Unleashing

The Power Of Data

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Abstract

Everyday, our lives are changing, and technology is at the heart of this change, driving all spheres of the economy and impacting access to basic life-enhancing services like healthcare, education, banking, agriculture etc. Like Asia, America and Europe; Africa is on the brink of a technological revolution with emerging technologies like 5G, AI, Blockchain, Internet of Things (IoT), etc paving the way. One of the key drivers of this revolution is Data. It is critical to Africa's economic growth and has become a new form of capital in the global economy. The continent's increasing connectivity and data generation, presents a unique opportunity to accelerate development, provided that adequate infrastructure, knowledge, entrepreneurship, capital, innovation and policies are in place. This study evaluates the role of data in unlocking Africa's potential. It will examine the challenges and opportunities the continent needs to scale its economic prosperity.

Introduction

The digital landscape in Africa is evolving rapidly. It is fueled by expanding mobile networks, rising smartphone usage, and the proliferation of internet services. There are over 160 million Africans that gained broadband internet access between 2019 and 2022, with a 115% increase in internet users in sub-Saharan Africa from 2016 to 2021 (The World Bank, 2024). In fact, taking Nigeria for example, there are over 161.9 million internet subscribers in Nigeria with a broadband penetration rate of 42.3%(Nigeria Communications Commission, 2024). These numbers show how far Africa has come in terms of how the hunger and quest for data continues to drive growth across its economic marketplace especially as smartphones usage continues to grow.

According to Adeyi (2023), Nigeria has one of the largest smartphone markets in Africa, growing at a high speed, with market penetration estimated to reach 66% by 2025. This growth is also synonymous in South Africa, where MccRocklin (2021) reveals that phones are now in the pockets of 95% of South Africans, with 91% being smartphones. It is one of the highest percentages seen in most sub-Saharan African countries. The increasing use of smart phones and other mobile devices have increased the need for Data-driven initiatives in every aspect of our lives. It is evident that this digital transformation is accompanied by a surge in data production from diverse sources such as social media, mobile transactions, sensors, and satellites. Harnessing this data holds immense promise for gaining insights into consumer behaviour, trends in healthcare, communication patterns, agricultural advancements, environmental changes, and many more.

Data plays a very big role in Africa in the following ways:

It provides opportunities for advancement: The effective utilisation of data can significantly bolster economic development across Africa. In fact, Mwaya (2022) stated that data is critical in achieving economic growth, increasing competition and bringing innovation. She reveals that according to a 2019 OECD report, public and private sector data sharing and access can contribute between 1- 2.5% to a nation's GDP. Using data to make decisions and develop strategies in business can optimize revenue, reduce cost and advance

growth in business. Through data analytics and artificial intelligence, businesses can optimise operations, devise targeted marketing strategies, and unearth new market opportunities. Moreover, data-driven decision-making has the potential to enhance productivity in sectors ranging from agriculture and manufacturing to healthcare and finance, driving sustainable growth and increasing talent pool.

- **It helps to address challenges in the society:** Powerfool tools like deploying data analytics, can address pressing societal challenges in Africa. It can help to provide insights into healthcare delivery, education quality, poverty reduction, and infrastructure development. By so doing, governments and organisations can improve healthcare outcomes, personalise educational approaches, target poverty alleviation efforts, and optimise infrastructure planning and management. Governments are coming to terms with the strategic relevance of big data in policy formulation, public service delivery and providing panaceas to issues affecting their polity. They are integrating data in smart city initiatives, managing public health and providing real-time data in disaster and emergency situations (Adeleye et al, 2024). This is helping in strategic decision making, encouraging efficiency and productivity and helping to societal challenges.

- **It stands as a transformative force that can propel Africa towards sustainable development and prosperity:** Investments in data infrastructure, skillsets, and supportive policies, can help African nations harness the full potential of data to drive innovation, economic growth, and societal progress. To pave way for a data-powered future in Africa, the public and private sector must collaborate with the academia to bring a balanced approach and help build a symbiotic value chain that will promote the growth of businesses, research and strong data policy frameworks to guide data governance in the continent.

