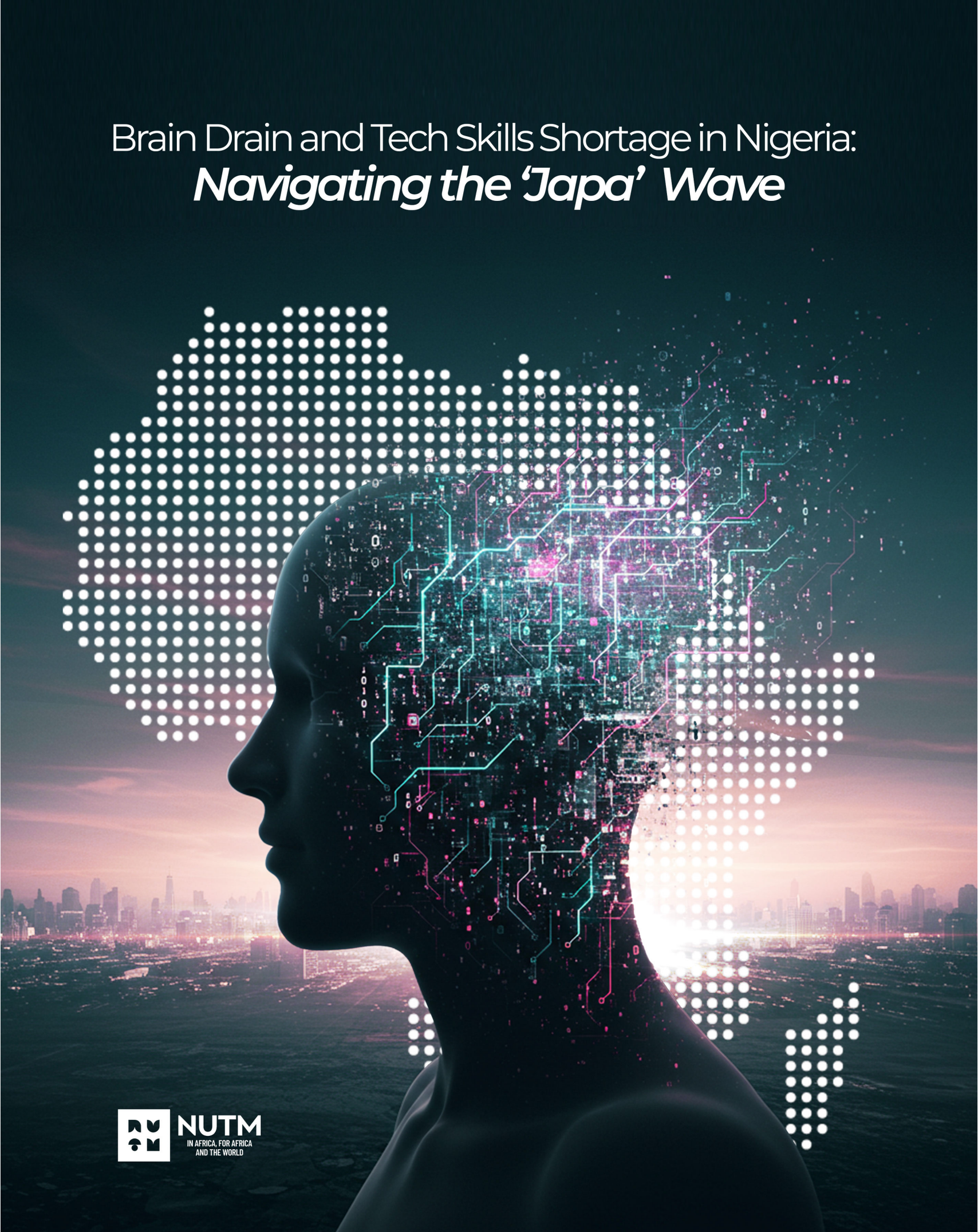
Brain Drain and Tech Skills Shortage in Nigeria:
Navigating the 'Japa' Wave



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Executive Summary

Nigeria has been facing an increased exodus of Tech professionals at alarming rates, a trend that has intensified in the post–COVID-19 period. Many CEOs and business leaders highlight the crippling impact of this sudden exodus on existing operations, business continuity, and future growth. This research by the Nigerian University of Technology and Management (NUTM) addresses the critical challenge of brain drain and tech skills shortage confronting Nigeria. The significant gap between the demand for certain specialized technology-related skills and the locally available supply of qualified professionals has been further widened by the rapid digitalization of most sectors. This study explores the multifaceted drivers and consequences of the talent gap. Beyond the key macro-drivers of economic instability, inadequate infrastructure and wage differentials, the rapid talent migration (known as *"japa"* syndrome) of skilled professionals in domains such as software engineering, data science, and IT product management, *amongst others,* represents a significant long-term threat to Nigeria's ambition of becoming a leading digital economy.

Furthermore, the mass exit of these experienced Tech professionals who play key roles in the innovation ecosystem diminishes the very resource that drives technological and economic advancement.

This study documents the outcomes of a multi-stakeholder survey completed by over 130 companies in the organized private sector in Nigeria, and over 170 individuals of Nigerian origin resident across five continents.

Personal interviews were also held with CEOs and Chief Technology Officers of some of the largest tech companies.

Our analysis reveals the profound impact of this talent migration on the domestic technology ecosystem and national innovation. In addition, a deep dive into previous interventions to remedy Tech skills shortages in Nigeria reveals gaps that need to be addressed, as well as the learnings to be implemented.

The research study moves beyond issue-identification to proffer a robust framework of both policy and industry-level solutions designed to mitigate the 'Japa' trend and transform the Nigerian tech skills landscape.

On the policy front, we recommend a series of strategic interventions: developing a comprehensive technology manpower database to enable industry-relevant, demand-driven training, providing targeted tax incentives and grants for local tech hubs, and implementing more strategic public-private partnerships beyond tactical training programs.

Furthermore, the Federal Government's approach to building a new generation of Tech Talent must be more coordinated and programmatic with joint ownership by both the Federal Ministries of Education and Communication, Innovation & Digital Economy.

Industry experts surveyed for this study are aligned such that Nigeria must invest in a reformed educational system that emphasizes practical, industry-relevant training from a young age, concurrently with any short-term initiatives to fix tech talent shortages. Acknowledging existing Tech Talent initiatives such as the 3MTT, as well as the Federal Government's bold curriculum redesign in basic and technical education announced in August 2025 as "a *comprehensive shift to make education relevant, inclusive, and transformative*"[1] this report recommends a systematic overhaul beyond superficial policy changes and education budgets. The shift from Nigeria's legacy education models to a more agile, skills-focused approach must be programmatic.

At the university level, there is an imperative for increased specialisation into frontier technologies such as artificial intelligence. The current practice of over-reliance and outsourcing tech talent training to ad-hoc training providers, interventionist donors, and venture-capital-funded organizations is considered grossly ineffective and unsustainable.

For the industry, enhanced collaboration between private sector stakeholders is required. Learnings from leading Nigerian organizations in Tech talent retention indicate their key success factors beyond globally competitive, localized compensation packages: tailored talent selection approaches, fostering a humane culture of professional growth, and active mentorship for the new workforce.

The imperative of talent pipeline management becoming a joint responsibility of both CIOs/CTOs and company human resource management in the emerging workforce model is clearly articulated as critical for establishing a sustainable and de-risked IT talent pipeline.

Leading practices from selected countries/markets for strengthening industry-vocational-university linkages are adapted to craft a workable/practical model for Nigeria, given the concurrent legislative arrangements for education in Nigeria.

Overall, the 'Japa' wave, while a significant challenge to Nigeria's economy and to private sector companies, presents a unique, urgent opportunity for a coordinated national response to developing the Tech workforce of tomorrow. The timing also favours the emergence of a world-class BPO industry in Nigeria powered by Nigerian talent. By simultaneously addressing systemic policy failures and adopting forward-looking industry practices, Nigeria can retain many of its brightest Tech talents while positioning itself as a global and emerging market leader in the digital economy.

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[1] *BusinessDay (2025) Nigeria's education reform: Local models leading a 21st-century skills revolution https://businessday.ng/features/article/nigerias-education-reform-local-models-leading-a-21st-century-skills-revolution/*

1. INTRODUCTION

1.1 Context-Setting

Globally, technology skills leverage is a key determinant of business competitiveness and economic performance. For business leaders and policymakers alike, the case of Nigeria presents a paradox: a nation of immense potential talent simultaneously experiencing a profound and accelerating erosion of its most valuable digitally equipped resource. The "Japa" wave —a term that has become shorthand for the mass exodus of Nigeria's highly skilled professionals— is not merely a social phenomenon but a critical market failure and a strategic policy challenge.

