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Developing AI Talent for the Nigerian Public Service:

The Role of NITDA/NCAIR

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Contact: contact@techhiveadvisory.org.ng

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Contact: policy@ikigaination.org

Contributors

Akin Agunbiade

Sandra Musa

Tolulope Ogundele

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Executive Summary

In November 2020, the National Information Technology Development Agency (NITDA) set up a subsidiary known as the National Centre for Artificial Intelligence & Robotics (NCAIR) to spearhead government-led initiatives in AI and robotics. This report presents the authors' thoughts on how NITDA/NCAIR can support Nigeria in recruiting, retaining, and retraining AI talent for the public sector. It also establishes that Nigeria suffers from a senior-level emerging talent shortage, affecting its ability to effectively regulate emerging technologies or adapt them for public service delivery.

Doing so will require the government to adopt an entrepreneurial and competitive approach toward workforce development, which can be replicated across other aspects of the public service where there is a talent shortage. It will involve a mix of strategies, ranging from higher wages, studying the recruitment and compensation structures obtainable in the tech sector, supporting regulatory technology (regtech) startups, and more.

Under the extant NITDA Act and the proposed amendment bill to this Act, NITDA is well-positioned to implement some of these strategies through committees that may be tasked with interacting with workers in technology-focused enterprises. The findings of such committees can inform the NITDA Board on how to develop comparable in-house structures and the right work environment for attracting tech talent.

NITDA could also go the route of organising hackathons where participants build solutions for the public service, and the best solutions get seed funding. To ensure these solutions gain traction, NITDA can facilitate their adoption by the relevant Ministry, Department, or Agency (MDA). Doing this annually is sure to encourage an organic interest in regtech solutions.

Nigeria struggles with poorly managed and disparate repositories of citizen data, which the National Bureau of Statistics (NBS) has drawn attention to. Ideally, government agencies should use the NBS-approved methodology in data collection and then warehouse such data with the NBS. However, this can be rectified with a detailed data management strategy, encouraging data scientists and analysts to consider government employment.

Nigeria can also adapt to what has worked elsewhere by setting up a Nigerian Global Talent route, similar to the UK Global Talent route, which allows highly skilled professionals a unique visa route to work in the UK. By doing so and matching it with the right incentives, Nigeria will be able to gain access to a global pool of senior-level emerging tech professionals, which we currently lack.

This proposal is not to say that those already working for the government should be neglected while efforts are made to recruit external talent. Civil servants are the low-hanging fruits of any AI capacity-building plan. In line with the National Digital Economy Policy & Strategy (NDEPS) and the proposed data management strategy, they can be trained to use data to make better decisions.

NITDA has also issued the Strategic Roadmap Action Plan (SRAP) 2021–2024, which supports the development of a framework to build the digital capacity of federal public servants. SRAP also states that NITDA will offer virtual and nano internships. These internships can be set up with the NCAIR and linked to the Nigerian Global Talent visa beneficiaries to ensure a trickle-down learning framework.

The ripple effects of adopting strategies may be far-reaching. The authors envisage the possibility of government data analysts and machine learning experts developing robo-advisers to support quicker decision-making and faster response time. Public opinion about policies and laws in development can also be quickly sourced in real-time using sentiment analysis.

Generally, this report presents the authors' thoughts on how the Nigerian government can rapidly upskill the public service in the field of AI and the benefits of doing so. As the adoption of AI and other emerging technologies accelerates in Nigeria, the country needs a new cadre of public servants and regulators who have an innate understanding of these technologies. All that is needed is for the government to take the first step and act.

Introduction

In November 2020, the National Information Technology Development Agency (NITDA) set up a special purpose vehicle/subsidiary known as the National Centre for Artificial Intelligence & Robotics (NCAIR) to spearhead government-led initiatives in the AI and robotics space.[1] Although setting up the NCAIR is a commendable initiative, its capacity to deliver on its mandate may be limited by a lack of adequate AI talent in the Nigerian public service.

There are numerous use cases for AI applications in the public sector, including revenue generation, feedback processes, and public opinion monitoring, among others. However, as AI adoption accelerates in Nigeria, the need for supportive regulation that mitigates its risks while fostering continued investment is vital. Achieving AI adoption in public services alongside supportive regulations requires that all relevant agencies of government be staffed with qualified personnel.

The lack of qualified tech talent in the public service may be attributed to factors, ranging from lower pay, risk aversion in government, and red tape, among others.[2] As a result, Nigeria may not be able to compete favourably with other nations in relation to the development of AI, if we lack the internal capacity to interpret the technology for ourselves.