Africa's journey towards sustainable development hinges on its ability to harness the transformative power of data-driven strategies. With a population surpassing 1.3 billion and a burgeoning consumer market, the continent stands at the cusp of unprecedented economic and social progress (Mwaya, 2022). Leveraging data not only unlocks avenues for innovation but also offers insights crucial for targeted interventions.

Traditional metrics like GDP often overlook the vibrant informal sector, leading to an inaccurate portrayal of Africa's economic landscape. By contrast, data-driven approaches provide a nuanced understanding of production dynamics, consumption trends, and overall economic vitality, thereby facilitating more informed investment decisions both domestically and internationally.

Moreover, data analytics unveil the nuanced needs of diverse communities across Africa, enabling policymakers to craft tailored interventions. For instance, by mapping regions grappling with malnutrition or inadequate healthcare access, governments can allocate resources more effectively, fostering inclusive development.

A lot of national governments have devised data-driven approaches in several sectors of their economy to achieve phenomenal results. Senegal for example partnered with the National Aeronautics and Space Administration (NASA) to map farms, collect and use comprehensive agriculture statistics and incorporate satelite data to improve the productivity of the agricultural sector. Its Finance Minister had stated that "Senegal considers investment in data as important as investment in other infrastructure such as roads", while unveiling the government's plans to prioritize data and technology in fostering its sustainable economic growth agenda.

Similarly, Ghana had outlined its comprehensive plan to improve national identification as key aspects of service delivery. The government had announced that its birth certificate will be a prerequisite for securing a national identity card and will further grant citizens access to healthcare, education and employment faster. Its Minister of Planning

had stated that "Often without data, you will get policies wrong. If the data is poor, you make poor decisions" (Sabiti, 2017).

Beyond informing policy, data analysis empowers businesses to refine marketing strategies and optimize supply chains, thus driving efficiency and competitiveness in African markets (Adewusi, et al., 2024). This data-driven approach is particularly pertinent in sectors like agriculture, where innovative solutions can bolster productivity, reduce waste, and promote sustainability.

Embracing data-driven development holds the key to Africa's socioeconomic advancement. By bridging knowledge gaps, identifying localised needs, promoting sustainability, and fueling business growth, data-driven strategies pave the way for inclusive prosperity (Ibitoye, 2023). Governments and private sector stakeholders must prioritize investments in data collection, processing, and analysis to unlock the continent's vast potential and steer Africa toward a future of shared prosperity and sustainable development.

Specific Areas or Sectors in Africa Where Data-Driven Approaches Have Shown Promising Results

Across various sectors of the economy in Africa have witnessed the transformative impact of data-driven approaches, leading to promising outcomes. Data-driven approaches have been deployed in some of these key sectors with impactful results.

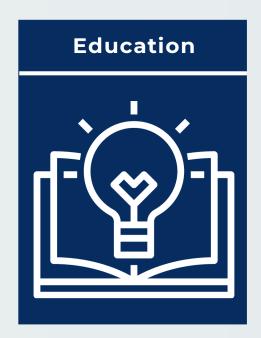Below are how some of these key areas have fared while deployed with data-driven approaches:

Healthcare

Nations like **Ghana**, **Rwanda**, and **South Africa** have embraced data-driven solutions to enhance healthcare accessibility and monitor disease outbreaks, resulting in more efficient health systems and improved public health outcomes. According to Mutuku (2020), IBM Lab in South Africa has been developing an algorithm that identifies genes that cause cancer cells to spread in African patients. They have also partnered with the WHO for modelled

data to predict better incidences of malaria and help the South African government to control the spread of Malaria using climate data.