This talent drain is most acutely felt in the technology sector, where it threatens to undermine the very foundation of the nation's digital economy and its ambition to lead on the African continent. Worse still, the Tech skills challenge is fast becoming a cross-sector binding constraint and potential limiting factor to Nigeria's overall economic growth objectives. Beyond the ICT sector, across most industries from agriculture to education to solar energy systems, the dearth of skilled talent to develop innovative, home-grown solutions to address Nigeria's peculiar challenges creates a vicious cycle of spending scarce foreign exchange to procure foreign solutions that may not be fit-for-purpose.

Introduction

Recent studies such as the SAP Africa report[2] on tech skills scarcity indicate that most Nigerian companies indicate being negatively impacted by tech skills availability. Other studies qualify this shortage as a "scarcity of senior tech talent"[3] with mismatches in specific technology domains. This paper examines the complex dynamics of the tech skills shortage in Nigeria, situating it within the broader context of the "Japa" phenomenon. We move beyond the general discourse on economic instability and inadequate infrastructure to identify and analyse the specific, systemic challenges that perpetuate the tech skills shortage.

Sections 1 and 2 of this study provide an overview of the tech skills challenge and a review of the literature, respectively. Section 3 discusses the survey and data-gathering approach. Section 4 synthesises the empirical data from a survey of business leaders and Chief Technology Officers across Nigeria with qualitative insights from selected interviews to understand industry perspectives on the scale and consequences of Nigeria's IT talent shortage. This section also provides a basis for the recommendations in Section 5. The concluding Section 5 articulates the strategic policy interventions recommended for both government and private sector stakeholders with concrete, actionable steps. The objective is to chart a new course, one that re-frames "Japa" not as an irreversible loss, but as a complex challenge that, if navigated correctly, could lead to a more resilient and globally integrated Nigerian technology sector.

1.2 Overview of Nigeria's Technology Sector

The Tech industry is one of the fastest-growing and largest contributors to the Nigerian economy. With exponential growth in employment [4] and a similar increase in GDP contribution from 10.9% to 17.3% [5] , ICT consistently ranks as one of the top [4] industries in Nigeria. The country's capital also hosts one of the fastest-growing tech hubs globally, ranked by pace of ecosystem development, innovation, and digital expansion. [7]

Beyond its direct contribution to economic growth and employment in Nigeria, the industry has also provided platforms to enable the rapid development of most industries and the emergence of new ones such as e-commerce. Today, some of the largest companies in Nigeria by market capitalization or valuation such as MTN as well as the largest taxpayers are ICT companies. Indeed, Nigeria's tech industry is a significant leader in Africa, known for its innovation, entrepreneurship, and strong fintech sector. [8]

The country boasts of one- third of Africa's fintech market, and its commercial capital of Lagos is also the leading African city ranked in the Global Top 100 Startup Ecosystems.[9] The ubiquity of digital technologies and the companies that power these technologies is evident in most cities of the country with the highest smartphone connections in Sub-Saharan Africa. [10]

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[2] SAP Africa. (2023). Africa's tech skills scarcity revealed. Market Research Project: Tech skills availability. Available at https://news.sap.com/africa/2023/03/sap-research-reveals-top-tech-skills-challenges-for-african-organisations/

NITDA ([2023]). IT Talent Gap Assessment in Nigeria. pp. [22-23] https://nitda.gov-.ng/wp-content/uploads/[2023]/[01]/IT-Talent-Gap-Research-Summaries-copy-[1].pdf

However, severe challenges remain. Beneath the headline news of rapid growth, high revenues, profitability, and digital adoption lies a sustainability challenge: a chronic skills shortage, skills mismatch, and huge talent turnover

The overall changes in Nigeria's economy and the emergence of new sectors are putting further pressure on skilled tech talent. Estimates from a World Bank country study [11] suggest the country would require over 28 million workers trained in digital skills across various sectors by 2030, and the requirements for skilled technology professionals run deeper. The issues are complex and multi-dimensional. While brain drain and technology skills shortages are key concerns in many emerging markets, Nigeria faces additional peculiarities.

First, the supply of skilled tech talent from both the tertiary institutions and vocational training has persistently remained below industry demand over several decades. Second, significant currency devaluation and cost-of-living or macroeconomic pressures have contributed to increased mobility across employers and geographies (the brain drain or *'Japa'* syndrome) towards higher-paying countries and companies. The emigration of senior tech talent has further created a vacuum in local mentorship. This has compounded retention problems for local companies. Third, the emergence of new sectors and new skill domains exacerbates the lingering skills mismatch, leading to increased training, retraining and outsourcing costs for employers who continue to invest in upskilling talent with no guarantees of reaping the benefits. Fourth, the emergence of new technologies and new technology delivery models such as co-bot driven intelligent operations in leading sectors such as telecoms and banking is redefining the "market" for technology skills while deepening the risk of a "hollowed-out" tech market.

Fifth, the cumulative deficits in IT skills create a tendency towards pricing distortions, concentration of top-tier talent in limited sectors, and a widening of the acknowledged 'digital divide' in Nigeria that limits digital penetration outside urban centres.

According to NITDA, the government's agency responsible for IT development, which conducts periodic IT skills gap assessments in Nigeria, there is an urgent need to move from the current interventionist approach to a systemic approach to address the underlying structural challenges with IT skills adequacy.

This report adopts the recommended broader approach to addressing the systemic challenges with IT skills adequacy and retention in Nigeria.

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[4] https://www.vanguardngr.com/2022/07/data-reveals-computer-science-as-most-sought-after-course-in-nigerian-varsities/#google_vignette

[5] https://microdata.nigerianstat.gov.ng/index.php/catalog/147/download/1157/Q4_2024_GDP_Report.pdf
https://guardian.ng/business-services/business/telecoms-sub-sector-leads-as-ict-contributes-17-7-to-gdp/#google_vignette

[6] According to NBS, Telecommunications and Information Services, was the second-largest contributor to nominal GDP (10.29%) and also showed strong real growth of 7.40%.

[7] https://dealroom.co/tech-ecosystem-index-2025 ;
https://businessday.ng/news/article/3-african-cities-among-worlds-fastest-growing-tech-hubs/#google_vignette

[8] World Bank/ Dahlia Khalifa 'How Nigeria can leverage the rise of fintech for economic progress'
Dahlia Khalifa, April 04, 2024.
https://blogs.worldbank.org/en/psd/how-nigeria-can-leverage-the-rise-of-fintech-for-economic-progre

[9] https://www.business-sweden.com/insights/articles/new-opportunities-in-nigerias-booming-tech-industry/

[10] https://www.statista.com/statistics/467187/forecast-of-smartphone-users-in-nigeria/

[11] World Bank/ IFC (2021) Demand for Digital Skills in Sub-Saharan Africa Key Findings from a Five-Country Study: Côte d'Ivoire, Kenya, Mozambique, Nigeria, and Rwanda 2021
https://documents[1].worldbank.org/curated/en/099614312152318607/pdf/IDU0b36e9e030767f0417e0afb806e2ffdf1e8bf.pdf

1.2 Overview of Nigeria's Digital Tech Sector

The Digital Technology Sector, for the purposes of this report, covers both the digital industry and the ICT industry. Based on the definitions used by many multilateral organisations such as the World Bank, United Nations agencies and many national statistical offices across the globe, the digital industry leverages ICT infrastructure for the creation, development, and delivery of digital products and services. On the other hand, the ICT sector provides the underlying infrastructure and technology enabling digital activities.[13] The digital industry is considered a subset within the broader digital technology sector, which includes both the digital industry and the ICT sector. Essentially, the digital industry leverages to create new products, services, and business models.

For the purposes of this study, the Digital Industry refers to the companies and activities that directly create and provide digital technologies, services, and solutions.

The ICT Sector refers to the broader set of technologies, including hardware, software, and telecommunications, that enable digital communications and information processing.

This encompasses internet infrastructure and mobile networks, and other activities within the ICT industry as defined by Nigeria's National Bureau of Statistics. Core manufacturing technologies and other specialised technologies and skillsets that are required only in narrow sub-industries such as avionics or medical imaging, hence of limited transferability across sectors, are outside the core focus of this study and excluded.