This report presents the authors' opinion on how Nigeria can recruit, retrain, and retain the AI talent needed in the public service through NITDA/NCAIR.

Recruiting, Retaining, and Retraining AI Talent

Recruiting, retaining, and retraining (the three Rs, 3Rs) AI talent for the Nigerian public service will require the government to adopt an entrepreneurial and competitive approach toward workforce development. If successful, this method can easily be replicated in other aspects of the public service where a talent shortage is evident.

The 3Rs will involve a mix of strategies, such as:

- Higher wages, equivalent to or at least close to the private sector wages;
- A study of the recruitment and compensation structures in the tech ecosystem;
- Supporting regulatory technology (regtech) startups;
- Increasing access to data or better data documentation policies;
- A Nigerian Global Talent route;
- NCAIR Fellowships; and
- Retraining of government officials.

These strategies are discussed under the following headings:

1. Better Compensation

Regarding better compensation, the question is "who pays better?" The answer is important for some tech talents, as it determines where they apply to work or aspire to work. To remedy the issue of compensation, the NITDA Bill 2021 provides an outlet. Section 12(2) of the Bill empowers the Board, in collaboration with the National Salaries, Incomes, and Wages Commission, to *'determine the terms and conditions, remuneration, allowances, and benefits of staff' concerning:*

a. the need to attract and retain quality and high calibre manpower for the Agency

b. specialised nature of work to be performed by the Agency: and

c. the salaries paid in similar government agencies to persons with equivalent responsibilities, expertise, and skills.'

The above provision is an addition to the powers under the Bill, as the existing NITDA Act of 2007 does not give the Board any power over wages or compensation for staff. Consequently, the only powers the Board currently has over staff are to *'appoint, promote, terminate, dismiss, and exercise disciplinary control'.*

The Bill proposes to give the Board power to determine wages for all staff, bearing in mind the need to retain a high-quality workforce. In addition, the drafters of the Bill are aware of the rapid changes in the Nigerian tech ecosystem and the need for NITDA to effectively play its role as the leading tech regulator.

The civil service' current restrictive and hierarchical approach may still repel most tech talent, even if the compensation is comparable to the private sector. To remedy this, NITDA may need to collect data about service and compensation structure conditions in the Nigerian tech ecosystem.

The First Schedule of the NITDA Bill 2021 empowers the Board to appoint *'standing or ad hoc committees as it thinks fit to consider and report on any matter with which the Board is concerned.'*

The Board can appoint a committee to conduct the fieldwork, which would involve, but is not limited to, the following:

- interacting with workers in tech startups and technology-focused companies.
- conducting surveys on perspectives about working for the government.
- reviewing employment contracts of selected companies and startups, subject to a non-disclosure agreement.

The findings that result from this work can inform the Board on a comparable salary structure, building the right work environment, and developing conditions of service that allow employees to take ownership of their work within the general framework of public service rules.

In line with this, some provisions in the Public Service Rules 2009 may have to be varied to recruit talent into NITDA because of their restrictive nature. In addition, these rules can be stepped down where they conflict with specific terms approved by the federal government, written into contracts of employment or letters of appointment.[3] Some of these rules are:

- Qualification for the recruitment exam requiring a minimum of an honours degree or higher national diploma, not below upper credit.[4]
- Restriction on public servants from engaging in any other business or receiving commission or profits while in government service,[5] holding more than one full paid job,[6] or engaging in private practice. [7]
- Restriction from acting as editor, taking part directly or indirectly in the management, contributing financially or writing for any newspaper, magazine, or journal without the express permission of their supervising officer.[8] This rule could be easily considered micromanagement by an increasingly vocal tech workforce, used to freedom of expression and being able to speak publicly about their projects.
- Low capital benefits when travelling by air, land, or sea at government expense. The current insurance covers are - Staff (N2,000), Wife of staff (N1,000), child of staff (N1,000), non-official (N1,000), and NYSC (N1,000). [9]

2. Supporting Regulatory technology (Regtech) Startups

Regulatory technology, or regtech, refers to a spectrum of software applications that help businesses achieve regulatory compliance.[10]

Apart from offering higher wages and relaxing employment restrictions, NITDA should support startups that build regtech products. Considering the financial technology (fintech) interest in the Nigerian tech ecosystem, the government's open interest in regtech products will help shift innovators' and investors' attention towards this fallow space. Moreover, as activity heats up in this space, interest in government employment is likely to pick up, if nothing else, to gain an insider's perspective of the current public administration challenges and how to build commercial solutions around them.