Agriculture

Countries such as **Kenya**, **Nigeria**, and **Ethiopia** have leveraged remote sensing technology and advanced weather forecasting models to optimize crop yields and revolutionise farming practices, thereby boosting agricultural productivity and food security (Arthur et al, 2024). **Uganda** is a typical example of one of eight countries that is using threshing technologies (ASI and NARO Lightweight Rice threshers) to reduce post-harvest grain loss from 4.87% to

0.01% and saving up to $12 million and up to 59% of threshing labour (UNCTAD, 2017). The opportunities in deploying data-driven approaches in Agriculture is a gold mine for Africa.

Education

Through data analytics, many African nations are identifying shortcomings within their education systems and implementing targeted interventions to enhance student performance, ultimately paving the way for a more educated and skilled workforce. Vijil-Morin, et al. (2023) have shown how African countries are using Geospatial data to make decisions on where to build schools, place teachers, and allocate resources required for granular geospatial data in

conjunction with various school data and other attributes like actual distances travelled to schools, school conditions (like access to water and electricity) and school proximity to basic facilities. Malawi is using Geographic Information Systems (GIS) to track implementation of a coaching intervention to ensure adequate and equitable coverage (Vijil-Morin, et al., 2023).

The advent of ride-hailing platforms like Uber and Taxify has underscored the importance of real-time location tracking for efficient transportation services in urban centres across Africa, improving mobility and accessibility for commuters (Arthur et al, 2024). Inf fact, these service providers have even adapted to the business climates in African countries they are present like Nigeria, introducing specially-crafted products like dispatch using Motorbikes popularly known as

Transportation

"Okada" to request for Items to be picked up and dropped off at any location using their apps with real-time location tracking and monitoring.

There is a widespread adoption of data-driven approaches across various sectors of the economy in Africa. These approaches are yielding tangible benefits, from improved healthcare and agriculture outcomes to enhanced financial inclusion and educational sophistication, as well as disaster preparedness. As these technologies evolve, they hold the promise of fostering sustainable development and prosperity across Africa.

Challenges and Opportunities in Data Collection, Management, and Analysis in the African context

Africa's journey towards leveraging data-driven solutions is marked by a blend of opportunities and challenges. The continent's rich diversity and complex socio-economic landscape, highlights the critical importance of adeptly managing data collection, organisation, and analysis. Despite the promise of data-driven development, challenges like inadequate data infrastructure, limited access to technology and digital skills, concerns about data privacy and security, and regulatory complexities continue to pose a threat to Africa's potential.

According to Shaffer, et al. (2018) there are challenges associated with developing and sustaining a Data Collection and Management System (DCMS) due to limitations in infrastructure, resources, trained personnel and other critical challenges. This is why, it has become important to underscore these challenges and illuminate the promising avenues and opportunities that can be explored to boost Africa's potential in data.

Some of these challenges include:

- **Infrastructure Limitations:** This is one of the major challenges affecting the transformative power of Data in Africa. Substantial parts of Africa grapple with inadequate infrastructure, characterised by unreliable power supply and limited internet connectivity. These deficiencies pose significant obstacles to the seamless collection and transmission of data, particularly in remote and rural areas. There are a lot of vandalisations and theft of telecom infrastructure, making it difficult to close the infrastructure gap that exist in the country. Recently, there was an internet outage as a result of damage to international undersea cables like West Africa Cable System (WACS), the Africa Coast to Europe (ACE), MainOne and SAT3 cables, near Abidjan Akintaro, (2024). This vandalisation caused significant downtime in West and Southern Africa, making it difficult for people to access banking services, telecom services and other network services.

- **Data Integrity Concerns:** Inconsistencies in data quality are prevalent in Africa, stemming from outdated collection methods, incomplete records, and a lack of standardisation, which continues to be a serious challenge in the Telecom and IT industry. Such disparities in data quality undermine the credibility and accuracy of analytical endeavours, thereby impeding informed decision-making processes. Using the Nigerian healthcare system, Tijani et al (2021) stated that the completeness and accuracy of data poses a huge challenge to strengthening service delivery as studies have shown that data quality and data integrity remains a huge challenge in Nigeria.