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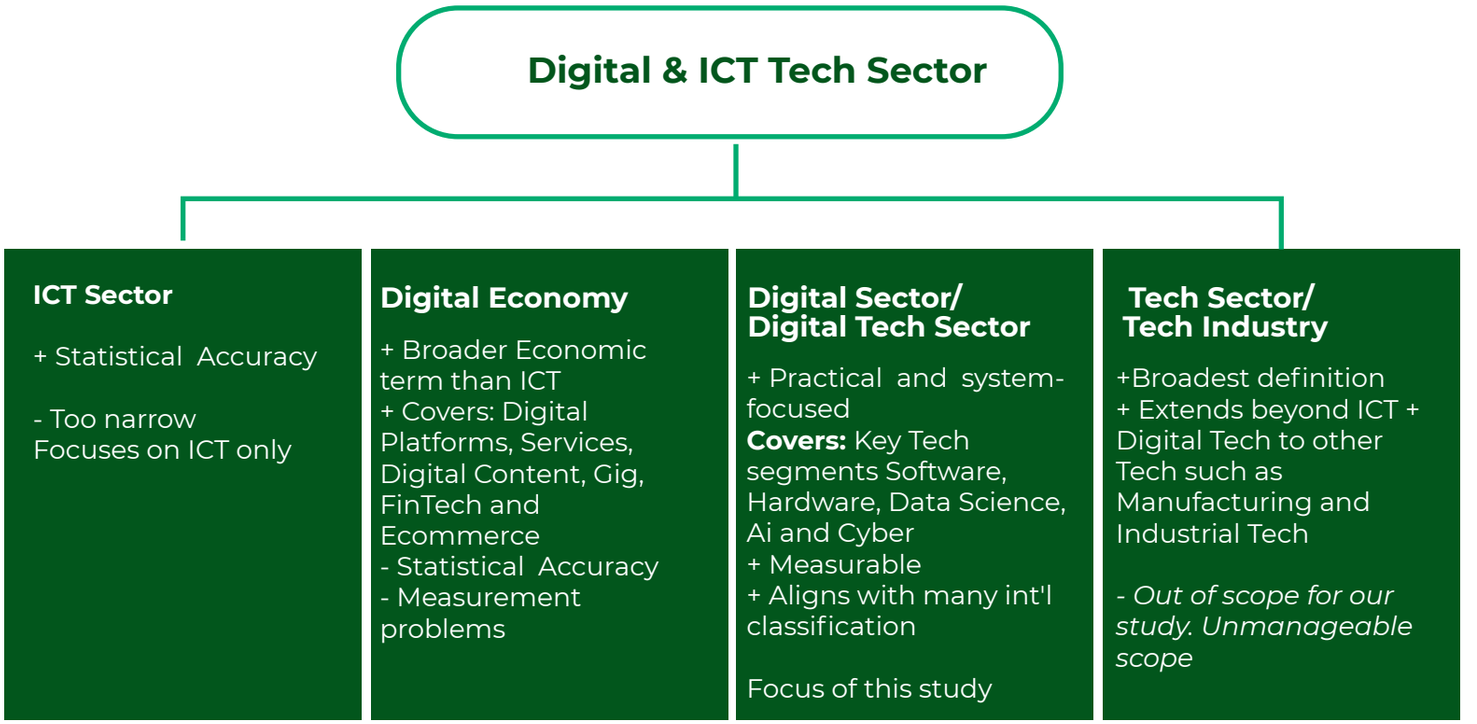
[12]Nigerian Information Technology and Development Agency (2023). https://nitda.gov.ng/wp-content/uploads/2023/01/ITTalent-Gap-Research-Summaries-copy-1.pdf

[13]UK Office of National Statistics (2015). What Defines the Digital Sector? What-defines-the-Digital-Sector.pdf

Figure [1] below summarises the four main terms or terminologies used in Nigeria when discussing the digital and technology sectors. Due to the potential overlaps between some of these terms and their subtle similarities to non-Tech professionals, this study focuses on the digital technology sector.



Note: + sign refers to pros of using the definition. – sign refers to cons
Fig 1: The Digital and ICT Sector in Nigeria

1.3 Classification of Tech Talent in Nigeria

Similar to what applies globally, there is no single, common methodology for defining and classifying technology skills in Nigeria. Though Nigeria's National Information Technology Development Agency (NITDA) has developed a digital literacy and digital skills agenda[14] framework, this framework is not primarily targeted to skilled IT professionals. For skilled IT professionals, most industry stakeholders and organizations in Nigeria use either of three approaches: ISCO skills classification for ICT professionals, European e-competence framework for ICT professionals, and industry-wide professional certifications. This third method of using professional certifications in combination with project portfolios, and number of years of post-certification experience is a common way employers assess the skills level of IT professionals in Nigeria.

Policy-makers in government, on the other hand, use a combination of the International Labour Organization's ISCO[15] and the European e-competence framework. Using ILO's International Standard Classification of Occupations (ISCO) occupational classifications, this study would cover the specific job groups in ICT:

- 133-ICT Service Managers
- 251-ICT professionals: Software and Applications Developers and Analysts,
- 252- Database and Network Professionals.

In addition, all the job groupings in the digital classification would be covered.
This study uses the terms skills and occupation as defined by the International Labour Organization (ILO)." *Skill* is defined as the ability to carry out the tasks and duties of a given job, while *Skill level* is defined as a function of the complexity and range of tasks and duties to be performed in an occupation. [16]

Similarly, the use of the phrase "Tech ecosystem" in this report aligns with the ILO's concept of ecosystems and the use of the "ecosystems approach" to identify the most pressing constraints to productivity growth in a specific sector with respect to decent job creation.

[14] NITDA (2023) National Digital Literacy Framework. https://nitda.gov.ng/wp-content/uploads/2023/07/Digital-Literacy-Framework.pdf

[15] International Labour Organization (ILO) 2015. International Standard Classification of Occupations: Concepts and Definitions https://ilostat.ilo.org/methods/concepts-and-definitions/classification-occupation/

[16] International Labour Organization (ILO) 2015. International Standard Classification of Occupations: Concepts and Definitions https://ilostat.ilo.org/methods/concepts-and-definitions/classification-occupation/

[17] International Labour Organization (ILO) 2025. Productivity Ecosystems for Decent Work. https://www.ilo.org/projects-and-partnerships/projects/productivity-ecosystems-decent-work#:~:text=The%20programme%20enables%20Governments%2C%20Employers,wider%20economy%20as%20a%20whole. Retrieved Aug 14 2025 at 14:11pm

[18] Alayande, F. (2025) Understanding Shifts in Africa's FinTech Industry (Unpublished manuscript)

[17] Figure 2 below provides a high-level graphical summary of the key stakeholder groups in Nigeria's digital technology ecosystem.