To achieve this, NITDA could organise regtech hackathons where participants build solutions for the public service. Winners would get seed funding, while NITDA would facilitate the adoption of the solution by the relevant Ministry, Department, or Agency (MDA), to guarantee a revenue stream for the team/company behind the solution. Moreover, doing this year after year would support organic interest in regtech solutions outside the confines of the hackathon.

NITDA has an open track record in this through the annual NITDA Hackathon. This hackathon is held across geopolitical zones and targeted at academic institutions and the student population. Each edition has a theme, this year's being agriculture, security, and logistics.[11]

Based on examples of operational regtech products in other countries, here are some examples of solutions that NITDA could encourage regtech innovators to build for:[12]

- a single sign-on digital identity system (Singapore's SingPass www.singpass.gov.sg);
- a virtual labour market for job seekers (Germany's Bundesagentur fur Arbeit www.arbeitsagentur.de);
- an e-procurement system centralising all procurement systems across the MDAs (Korea's KONEPS www.pps.go.kr);
- an electronic public record system for digital versions of citizens' documents (Norway's Offentlig Elektroiisk Postjournal www.oep.no);
- a virtual assistant for responding to citizen enquiries (US Department of Homeland Security's Emma www.uscis.gov/emma); and
- a one-stop portal for accessing all government services (www.services.gov.ng proposed under the National Digital Economy Policy & Strategy). [13]

Interestingly, startups in Nigeria have already built products similar to those above,[14] although they are consumer-facing. They could develop similar solutions or modify their current offerings to have government-facing features with the right incentive.

3. Increased Access to Data

Though disparately and poorly managed, large repositories of citizen data lie with the government.[16] A detailed data management strategy is likely to have ripple effects that support an interest in government employment. For instance, at a World Bank event on May 19th, 2022, the Director of ICT at the National Bureau of Statistics (NBS), complained about the siloed approach to collecting data in Nigeria. He stated that, in line with the Statistics Act, government agencies are supposed to use the appropriate methodology in data collection, which will then be warehoused with the NBS. However, many agencies have failed to share their data with NBS. He gave the example of the National Identity Management Commission (NIMC) whose data, if available, would reduce the cost of conducting surveys for the NBS. [17]

However, in 2016, the Presidency issued a directive to all data collecting agencies for all data to be domiciled with NIMC which would aggregate the data into a single data bank.[18] The open disagreement between the two major data collecting agencies would suggest that there has not been much progress made since 2016, and there is still a lack of consensus on which agency should warehouse all data in Nigeria.

This situation could be remedied by introducing a national data strategy. Countries that have introduced similar policies are the USA and Australia. The American Federal Data Strategy directs agencies to improve their data and model inventory documentation, to support discovery and usability. In doing so, access to data is prioritised to support AI research, development, and testing.

The Federal Data Strategy also incorporates rules that encourage the responsible use of AI by introducing safety, security, privacy, and confidentiality protections.[19] Also, the Australian Data Strategy sets standards for the safe and transparent sharing of public sector data, further articulated in the Data Availability and Transparency Bill 2020.[20] In the same vein, a Nigerian national data strategy could provide implementation frameworks for agencies to improve their data documentation while referencing the Nigerian Data Protection Regulation (NDPR) 2019 for personal data protection standards.

Notwithstanding, a national data strategy with mandates that cut across several government agencies may not achieve its full potential if it is not backed by political will and a genuine commitment to follow through.

4. A Nigerian Global Talent Route

The idea of a Nigerian Global Talent route is inspired by the UK Global Talent route, which provides highly skilled professionals with a visa route to work in the UK. In developing the UK Global Talent route, the plan was to endorse applicants from the scientific and research community through UK Research & Innovation (UKRI). Priority postings for beneficiaries of the UK Global Talent route are higher educational institutions, research institutes, and public sector research establishments.[21]

In proposing a Nigerian Global Talent route, the idea is not to portray that Nigeria suffers from a lack of talent, but rather to admit that while Nigeria has talent,[22] we lack senior-level emerging tech professionals. Proof of this may be found in the recently issued Executive Order 5, restricting visa issuance to foreign professionals, except those with skills lacking in Nigeria.[23] Thus, working with the Ministry of Interior and the Nigerian Immigration Service (NIS), the Nigerian Global Talent visa will be managed by the NITDA, who will endorse applicants, subject to verifying with the list maintained by the National Office for Technology Acquisition and Promotion (NOTAP), that the applicant does not possess a skill already well-represented in the Nigerian labour market.[24] It will be restricted to high-level experts, not just in AI but in other fields where Nigeria lacks adequate expertise. The focus will be to staff higher institutions, research institutes, and public sector research establishments, just like in the UK.