- **Shortage of Tech Talents:** A scarcity of skilled professionals proficient in data collection, management, and analysis plagues Africa. This is a serious issue in countries like Nigeria where its teeming youth population have developed this "Japa" syndrome and leaving the country in search of greener pastures for one reason or

the other. This has left Nigeria with shortage of Tech talents and brain drain, as those who have the skills are leaving the country. Liu (2023) revealed that the UK Government had reported the number of Nigerians who had been granted study visa to the UK, to have increased by 500% in the past 2 years, and it looks towards countries like Nigeria for its talent pools to refill skilled positions in its labour market. This leaves a huge gap in Nigeria as our tech talent pool begins to reduce daily.

- **Access to Capital and Investments:** Little or no access to Capital poses a formidable barrier to the establishment of robust data collection and management frameworks in Africa. Restricted financial resources impede investments in technological infrastructure, staff training, and advanced data analytical tools, thereby constraining the scalability and sustainability of data-centric projects. With tightened monetary policies from Central Banks across Africa and the unstable economic climates in the continents, it is difficult to access loans to invest in the infrastructure, data analytic tools and train and hire the tech talents needed to bridge this gap.

- **Data Privacy and Cybersecurity:** This is a serious problem affecting all spheres of the economy. The financial sector for example are faced with this challenge daily as their networks are vulnerable to cyber attacks (data breaches), with governance issues affecting how they collect and manage data from their stakeholders. Insufficient safeguards for personal data expose individuals and entities to risks like identity theft and data breaches, eroding trust in data-driven initiatives. Organisations do not even know how to handle data in line with the Data Privacy laws and regulation.

Just like there are critical challenges affecting Africa's potential, these challenges also present opportunities for Africa to transform its potential and unleash the power of the data. The fourth industrial revolution is already here, and since Africa could not participate in the first, second and even third, now is the time to participate in the fourth industrial revolution with the opportunities below:

- **Enhancing technological advancements:** Despite challenges, Africa has witnessed remarkable technological progress fueled by the

proliferation of mobile connectivity and digital innovation (Adeyi, 2023). Leveraging emerging technologies such as cloud computing, artificial intelligence, and the Internet of Things (IoT) offers avenues to surmount infrastructural impediments and encourage capabilities in data collection and analysis.

- **Building collaborations and partnerships:** Collaborative initiatives involving the public sector, private enterprises, academia, and civil society organisations. facilitate knowledge exchange, resource sharing, and capacity enhancement. Strategic partnerships enable access to expertise, funding, and technological solutions, fostering innovation and longevity in data-driven initiatives.

- **Encouraging open data initiatives:** Embracing open data initiatives fosters transparency, accountability, and accessibility of data resources throughout Africa.

By making datasets freely available to the public, governments and organisations empower citizens, researchers, and entrepreneurs to harness data for societal, economic, and civic purposes, thereby stimulating innovation and informed decision-making. Last year Meta launched the Large Language Model AI (LlaMa 2) to encourage researchers, policy makers and scholars to have open access to information and use it freely in a more ethical and responsible fashion. Organisations like Liquid Intelligent Technologies partnered with Meta on the launch of this initiative (Meta, 2023).

- **Tailor-made localised solutions:** Africa's diverse socio-economic and environmental milieu necessitates tailor-made solutions for data collection, management, and analysis. Prioritising indigenous knowledge, cultural sensitivities, and community engagement facilitates the development of context-specific approaches that effectively address the continent's multifaceted challenges. Uzuegbu (2019) found out that rural dwellers who received tailor-made information literacy provisions participated more in a sustainable development target than their colleagues who depended solely on the existing information communication systems accessible to them. Access to financial services had been a challenge for people in Nigeria especially in remote areas. However, Babalola et al (2024) reported that microfinance banks are playing a vital role in encouraging financial inclusion even for the most marginalised people in the society, giving them access to financial services.

