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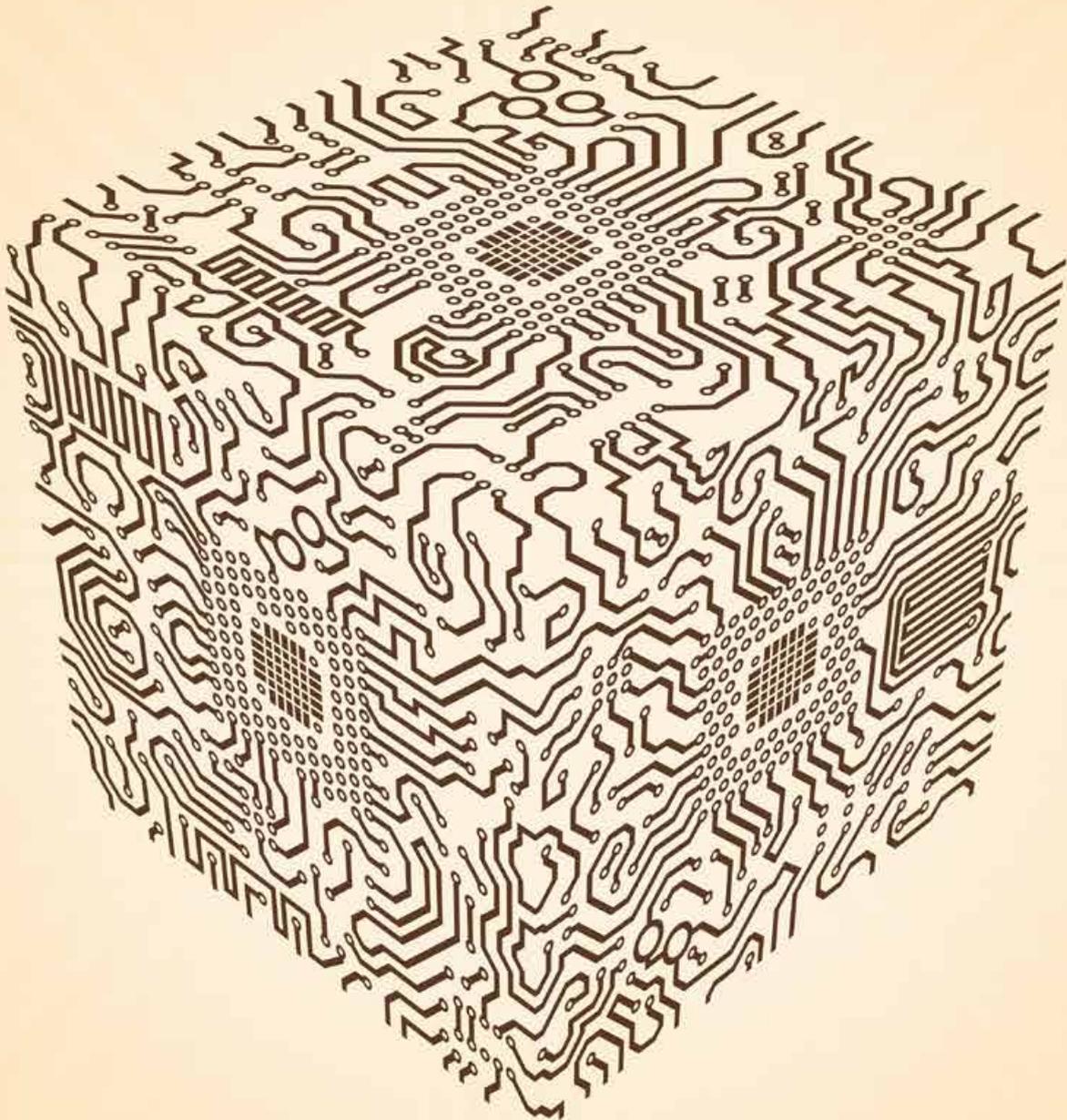
The CORVUS

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**Demystifying Blockchain
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Foreword

Segun Agbaje

Welcome to the 4th edition of The Corvus, a financial and economic publication of Guaranty Trust Bank plc.

The world is changing at such a fast pace that it seems there is little or no time to make sense of it. Yet, while this change is non-linear and occurring at breakneck speed, it is deeply rooted in the past, and indeed in the present. This means that by analysing the constants of the past and paying attention to current variables, we will be able to, not only better appreciate the pace of change, but also fundamentally understand how to leverage it. This is what this edition of The Corvus Magazine sets out to achieve.

Whilst all the buzz is on predicting what the future would look like, the articles in this magazine, instead, ask how we get to the future. Focusing on topical issues that cut across the workplace, the new dynamics of business and the changing nature of trade, these articles explore the core technologies, new processes and emerging principles that are driving the new economy.

If the digital revolution transforming everything around us is a vehicle, then data is its fuel. This edition takes a look at the limitless possibilities data brings to commerce; the greater certainty that it can provide to marketing efforts and the massive potential to grow sales whilst improving customer experience. Beyond the potential benefits to commerce, there is still a significant challenge to harnessing data; and this magazine puts forward

more than a few ideas on how to go big with data.

Persisting questions over how much the internet can be trusted leads this edition to look into blockchain technology and its task of providing a secure and efficient platform for value transfer. It also brings the conversation home by analysing Nigeria's trade potential and what it would take to drive and deliver effective import substitution in the country.

It would be incomplete to talk

about how the future would work without discussing the future of work, and in this edition you will find an interesting take on the impact of technology, the changing nature of productivity and the culture revolution at the work place.

This edition of The Corvus offers ideas and insights which are not only relevant to our lives today but brilliantly foreshadow how we will live, work and do business in the near future. I trust that you will find this edition very exciting ■



Advertising the Future

Onyedimmakachukwu Obiukwu

The future is increasingly the best source of competitive advantage for businesses the world over, but it poses an even greater threat to small businesses.

The biggest companies in the world today - Google, Amazon, Facebook and Alibaba, amongst dozen others - are undoubtedly renowned for the industries they dominate. However, these companies are much more revered for what they could yet become. So too the smaller, but widely popular companies, such as Uber, AirBnB and SpaceX. Known as unicorns for how fast they sprang from startups to billion dollar establishments, these companies have as their biggest selling points not just the current value of their products and services but the potential of their business model. To put it simply; the leading companies in the world today have done, and continue to do, a great job of positioning their organizations as the businesses of the future.

Positioning for the future, in the context of this article, is not the abstract prospecting of what could come

next. Rather, it is tangible, apparent and rooted in the rapid technological advancements happening all around us today. International bestselling author, Joshua Cooper Ramo, describes this future as the age of connected systems. "Connected systems have different laws of power, and I think they can be kind of boiled down to the idea that connection changes the nature of any object," Ramo said, discussing his most recent work, the Seventh Sense, which postulates that with so much disruption going on in the world, we need a new

sense to understand how things will change as a result of connectivity.

Things are already changing as a result of connectivity. App services like Uber now dominate the taxi industry in Lagos and several other major cities around the world, fundamentally changing how people move around town despite the fact they haven't got any taxis of their own. Just as Uber has done with taxis, so too AirBnB with lodgings and Alibaba with, well, everything that you may need to ever



buy. Yet the age of connectivity is not just about the disruptions caused by the aforementioned Non-Content Generators; the real big deal is how these businesses aptly reflect, in this present time, the fine line between the past and the future. Yellow taxis in Lagos, increasingly inconvenient to hail or ride in, have never looked more like relics of the past; the same goes for hotels that you cannot book online or, increasingly, apparel-makers that you cannot connect with via WhatsApp and eateries that you cannot order from online.

On the flip side, we are looking to organizations that are leveraging the power of connectivity as the torchbearers of the future, even when they have been around for aeons. Take universities for example. Unsung heroes in their adaptation to connectivity, (some of) these “aged” institutions quickly moved from the dogma of learning in physical proximity which had held sway for centuries, to learning anywhere with any internet-enabled device that you can lay your hands on. That single action has expanded the reach of these schools beyond the levels their classrooms could ever reach, revamped their interaction with students and prospective students around the world and, most

importantly, ensured that they continue to be looked at as centres of learning for the future. The irony is perhaps, that some organizations, formed or blooming in the present (within the last 15 years) are already fading away, or looking like they just might soon. Business Centres held sway across Nigeria’s city centres not too long ago, now they are increasingly difficult to spot, and while Cable TV and Cinema businesses are the in-things now with streaming and movie download services on the rise, it’s not difficult to deduce that they might be on their way out sooner than later. So what does all of these mean for businesses today? First, the obvious; the future is the best source of competitive advantage for businesses the world over. And then the not so comforting; the future is also a great threat to businesses, especially those in the SME sector.

In Nigeria, it is estimated that nearly 7 in 10 small businesses go moribund within five years of operation. In the western world, the situation is only marginally better with 5 in 10 small businesses making it beyond the same period. There are several reasons for the struggles these small businesses experience in Nigeria, ranging from financing to infrastructural challenges, but the future also plays a part. With

most small businesses built on short-term strategies, and often run to satisfy subsistence needs, the future - in the context discussed above - isn’t what many small businesses give so much attention to. This makes such small businesses not only unsustainable, but also very prone and pliant to disruption, which is all too rampant in this age of connected systems.

Contrary to how we talk about disruption, which is usually in the context of big companies put out of business by startups, the biggest victims of tech-inspired disruptions, by numbers at least, are small businesses. Think about how many Business Centres have been put out of business due to the greater liberalization of internet services over the last 10 years; the silent and gradual disappearance of photo studios as people depend more on their phones to take and store their images; and the gradual erasure of small publishing houses as roadside magazines struggle to pull the attention of road users away from the articles on their mobile phones. Certainly, the future poses an even greater threat to small businesses today, but leveraging its opportunities is also the key to beating the threat.

While for big businesses, leveraging the future could mean a systematic





overhaul of services or well enshrined operational structures, for small businesses it often entails not so much than “a tweak here and a turn there” in terms of their business plan or the direction adopted by the business owner. This is a good thing for small business owners, who, although may have started their ventures as a basic means of tackling personal unemployment, could transform it into a sustainable enterprise that can create long term value. The challenge then is, how do small businesses leverage connectivity to remain sustainable well into the future? The answer is best illustrated by the practices of the past.

The difference between now and what is increasingly the past is that, whilst the latter involved finding somewhere - either in a village square or in an ultra-modern international market - to connect with customers, the former entails creating the sort of value that would be so relevant, customers

would seek to, and can, connect to us, wherever we may be. Hence, with the advent and rapid penetration of the internet - and the internet of things - the business plan of small businesses no longer have to depend on a physical location for connectivity, they already have it, rather, they must now seek to create the sort of value that transcends proximity in the same way that the internet and mobile technology, which is our new source of connectivity, has. Connectivity as a source of competitive advantage is not a new concept. In fact, it is as age-old as man’s venture into commerce.

