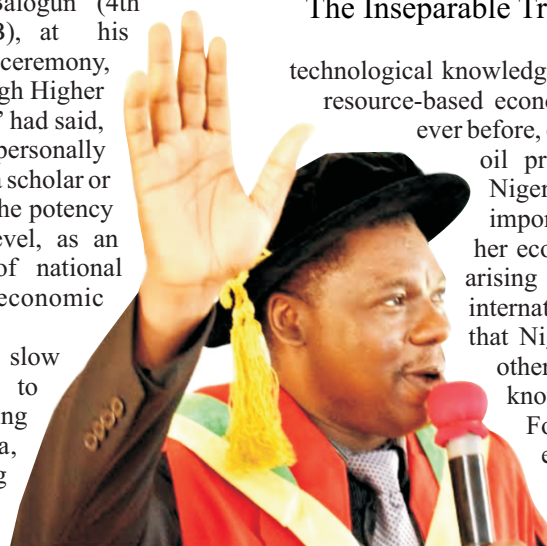
However, there is a paradigm shift with performance differential and competitive advantage, which is determined by intellectual rather than physical resources, such as the production of tangible goods in developed countries towards intangible goods (knowledge-based assets) or informational goods as well as services. Other countries in Asia, United States of America and United Kingdom that adopted knowledge economy have started benefitting from it. However, it is quite unfortunate that our own country, Nigeria is just joining the emerging countries as its economy has witnessed negative trends by falling into economic recession, due to the mono-economic system of petroleum production that Nigeria had engaged in over the year rather than diversifying the economy.



Agbata (2016) suggested leveraging ICTs to mass produce and commodify knowledge, information, solutions, innovative products and even our cultures for sale to outside world. The Nigerian Minister of Science and Technology, Dr. Ogbonnaya Onu reiterated that it had become clear that a nation that desires to develop and modernise its economy

and remain competitive, must embrace knowledge especially, scientific and technological knowledge. Dr. Onu emphasised the need to move from resource-based economy to knowledge-based economy more than ever before, considering the recent and near collapse of crude oil prices that exposed the vulnerabilities of the Nigerian economy, saying "This has occasioned the importance and urgent need for Nigeria to diversify her economy to help her withstand any future shocks arising from the decline in commodity prices in the international market". Agbata (2016) further advised that Nigeria needs to use its oil proceeds to develop other sectors of the economy while also building a knowledge-based economy.

For a country like Nigeria to emerge as knowledge economy, the following four pillars must be established (SciDev, 2018): (i) institutional structures that provide incentives for entrepreneurship (ii) the use of knowledge, skilled labour and good educational systems (iii) ICT infrastructure and access, and finally (iv)



Prof. Oluwafemi Olaiya Balogun,
Head, Department of Computer Science, FUNAAB

a vibrant innovation landscape that includes academia, the private sector and civil society while universities should develop sustainable policies to promote the use of ICTs through public-private partnership (Kupoluyi & Awotunde, 2018). During the 2018 visit of the founder of Bill and Melinda Gates Foundation to Nigeria, he enjoined the Nigerian government to invest more on people. Few years ago, the Vice-President of Nigeria, Prof. Yemi Osinbajo had initiated an Ease-of-doing Business in Nigeria, which would make the citizens to key into KE. However, with more than 60 percent of the Nigerian population making up of youths, it is also better to diversify into the knowledge economy by leveraging on IT in solving national

problems through local content development.

However, it is not mere sweet-saying that in this information age, IT departments are the nerve centres of activities in many organisations, FUNAAB inclusive. Most organisations cannot survive the pressure of their daily transactions without IT, as it had provided opportunities for the employment of professionals such as computer programmers, network administrators, computer engineers, Web developers and other IT-related jobs. IT has now become an integral part of our everyday life. There seems to be IT revolution everywhere not only in Nigeria, but on the global level. Most solutions and breakthroughs in businesses and scientific problems in various fields are achieved through the use of IT. Hence, for sustainable development to take place in a nation like Nigeria, the three constructs (Triplets) of Information Technology, Knowledge Economy and National Development must always be considered without separation by the citizens, governments, policy makers, and other stakeholders.

Extracted from the speech delivered by Prof. Olusegun Folorunso, Head, Department of Computer Science during the first Leadership Seminar, organised by the College of Physical Sciences, Federal University of Agriculture, Abeokuta (FUNAAB) on Wednesday, July 4, 2018.