Moniepoint and Opay are some of the leading Microfinance banks helping rural dwellers, young people and even SMEs perform financial transactions easily.

- **Evidence-based policymaking:** Embracing evidence-based policy making equips African governments with the tools to craft targeted interventions, allocate resources efficiently, and monitor progress effectively. Integrating data-driven insights into policymaking processes enables policymakers to tackle pressing socio-economic issues, spur inclusive growth, and enhance governance outcomes across the continent.

Africa is at a pivotal juncture in unleashing the transformative potential of data to promote sustainable development and tackle prevalent challenges. While formidable hurdles persist, including infrastructural deficiencies, data integrity concerns, and skills shortages; there exists a wealth of opportunities for technological innovation, collaborative synergy, and evidence-based governance.

By surmounting these challenges and seizing the available opportunities, Africa can unlock the full potential of data to foster economic prosperity, empower communities, and pave the way towards a brighter future for its inhabitants.

Strategies to enhance Data Literacy, Capacity Building, and Data-Driven Decision Making in Africa

Enhancing data literacy, building capacity for data-driven approaches, and promoting informed decision-making are essential steps towards leveraging the potential of data in Africa. This actionable strategies will do well to strengthen data literacy, foster capacity building, and drive the adoption of data-driven decision-making practices across the continent.

In his strategic vision for the Nigeria Federal Ministry of Communications, Innovation and Digital Economy, Tijani (2023) disclosed the vision to achieve 95% digital literacy by 2030 as a critical pillar for a digitally inclusive nation. He also revealed the plan to achieve 70% of digital literacy by 2027 using a multifaceted approach that hinges on a robust educational programme, improved digital infrastructure and universal access to digital resources, as they are critical to fostering the growth of the citizens, which is the foundation for a successful economy. This same approach is instrumental in enhancing data literacy in Africa. Below are those strategies to enhance data literacy in Africa:

- Deploying improved educational reforms: Integrating data literacy courses into educational curricula at all levels, from primary to tertiary education, ensures that future generations are equipped with essential data analysis skills to navigate the increasingly data-driven landscape effectively. In fact, the educational curricula across Africa specifically in Nigeria needs to be updated as most courses are long outdated. Emerging technologies are changing how we learn and what we learn and we need to include these technologies into our school programmes and courses. Till date, universities are still offering "Introduction to Computer" as a course when almost every university student owns and operate a Smartphone and are doing a lot on it. Partnering with the Academia will help develop better educational reforms for schools from Primary to Tertiary level. Fund research on courses like Data collection, management and analysis and the likes, include it into the school curriculum and let students be taught.

Implement data training initiatives: Implementing targeted training

programs for professionals across diverse sectors provides them with the necessary competencies in data concepts, tools, and techniques, fostering a culture of data literacy and proficiency. Similar to the school curriculums, tailor-made trainings on data collection, management and analysis should be designed for professionals so they are equipped with the knowledge, tools and regulations in data handling and sharing.

- Create public awareness campaigns on data privacy and literacy: Deploying public awareness campaigns to highlight the significance of data privacy and literacy and how it affects the lives of citizens is paramount to empowering citizens and helping them to make informed decisions when dealing with data. Important events like Data Privacy Week should be treated with great importance. The public and private sector should collaborate to sensitize the public and their employees about data privacy, which is an area most organisations are not even aware of.

While data literacy is very important and should be treated as a critical emergency, building capacity for data-driven approaches is very key to transforming Africa's potential. Below are some of these strategies in building capacity:

- Investing in Infrastructure: Investing in critical infrastructure is essential in building a sustainable strong digital economy. Allocating resources to enhance technological infrastructure, such as broadband connectivity and data storage facilities, strengthens the capacity for data collection, management, and analysis, laying a robust foundation for data-driven innovation. Investment in infrastructure will give increased broadband penetration, achieve efficient spectrum management, build sustainable digital public infrastructure and optimize communication satellites (Tijani, 2023).