The e-Commerce sector has a great deal of good examples of small businesses creating the aforementioned value. From single room retail outlets that offer home delivery of goods to office-less service providers that offer to satisfy customer needs wherever they may be, these small businesses demonstrate the premium on value

that the age of connected systems demands. Yet, putting up contact details and a few pictures of what it does isn’t enough to declare a small business and “positioned for the future”, which is why platforms like the SME Markethub, which maximizes the value created by individual businesses by pooling them together, serve a very important purpose. And even then, this alone is not enough. If small businesses in Nigeria are to become enterprises positioned for the future and capable of creating value in the long term, then they would not only have to get online, but also adopt a business model that constantly demands innovation with regards to what to serve customers, and indeed, how to serve customers. This way, the ever present risk of being put out of business would be drastically reduced whilst achieving the need to stay in touch with ever evolving customer needs ■



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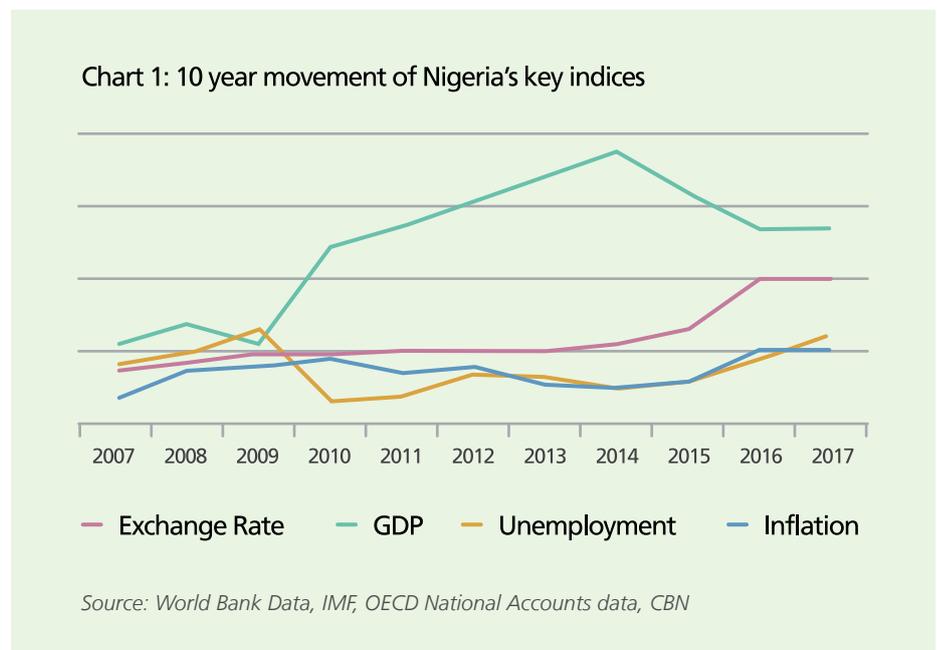
Beyond the Rhetoric of Import Substitution

Suliat Aliyu

The reason for patronising locally produced goods is less about patriotism and more about protecting the nation's FX reserves and developing the domestic economy.

In the face of the many predicaments Nigeria has had to deal with in recent times, from falling oil prices and production levels to the uninspiring depreciation of the Naira, the need for the country to look inward has become paramount once again. The economy has seen its relevant indices drop from their highest of 2014 to very low levels it has ever been in years; Inflation (8.0% in Dec.2014 vs 15.4% in Dec.2017), unemployment rate (7.8% in Q1 2014 vs 18.8% in Q3 2017), GDP (\$568.5bn in 2014 vs \$408.2Bn¹ in 2017), official CBN exchange rate (N168/US\$1 in 2014 vs N306/US\$1 in 2017), to mention a few.

The main reason for this is related with the country's heavy reliance on imports, from industrial to basic day to day needs of its citizens. Nigeria is still a nation filled with vast resources that can still



be harnessed to get the country back on an upward trajectory despite all the challenges facing the country.

Import Substitution, The Development Paradox

Import substitution (IS) has been, for many years, the go-to strategy for countries to reduce their dependence on foreign markets as it stimulates local production and consumption. This would usually require some amount of sacrifice and/or dedication on the part of citizens, corporates and the government.

Citizens will need to cut back on their level of imports and rely more on local purchases; corporates will need to adopt backward integration as part of their strategic business policy, while the government will need to build an enabling environment for capital investments. Only then can an IS strategy be truly deemed as successful as the benefits in the long run will outweigh all the short-term inconveniences. It would not only reduce reliance on importation but would also have the domino effect of strengthening the nation's currency, increasing domestic employment, enhancing economic resilience in the

¹ based on analyst forecast



face of global economic shocks such as recessions and depressions, and serve as a catalyst to achieve economic diversification.

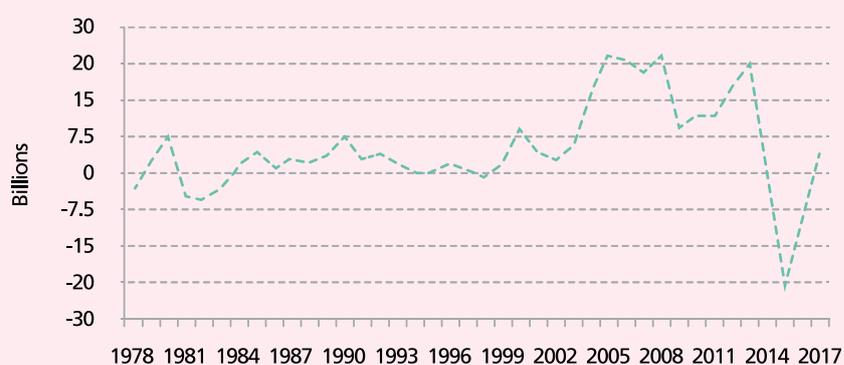
IS strategies are employed in various ways ranging from policies that restrict importation of certain foreign products to creating favorable conditions for domestic industrial development by way of tax incentives, cheaper funding, etc. in a bid to help emerging industries. History has however shown that successful import substitution goes beyond the various policy instruments and techniques employed by the government, as a lot of factors which differ from country to country could prevent these policies from being successful.

In Nigeria, the government has implemented several import substitution policies. This dates back to the 1970s with the introduction of the Indigenization decree, which declared many sectors of the Nigerian economy off-limits to foreign investment in order to develop local competence whilst ensuring that Nigerians were the main beneficiaries of the resources of the country. Whilst this led to development of the iron, steel, textile, and breweries industry at that time, the decree also discouraged Foreign Direct

Investment (FDI) into the country. The government eventually realized that the Indigenization decree was not the solution the country needed as it later led to reduction of non-oil investments. Fast forward a few years later to 2012, the government launched the Nigeria Industrial Revolution Plan (NIRP) which included generous tax concessions and single-digit lending rates in order to boost local production in chosen sectors including agro allied, metals & solid minerals, oil & gas, construction and light manufacturing. The country saw the emergence of several intervention funding schemes including the Power and Airline

Intervention Fund (PAIF) which aimed to encourage developmental projects in the aviation and power sectors; Commercial Agriculture Credit Scheme (CACS) with the aim of growing the agricultural sector and promoting low food inflation; Micro, Small and Medium Enterprises Development Fund (MSMEDF) to engender inclusive growth; Nigeria Incentive-Based Risk Sharing System For Agricultural Lending (NIRSAL) to de-risk lending to the agricultural sector; Non-Oil Export Stimulation Facility (NESF) to attract new investments in value-added non-oil exports; and the more recent, Anchor Borrowers' Programme to increase

Chart 2: Net trade, Nigeria (US\$)



Source: World Bank Data

agricultural output and capacity utilization of agricultural processors.

Furthermore, the government also implemented bans and tariff increases on some imported items such as rice, cement, fruit juice and cars. Some 41 imported goods and services were also deemed not valid for FX purchase from the official forex window all in a bid to encourage local production of these items. While a few of these strategies recorded varying degrees of success, Nigeria's balance of trade data has still not shown any sign of sustainable growth.

From the above chart, the country's Net Trade, defined as the excess of its exports over imports, swung to a negative position in 2015. During that year, it was reported that Nigeria spent N6.7 trillion on the importation of goods and services, some of which are locally produced. Roughly N1.6 trillion on boiler, machinery and appliances; N1.3 trillion on mineral products; N1.5 trillion on spare parts; over N1.09 trillion on imported foods and drinks; N123.01 billion on shoes and cloths; and a total of N399 billion on household items. Statistics like these would lead anyone to believing that Nigeria is its own biggest problem. It can be seen clearly that the impediment to achieving a successful IS strategy is mostly centered around the acquired taste of the citizens for foreign products, and the insistence of most manufacturing companies on importing spares and raw materials that can be acquired locally with a little investment.

Despite all these difficulties surrounding import substitution strategy and implementation, there are still reasons to believe that it is a satisfactory approach to development as can be seen in many other countries around the globe.

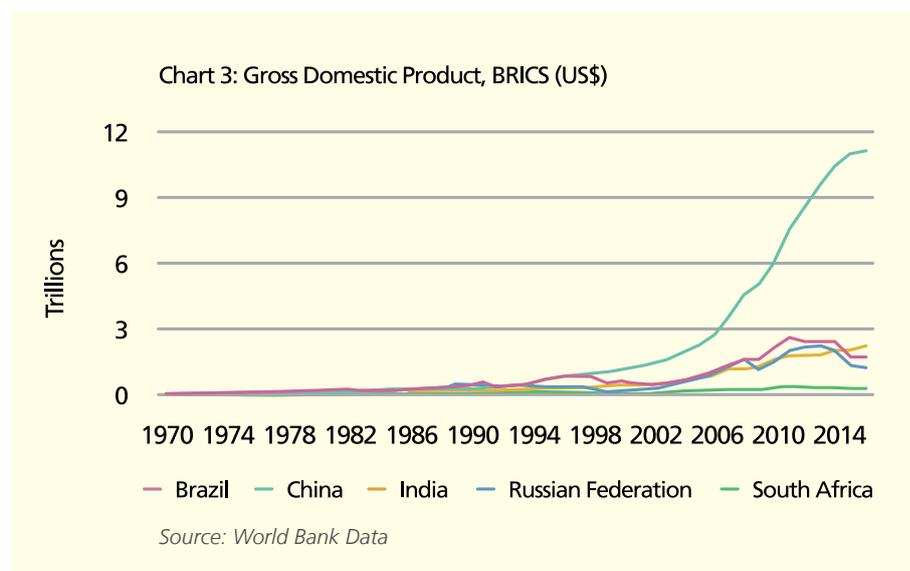
What can Nigeria learn from BRICS?