Drawing from the UK's experience,[25] foreign professionals can be rotated across different agencies and institutions, giving them room to be more creative; easier access to the wider employment market, after their Global Talent visa may have expired.

With a Nigerian Global Talent route, younger Nigerians looking to work with foreign experts may be further incentivised to work with the government whilst acquiring the advanced skills needed for their career progression. However, it must be conceded that in the absence of wider reforms and better funding of the public institutions to be served, a Nigerian Global Talent visa and attached incentives may be dead on arrival.

5. NCAIR Fellowships

NCAIR Fellowships will be a subset of the previous proposal but within the AI space. The fellowships will be tiered into senior and junior fellowships in this space. The senior fellows would be the foreign experts, while the junior fellows would be young Nigerians. This would enable junior fellows to work with senior fellows, and engage in cutting-edge research in aspects of AI and machine learning under the umbrella of the NCAIR in collaboration with international agencies.

The end goal of these fellowships, which can be modelled after the Turing AI Fellowships, managed by the United Kingdom Research and Innovation (UKRI),[26] could be the following:

- accelerating the careers of high potential Nigerian researchers towards occupying global positions in and outside Nigeria at the end of their fellowship.
- recruiting and retaining world-class researchers towards establishing centres of excellence in AI research.
- support Nigeria in building a critical mass in AI research.

Even where young Nigerians do not stay in government employment after completing their fellowships, the platform given by the fellowship will portray NITDA/NCAIR as supportive of tech careers. In addition, it will encourage direct recruitment efforts for the Agency.

6. Capacity building and retraining government officials

As efforts are being made to encourage and create opportunities for young Nigerians to select careers in the public sector, those already in government employment should not be neglected. They represent the low hanging fruits in any AI capacity building plan. They are already aware of government processes and possess the necessary qualifications. There is a need to upskill current staff and bring them up to par with the demands of shaping policy and supporting innovation in emerging technologies. For instance, the National Digital Economy Policy & Strategy (NDEPS), under its 4th pillar (Service Infrastructure), supports the training of relevant government officials on how to use data to make better decisions. This ties into the previous proposal under "Increased Access to Data" and could constitute one of the proposals under a National Data Strategy.

According to the Nigerian National Development Plan (NNDP) 2021–2025 report, from 2017 to 2020, the government trained over 40,000 workers to improve service delivery in the public sector and introduced performance reviews for culture and skills development evaluation. In addition, over 35,000 workers were trained in computers and over 9,000 civil servants in other capacity-building areas in the same period. This training proves that a comprehensive retraining program for civil servants in aspects of AI and data science relating to their work is achievable over the next three to four years if prioritised. [27]

The NNDP also offers guidance on how a retraining program can be implemented. It calls for adequate funding for MDAs to ensure good governance. For instance, if one of our objectives in deploying AI is to improve public service delivery; training opportunities should first be offered to those MDAs that play a more critical role in ensuring good governance. They are listed in the NNDP as follows: [29]

- Revenue Mobilisation, Allocation and Fiscal Commission (RMAFC);
- Code of Conduct Bureau (CCB);
- Code of Conduct Tribunal (CCT);
- Federal Character Commission (FCC);
- Federal Civil Service Commission (FCCC);
- Federal Ministry of Justice (FMoJ);
- Independent Corrupt Practices and Related Offences Commission (ICPC);
- National Salaries, Incomes and Wages Commission (NSWC);
- Fiscal Responsibility Commission (FRC);
- Office of the Secretary to the Government of the Federation, Special Duties and Intergovernmental Affairs (OSGF);
- Office of the Head of the Civil Service of the Federation (OHCSF);
- Auditor-General of the Federation;
- The Presidency; and
- Similar MDAs at the state level.

Also, NITDA can implement the proposed training program according to its Strategic Roadmap Action Plan (SRAP) 2021–2024. One of the initiatives under this plan is to develop a framework for the digital capacity building of federal public servants. The objective is to create a globally competitive human capital pool to drive digital transformation in the public sector. [29]

7. Virtual and Nano Internship with NCAIR

This internship is another initiative provided through SRAP 2021–2024. The objective is to prepare students for future engagement with the NCAIR[30] and be linked with the NCAIR Fellowships earlier proposed. Interns could shadow the senior and junior fellows, by supporting their research and learning. This way, a trickle-down learning framework can be built, where the senior fellows provide guidance to junior fellows, and both cadres of fellows support interns who may still be in school or just out of school.