Alumni and Nigerian Universities

The word 'alumni' refers to graduates of an institution. An alumni association is a forum for reconnecting with classmates and helps in bringing together like-minded individuals. With the advent of social media, which have aided various networking platforms such as Facebook, Twitter, WhatAapp, and LinkedIn, alumni groups can meet virtually and share various contents. Consequently, most alumni that graduated some decades ago are now reconnecting and creating useful business networks and fun. However, many of these associations seldom have any interactions with the institutions they graduated from thus; there is need for alumni associations to refocus by leveraging on the strength of reconnection to give-back to their alma mater. Also, managers of institutions should establish good relationships with their institution's alumni association.

With the present financial situation in Nigeria, it has shown that the government alone cannot finance institutions. Therefore, it is imperative to build a vibrant ecosystem of the alumni network in various institutions. This should start from the departmental level, as the collection of graduating sets in an academic department would form an ecosystem. Asides financial supports from the alumni, there are other tangible and intangible benefits institutions of higher learning can derive from such bodies. Alumni associations can give "give-back" to their universities through support system whereby each academic department would engage its alumni to benefit from their skills and experiences by offering support to present students and the entire institution. Well-informed and engaged alumni are the most loyal supporters and best ambassadors of the university,

providing valuable marketing and promotions across their personal and professional networks.

Most talented alumni would likely have the wealth of experience and skills to share with current students via talks and meets. Also, alumni can offer practical support to students in work placements and help them launch their careers as a way to "give back" to the university. In fact, they may be invited for lectures to share their practicing

experiences with staff and students. Assistance in employability: most alumni networks have real life benefits for current students. Alumni may donate their valuable time to offer career support to current students. This enhances the students' experience and gives them that competitive edge in today's tough job market. The alumni network of a university is one of the biggest sources of placement opportunities to the students. Alumni can help students get placed at their respective organisations.

Mentorship and scholarships: alumni can play active role in voluntary programmes like mentoring students in their areas of expertise. They can also play significant role in contributing scholarships to deserving students. Alumni get in touch with students and share their expertise and best practices in a given field. Leveraging the alumni community can be a win-win for both the institution and the alumni. Many of them are willing to "give-back" to their alma-mater as a sign of their gratitude and affinity towards the institution. Recently, a 1988-1992 graduating set in the former Department of Mathematical Sciences, University of Agriculture, Abeokuta, considered it necessary to reconnect and strategise by giving-back to the university that brought him into limelight.

The Convener for the graduating set, Mr. Segun Orefuja, is the founder of Gold Salem Technology, United Kingdom. He is an IT consultant with special interest in services on cloud infrastructure. He has worked with multinational organisations around the world within IS/IT services. Interestingly, within an hour of creating a WhatAapp group for the 1988-1992 graduating set on the September 11, 2020, almost all members were visible and a brief Zoom meeting was organised a few days later. I hereby encourage each graduating set to passionately adopt this model as a channel of meeting and deliberating on how to support our various departments and the entire university.



Mr. Segun Orefuja



Prof. Olusegun Folorunso
Head, Department of Computer Science,
FUNAAB

How Data Science Can Change the World ?

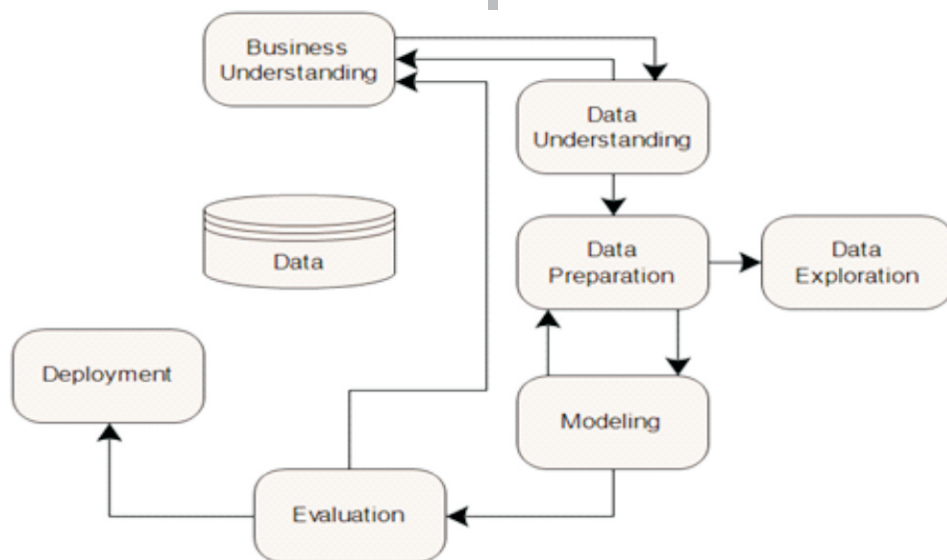
Data Science is a branch of Artificial Intelligence that uses scientific methods, processes, algorithms and systems to extract knowledge and insights from many structural and unstructured data. It involves the use of various tools, algorithms, and machine learning principles to discover hidden patterns from raw data. A data scientist develops strategies for analysing data, prepares data for analysis, analyses/visualises data, builds models with data using programming languages such as Python and R, and deploys models into applications.