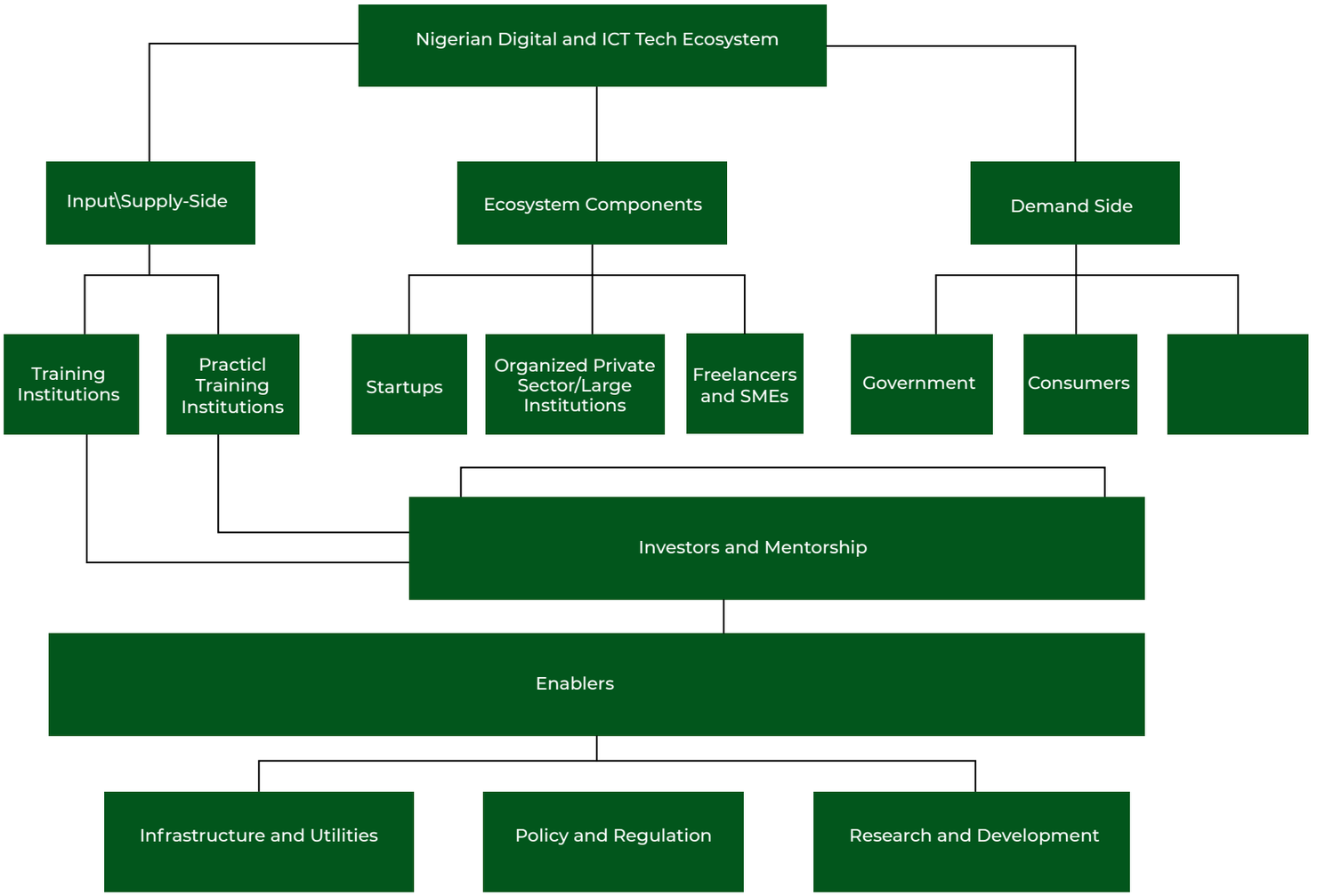
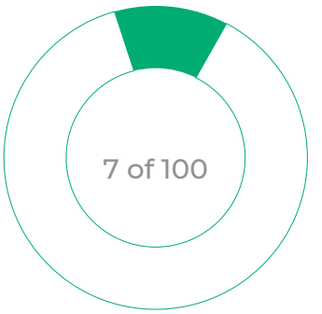


Fig 2: The Nigerian Digital and ICT Tech Ecosystem

1.4 Current Status: Technology Skills and Pipeline of ICT Professionals in Nigeria

Accurate data on the aggregate number of skilled technology professionals in Nigeria is scarce. This is due partly to the increasing prevalence of many private sector trainers and coding bootcamps that may not be officially accredited, as well as lags in the release of official statistics from the relevant regulatory and industry bodies in Nigeria. However, available data on the talent pipeline indicates a pool of entry-level professionals coming onstream in the next three to five years. Official data on full-time students studying computer science and IT-related courses in Nigerian universities indicate that about 7% of all enrolled university students in Nigeria are studying for a bachelors' degree in either computer science, computer engineering, or information technology. **Indeed, as a validation of the interest and perceived market demand for IT professionals, the B. Sc degree in Computer Science has the highest full-time enrolment of any degree program in Nigerian universities from 2019 till date.** Nigeria also produces over 10,000 graduates per annum in computer science.[19] Despite concerns about industry relevance and employability of some graduates, general estimates and industry feedback indicate that about one-quarter of the computer science and IT graduates are from rated private universities or established public universities with programs that enable credible industry internships.

Effectively, an additional 2,500 entry-level computer science and IT graduates with basic industry-relevant IT skills are available, ready to enter the IT labour market in Nigeria annually.



% of students in Nigeria's universities majoring in computer science, computer engineering and information technology courses

other graduates from polytechnics and technical colleges regulated by Nigeria's National Board of Technical Education (NBTE). Effective 2024, the approved curriculum of the NBTE has also phased out the legacy HND Computer Science program and replaced it with four options in Artificial Intelligence, Networking and Cloud Computing, Software and Web Development, and Cybersecurity and Data Protection. The active partnership of many of these Technical and Vocational Educational (TVET) institutions with IT academies such as the Cisco Academy in Nigeria is providing a platform for many of the students to concurrently prepare for globally-recognised entry-level information technology certifications such as the CCNA.

Despite the increasing growth of private sector academies and software bootcamps in Nigeria from 2014 to date, thereby increasing the pipeline of potential IT professionals beyond the regulated universities and

[19] Nigerian Universities Commission (2019). Nigerian University System Statistical Digest https://nuc.edu.ng/wp-content/uploads/2021/07/2019-NIGERIAN-UNIVERSITY-SYSTEM-STATISTICAL-DIGEST-CONDENSED-VERSION-FINAL-2_compressed.pdf
** Available information as of 2019. While the NUC's website mentions a "2023 NUS Statistical Digest Data Collection" for universities, this refers to the data gathering process itself, not the final published digest for public access

polytechnics, there is still a strong linkage between the accredited institutions and ad-hoc bootcamps in Nigeria's Tech ecosystem. For instance, for some of the larger IT talent training companies, over half of their enrollees or participants have previously completed a four-year degree in computer science or engineering. [20] These private sector academies and bootcamps provide six-month training programs often complement the accredited institutions by providing further industry-relevant training and certifications.

Since 2023, the Federal Government has also embarked on ambitious programs such as the 3 Million Technical Talent program (3MTT) aimed at building Nigeria's technical talent backbone to power the digital economy and position Nigeria as a net talent exporter.[21] Similarly, many state governments working with international development organizations and private sector partners run various initiatives to equip potential IT professionals with industry-relevant skills. However, a number of these initiatives are relatively in their infancy or have limited data available for impact assessment to enable an objective validation of their distinct contributions to the aggregate ICT sector or the macroeconomy.

Industry stakeholders nonetheless recognise the increasing importance of the informal ecosystem in Nigeria. This informal learning ecosystem for IT is an organic response to fill the significant gaps left by the traditional university system to meet the soaring demand for tech skills. Operating as a vibrant, decentralised platforms, communities, and individuals, their value proposition is their relative accessibility to the larger population. Beyond the software bootcamps and training academies, which are perhaps the most structured part of the informal ecosystem, popularised by Andela and then by others such as Decagon Institute, Semicolon Africa, and Anchorsoft Academy, other fully online course providers enable self-taught professionals to learn at their own pace in preparation for industry certifications.

However, the informal ecosystem also has its challenges. Beyond the gap in soft skills such as communication, collaboration, and critical thinking often cited by industry recruiters seeking entry to junior mid-level IT professionals, quality assurance is also a key issue.
One commonality of both sets of professionals, whether from government-accredited institutions or private sector bootcamps, is the high attrition rate of these IT professionals, with many of them spending less than 18 months on any full-time role. Based on informal surveys of heads of IT units in established organizations, an estimated one-third of these junior to entry-level professionals either emigrate to work in other countries (the *Japa* syndrome) or work with offshoring companies while physically resident in Nigeria. A significant number of these junior to mid-level professionals combine multiple roles, including dual full-time daytime roles, thereby creating ethical and productivity issues for employers. All of these factors compound the challenges with estimating the number and availability of skilled IT professionals in Nigeria.

[20] International Finance Corporation (2019). https://www.ifc.org/content/dam/ifc/doc/mgrt/digital-skills-final-web-andela.pdf

[21] https://www.weforum.org/stories/2024/09/nigeria-digital-transformation-3mtt-technical-talent/#:~:text=The%20potential%20and%20promise%20of,population%20for%20such%20a%20programme.

Beyond skills in mature information technology domains, assessing the availability and quality of Nigeria's skills in new frontier technologies such as multimodal artificial intelligence, blockchain and quantum computing also present estimation challenges. Recent expert reports such as the United Nations UNCTAD [22] 2025 Technology and Innovation Report acknowledge the paradox of increasing AI infrastructure preparedness of Nigeria yet relatively low skills preparedness[23] for emerging technologies.