Linking the 'How' to the 'Why'

So far, this report has presented ideas on how the Nigerian government, through NITDA, can recruit the tech talent needed to internally innovate approaches to public service delivery and intelligently regulate the Nigerian tech ecosystem. Most of these approaches are indirect techniques based on the recognition that the problem with recruitment cannot be solved by simply making money available, but by changing how people view the government and the government's stance towards innovation.

These ideas, if adopted, can help build an organic interest in working for and with NITDA. These ideas are the 'how' of supporting recruiting, retaining, and retraining AI talent for the Nigerian public sector. The 'Why', or the benefits of working with the ideas presented above, should also be explored. The benefits include:

- Robo-advisory for supporting policymakers
- Online public opinion scraping
- Supporting tax compliance
- Creating new future government roles (auditors etc.); and
- Supporting implementation of Pillar 4

The Benefits of Recruiting, Retaining, and Retraining AI Talent

1. Robo-advisory support for decision-making

Building on the ideas described above, NITDA should after a few years be able to recruit a cadre of data analytics and machine learning experts who can access government datasets to build knowledge-based systems (KBS) that underlie Robo-advisory support. The KBS could be a rule-based or case-based reasoning system depending on the specific domain. A rule-based KBS would be built on domain knowledge and offer pre-defined answers based on queries. On the other hand, case-based KBS would offer more dynamic responses based on prior case experiences.

With these robo-advisers, government officials could respond faster to queries and make quicker decisions. In addition, they would be equipped with intelligent tools for sifting through historical data of previous similar instances, precedents, and regulatory instruments.

2. Online public opinion scraping for policy-making and review

Another benefit of having in-house data analytics and machine learning experts in public agencies is the possibility of collecting data regarding people's opinions about issues. By scraping comments on social media, citizens' honest perspectives can be discerned, on a wider scale, compared to surveys, which may not be able to capture a broad base and may not always supply honest answers. This approach is known as sentiment analysis. With sentiment analysis, public opinion about the impact of laws and regulations can be collected to inform the reviews of laws, policies, and reactions to new societal developments.

3. Promoting tax compliance

Using data on taxpayer history, the FIRS and State Internal Revenue Services can discern future trends in taxpayer behaviour. These insights can inform a review of tax laws and filing procedures to encourage tax compliance and revenue collection for the national and subnational governments.

4. Creating new government roles

Where the plans to gradually digitise governance in Nigeria under the Nigeria E-Government Masterplan are implemented alongside the ideas presented above, new risks may be created due to putting data at the centre of governance. Therefore, new roles will have to be created to effectively manage these risks that are unlike any faced today by creating new employment and training opportunities. A good example of the new roles created is an algorithm auditor, who would work with data science teams to ensure that underlying datasets are privacy-preserving. As a result, the algorithms built on them are transparent, fair, and explainable. In addition, they could play this role concerning internal-facing tools of the government and the private sector by testing similar tools and certifying them as safe for use, following defined standards.

The work of an algorithm auditor will typically involve periodic reviews to determine the fairness of a model after it has been deployed, checking for black-box issues, algorithmic bias, privacy protection measures, and unlawful discrimination. Beyond identifying the issues, these auditors would offer recommendations on how models can be more ethical and explainable. They could also work with regulators and judicial authorities where such algorithms have become the subject of dispute or litigation.

5. Supporting implementation of Service Infrastructure

Implementing these ideas will also support the actualisation of the 4th Pillar of the NDEPS – Service Infrastructure. The components of this pillar include an E-government masterplan, Government digital services, Nigerian e-government Interoperability Framework (Ne-GIF), Nigerian Government Enterprise Architecture (NGEA) and E-commerce platforms.

Conclusion

This report provides innovative methods on how the Nigerian government can rapidly build AI talent in the public service and the potential benefits the Government may derive. However, to leverage these ideas, the regulators must have an innate understanding of AI and how it can be deployed to deliver public services. It is evident that most of the proposed ideas in this report are low-hanging fruits that coincide with current government policies and laws, which shows that Nigeria is well-positioned to contribute to the development of AI globally. All that is left is for the Government to act.

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