The BRICS are major emerging economies, which have adopted import substitution strategies at different stages on their path towards industrialization. These five countries - Brazil, Russia, India, China and South

Africa represent about 41% of the world's population, with a combined nominal GDP of US\$16.8 trillion as of 2016. This article will take a quick look at the complexities of the IS initiatives that have been implemented by each of these countries, with a view to identifying what key takeaways can be adapted into the Nigerian IS strategy.

country's technological know-how. The share of industrial sector in Brazil's GDP nearly doubled from 24.1% in the 1950s to 40.9% in the 1980s.

The country witnessed development of major industrial sectors particularly the automotive and oil & gas industry as the Brazilian government saw the growth of these sectors as the quickest way to promote the country's industrialization. Brazil's auto transformation which



Brazil

The most notable IS strategy in Brazil was adopted after World War 2, when the country embarked on a rapid expansion of industries through various economic policies such as import prohibitions, multiple exchange rates, import licencing, tariffs, cheaper funding, social security and government investment in key economic sectors in order to aid backward integration. However, despite the various mix of policies deployed, Brazil came to realize that these IS strategies alone were not effective in increasing GDP. In the 1980s, the government decided to combine export promotion policies with the implemented import substitution strategies, which had a significant positive effect on the Brazilian economy. Furthermore, the government invested heavily in research and development with the establishment of agricultural research corporations and aeronautics institute to increase the

covers light vehicles, trucks, buses and agricultural machines began with the introduction of the five-year plan. The government restricted importation of automotive and forced companies that only had assembling plants in Brazil to choose between producing vehicles with 90-95% Brazilian made content or exit the Brazilian market, with a deadline period of five years.

The government also offered attractive subsidies to reduce the cost of capital investment and guaranteed a return even if profits did not materialize, all within the five year period. By so doing, assembling companies were pressured to rapidly invest and commence local production in Brazil as the incentives were only available for five years. This also encouraged inflow of foreign capital and technologies from large global companies such as Nissan, Honda, Hyundai, Mitsubishi, Chrysler and Audi, as they decided to settle and open factories in Brazil so as not to lose market share due to the import ban. Automotive production volume grew from 133,000 in the 60s to 1.2

Million in the 80s, and to 2.1 Million by 2016.

The growth of Brazil's oil and gas sector began in the late 90s when the government introduced legislative and regulatory reforms to liberalize the market in a bid to attract private sector participation. This led to the creation of the National Council for Energy Policy (CNPE) and the National Agency of Petroleum, Natural Gas and Biofuels (ANP). The Petroleum Law, which introduced the concession regime and bid rounds model for granting of exploration and production right, was passed. Access to the bidding rounds was opened to any company or consortium that met the legal, technical and financial requirements established by ANP, and criteria to determine the winners were based on the local content offered by each bidder, amount of signature bonus and the minimum exploratory program. The success of the concession regime greatly reduced Brazil's dependence on imported petroleum and the country became self-sufficient by 2007.

Russia

Following the plunge in global oil prices and the economic sanctions imposed by the EU in 2014, Russia plummeted into a financial crisis recording a drop in GDP as can be seen in chart 3 above. Russia's recovery strategy was centered on import substitution.

The strategies included subsidies for local producers (remunerating 20 percent of direct costs), ban on most imported food items from the West, promotion of pharmaceuticals and electronics sector, and ban on use of foreign automobiles by certain companies. The food ban in particular served as a catalyst for investments in food production in order to bridge the gap caused by the ban. The country was also able to reduce its dependence on western import as it quickly developed technologies that it lacked, such as arctic drilling. This progress was attributable to the fact

that Russia understood that stimulating local production alone was not enough to achieve import substitution. It ensured that what was produced locally was consumed by enforcing the ban on certain imported items.

India

After several efforts in the 40s and 50s to achieve a self-reliant economy, India finally got the right mix of policies in the 60s with a clear and

In addition, the policy of protection against import was reinforced by way of tariffs and quotas in order to allow time for the local industries to develop until they were able to compete directly with those of developed economies.

China

China has had one of the most successful development strategies, which has seen its percentage of export to GDP

Chart 4: Global Oil Prices (2013-2017)



Source: World Bank Data

specific industrialisation plan. These policies focused on expanding India's consumer goods sector in order to discourage importation while expanding the country's export base. India also implemented initiatives aimed at attracting foreign capital (especially Foreign Direct Investment) in order to directly address currency devaluation and bolster investments in capital goods industries. The initiatives included setting up special trading zones, infrastructure development, favourable labour laws and focus on strengthening single window clearance system for fast-tracking approval processes. Corporations also played their own part by going on a self-sufficient drive. Backward integration became the hottest game in town; from steel companies like Mukand Ltd to petrochemical companies like Reliance. The scope of India's revitalization strategy ranged from manufacture of vehicles, down to almost any item that could be produced within the country's borders.

grow from 2.5% in 1970 to 19.6% in 2016. In 1978, China implemented the trade reform policy in order to complement its already adopted import substitution strategy (which already boosted industrialization). This was to enable China achieve its desired level of competitiveness in global markets in terms of trade volume, pricing and quality. The trade reform policy focused on two major areas; attracting export oriented foreign investors and encouraging export promotion. The policy to attract export oriented foreign investors included development of infrastructure facilities in special economic zones, tax rebates, tariff exemption, income tax exemptions, cheap and flexible labour, incentives and funding for export based projects. The export promotion policies included adoption of an exchange rate system favourable to exports, organizing trade and export fairs, and permitting companies backed by foreign investments to engage in their own foreign trade activities. These policies encouraged foreign companies



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and investors to shift base to China - especially those operating in labour intensive industries and sourcing for cheap labour - which helped China develop its desired links with the world market. The country capitalized on its strengths in formulating its trade reform policy and China has, since 2009, been the world's largest exporter of goods and services.

South Africa

South Africa commenced its import substitution strategy as far back as the 1920s with the implementation of strict import quotas. Though this encouraged industrialization and bolstered exportation of basic commodities, by 1970s, there was a need to diversify the country's export base to ensure more sustainable development. This led to the implementation of flexible exchange rates, complex tariff structure to protect local industries (particularly mining, transportation, and power), and implementation of structural adjustment programmes for selected sectors. Additional reforms were later adopted on the back of the regional and bilateral trade agreements South Africa had signed with many countries. All these enabled the country transition from a major producer of consumer goods to that of capital goods, including power generation, mining and energy.

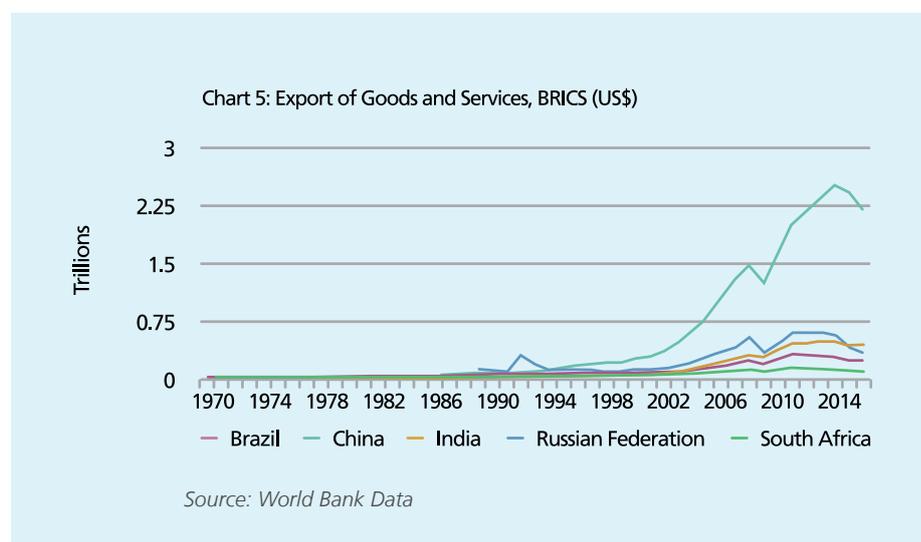
The way Forward...

International experience has shown that:

- Import substitution strategies cannot be pursued in isolation.
- Specific sectorial policies aimed at promoting industry growth should be enacted and implemented by the government.
- To achieve economic independence, it is necessary to protect domestic producers.
- Locally produced products must be consumed locally first and then exported.
- Companies have a role to play by investing in backward integration.
- IS strategies should be supported by export promotion and enabling environment to encourage foreign investments and capital development.

Whilst the government introduced tax incentives, intervention funding, and attractive fixed income yields to boost foreign inflows and stimulate local production, the right policy mix and basic infrastructure that would enable industrial growth such as good roads, rails, and stable power

Nigerian government is the complete passage and implementation of the revised Petroleum Industry Bill (PIB). From the Brazilian case study earlier discussed, the growth in the oil and gas sector began when the Petroleum law was passed to establish a legal and regulatory framework for the



source are still lacking. Furthermore, the technical know-how needed for major construction and industrial projects is still at discouraging levels due to low spend on Research & Development (R&D) and the necessary technical institutes. How then can these implemented IS strategies gain traction beyond what we have today?

1. The role of government in the IS journey is very crucial as they need to provide the right economic blueprint for development to thrive. The Nigerian government launched the Economic Recovery and Growth Plan (ERGP) in April 2017 with the aim of achieving structural economic transformation and sustained inclusive growth. The plan will cover sectorial strategies for infrastructure and industrial development, revamping of local refineries, and forging better partnerships between private and public sector. All these definitely sound like what the Nigerian economy requires, which is why there is a need for proper and quick implementation of the ERGP to set Nigeria on the path to finally achieving sustainable growth.

2. Another crucial task for the

industry. With the successful passage of the Petroleum Industry Governance Bill (PIGB) in 2017, the National Assembly must fast track the passage of the other three (3) components of the revised PIB namely Petroleum Industry Administrative Bill (PIAB), Petroleum Industry Fiscal Bill (PIFB) and the Petroleum Host Communities Bill (PHCB). The implementation of the revised PIB will likewise encourage investment and drive growth in the country's petroleum industry, which will in turn generate revenue for the development and diversification of the economy based on the ERGP blueprint.

3. In addition to the aforementioned, another setback to successful import substitution in Nigeria is the shortage of local demand, both at the individual and corporate levels.

Firstly, when Nigerians spend huge amounts on imported goods and services, it is to the detriment of local companies. It has been advocated for years that Nigerians should buy Nigerian made products. The reason for this is less about patriotism and

more about protecting the nation's FX market and contributing to the growth of domestic market for our own benefit. When local companies are unable to grow to the point where they can take advantage of economies of scale, they will see no need in investing in capacity building that will churn out the desired product quality. This eventually leads to the winding down of the company and ultimately the death of that industry. A good example of this is the Nigerian textile industry which the government has been making several efforts to revive. Nigerians also need to understand that the more they spend on imported items, the more expensive those items become as every kobo spent on import contributes to the devaluation of the naira. Alternatively, the more Nigerians spend on locally made products, the cheaper the product becomes in the long run when local companies achieve economies of scale.