Furthermore, UNCTAD's technology rankings indicate that Nigeria ranks in the bottom 10% of countries globally in terms of technology and digital services exports as a share of trade.

Among African countries, while Nigeria ranks in the top 10% of technology research, it has a low ICT rank and the poorest brain drain index relative to the other African tech hubs (South Africa, Kenya, Egypt).

Table 1a: Global ranking of selected African countries on frontier technology readiness

African Country	**Total Score** (Maximum of 1.0)	**2024 Rank** (out of 170 countries)	**2022 Rank**	**ICT Rank** (Access + Mean download speed)	**Skills Rank** (HighSkill Employment	**R & D Rank** (Publications + Patents)	**Tech + Digital Services Exports' Ranking**	**Brain [24] Drain Index**
Kenya	0.37	113	113	128	130	86	71	6.3
Nigeria	0.39	106	116	126	101	54	158	6.6
Ghana*[25]	0.40	105	102	107	128	85	93	6.5
Egypt	0.49	85	82	115	92	45	89	4.7
South Africa	0.65	52	51	76	71	41	55	4.3

**Ghana is included in this list of African tech hubs due to Ghana's rapid digital growth to become in 2022 the largest exporter of digitally delivered services in Africa, driven by professional, and technical services, including BP0.*

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[22]UNCTAD (2025) Technology and Innovation Report: Inclusive Artificial Intelligence for Development
https://unctad.org/system/files/official-document/tir2025_en.pdf

[23]According to the UNCTAD 2025 Report, AI infrastructure preparedness is proxied by logarithmic transformations of cumulative or average investments in telecommunications services while AI data preparedness is proxied by average cost of fixed broadband connection as a proportion of gross national income per capita and the fixed broadband internet traffic.

[24]The Global Economy.com
https://www.theglobaleconomy.com/rankings/human_flight_brain_drain_index/Africa/#:~:text=Human%20flight%20and%20brain%20drain%20index%2C%200%20(low)%20%2D,2007%20%2D%202024
Retrieved 24/09/2025 at 03:28am

[25]World Bank Group/ WTO (2023) TURNING DIGITAL TRADE INTO A CATALYST FOR AFRICAN DEVELOPMENT
https://www.wto.org/english/thewto_e/minist_e/mc13_e/policy_note_digital_trade_africa_e.pdf

Table 1b: Nigeria's Tech Rankings Relative to Five Selected African Tech Hubs

African Country	**Total Score** (Maximum of 1.0)	**2024 Rank** (out of 170 countries)	**2022 Rank**	**ICT Rank** (Access + Mean download speed)	**Skills Rank** (HighSkill Employment	**R & D Rank** (Publications + Patents)	**Tech + Digital Services Exports' Ranking**	**Brain [24] Drain Index**
Kenya	*5th*	*5th*	*5th*	*5th*	*5th*	*5th*	*2nd*	*3rd*
Nigeria	*4th*	*4th*	*4th*	*4th*	*3rd*	*3rd*	*5th*	*5th*
Ghana*[25]	*3rd*	*3rd*	*3rd*	*3rd*	*4th*	*4th*	*4th*	*4th*
Egypt	*2nd*	*2nd*	*2nd*	*2nd*	*2nd*	*2nd*	*3rd*	*2nd*
South Africa	*1st*	*1st*	*1st*	*1st*	*1st*	*1st*	*1st*	*1st*

1.5 Framing the Problem: A Vicious Cycle of De-skilling and Systemic Erosion

Most stakeholders in government and in the private sector acknowledge the issues with skills availability, brain drain and retention of skilled workers in Nigeria's technology sector. Indeed, with Nigeria's poor Human Capital Flight and Brain Drain Index of 6.6 in 2024, ranking 17th worst in Africa, the impact of this brain drain is severe for in-demand global skills such as digital and information technologies.

According to government-sponsored reports in the recent decade, [26] [27]Nigeria's *"skills-supply infrastructure"* will continue to face *"huge pressures"* as we approach the year 2030. This is a compound problem, as the *"significant digital literacy gap"* is foundational and feeds into skills inadequacy in the technology sector. The changing labour market, as well as the acknowledged inadequacies of the Nigerian educational system to rapidly align with emerging realities of businesses, further compound this supply-demand imbalance for Tech skills in Nigeria. [28]

With the increasing growth and relevance of the tech industry to Nigeria's GDP, this supply-demand imbalance for Tech skills in Nigeria is getting more acute. Several studies acknowledge the urgent need to move from the current interventionist approach to a systemic approach to address the underlying structural challenges with IT skills adequacy in Nigeria. [29] [30] [31] [32]

The core of this problem lies in the systemic erosion of Nigeria's deep-tech talent pool, which has critical implications for both micro-level business competitiveness and macro-level economic growth

- **Firm Level:** The departure of senior-level professionals results in a significant loss of firm-specific capacity. This not only disrupts project continuity but also compromises a company's capacity for radical innovation and its ability to mentor a new generation of talent. The subsequent increase in recruitment costs and salary inflation creates a non-sustainable local IT labour market, eroding profit margins and making it difficult for local firms to compete with their global counterparts. This hollowing-out effect on organizational capabilities is a risk to Nigeria's tech ecosystem.

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[26] Nigerian Information Technology and Development Agency (2023) https://nitda.gov.ng/wp-content/uploads/2023/01/IT-Talent-Gap-Research-Summaries-copy-1.pdf

[27] Industrial Training Fund/ United Nations Industrial Development Organization (2017): Skills Gaps Assessment in Six Priority Sectors of the Nigerian Economy. https://www.itf.gov.ng/ftp/Skills_Gap_Assessment.pdf

[28] BusinessDay (2023) https://businessday.ng/technology/article/nigerian-firms-decry-low-supply-of-tech-talents/

[29] Nigerian Information Technology and Development Agency ([2023]) https://nitda.gov.ng/wp-content/uploads/2023/01/IT-Talent-Gap-Research-Summaries-copy-1.pdf

[30]https://www.theglobaleconomy.com/Nigeria/human_flight_brain_drain_index/#:~:text=Human%20flight%20and%20brain%20drain%20index%2C%200,low)%20%2D%2010%20(high)&text=The%20latest%20value%20from%202024,to%20compare%20trends%20over%20time.&text=Definition:%20The%20Human%20flight%20and,the%20greater%20the%20human%20displacement.

[31] [32] Source: https://worldpopulationreview.com/country-rankings/brain-drain-countries

- **Industry/ Ecosystem Level:** The *"japa"* wave is a symptom of a dysfunctional market feedback loop. The persistent socio-economic and infrastructural challenges within Nigeria serve as "push" factors, while opportunities for professional growth and remuneration in Western economies act as powerful "pull" factors. This dynamic creates a vicious cycle: as more talent leaves, the perceived quality and long-term viability of the domestic tech ecosystem diminish, further incentivizing others to either exit or gravitate to better-paying local industries. This process threatens to unravel the very foundation of the digital economy by disassembling the critical mass of locally trained, skilled professionals necessary for sustained innovation and growth.

This research will investigate the quantitative and qualitative dimensions of this IT human capital flight. By analyzing the drivers of IT talent emigration and its multi-layered impact on firm performance and national policy objectives, we aim to provide a robust, evidence-based framework for strategic interventions. The central question this study seeks to answer is not merely why skilled IT talent is leaving Nigeria, but what actionable policies can be implemented to mitigate this crisis and rebuild a resilient talent ecosystem.

This study therefore seeks to:

1. Understand the drivers and impact of brain drain on technology skills shortages in Nigeria as of June 2025 [33]

2. Proffer recommendations on the identified or validated issues, building on stakeholder perspectives on an actionable path forward

3. Contribute to existing thought leadership towards a systemic resolution of the digital technology skills challenge in Nigeria.

A key challenge with research studies of this kind is data availability. Due to the long-dated nature of many available official reports, and the absence of recent data on skilled manpower, this study would combine quantitative data with industry interviews to synthesize a state-of-play of Tech skills in Nigeria.

Subject to available information and significant data gaps in Nigeria,

2. UNDERSTANDING THE TECH SKILLS SHORTAGE PROBLEM IN NIGERIA: A LITERATURE REVIEW

"The issue of tech skills talent shortages in Africa is a complex one," [34]
- Francis Dufay, Former chief executive of e-commerce giant, Jumia.