Several processes are involved in data science. These are: Framing the problem and business understanding; collection of raw data needed for the problem (data understanding); and data collected can be in any of these formats: CSV, JSON, HTML, HDF5 Feather, Parquet, ORC, Msgpack, Stata, SAS, SPSS, Python Pickle, SQL, Google Big Query and text; data preparation (data wrangling) whereby the data would be well prepared to remove likely errors that can corrupt analysis such as missing values, invalid entries, time zone differences, duplicate values and date range errors. Data

wrangling libraries in Python include Pandas, Numpy, Matplotlib, Plotly and Theano. Data wrangling libraries in R include Dplyr, Purrr, Splitstackshape, JSONline and Magrittr.

Other processes include data exploration: After cleaning the data, it is imperative to understand the information (trends or correlations) in the data. Data exploration libraries in Python include Numpy, Pandas, SciPy,

Matplotlib, Seaborn, Scikit Learn, TensorFlow, Keras, Statsmodels and Plotly; in-depth analysis such that during this process, statistical, mathematical and technological knowledge are leveraged on and data science tools are employed; modeling, evaluation, and deployment entail data modeling libraries in Python and include SciKit-learn, PyTorch, TensorFlow and Keras; while deployment libraries in Python include Streamlit, Flask, Django and Bottle.



Processes in Data Science

Business advantages of data science require many organisations having to make data science a priority and are deploying it to gain competitive advantage for their products and services.

Data science and machine learning use cases include:

1. Customer analytics in determining customer churn through analysis of data collected.
2. Improved efficiency: through analysing traffic patterns, weather conditions and other factors for logistics companies. For instance, to improve delivery speeds and reduce costs.
3. Improved diagnosis through the analysis of medical test data and reported symptoms for doctors to accurately diagnose patients' diseases.
4. Supply chain optimisation requires optimising

the supply chain through the prediction of break downs of equipment.

5. Fraud detection is the detection of frauds in financial services through the identification of suspicious behaviours and anomalous actions.
6. Improved sales by creating recommendations for customers based on previous purchases.

Other areas where data science can be applied include Internet search, digital advertisements (targeted advertising and re-targeting), recommender systems, image recognition, speech recognition, gaming, price comparison websites, airline route planning, fraud and risk detection, and delivery logistics, among others.

Dr. Ayodeji Makinde, an alumnus of Department of Computer Science, FUNAAB, lectures in the Department of Computer Science, Edo University, Iyamho, Edo State