Secondly, when there is a lack

of backward integration by corporations, there is a risk of economic policies not achieving the desired effect. Industry experts have argued that over 80% of Nigeria's manufacturing needs are imported which contributed to depletion of the country's foreign reserves. A number of companies had to wind down when the Nigerian economy slid into recession in 2016, while the few companies that had invested in backward integration reaped the benefit. Players in the Nigerian brewery industry have embraced vertical integration by sourcing raw materials locally and pumping investment to support local farming of sorghum and cassava, saving the country about US\$7million in foreign exchange on processed cassava starch alone, as argued by some industry player. It was also revealed during the 23rd Nigeria Economic Summit that backward integration in the cement industry saves the country about N240 billion yearly. You can imagine how much foreign exchange savings the country would achieve if a diverse

number of corporations adopt vertical integration. This would go a long way in ultimately bringing the country out of its dependence on import for industrial existence.

Changing from imported items to locally produced items will certainly prove difficult for individuals and corporations alike. However, understanding the impact that import consumption has on the economy and the role we each have to play is crucial in overcoming current challenges as successful import substitution goes beyond policy promulgation by the government. Having said that, the Nigerian government still has the task of implementing the right mix of different IS initiatives and sectoral based policies as can be seen from the BRICS example, while ensuring consistency of the policies and an enabling environment for the implemented policies to bear fruit. Only then can Nigeria be set on the right path to achieving import independence ■

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Data is the New Black Gold

Festus Okubor

At the dawn of the 20th century, a new economic power bloc was emerging. One founded on a natural resource – crude oil. By the end of the 20th century, that bloc was firmly established. Leveraging its primary asset, Crude Oil – or black gold as it was called – it impacted on activities from household and industrial heating, transportation, industrial power generation, manufacturing and pharmaceuticals; there was no facet of modern life that was not, one way or another, impacted by the exploration and refining of oil. The scions at the forefront of this new bloc — the Rockefellers at Standard Oil, the British Royals at BP, the Dutch Royals and the Rothschilds at Royal Dutch Shell — did not merely achieve financial dominance, they acquired economic power that enabled them impact on the world economy.

Oil. The 19th century was transformed by it, the 20th century was shaped by it, but the 21st century is gradually moving beyond it, powered by changing attitudes and an increasingly more valuable and widely sought commodity, one with the power to transform the way we connect and interact with the world around us. Whilst oil's value is primarily derived from its scarcity, this New Black Gold is as powerful as it is ubiquitous, providing competitive value to the companies who are able to

harness and exploit it for and from their customers. In this time of seamless integration of softwares, lifestyle and social networking, the 21st century is increasingly likely to be known as the Age of Big Data.

In the data-driven world of today, the ability to fully harness information from all available data to achieve improvements in product development, understanding behavioral trends and enhancing process efficiencies, and applying same to private and public sector challenges, represents the single most transformative opportunity in the world today. It is believed that the value to be derived from the ability to leverage information gained from big data analytics to achieve innovation in fields of healthcare, scientific research, agriculture, logistics, urban design, energy, retailing, crime reduction, business operations, etc is immeasurable.

What makes Data Big?

Prior to the advent of the internet, traditional datasets were structured -neatly organized into databases. It consisted of only standard data recorded by the originating entity – say a bank keeping details such as date, amount, payee, check number, etc. Today, with the explosion of the digital

economy, data consists of much more than that; banks now seek to capture information on channels used, where funds were spent and on what it was spent on. Banks seek more information to help serve the customer better and/or enhance decision making. Same can be said of almost all other industries – be it social media, retailing, news streaming, etc.

Big data refers to the capturing, processing, analyzing and interpretation of large datasets using advanced analytical technologies to aid understanding, facilitate decision making and enhance projection. What makes big data includes the sheer volume of data that can be captured, the robustness – consists of various types – texts, videos, audios, tweets, shopping preferences, pictures, browsing preferences, etc.; the ability to capture them on a real-time basis and relative reliability of the data. Leveraging significant advancement in digital technologies, data can be captured from a variety of devices – including home appliances, mobile phones, smart devices, cars, and other electronics. The sheer volume of data that can be captured and analyzed is truly tremendous.

Put together, these data sets can become extremely large and complex, requiring new tools and approaches to make the most of them. Due to the

extraordinary amount of information that is generated by human activity and can be made available for analysis, companies - Google and Facebook - whose business it is to mine these data have gradually evolved into some of the most powerful corporations in the world today. Leveraging the information from big data analytics, these firms are able to provide superior customer service, anticipate customer needs, leverage trends in behavior to enhance innovation and product development and generally promote customer loyalty.

Over the last couple of years, Nigeria's technology industry has begun to attract global interest, almost rivaling the oil and gas industry. Facebook, YCombinator and some venture capital and early stage investors are coming into the space, trying to position themselves as the companies who are best placed to harness the rich mines of data in some of Africa's most populous countries. One of this high profile financing rounds include the Chan-Zuckerberg Foundation investment in Andela, a programme which trains developers all over Africa. Some of these companies are poised to achieve success in data driven service delivery that startups can learn from in the face of data driven strategies of the 21st century unicorns.

What benefits do Big Data driven strategies offer? – (Network effects)

A data driven strategy has immense competitive advantages for companies today. The most profitable firms in the world today, including Apple, Google and Amazon all have one thing in common, besides from very impressive revenue, the ability to generate loads of data on customer behaviors, which are put to significant use in boosting customer experience, enhancing innovation and boosting sales. A recent McKinsey report which revealed that organizations that leverage customer behavioral insights on average outperform peers by 85% in sales and more than 25% in gross margin only further corroborates these facts. By capturing data, such as

 **1.2 million new social media users**

 **4 million hours of video content uploaded**

 **67 Instagram posts**

 **5.2 billion google searches**

 **5.75 billion facebook likes**

 **656 million tweets**

 **5.97 billion users watching youtube**

 **4.3 million facebook messages posted**

 **1.32 billion daily active users**

 **22 billion text messages**

geo-mapping activities, social media interactions, digital activities, socio-political interests, expenditure patterns, etc., at every point along the customer's path of interaction, firms are better able to profile, understand the needs and interests of their customers and leverage the information to enhance customer experience, promote loyalty and stickiness and maximize sales - put simply, in today's world, the company with the most data capability most probably wins. The risk posed by big tech disruption of incumbent industries has created a "new gold rush". Senior executives see the impact and reach of data-savvy companies such as Google and Facebook and recognize the need for affirmative action.

Data driven strategies are the key ingredient of Silicon Valley startups. The most successful firms provide platforms for collaborations which generates data that is used to further enhance day-to-day activities and engender the creation of valuable social networks, which in turn motivates the user to continue on the platform or risk losing any benefit derived from participating with the network. This is the lock-in power of social media and crowd-based platforms - the value creator for the internet. By collecting more data, firms have greater scope to improve their products and services, which attracts more users, generating more data and so the cycle goes.

Examples abound of interesting data driven business models in finance, health and fitness, hospitality and others. For instance, Upstart Network is a lending company whose specialized algorithms and non-traditional measures allow it use a range of customer-background data to offer market-leading rates. Similarly, Ginger.io - a medical provider that offers emotional and mental health support - relies on customer data such as sleep, mobility and communication patterns from smartphones and fitness wearables to provide personalized care and improve clinical assessments in health management.

Keying into the New Data Economy

The ubiquity of Smartphones and internet enabled devices has made access to data abundant as every activity creates a digital trace which can be harnessed and analyzed. As more of our devices connect to the internet, the volume of data will only continue to increase exponentially. Artificial intelligence techniques such as machine learning can extract more value from the data we leave. Algorithms can predict when a customer is ready to buy a certain product or service, or when a person is at risk of a disease. Companies such as General Electric (GE) and Siemens are now branding themselves as data

companies with varying degrees of success, but increasingly one thing is clear, the business model of today, and tomorrow would be data driven, and this poses both incredibly exciting and troubling news for firm executives. To put things in perspective, International Data Corporation (IDC), a global research firm, forecasts that \$187 billion will be spent by firms on big data and analytics by 2019, a 53% increase from the \$122 billion invested in 2015. Executives all over the world are wary of the risk of disruption from companies who have built big data advantages into their business model, but it also presents immense opportunities for them as well.

Big data analytics holds significant potential for the future, offering opportunities to improve decision making across several industries – allowing service providers and consumer industries to leverage data and analytics to unlock customer insights, and provide real time, contextual, personalized and improved services to customers. In the energy industry, techniques such as advanced data analytics employed by the likes of Google, Facebook, Amazon and others mainly to disrupt consumer facing businesses, are now being applied to enhance operations and increase efficiency. Under pressure from renewable energy projects, there has been a flurry of alliance

between IT firms and oil companies to improve exploration activities. Last year, Microsoft signed strategic partnership with Halliburton and Chevron. Nvidia, makers of high performance chips for video games, has been working with Schlumberger, Halliburton and others to adapt its technology for viewing and interpreting seismic information.

Locally, Delivery Science - a Lagos-based distribution operations firm - provides large organizations with mobile driven platforms to manage and monitor their distribution assets and logistics smarter. The company was accepted into the fourth Google Launchpad Accelerator program. FieldInsight, an innovative solution firm, that helps manufacturers collect and process data in the field using mobile devices handled by the manufacturer's field workers are helping FMCG companies get visibility into their supply chain functions through the automation of manual processes, gathering of data, and real time analysis & insight on the data collected. The company boasts of giants such as Flour Mills and Unilever as clients.

In the Banking industry, regulators and financial services providers are increasingly embracing the power of data to transform service delivery. For a market leading organization, it is important that the data and analytics operation be run as a profit center of

sorts.

The Value and Potential Danger

It is agreed that the benefits of big data are enormous, especially as technological advancements make for increasing capacities for data generation, capturing and analysis. There are also increasing fears about how much data is too much data – where does the line between data transparency and privacy invasion lie? Would it be an invasion of privacy if a person's medical status is deduced from data garnered from a health tracking app? Would a company be in its right to deny such persons employment on the basis of such information? Or could information of personal habits and activities be used to discriminate on access to services through a credit score or some other measure? Is there a limit on how much data is too much or whom such data can be shared with? Or what purposes they can be put to?

The ongoing debate in the United States about how data from Facebook users were utilized by political consulting firm, Cambridge Analytica to influence electoral processes during the 2016 Presidential elections highlights the grey areas around the unregulated use of big data.