This section 2 focuses on a review of frameworks as well as the literature on the drivers and consequences of tech skills shortage and skills migration affecting Nigeria's technology ecosystem. Factors contributing to this trend are identified, and key themes are mapped towards a better understanding of the subject and facilitating navigating this contemporary challenge. The theoretical review explores the foundational theories of human capital as a basis for the empirical review. The empirical review provides an overview of prior publications and studies on the competitive dynamics shaping the technology labour market in Nigeria, as well as the resulting impact on firms.

2.1 Theoretical Frameworks

Most of the theories around human capital migration that are foundational to understanding the technology skills shortage with respect to migration can be classified into three broad categories. The first category is the **classical economic models,** notably the push-pull framework and the human capital theory as propounded by Gary Becker. [35] [36]
The push-pull framework analyzes wage differentials, employment opportunities, and living standards across various geographic hubs as primary drivers of migration. Similarly, the basic human capital theory explains the high global demand for tech talent as a direct search for high-value human capital that would logically lead to intense competition for talent and significant tech skills shortages in some infrastructure-deficient countries such as Nigeria. The dynamic human capital theory, on the other hand, advances the argument and reframes human capital not as a static resource, but as a continuously evolving asset that individuals strategically invest in and then seek to maximize the return on over their lifetime. According to these economic models, the decision to migrate is therefore a rational economic choice made to optimize the individual returns on investment in education and skills development. For Nigeria, the implication of both the push-pull and the dynamic human capital frameworks is that, given the significant wage differential in real (dollar) terms between average pay for Tech workers in Nigeria and most Western countries, coupled with better living and working conditions, skilled Tech workers would continually seek to migrate.

The second category is the contemporary sociological and behavioural theories in a globalised world. These include the network theory and the 'risk and rational choice theory'. The network theory explains the role of established diaspora communities as well as social and professional networks in the destination country in facilitating and accelerating talent migration. Based on the network theory, professional associations such as the Nigeria-US IT Network that provide a platform to enhance the career mobility of Nigerian IT professionals in the United States, as well as other similar interest groups, would provide strong social support systems for migrating Tech professionals. The risk and rational choice theory, on the other hand, focuses on the professional's assessment of risk (political instability, insecurity) versus reward (higher income, better quality of life, professional growth).

The third category of frameworks applies Williamson's **transaction cost economics** [38] to frame the movement of skilled workers as a series of exchanges or transactions wherein firms, irrespective of geography, seek to minimise the costs of finding, hiring and managing skilled talent.

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[34]https://54collective.vc/insight/solving-africas-tech-talent-conundrum-a-wicked-problem-quality-and-quantity/#:~:text=In%202020%2C%20the%20International%20Finance,Development%20&%20Outcomes%20at%20Moringa%20School.

[35]Gary Becker (1993) [1964]. Human capital: a theoretical and empirical analysis, with special reference to education (3rd ed.). Chicago: The University of Chicago Press

[35]Gary S. Becker, 1964. "Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education, First Edition," NBER Books, National Bureau of Economic Research, Inc, number beck-5, July

Applications of the transaction cost theories have implications for how global firms make choices between full-time employees, remote freelancers, or outsourcing entire projects based on which option has the lowest transaction costs. For developing countries like Nigeria, transaction cost economics frameworks offer a compelling explanation for the rise of digital labour and remote work. This is particularly relevant for many entry-to-mid-level tech professionals in Nigeria, who would likely benefit from global companies adopting new workforce models.

Collectively, these theoretical frameworks provide explanations for the evolution of the tech labour market in Nigeria as a complex interplay of the differential value of skills *(human capital theory),* the economic decisions of companies *(transaction cost economics),* and the interconnected nature of the modern world. Within the context of emerging technology trends that encourage decentralisation of technology work on one hand, and enhanced global mobility strategies for highly skilled tech talent (e.g. Canada's Global Skills Strategy, the UK's Tech Nation Visa) on the other, the logical interpretation of the theories is that certain countries would continue to be susceptible to episodes of Tech skills shortage.

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[37] *Sonja Haug. 2008. "Migration Networks and Migration Decision-Making." Journal of Ethnic and Migration Studies 34 (4): 585*

[38] *Williamson, O. E., Outsourcing, Transaction Cost Economics and Supply Chain Management, Journal of Supply Chain Management*

2.2 Empirical Review

This section synthesizes existing empirical studies on the relationship between brain drain, particularly in the technology sector, and skills shortages.

Many of the existing empirical studies on Tech skills migration acknowledge the multi-dimensional nature of the problem, and the growing trend of increased exodus post-Covid. Leading publications that provide extensive coverage of the *Japa* syndrome contextualize the brain drain within the socio-economic challenges such as systemic corruption, deteriorating infrastructure, and limited employment. Many of the studies agree on the critical sectors, such as healthcare and technology, that are most impacted. Systemic migration of highly-skilled professionals in post-independence Nigeria is often traced to the exodus of Nigerian doctors and other medical professionals in the mid-1980s as an aftermath of the structural adjustment program that devalued the Nigerian naira. [40] [41]Due to the more structured career pathways and regulated mandatory licensing for professions such as medicine, statistics on the exodus of medical professionals abound more in the literature. [42] Key findings from many studies clearly indicate the adverse impact of brain drain on Nigeria's competitive edge and its growth potential.[43]

The perception of the negative impact of brain drain on a country is not universal.

Some studies rather explore the concept of brain circulation, where diaspora Nigerians either physically return with skills and knowledge gained abroad or virtually transfer such knowledge and skills. Indeed, brain circulation has been attributed to contributing to the economic success stories of China, India and Israel [44] [45] Other positive effects include technology transfer and diaspora remittances. Between 2010 and 2022, Nigeria was one of the top ten recipient countries of international remittances. [46] However, while these and other positive effects are acknowledged, the negative effects can be overwhelmingly felt by organisations, especially when they result in a skills shortage in specific sectors, such as the tech industry.

The key limitations of many of the published research papers are the extensive focus on issue-identification and problem analysis, while being short on actionable industry-relevant solutions.

A few reports, such as the SAP Africa Tech Skills Report,[47] however, go beyond the current position assessment to not only gauge the pulse of senior business executives but also to project the likely impact of the skills gap on Africa's digital transformation objectives. Based on the SAP study, despite high under-employment rates, organizations face critical skills shortages, with 80% of Nigerian companies expecting skills gaps.

Other studies by international development partners such as UK AID go further to dimension the paradox between the dearth of basic digital skills remaining scarce among Nigerian students and the increased emigration of skilled technology professionals.

[48]Similarly, the International Finance Corporation (IFC) [49] in the report on digital skills shortage offer a practical set of actions to take to tap into the demand for ICT skills in Nigeria. The World Bank [50] in its 2021 study, identified three specific drivers applicable to increased ICT skills demand in Nigeria post-2020:

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[39]Madubuko, C. C., & Nwaka, T. F. E. ([2024]). The Alarming Exodus of Nigerian Professionals: The Devastating Consequences of Human Capital Flight and Migration on Nigeria's Economic Development. American Journal of International Relations, [9]([7]), [1–63]. https://doi.org/[10.47672]/ajir.[2485]

[40]S.E. Omoruyi ([2007]) A Review of the Structural Adjustment Programme, the Foreign Exchange Market and T et and Trade Policies in Nigeria. Economic and Financial Review Volume [25] Number [4] Article [7] [12–1987]. Central Bank of Nigeria https://dc.cbn.gov.ng/cgi/viewcontent.cgi?article=[1829]&context=efr

[41]Adebayo Olukoshi, The Elusive Prince of Denmark: Structural Adjustment and the Politics of Governance in Africa, Uppsala: Nordiska Afrikainstitutet, [1998]

[42]Nichola Aderinto et al. Addressing Nigeria's proposed bill on the emigration of doctors
The Lancet, Volume [403], Issue [10425], [435]

[43] Samik Adhikari, Michael Clemens, Helen Dempster, and Nkechi Linda Ekeator. [2021]. "Expanding Legal Pathways from Nigeria to Europe: From Brain Drain to Brain Gain." World Bank and the Center for Global Development (CGD), Washington, DC. License: Creative Commons Attribution CC BY [3.0] IGO

[44] C. Harmon ([2022]). How brain circulation can fill the void of brain drain in Nigeria. Nairametrics. Available at https://nairametrics.com/[2022]/[11]/[17]/how-brain-circulation-can-fill-the-void-of-brain-drain-in-nigeria/

[45] ILO. ([2020]). Country study: Potential for skills partnerships on migration in Nigeria. A publication of the International Labour Organization. Available at https://researchrepository.ilo.org/esploro/outputs/encyclopediaEntry/Country-study--potential-for-skills/[995219109002676]

[46] IOM ([2024])
https://nigeria.iom.int/news/iom-facilitates-development-national-diaspora-policy-nigeria#:~:text=%E2%80%9CNigeria%20is%20one%20among%20the,funding%20from%20the%20European%20Union.