Fuzzy Case-Based Model and Automobile Tyre Selection

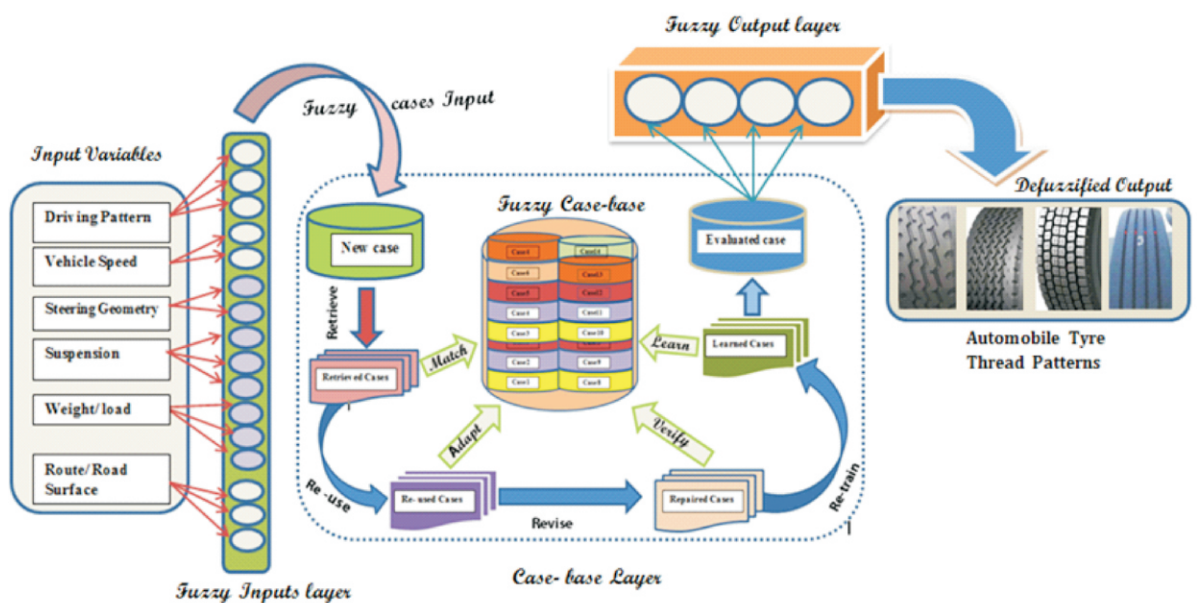
Case-based reasoning is an Artificial Intelligence (AI) technique for solving new problems based on past experiences and results generated from similar problems. The most challenging problems occurring today are not completely new as similar or related problems have existed earlier, and some methods had been adopted to solving them. Case-based reasoning is often applied in law practice when a lawyer predicts the outcome of a court case based on results of past cases or when a judge gives judgment based on previous or similarly-related cases.

A specialist and automobile mechanic resolves new automobile problems premised on his vast collection of past experiences on similar problems. Often times, management decisions and political leaders lay claim on past or previous situations to explain the motive for their present actions. Case-based reasoning is indeed used extensively in day-to-day common sense reasoning. Due to the uncertainties in knowledge representation, attribute descriptions and similarity measures in case-based reasoning, a model combining Fuzzy logic and case-based reasoning known as Fuzzy Case-Based (FCB) is established to provide accurate results better than what is obtainable in either of the singular techniques.

Reliable prediction and selection of automobile tyres can help guarantee safety of lives and properties, increase efficiency and durability of vehicles and as well reduce cost of maintenances on vehicles. Unfortunately, many car users have little or no idea about the specifications and requirements of the tyres of their vehicles. Many depend on road side vulcanizers to determine the fitness and placements of their vehicle tyres, which in most cases, could give wrong or inaccurate information because their main concern is on the

visibility of thread patterns in automobile tyres without the consideration of other associated factors.

Previous research attempts, made on automobile tyres, have been geared towards improving vehicle efficiency and engine stability with focus on the fume emitted, body composition and engine power generated. However, improved success can be achieved with the deployment of Fuzzy Case-Based (FCB) model, which is a combined Artificial Intelligence technique. The FCB model, as shown below, is concentrated on tyre durability and thread pattern selection for specified automobiles considering factors such as driving styles, position, speed of vehicles, load, pressure and alignment.



A Fuzzy Case-Based Model for Automobile Tyre Selection

To enhance the model, an intelligent web or mobile based system (populated and regularly updated with fuzzy cases) could be developed with an intuitive user interface to simplify

the process of knowledge representation and minimise the system's computational complexity (time and memory) for the prediction of tyres life span and selection of most suited tyres for automobiles.

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Artificial Intelligence and Impact on Workforce

Rapid advances in Artificial Intelligence (AI) have the potential to significantly disrupt labour markets. While AI and automation can augment the productivity of some workers, they can replace the workdone by others and would likely transform almost all occupations to some degree. A two-year study from the

McKinsey Global Institute suggests that by 2030, intelligent agents and robots could replace as much as 30 per cent of the world's current labour and displacing the jobs of as many as 800 million people. The Figure 1 below shows the classification of some jobs while Figure 2 illustrates the jobs that would likely be replaced by AI.