For instance, during the election campaign, if there was a spike in clicks on an article about immigration in a



county in Pennsylvania or Wisconsin, Trump would go there and give an immigration-focused speech. When you consider how a few thousand votes in a handful of swing states determined the election, their impact on the elections could be termed significant. The potential uses of Big Data in government flows both ways as well. Data has the power to transform civic education and engagement, empowering ordinary citizens to hold governments to better account, while also enabling government to better allocate resources to the most deficient areas or citizens.

to boost their online reputations. As online interactions continue to lead to increasingly significant real world effects, we expect to see the rise of reputation black markets where people can boost their credibility, much in the same way that people can now buy twitter followers and Instagram likes as signals of credibility and influence.

The monopolization of the oil industry in the 20th century evoked a rise in regulatory inventions such as the Anti-Trust rules. These rules resulted in the break up of Standard Oil Company in 1911 after John D. Rockefeller; Chairman of Standard Oil appeared

Laws would need to be updated to reserve rights to privacy, intellectual property, delineation of responsibilities, limits of liability and such other concerns that may emerge.

Opportunity for the taking

The power and potential of big data to create massive improvements in our standards of living is widely accepted. This is one of the reasons for the wide proliferation of companies and start-ups looking to leverage big data strategies as a springboard to establish businesses across all industries. However, the term "Big Data" itself describes



Questions on a brave new world

While a tremendously exciting prospect, the dangers of an increasingly open world are not trivial. Hackers thrive as valuable information is available from all sorts of data repositories.

Individuals, corporates and governments must pay attention to the security and integrity of their data management processes. An unintended consequence of government data collection and utilization efforts will be the rise of data "Black markets", as people find ways

before the US Congress contesting the break up whilst sitting on the same seat Mark Zuckerberg sat on during the Facebook data scandal hearing a few months ago. We expect to witness a rise in judicial and legislative clamor for increased regulatory oversight into the processes and uses of big data repositories to avoid unwholesome practices, prevent anti-trust tendencies and prescribe compliance guidelines and sanctions. An effective data driven business strategy therefore will have to pay attention to the ethical concerns around the gathering, storage and usage of data on customer interactions.

datasets too large for individuals or consumers to process. Hence, there remains a financial barrier to entry that automatically favors wealthy individuals and corporations.

Many businesses have the advantage of long-standing client relationships, deep pockets of expertise and scale. By prioritizing a handful of specific customer outcomes, such as reduced churn or improved cross-sell, and setting up small, dedicated cross-functional teams to experiment, refine, and release new approaches, established players can generate significant returns and future-



proof themselves from disruption. This Author's recommendations for an institution are summarized below:

- **Enrich customer data:** Customer data should be enriched to incorporate digital profiles, life events, community information, transaction-based insights, customer preferences, sentiment scoring etc. in order to get a full picture of the customer. Organizations can capture digital profiles and digital activity by linking web, mobile, and social-presence data. Marketing or customer teams can start by attaching activities to each customer profile.
- **Make that data shareable and accessible:** Using "two speed" IT, where

specialist business and IT teams fast-track digital development, businesses should identify and implement high value customer initiatives even as we build out our longer-term transformation. Software overlays can link data silos among different lines of business, and semantic layers can funnel information into user friendly interfaces that are accessible company wide.

- **Enable collaboration and third party sandboxes:** Innovation can occur when third party developers with unique insight and skillsets are empowered to solve problems and create unique products layered on an incumbent's proprietary datasets.

Partnerships and Collaborations are a strategic necessity in the 21st century. For businesses in this increasingly customer-centric world, the ability to capture and use customer insights to shape products, solutions, and the buying experience as a whole is critical. Customer data must be seen by businesses as strategic; Data is a profit driver, integral to the organizations relevance in this age of Big Data ■

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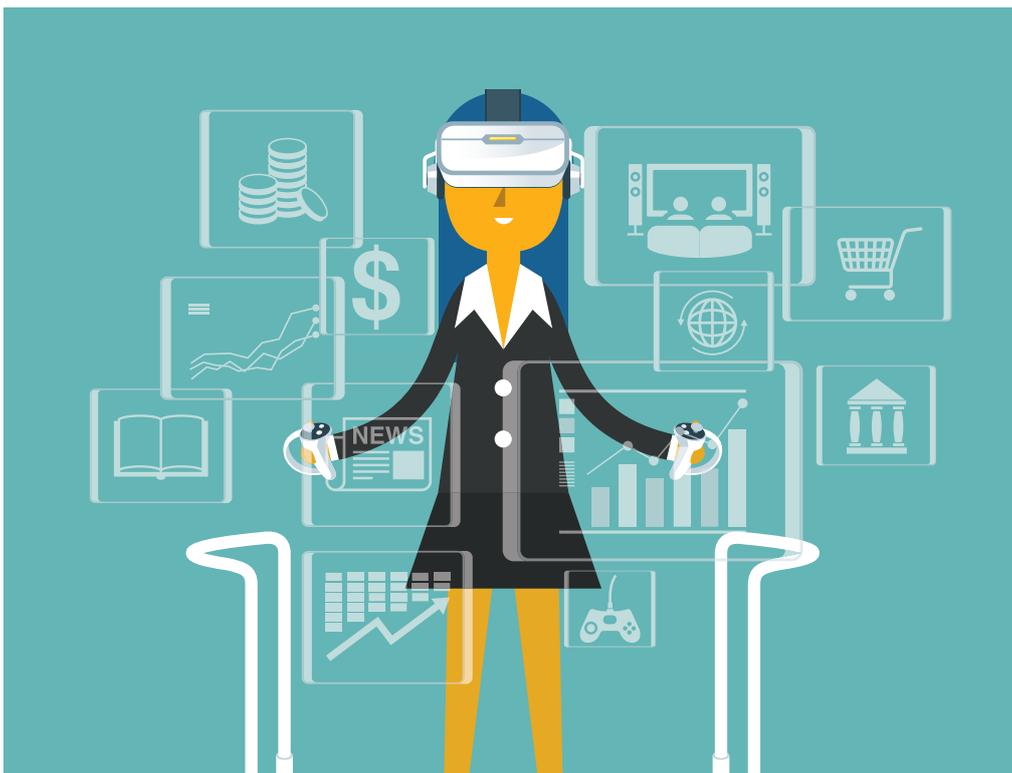
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In a survey of global HR decision makers this year (by the World Economic Forum), about 44% of them pointed to new technologies enabling remote working, co-working space and teleconferencing as the principal driver of change. Advances in mobile and cloud technology allowing remote and instant access were singled out as the most important technological driver of change, enabling the rapid spread of internet-based service models.

What do these disruptions mean for human labor? It means more flexible working arrangements, and increased variety in our lives. It means that people need to be adaptable to the changes occurring rapidly, to remain competitive in the job market.

Today's work environment bears almost no resemblance to that of a few decades ago. There's no denying that a lot has changed with the passage of time – from the process of job hunting to the way the workforce communicates with each other. The differences are remarkable, and in some cases, drastic. In the past, it was common for people to have one job and sometimes, even

the same employer for life. Today however, more people can expect to have a range of different jobs in their lifetime.

There is a central driver of these transformations, and it is 'technology'. The pace of technological change is fast-moving and over the next 15-20 years, the wave of change will

The type of work people do and how they do it is evolving. New opportunities are opening up and new directions are possible for anyone and everyone to consider. The job landscape is undergoing radical changes and by 2020, there will be



high demand across all industries for roles such as data analysts, software developers, information security analysts, robotics engineers, product designers, specialized sales people, and HR development specialists – to help employees develop new skill sets.

Technological advancements are transforming the way we work, and this has led to big innovations that have created a lot of new jobs, and side-lined some. For example, the invention of the PC and smart phones essentially turned all of us into typists, and in turn eliminated the market for professional typists. Today, we have jobs such as virtual assistants, digital marketing experts, SEO (Search Engine Optimization) specialists, app developers, web analysts, bloggers, social media managers, and user experience (UX) designers – all of which did not exist 20 years ago.

According to Forbes, jobs such as postmasters, switchboard operators, agricultural workers, data entry keyers, door-to-door/street vendors, petrol

pump operators are fast disappearing and would massively decline in numbers by 2020. The shift to a knowledge based, tech-heavy service economy is hitting many workers hard, and will affect jobs like retail cashiers, travel agents, taxi drivers, librarians, print media, sports referees/umpires, and even bank tellers, all of which are unlikely to exist by 2030.

In addition, it is expected that by 2030, the technological landscape will be unrecognizable and about 60% of jobs will be completely new compared to today's workforce. Children going into primary school today will likely work in roles that have not even been created yet.

Many of today's jobs will be redefined as opposed to totally eradicated, with skills that are transferable to other roles. No matter what your job looks like today, it will be a significantly different job by 2030. Flexibility and a willingness to change career will be an important attribute in the future job market.

Beyond the transformation of 'work' itself, changes in the external world have also led to changes in the attitudes and expectations of various groups of stakeholders – customers, governments and particularly employees.

Customers and governments now demand greater transparency of business, and the availability of data on organisational activities and behaviours has put more pressure on employers to find ways to brand themselves as socially responsible, and to have a positive effect on their host communities and employees' lives.

Employees now want more out of their work relationship with employers. This is not a question of defined 'generations', but rather an ongoing trend in the morphing characteristics and demands of employees. Evidence does not support the idea that millennials, for example, are dramatically different from generation X but rather that attitudes are changing over time due to differences in successive generations' experiences as they grow up. For example, the younger generation of



employees will increasingly want a higher level of feedback, instant appraisal and reassurance, and the constant interaction of social media applied to a work environment. Similarly, they will also expect to be able to share personal opinions and to be involved in organisational decision-making, driven by the need for a sense of pride and ownership in their work.

Organisations and their structures of managers will need to find ways to deal with different working styles. Perhaps transparently communicate goals and desired outcomes, and let team members own the strategy and implementation of projects. This would create more investment from teams and also produce creative ideas and processes.

Today, technology has made it possible to work anywhere, anytime and with anyone. The exponential growth of digital connectivity, devices and information is driving profound changes in the way people work across the globe. We have moved from a world where information was scarce, to one of information abundance. While at times, the constant communication and flood of data around us can be overwhelming, there are also immense creative possibilities for growth and positive change due to this flow of information.