- Post-covid shift to e-commerce and digital/ online transactions: The impact of the COVID-19 pandemic has accelerated requirements for digital skills, with many firms of all types and sizes digitizing their operations to remain in business. This has further accelerated the demand for digital skills. This is particularly true of the ICT and e-commerce sectors in Nigeria, and is even expanding to rural areas and other sectors such as agriculture.

- Economy-wide improvements in ICT infrastructure: The gradual improvement in ICT infrastructure, such as internet and broadband availability, a thriving ICT sector tapping into new business and skills training opportunities, is fostering a start-up ecosystem that is driving further interest in digital skills and unwittingly increasing or surfacing both supply and latent demand.

- Governmental and Industry-level Initiatives: In Nigeria, a higher tertiary GER (gross enrolment ratio) of about 11 percent is generating an increased number of graduates in computer science and related fields, as well as digitally literate graduates. Tech companies, such as Google, IBM, and Facebook, have also launched, funded, or supported training and other programs that aid digital adoption among the population.

With the exception of a few, common limitations of many of the existing studies include the reliance on secondary data, which may not provide a first-hand perspective of the industry stakeholders who demand skilled IT workers and bear the costs of recruiting and retraining new staff. Second, there is a scarcity of primary research using field surveys, especially in Nigeria, where official data on labour market surveys and manpower censuses are infrequent or outdated. Third, a number of the existing empirical studies by organizations such as The World Bank focused on assessing digital literacy skills for the workforce, as distinct from industry skills for professionals in the ICT industry. [51]

This study attempts to address these limitations by conducting a field-based study to obtain primary data.

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[50] World Bank (2021). Demand for Digital Skills in Sub-Saharan Africa - Key Findings from a Five-Country Study: Cote D'Ivoire, Kenya, Mozambique, Nigeria and Rwanda https://documents1.worldbank.org/curated/en/099614312152318607/pdf/IDU0b36e9e030767f0417e0afb806e2ffdf1e8bf.pdf

[51] UNIDO (2017) Skills Gap Assessments in Six Priority Sectors of the Nigerian Economy https://downloads.unido.org/ot/60/55/6055563/Skills%20Gap%20Assessment%20in%20Nigeria%20-%20Final%20Report.pdf#:~:text=In%20resolving%20the%20issue%20of%20low%20skills,often%20result%20in%20skills%20gap%20and%20mismatches.

[52] ILO. (2017). How Useful Is the Concept of Skills Mismatch? Skills and Employability Branch. International Labour Organisation (ILO). Available at ps://www.ilo.org/publications/how-useful-concept-skills-mismatch

[53] Carlisle, S., Zaki, K., Ahmed, M., Dixey, L., McLoughlin, E. (2021). The imperative to address sustainability skills gaps in tourism in Wales. Sustainability, 13 (3), 1161

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[47]SAP Africa. (2023). Africa's tech skills scarcity revealed. Market Research Project: Tech skills availability. Available at https://news.sap.com/africa/2023/03/sap-research-reveals-top-tech-skills-challenges-for-african-organisations/

[48]ITU & UK AID. (2024). Assessment of skills supply and demand in the digital economy in Nigeria, including digital skills. A report of the International Telecommunications Union (ITU) in collaboration with UK AID. Available at https://www.itu.int/dms_pub/itu-d/opb/phcb/D-PHCB-DIG_ECON.1-2023-PDF-E.pdf

[49]IFC (2019) Digital Skills in Sub-Saharan Africa: Spotlight on Ghana. International Finance Corporation
World Bank (2021). Demand for Digital Skills in Sub-Saharan Africa - Key Findings from a Five-Country Study: Cote D'Ivoire, Kenya, Mozambique, Nigeria and Rwanda https://documents1.worldbank.org/curated/en/099614312152318607/pdf/IDU0b36e9e030767f0417e0afb806e2ffdf1e8bf.pdf

2.3 Quantifying the Technology Skills Gap

Very few published literature attempt to objectively estimate the skills gap in Nigeria's ICT sector. Certain stakeholders have, however, raised the question of whether Nigeria has a skills gap or a skills mismatch. [52]

These documented concerns about assertion on Nigeria's tech workforce and the risk of investing in tech skills without recent empirical data on labour market information have been reiterated by senior tech professionals in Nigeria. Technically, the concepts of skills mismatch, skills gap, and skills shortages are similar and often used interchangeably, though quite distinct. Based on ILO definitions, a skills mismatch is a situation of imbalance between the skills offered through education and training and the skills required in labour markets.[53]

A skills gap refers to the difference between the skills employees possess and those the industry deems important.

[54] Skills mismatches may also range from skill shortages to skill obsolescence, and may be vertical or horizontal. While skill shortages generally refer to situations where the demand for specific skills exceeds its supply, skills obsolescence refers to deteriorating or outdated skills Skills mismatch, skills gap, skills shortages, and skills obsolescence are all different forms of vertical mismatch. Vertical mismatches may result from overeducation, undereducation, overskillingg, andunderskillingng (ILO, 2017).

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[54] *Carlisle, S., Zaki, K., Ahmed, M., Dixey, L., McLoughlin, E. (2021). The imperative to address sustainability skills gaps in tourism in Wales. Sustainability, 13 (3), 1161*

[55] *Rikala, P., Braun, G., Järvinen, M., Stahre, J., & Hämäläinen, R. (2024). Understanding and measuring skill gaps in Industry 4.0; A review. Technological Forecasting and Social Change, 201, 123206. https://doi.org/10.1016/j.techfore.2024.123206*

[56] *Rikala, P., Braun, G., Järvinen, M., Stahre, J., & Hämäläinen, R. (2024). Understanding and measuring skill gaps in Industry 4.0; A review. Technological Forecasting and Social Change, 201, 123206. https://doi.org/10.1016/j.techfore.2024.123206*

Figure 2 below summarises the factors driving skills gaps in a developing country such as Nigeria.