Figure 1: Some Job Classifications

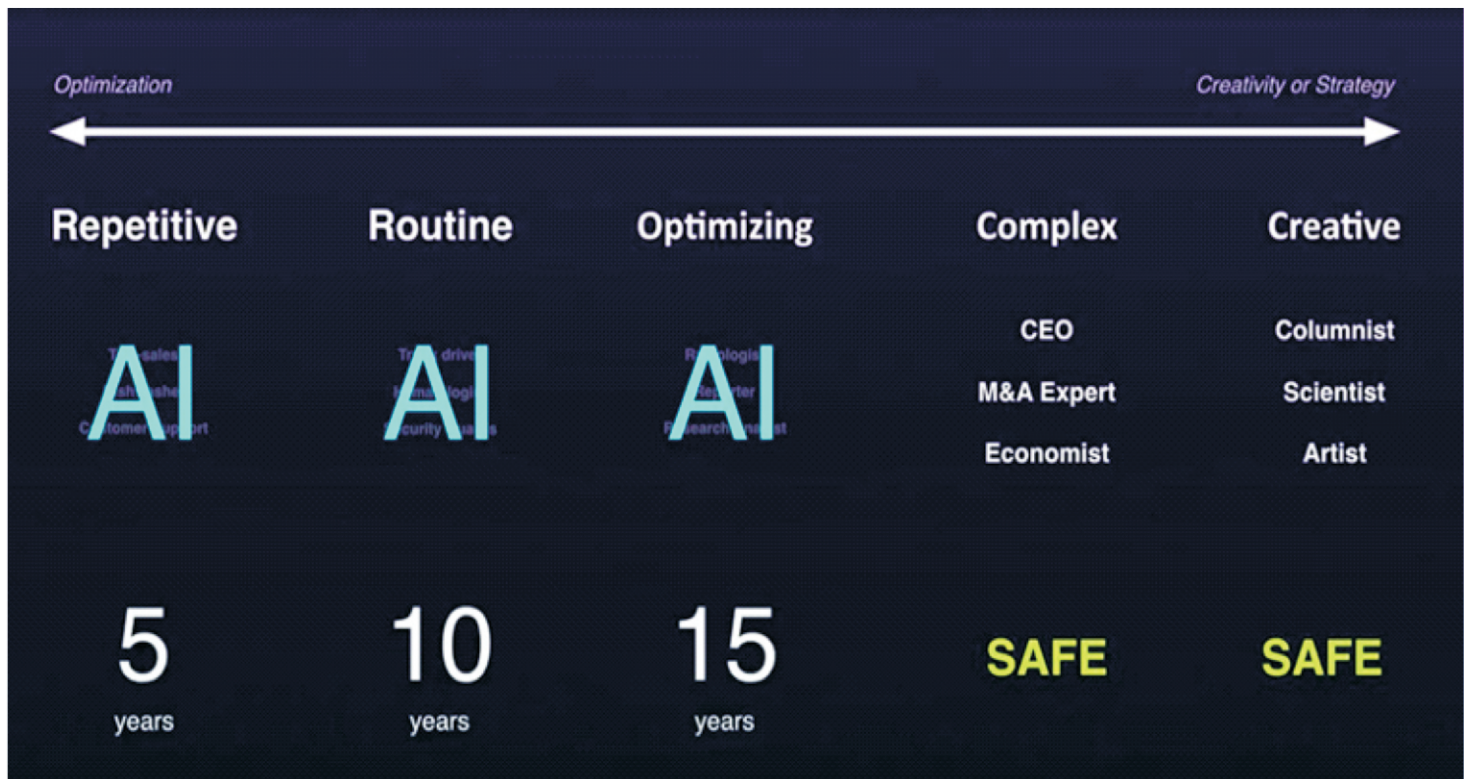


Figure 2: Job Replacement by Artificial Intelligence

PRECIOUS VINCENT

Software Developer and 400-level Student
 Department of Computer Science
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How Safe Are Virtual Private Networks ?

A Virtual Private Network (VPN) extends a private network across a public network and enables users to send and receive data across shared or public networks as if their computing devices are directly connected to private network. VPN gives an online privacy and anonymity by creating a private network from public Internet connection. VPNs mask the Internet Protocol (IP) address such that online actions become virtually untraceable. As such, VPN provides Internet users with virtual network that is private, safe and secure to connect. In essence, VPN gives the liberty to surf the Internet without being tracked or monitored.