The line between work and life itself is fast eroding. The erosion of traditional work hours has challenged the conventional concept of the workplace. Many employees juggle a work-life balance - off the clock

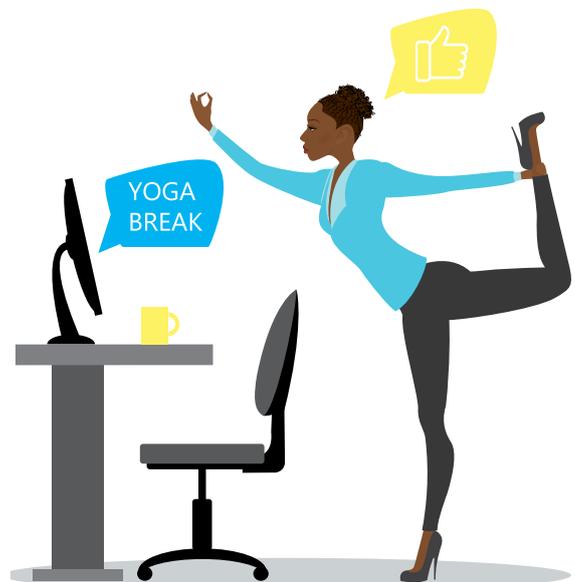
emails and quick calls to colleagues/clients leave the boundaries between work and personal life blurred. As a result, employees now demand work-life balanced focused benefits and flexibility in working conditions – job sharing, telecommuting, flexi-time, compressed work weeks etc.

More often today, companies are becoming less bound to traditional corporate culture and hierarchies as suits are evolving into hoodies and cubicles into open plan offices. Already, revolutionary organizations such as Apple and Google have adopted collaborative office designs where running into people and having chance meetings are more important than having a desk. Creating paths for chance meetings by designing agile and unique workspaces are solutions that promote collaboration, creativity and productivity in the office.

It is predicted that outsourcing or contracting work will be on the rise. According to a PwC report, by the year 2022, 20% of the workforce will be made up of contractors and temp workers - flexible workers, gig workers and networks of self-employed freelancers. 'Employees' would most likely have a strong desire for variety and flexibility in their roles and the ability to both develop and showcase

their unique skill sets. For many organizations, this will translate to a huge shift in workforce strategy from "I need to hire a person for a role" to "I need someone to complete a task or project", which will drive the utilization of the independent workforce.

There will be varied models of the employment relationship, providing more choices for many groups of people and those with 'market power'. To remain valuable in the workforce, one would need to be multi-skilled and be able to transfer skills from one area of life and work to another. Today,



the more skills you have, the more employable you become. Skills such as social intelligence and new media literacy will become increasingly important for workers. In addition to technical skills, capabilities that will be

valued for the future of work include:

- Social intelligence – ability to connect to others in a deep and direct way, to sense and stimulate reactions and desired interactions.
- Computational thinking – ability to translate vast amounts of data into abstract concepts, and to understand data-based reasoning.
- New media literacy – ability to critically assess and develop content that uses new media forms, and to leverage these media for persuasive communication.
- Design mindset – ability to present and develop tasks and work processes for desired outcomes.
- Virtual collaboration – ability to work productively, drive engagement and demonstrate presence, as a member of a virtual team.

In order to survive in this new world, companies need to rethink everything - from culture to tools to environments. How do we lead in this world? How do we create value? How do we create opportunities for growth?

“Businesses must accept change, but the art of progress is to preserve order amid change”. The workforce of the future will be the most diverse the world has ever seen. To succeed, companies need a broader understanding of their people. Organisations that want to attract and retain top talent in this fast-developing app economy need to adapt their culture and technology to accommodate the shift in attitudes.

Today, the top contributors to employee engagement and satisfaction include respect, trust, recognition, opportunities to contribute, autonomy and purposeful work. Organizations need to deliberately create environments that foster these.

It is not enough to hire adequately skilled employees. Companies must invest enough to develop talent within their organizations and produce groomed and prepared successors, as well as cultivate leadership capabilities. Building employee value is a critical economic necessity. Organizations

need to regard their employees as not just human resources (that can be drawn on when needed or until exhausted), but as human capital which represents a form of wealth that grows (with investment) to produce more capital.

As we transition to a gig economy, there will be a growing shift towards people having multiple roles and seeking more autonomy in the way they work. Organizations should focus on creating a modern workplace which enables work-life integration by blending professional expertise with off-work interests. These changes can reap significant results and create a springboard for excited, engaged employees and new routes to productivity.

Today, we have the concepts of ‘moonlighting’ and ‘sunlighting’ where employees, rather than ‘moonlighting’ on other jobs without their employer’s knowledge, will take to ‘sunlighting’ i.e. working on a business or charity one day a week with the full knowledge and support of their employers... Yes, this is what the future of work will look like for us – are we ready? ■

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How Cognitive Commerce Makes Everyone's Life Easier

Aisha Sheidu-Balogun



As we all race towards digital, it is easy to underestimate the real benefits of digitalization. Why is it so important? How useful can Big Data and Internet of Things (IoT) really be without fully understanding what they bring into our lives?

statistics, charts and graphs. The majority of the digital information collected by our mobile devices, IoT, connected home wares and wearable tech-devices aren't numerical. This data comprising of natural speech, sight and

It is estimated that 2.5 quintillion bytes of data are created every day; it's okay if you're not entirely sure what that means but it means a lot. Apparently, 90% of the data in existence today were created in the last three years. Yet, the way we process that data is not developing as fast; roughly 80% of data is still in the dark. We know it's there, but we can't see it, we can't use it, it can't help us solve problems. However, this is changing gradually, thanks to cognitive solutions.

Cognitive solutions clarifies big data in a way that benefits us and businesses around us. Human activity is difficult to break down into binary data and codes. It can't easily be distilled into numbers and

sound were essentially invisible before cognitive.

It's almost as if the Sci-Fi movies of the 80s are becoming reality. Can you remember Barney and Friends - the American children's television series that featured the title character, Barney - the big purple dinosaur? Interestingly, its only kids of the 90s and early 2000s that can relate to this as Barney has been replaced with Cognitoy for today's kids. Cognitoy is a supercomputer packaged into this cute little dinosaur. Cognitoy - an internet connected smart toy that learns and grows - was launched towards the end of 2015 and brings Cognitive solution into early learning years of children. It connects to home Wi-Fi and allows kids to directly engage in intelligent conversations with it as it listens, speaks and simultaneously evolves, learns and grows with the kids. After the initial details are entered into the toy by the parent(s)/guardian(s), there's no need for further programming. Although parents still have parental control via the parent panel, Cognitoy constantly evaluates the child's abilities, changing its interactions to further develop their skills. It can answer questions, tell stories, play games, crack jokes while relating in a natural child appropriate manner. Cognitoy is smart, constantly evolving, easy to set-up and acts as an educational buddy for kids.

The Forerunner of cognitive computing is IBM's Watson, a computer running software capable of answering questions posed in natural language.

Funny thing is IBM initially developed Watson to compete in the American game show –Jeopardy and in 2011, Watson competed and won on Jeopardy against the TV quiz show’s two biggest all-time champions who were humans. This was a big deal because computers had never been good at finding answers. For instance, search engines don’t answer questions but rather they deliver thousands of search results that match keywords. University researchers and company engineers have long worked on question answering software, but the very best could only comprehend and answer simple, straightforward questions like how many Champions League trophies has Real Madrid won?

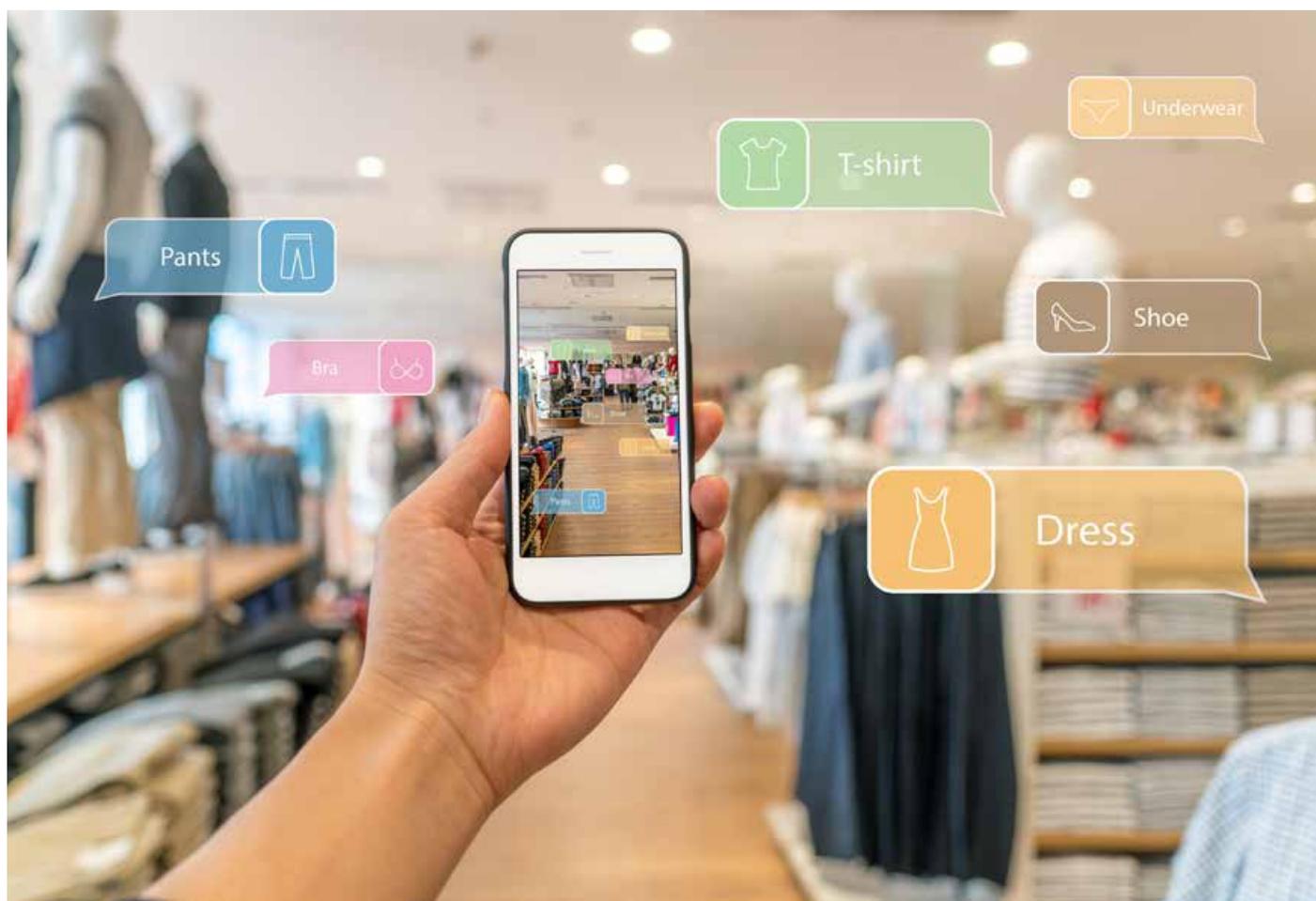
working on natural language problems and finding answers amid unstructured information at IBM Research. “The goal is to build a computer that can be more effective in understanding and interacting in natural language, but not necessarily the same way humans do it” he added.