Establishing skills development programmes to increase Talent Pool (Knowledge): Establishing specialised training programmes, workshops, and certification courses tailored to the needs of different sectors, fosters a skilled workforce proficient in data collection, analysis, and interpretation, driving organisational and societal readiness for data-driven approaches. Akintaro (2023) revealed that

the Federal Government of Nigeria signed a N1 billion deal with Africa's largest telecom infrastructure company, IHS to build learning communities across the country for the 3 Million Technical Talent (3MTT) it launched in 2023. The initiative is to help accelerate the growth of Nigeria as a global technical talent hub, deepen Nigeria's global position in research in key technology areas and increase digital literacy in the country (Tijani, 2023).

Data-driven decision making in Africa is needed when building capacity. There is a need to:

- **Integrate into policy processes (Policy):** Embedding data-driven decision-making principles into policymaking processes ensures that policy interventions are evidence-based, targeted, and responsive to the evolving needs of communities, leading to more effective and sustainable outcomes.
- **Encourage data sharing and open access:** Encouraging data sharing and open access to datasets promotes transparency, accountability, and collaboration; enabling stakeholders to leverage data for informed decision-making, innovation, and research across sectors and disciplines.
- **Provide incentives in data Use:** Providing incentives, such as grants, awards, and recognition, for organisations and individuals that demonstrate exemplary use of data in decision-making incentivises the adoption of data-driven approaches, fostering a culture of innovation and continuous improvement. There is a need to encourage the use of data-driven approaches to promote economic prosperity.

By prioritising data literacy, capacity building, and data-driven decision-making, Africa can unlock new pathways for economic growth, social development, and innovation. Through collaborative partnerships, investment in education and infrastructure, and the integration of data-driven principles into policymaking processes, the continent can harness the transformative power of data to address its complex challenges and create a more sustainable future for its citizens.

Recommendations for financing data initiatives and establishing sustainable data ecosystems

Securing adequate funding and establishing a sustainable data ecosystem is crucial for advancing data initiatives. It can also harness the transformative potential of data in Africa. With the challenges and opportunities abound, the following are recommendations and best practices to ensure financial stability and long-term sustainability for data-driven projects across the continent:

- Policymakers must prioritise the establishment of robust data governance frameworks that balance innovation with privacy protection. A robust regulatory framework instills confidence, attracts investment, and protects individuals' rights within the data ecosystem.
- Emphasize the importance of data sovereignty and local control over data assets to prevent exploitation and foster inclusive economic growth. Implement frameworks for data localisation, protection, and equitable access.
- Investments in digital infrastructure including broadband connectivity and data centres, are essential to ensure widespread access to data resources. Encourage Public Private Partnerships (PPP) to fund data-driven initiatives like innovation hubs and infrastructure investment.
- Educational initiatives should focus on building data literacy and technical skills to empower the workforce for the data-driven economy.
- Engage Development Finance Institutions (DFIs) to access concessional financing, technical support, and risk mitigation tools for data projects.
- Promote open data initiatives, facilitate data sharing agreements, and establish collaborative platforms to facilitate knowledge exchange, interoperability, and innovation. A culture of collaboration strengthens the data ecosystem and amplifies the impact of data-driven solutions.

Conclusion

By adopting the recommendations above, African nations can overcome financial barriers, access quality healthcare, drive innovation, gather the right skills and establish a sustainable data ecosystem conducive to economic expansion and social progress. Through strategic partnerships, innovative financing mechanisms, capacity building initiatives, and effective governance structures, Africa can unlock the full potential of data to address its pressing challenges and unlock new opportunities especially as the fourth industrial revolution is already present with us. Collaboration and commitment from stakeholders across sectors are essential for building a data-driven future for the continent.

Getting the right policy framework is essential to Africa's economic growth and development. Itt is the duty and obligation of all stakeholders to promote data literacy, data privacy, data collection, management and analysis if Africa utilises its vast potentials for its growth.

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