VPN is an encrypted connection over the Internet from a device to a network. The encrypted connection helps ensure that sensitive data are safely transmitted. It prevents unauthorised people from eavesdropping on the traffic and allows users to work remotely. For the average user, what actually happens when one connects to VPN can be confusing and cause downright suspicious. A person may be using the VPN service to keep prying eyes away from web activity, but who can tell what is going on under the hood? How does one know if the service itself is trustworthy?

Reputable virtual private networks are extremely safe to use. For a VPN connection to be fully secure, it has to be directly

connected to the destination server. When there is connection to VPN, the computer connection is routed through a server located somewhere else before accessing the Internet from the server. When this is done, the connected remote assigns a new IP address. Throughout this effort, there is connection to home Internet Service Provider (ISP), and data transmissions are heavily encrypted (usually either SSL or AES encryption). However, when there is connection to the VPN server, the aforementioned layers of protection mean that the ISP cannot allow what is done to be seen beyond identifying how much data are being uploaded and downloaded. Therefore, while in safe hands with a reputable and paid VPN provider, free VPNs need to make money somewhere and would not usually offer the same levels of security as paid services. Worse still, there are [fake VPNs in circulation](#) that are an outright scam, as free VPNs often make their money from advertising or even selling the user's data.



Connecting to the Internet with VPN

Reputable VPNs have three primary safeguards to help customers ensure privacy:

1. No-logs policy: This is perhaps the number one best solution VPN services have devised to help secure user anonymity even when monitoring occurs by ISPs. Some VPN services maintain a policy in which they would keep no-logs that identify users. While they may still keep Meta data, as such data would not have any personally-identifying information.
2. Anonymous payment methods: Some VPN services would not collect user's name, if desired. Instead, they would use an e-mail address for the username and allow users to sign-up using secure and anonymous payment methods like PayPal, prepaid debit cards, or Bitcoin.
3. Shared IP addresses: Most reputable VPN services would use shared IP addresses, as a way to ensure user anonymity. By assigning the same IP addresses to multiple users connecting in from different locations, the VPN service can effectively make users anonymous because the given the IP address is not connected to any one user for it is effectively impossible for authorities to track activity back to a single person. Hence, it is highly necessary for users to always connect to reliable VPNs.

Collins Nkendirim
200-level Student
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Ogun Appoints **CSC** Alumnus As Permanent Secretary

The Governor of Ogun State, Prince Dapo Abiodun has appointed Engr. (Dr.) Yusuf Oladimeji, an alumnus of the Department of Computer Science of FUNAAB as Permanent Secretary, Ministry of Works and Infrastructure.

Engr. Yusuf, who hails from Konjo-Adi compound in Ijaiye, Abeokuta, Ogun State completed his primary and secondary school education at the Olumo Primary School and Premier Grammar School, Abeokuta respectively. He is a graduate of Civil Engineering from the University of Ilorin. He obtained his Postgraduate Diploma with Distinction in 2005; Master of Science in 2009, and Doctor of Philosophy Degrees in Computer Science in 2016 from FUNAAB.



Engr. (Dr.) Lateef Yusuf (Right) receiving his letter of appointment as Permanent Secretary from the Ogun State Governor, Prince Dapo Abiodun.

He started his working career as an Engineer II (Grade Level 08) with the Ogun State Ministry of Works and Housing in May 1991 and worked conscientiously to the elevated position of Permanent Secretary on September 29, 2020. He is a registered Engineer with the Council for Regulation of Engineering Practice in Nigeria (COREN), Member of the Nigeria Society of Engineers (NSE), and Member of the Nigeria Computer Society (NCS). He has participated in procurement, planning, design, construction and supervision of several structural and highway engineering projects, including the ongoing Urban Renewal Infrastructural Projects in the State.

He has 15 international publications to his credit in the various disciplines of Civil Engineering, Computer Science and Public Procurement, such as:

1. "E-procurement: A Strategic Approach to Public Works Tendering", published in *Asian Journal of Research in Computer Science* in December 2018.
2. "User Interface Design and Usability Testing of a

Reinforced Concrete Design (RCD) Beam Interface", published in *British Journal of Mathematics and Computer Science* in 2011.

3. "SOADIWA: A Service-Oriented Architecture for Data Interoperability in Web Applications", published in *Asian Journal of Research in Computer Science* in 2019.
4. "Adoption of IFÁ as a Computer-based Information System", published in *American Journal of Computer Sciences and Applications* in 2019.

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