When a question is put to Watson, more than 100 algorithms analyze the question in different ways, and find many different plausible answers - all at the same time. Yet another set of algorithms ranks the answers and gives them a score. For each possible answer, Watson finds evidence that may support or refute that answer. So for each of hundreds of possible answers it

As you may have guessed the Cognitoy runs on The Watson. The Watson has tentacles in various industries including health, financial advisory and cooking.

Cognitive commerce

Cognition refers to any system that learns, reasons and thinks on its own. Cognitive Commerce is the process of applying these systems to transform processes and operations to achieve greater certainty to improve customer experience, increase sale and better accuracy in the predictive value chain. It can be likened to a friend that knows you well enough to predict what you would purchase next and is correct



Watson does a remarkable job at understanding a tricky question and finding the best answer. IBM’s scientists have been quick to say that Watson does not actually think. “The goal is not to model the human brain,” said David Ferrucci, who spent 15 years

finds, hundreds of bits of evidence and then using hundreds of algorithms, it scores the degree to which the evidence supports the answer. Consequently, the highest ranking answer with the best evidence assessment becomes the most appropriate answer. All these are done in approximately three seconds.

80% of the time.

Look at it this way, every time you shop online you leave trails of evidence about who you are including your name, e-mail address, debit card details, location etc. Retailers use this information to assign a unique identifier to you. With this unique identifier, they can retrieve the

history of everything you've bought from their store (online and offline). In some cases, they can acquire more data about you from other sources to get a better idea of your persona, interests, wants and needs. Then the retailer proceeds to use the aggregated data/information about you to predict your likely shopping needs and their prediction are mostly correct.

Let's take Amazon for instance. Amazon is an e-commerce giant that sells everything. Every time you go on the site it feels like a visit to your neighborhood petty trader who knows your name and your frequent purchases. However, in the case of Amazon, they use the data of your recent purchases and searches to recommend related products and discount deals as well as additional items for your purchase consideration right there on your homepage.



With Cognitive commerce, retailers gather data on each customer to understand them within the context of a particular situation, analyze the data and applies machine learning to make recommendations for future purchases based on the customer's historic activities on their platform.

This capability is available now and

has shown great results in real-world testing thus, it is not entirely futuristic. In 2012, Target - the second largest discount retail store in the United States - decoded a teenage girl was pregnant before her father did. The store had come up with a formula about the clues to a shopper's impending bundle of joy with the aid of cognitive solutions. Chief Statistician of Target, Andrew Pole and his associates were able to identify 25 products that, when analyzed together, allowed them to assign a "pregnancy prediction" score to each shopper. These products didn't involve the usual tell-tale baby items like car seats and breast pumps but seemingly harmless products including unscented lotions, hand sanitizers and multivitamins.

The objective of cognitive systems as a whole is to help people make better

decisions. And this is why it is gaining more traction and popularity in the marketplace as it accurately gets up close and personal with customers. For retailers and companies who use cognitive commerce, prices optimize themselves, products sell through at higher speed with lower stock out and customer service is revolutionized into becoming more proactive than reactive.

With Cognitive Commerce, the landing page of each customer's favourite e-commerce site contain the brands they use frequently first, as well as options of other brands that might also be of interest to them. Each customer receives information of products, discounts and offers that they are actually interested in as they are tailored just for them.

Cognitive Commerce is like a fast sports car that can hit 100km/h in 2secs, sleek as a fox but without fuel that beast can't move an inch. The fuel that feeds cognitive commerce is data, without analyzed data there would be no cognitive commerce.

Data has been called the world's most valuable resource overtaking oil and gold, but many companies are yet to fully utilize the data they're sitting on. Digital-savvy customers, have certain expectations from companies. For one, customers don't expect to start the same conversation over and over again with their favourite retailer, once they start a conversation from a physical outlet, they expect that when they go online, the retailer recognizes that it is the same person that initiated the correspondence offline and continue from where the correspondence stopped. Putting data to proper use helps to connect with customers in a variety of ways, across multiple devices and channels which will in turn build relationships that go beyond sales with customers thus, delivering a complete end-to-end experience. Brands that fail to keep up with customer expectations and provide these experiences might find themselves struggling for market share and relevance.

The trick here as stated by Steve Gatto of Perficient Digital is to "think of all the data you need – stored data, online data, CRM data, etc. All of this data sits in other repositories, and it's awfully difficult to bring it together, analyze and use the insights to deliver relevancy in the moment," he said. "But if you have cognitive solutions to take in and analyze this data, from an omni-channel perspective, you can understand how customers are engaging with all of your touch points, and maybe even predict some of the things that they need

the next time you engage with them. That's providing relevancy and value to your customers," he added.

Analyzing the data in a personalized

niche videos that would not make economic sense for cable TV because their audience would be too small to support significant advertising revenue or occupy a cable channel time slot.

countries to meet their electricity demands is around 1,000MW per million people. This implies that Nigeria would require about 180,000MW generation of electricity to meet with



manner and understanding that each customer is an individual, not necessarily a member of a demography. Consequently, the historical Business to Customer (B2C) is gradually evolving into Business to Individual (B2I).

Arguably the most vibrant online movie rental service- Netflix is a brand big on cognitive systems, the company estimates its algorithms produce \$1 billion a year in value from customer retention. Like any digital business, Netflix has little time to catch the customer's attention and as such it uses a broad set of data including what each member watches, when they watch, the place on the Netflix screen the customer finds his/her videos, recommendations the customer chose or didn't choose, and the popularity of videos in the catalog. In the end, each customer's Netflix home screen is customized for each customer based on their different movie interests. Netflix, not only saves about \$1 billion a year from cognitive systems, it also helps find an audience for relatively

How can cognitive solution help Nigeria's electricity challenges?

Power generation and supply is one of the key indicators of economic prosperity of a country. It is crucial and unavoidably necessary for both human existence and a nation's development. Nigeria has continued, despite several reported efforts, to struggle with providing just enough electricity for its citizens. The average Nigerian uses 136 KWH per year and on relative basis, this represents about 3% of total power consumed by an average South African and about 5% of that of an average Chinese Citizen per year.

Nigeria aims to generate an excess of 40,000MW of electricity by 2020. From experience however, we can't hold our breath as electricity demand significantly exceeds supply. With an estimated population of over 180 million people, available research has shown that an estimate for developing

her current demands. This is a far cry from the present status of total installed capacity the country possesses as well as the 2020 target of 40,000MW.

So let's say our power holding company - for the sake of this article - is called NEPA. NEPA uses cognitive computing to distribute power. It will have the data of every appliance and energy generating device or machinery in every household, office and industry. From the kilowatts consumed, it can tell exactly how much and at what time energy is consumed by each appliance in every single household, office and factory using cognitive systems.

Imagine how effective NEPA will be if it can redistribute power on a needs basis only. I'll give the example of my household and my office. From 7.30am to 7:00pm, the only appliances that consume power in my house are my fridge and deep freezer while in my office from 6:30am to 8:00pm all lights, computers, air conditioners are powered up. Imagine NEPA becomes

smart enough to only power my fridge and freezer during the time I'm away at work whilst redistributing the excess power from my home (and other households with similar energy needs) to offices and industries who need it from 9am - 5pm. And then supply power to every appliance in households from 5pm to 8am whilst restricting power supply to light bulbs, inverters and security gadgets at my office at

the same time (and every other office with similar energy needs). This will go a long way in assisting small businesses such as barbing and hair dressing salons etc. that need to power their service appliances to attend to their customers till 9-10pm. This will aid the equitable utilization and redistribution of the limited power supply to grow businesses whilst providing adequate power supply for households up until

when we are able to resolve our power generation and supply challenges as a country.

The possibilities of cognitive solutions as a whole is limitless. Imagine a digital world where right after you buy a bag of rice, tomato paste and curry, you receive an e-recipe of how to make Jollof rice! A world where every entity in the future is smart and systems think ■

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Demystifying Blockchain Technology

Ifeanyi Ezugbo-Nwobi and Vivian Ojukwu



Overview

The internet has evolved massively since its inception in the 90's and has become an integral part of our daily lives. Its unique ability of connecting the farthest parts of the world and turning it into a global village has expanded interactions between people irrespective of race, language or geographical affiliations. Despite these successes, the level of trust in trade, especially e-commerce, is yet to attain heights reached by other types of social interactions (like social media and information transfer) boosted by the internet. Online, there are still challenges in the areas of identity management, record keeping and value transfer. Consequently, most successful value transfer transactions between different parties are aided by intermediaries such as Banks, lawyers, brokers etc. The proponents

of blockchain technology seek to solve these problems by providing a platform to guarantee trust, eliminate these intermediaries and act as a fulcrum for efficient value transfer.

Blockchain is an open, digital distributed ledger that can record transactions between parties in an efficient, permanent and verifiable manner. It can be programmed to keep records of virtually anything of value and transfer same from one party to another. Value in this instance could represent money, shares, stocks, property deeds, digital royalty or in the not too distant future electoral votes.

Currently, we rely on intermediaries such as financial institutions, legal professionals as well as central authorities to complete transactions and transfer asset ownership. Blockchain

represents a clear departure from this norm; it seeks to foster a platform where digital records of transactions and events are created and added onto a chain in chronological order and enables participants to verify and authenticate the information directly without 3rd party intermediaries and central authorities. Blockchain technology seeks to build a world where every agreement, process, task, payment and literally anything of value would have a digital record and signature that could be identified, validated, stored and shared.

Blockchain technology has gained enormous popularity over the years and has been lauded to have a significant impact on Information technology (IT) in much the same way that Linux did, becoming a cornerstone in modern application development. The technology, no doubt, has the potential



to do for value what the internet did for information.

Is blockchain a disruptive technology?

There is a general belief that the blockchain concept is a disruptive technology, much like Uber, AirBnB, Facebook, Alibaba, etc, that distorts the competitive landscape by attacking traditional business models with lower-cost technological solutions enabling it to overtake the dominant market players within a relatively short period of time. This article takes the approach that the Blockchain technology is rather more foundational than disruptive. Foundational technologies in addition to enabling the establishment of new business models and markets, allow for the gradual adaptation and development, achieving efficiency and cost effectiveness over time.

Whilst the huge potential of blockchain cannot be contested, there are concerns that it could revolutionize business, redefine economies and de-emphasize government's power in certain industries in the shortest possible time are rather premature. The affordability and acceptability of the blockchain technology is still years (if not decades) away. Taking a cue from the progress of other foundational technological advancement reveals that there would be some hurdles – governance, regulatory, technological and societal – to surmount on its way to becoming wide spread.

How then does blockchain technology work?

Blockchain was first mentioned in a Bitcoin research paper in 2008. It is a chain of connected blocks about transactions. Each Block has a hash¹ of the previous block as well as the timestamp and transactional data. When a block is full or completed with transaction, a new block is created with the same attributes as the previous one. Each member of the network has a copy of the blockchain database and the systems are synchronised at short intervals to ensure that all members of network have the original, updated and correct version of shared database. The process of blockchain functionality is exemplified below:

- Member X consummates a transaction with Member Y through a client
- Blockchain Miners receive an order on the transaction and is added to the mining block²
- The block is mined when one of the miners completes the block faster than others
- The new mined block is added as the latest block in the blockchain and the copy is broadcasted through the network

The security of the blockchain technology has sometimes been, albeit unconsciously, over-estimated by most blockchain experts. Whilst this is not entirely true as no system is unhackerable, it might take more than

an arm and a leg for this technology to be hacked. The way the different blocks are interrelated and arranged makes it arguably the most secure technology today. The reason for this is not far-fetched. To successfully breach the security of the technology, one would need to hack into every single system on the network. Though not an impossible thing to do, it comes across as an extremely difficult task to accomplish without being detected.

Where can blockchain technology be applied?

The proponents of Blockchain technology have received loads of accolades for the ground breaking and widely hyped Bitcoin which promoted a peer to peer version of e-cash that would allow online payments and transfers to be sent directly from one person to another without having to go through a bank or own a bank account. Our fascination at the mere conception of the thought still outweighs the excitement that comes with the huge potential that the concept holds.

Cryptocurrencies (Cryptos) are one of the first applications of the blockchain technology. It is a digital, decentralized medium of exchange whose creation is controlled by cryptography. There have been earlier attempts to create centralized digital currencies which failed but in 2008 the first crypto which was named Bitcoin was created. It was described as a new digital cash system that is decentralized with no central

¹ Hash is the fixed-sized data generated after an arbitrary amount of data is processed using some algorithms.

² Mining of blocks is the process of verifying and recording new transactions on a public ledger of approved ones.



technology is not restricted to financial services alone as it provides a platform for a wide variety of solutions in other industries including supply chain management, Internet of Things (IoT), Healthcare, Fintech, Energy etc. Its applications could range from single use items, low cost substitution to transformative products.

Also blockchain technology could change the way supply chain management is viewed.

Supply chain management could be cumbersome due to payment delays (especially for cross border payments) and additional costs due to activities

of intermediaries such as banks. Blockchain could provide a more efficient system as product information could be stored and shared on a distributed ledger to aid consumers in making decisions. It will also make processes transparent, eliminate intermediaries, simplify the chain and aid financial savings. The transparency and decentralization of information provided by the technology could allow for the improvement of old and development of new services for supply chain consumers.

The democratization of product information would reduce the purchase and consumption of substandard and adulterated products as consumers are equipped with sufficient information to assess the history and suitability of the product.

Smart Contracts has been described as the most transformative application of the blockchain technology. Smart contracts can make payments and other assets as negotiated conditions

are met. This can be likened to a vending machine that will only dispense a candy bar when the correct amount is inserted into the cash slot. Digital proven contracts where the duration and correctness of contractual conditions go automatically, without human interactions would significantly reduce possibility of mistake or fraud. This application could trigger a change in contract handling process. Also, inventory management could be boosted by smart contracts for manufacturers and retailers.

Blockchain technology could also aid the secure and efficient tracking and management of digital identity. As mentioned earlier, personal data could be recorded on a distributed ledger and could provide key information to hospitals, banks, insurance companies, law enforcement and other government agencies. This could help in providing credit ratings, insurance premiums and health records on real time basis. Blockchain based identity management could help government/citizens improve revenue collection, track spending and eradicate ghost workers.

The social and political implications of the blockchain implementation are exciting as it will come in handy for Africa. New forms of communication will be developed, which would enhance freedom of speech and improve government institutions and its personnel. Governmental control could be eliminated, resulting in the democratization of national regimes. Thus, the inequality between people from various continents, cultures and background could be smoothed. Education will be accessible to a lot more people. Consequently, governance and the political institutions will be reformed to be more efficient, accountable, transparent and corrupt-free.

Can you imagine how transparent elections would be if the Blockchain technology is applied to the digital voting process? In Estonia for instance, electoral votes can be cast through a secure online portal. Votes can be cast as many times as possible however, only one will count, thanks to their blockchain-based digital identity management. The voting system also

authority.

Cross Border remittances to and from any country, including Nigeria – which still takes about 1 to 2 days - could be simplified to achieve instant remittance (in minutes) using Blockchain applications. Blockchain based money transfers should significantly lower fees and bypass middle men who take a significant portion of these fees. The challenges surrounding remittances using platforms like MoneyGram, Western Union and SWIFT can be handled efficiently using cryptocurrencies. SureRemit and SureGift are examples of start-ups carrying out remittance service in the region.

There is a misconception that Blockchain and cryptocurrency, especially Bitcoin, means one and the same thing. The truth is that Blockchain is the platform that powers cryptocurrencies (such as Bitcoin, Ether, and Ripples). The most appropriate analogy to explain this will be the email and Internet. Blockchain is to cryptocurrencies what internet is to email. The successes of blockchain

allows vote and result verification only on mobile phones. Results are also encrypted so government officials cannot view how individual votes were cast.

How blockchain technology can help startups/smes

Technological advancement and globalization has given SMEs access to global markets which used to be the forte of big corporations. The challenges facing SMEs are well documented and top on the list is a lack of funding sources as a large percentage of SMEs do not have access to, or qualify for funding from traditional financial institutions. Without funding, SMEs have little or no chance for growth or expansion and the biggest barriers is their credit risk. These challenges have also been compounded by the global financial crises as banks now apply stringent loan assessment criteria before disbursement.

The rise of blockchain technology based lending platform WishFinance and SALT have unlocked cheaper funding prospects for SMEs. Lending

institutions can evaluate SME funding requests based on data stored on the blockchain. Similarly, SMEs are able to make informed decision on their customer's needs and significantly impact their conversion ratios.

SMEs can pay for goods using cryptocurrencies and utilize smart contracts to automate payments and inventory supply. Companies like Slock are using smart contracts to assist its customers in renting items ranging from bicycles, cars to houses. Other areas Blockchain technology can be useful to SMEs include Notary services and digital identity management.

Assessment of the adoption of blockchain technology?

As it is with new technology, two factors will determine its ease of adoption by different ecosystems.

- Novelty of the application: The degree to which it is new to the world. The more its uniqueness, the more effort it will require to ensure that users understand the problem it solves.

- The complexity of the coordination efforts needed to make it workable: The number and diversity of parties that need to work together to produce value.

Blockchain is still a novel process with different levels of complex applications. This ranges from single use and low cost applications (like cryptocurrencies) to transformative products (like smart contracts).

Hence, an easy place to start the blockchain adoption will be by adding cryptocurrencies as a mainstream payment mechanism. The infrastructure and market are already well developed and will force a variety of intermediaries to build blockchain capabilities. Another low risk approach would be for organizations to use blockchain internally for identity and asset management and internal records maintenance. Developing substitute blockchain applications would require careful planning, as existing solutions may be difficult to dislodge. One way to go may be to focus on replacements that would not require end users to change their behavior but present alternatives to existing business models ■

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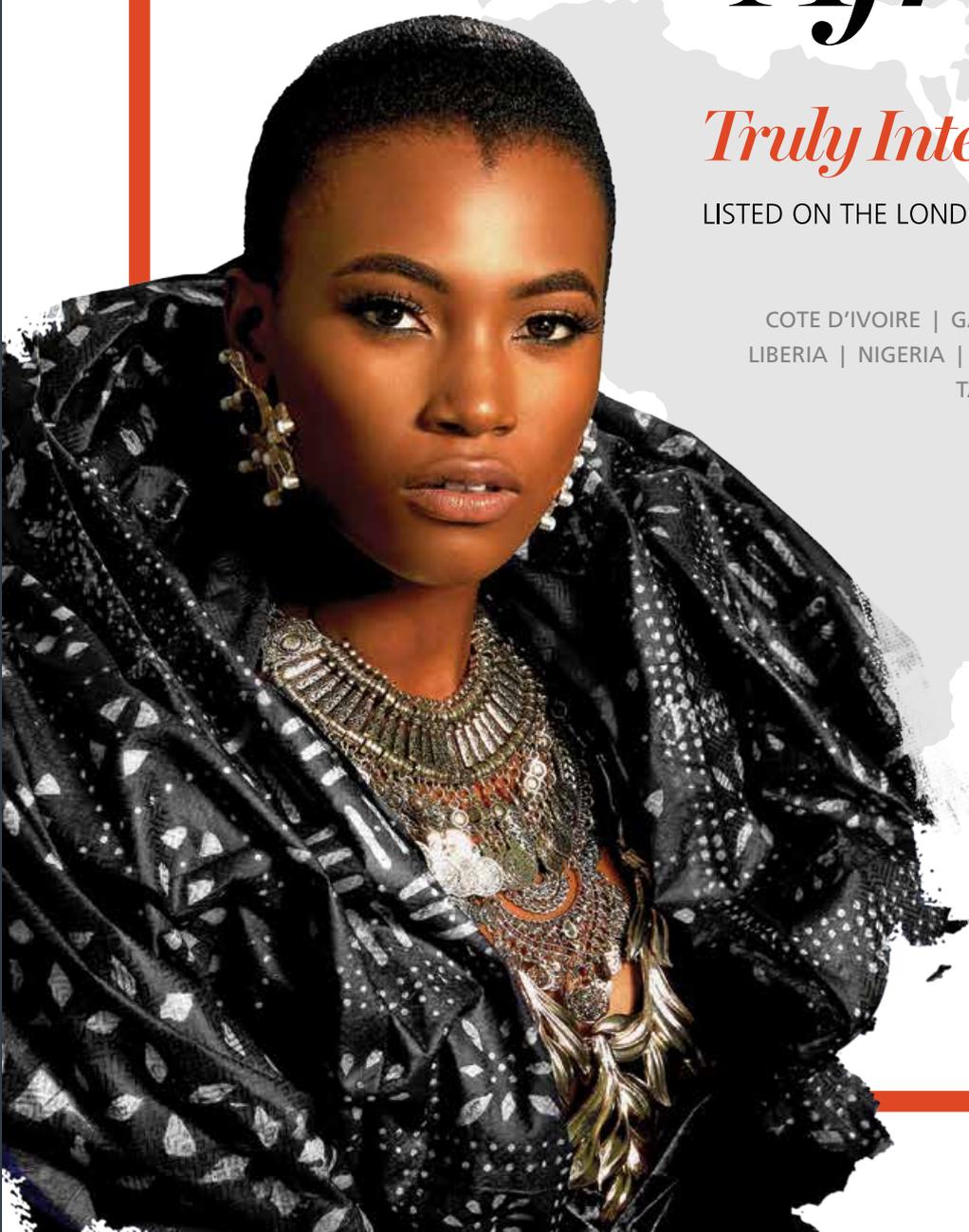
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