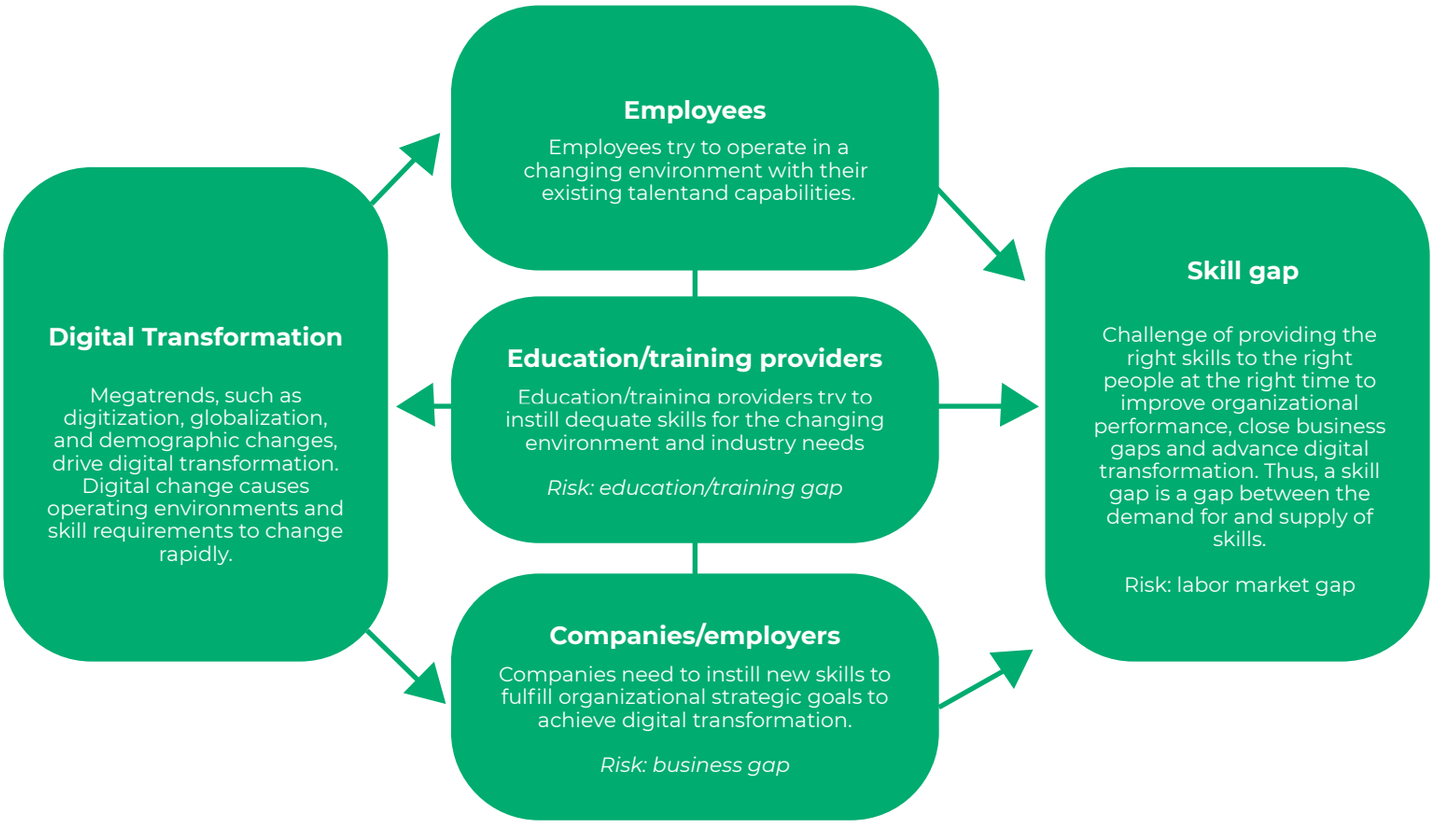


Figure 2: Factors driving skills gaps in developing countries

Despite the data limitations on the number of skilled technology professionals in Nigeria, some data exist on tech migrants from Nigeria to North America. Technology Councils of North America (TECHNA) and Canada's Tech Network (CTN) revealed that over 32,000 tech migrants in Canada, as at the time of their report, were tech talents from Nigeria. This number is the second highest number of Tech migrants into Canada from any country in the world [57] (Techna & CTN, 2023).

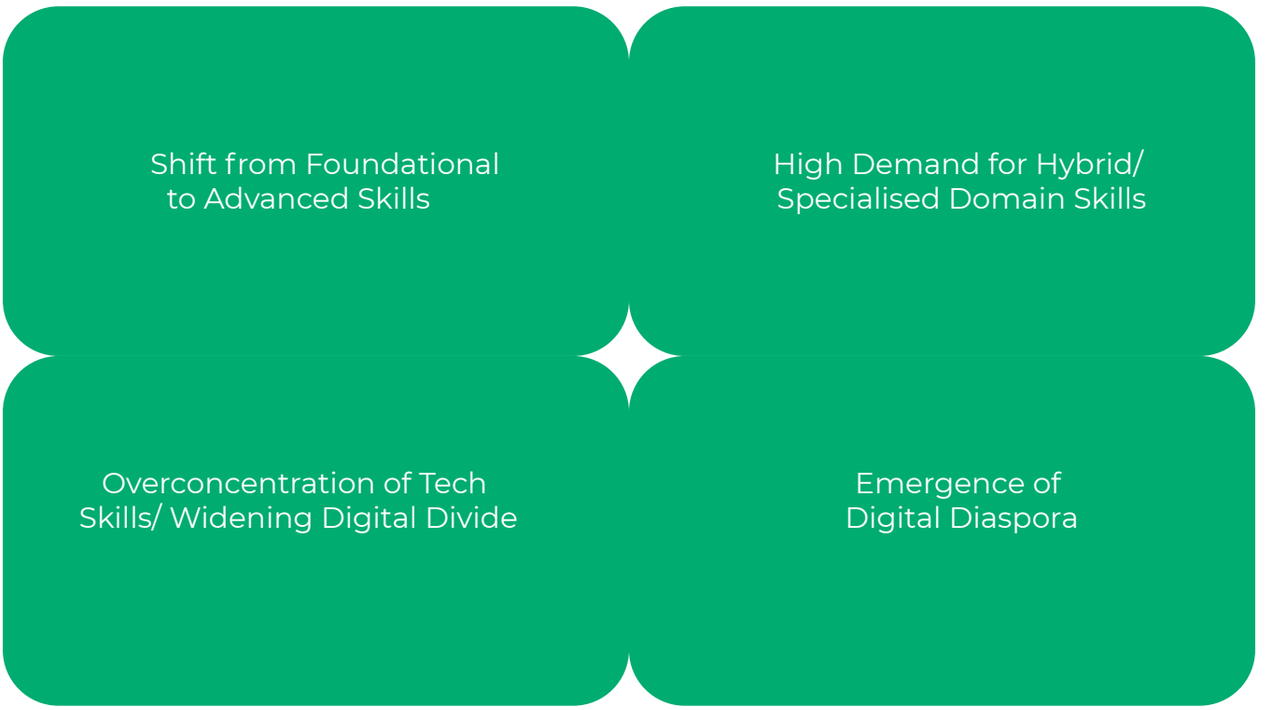
2.4 Review of Other Emerging Trends in the Technology Skills Market

Emerging trends in the Tech skills market in Nigeria continue to suggest the structural mismatch between the available talent and the skills required to analyze or process complex information in a rapidly evolving digital economy. Major trends in Tech skills shortage in Nigeria may be summarized into four, as depicted in the chart below:

1. Shift from Foundational to Advanced Skills:

Since 2020, there has been a higher demand for advanced Tech skills that require multi-domain specialty or IT program management skills beyond narrow or mono-domain programming skillsets. Despite the increase in the number of computer science graduates and newly-trained junior developers completing a six-month certification in programming from the many software training bootcamps in Lagos, Abuja, Benin or Port-Harcourt, many senior IT professionals still acknowledge critical gaps to deliver on key IT projects.

Emerging Trends in Nigeria's Tech Skills Landscape



[57] *Techna & CTN. (2023). New Report from The Technology Councils of North America highlights growing national tech workforce thanks to immigration-friendly national policy. Available at https://members.tecna.org/news/Details/canada-welcomed-more-than-32-000-tech-workers-over-the-past-12-months-report-finds-175229*

[58] *NITDA. (2025). Shaping the future of Nigeria's workforce. Available at https://3mtt.nitda.gov.ng/*

In addition to the private sector-led Tech bootcamps, key initiatives by the government to improve the skills base of junior Tech talent include the ³-Million Technical Talent Program (³MTT) of the Federal Ministry of Communications, Innovation, and Digital Economy, which aims to build the digital talent required to power Nigeria's digital economy (NITDA, 2025). ³MTT is focused on several phases of training in modern technologies such as artificial intelligence and machine learning, animation, cloud computing, UI/UX design, data analysis and visualization, data science, DevOps, game development, product development, quality assurance, software development, and cybersecurity across the country. [58]

2.High-Demand for Hybrid Skills:

Specialised Domain Skills combined with managerial experience: Beyond AI and machine learning (ML), cybersecurity and cloud computing, larger companies are requiring professionals who can bridge the gap between DevOps and Automation. [59]

3. Widening Digital Divide:

Nigeria's paradox of being Africa's largest ICT market with about 82% of the continent's telecoms subscribers, yet only 29% of internet usage masks significant differences in internet and broadband infrastructure availability on one hand, and a resource constraint to developing a stronger pipeline of Tech talent in some peri-urban areas on the other. The implication of this on the Tech labour market is a skills concentration and attendant risks of pricing distortions.

4.Emergence of the Digital Diaspora

Nigeria continues to be hit by new waves of emigration of skilled talent, including more subtle patterns such as the *"Digital Diaspora".*[60] Many of these patterns are fast evolving and, as they require little official documentation, are not adequately captured or accurately measured in national statistics or skills reports. In the Tech space, the *digital diaspora or virtual emigrants*, is one of the new yet significant trends of skilled tech workers who live or hop across emerging markets such as Nigeria, yet work full-time for companies in North America or Europe. [61] The complexities with these new concepts of transnational digital labour, on-demand remote workforce, digital nomads and circular migration present newer socio-economic and professional challenges that define the unique situation of the modern skilled Tech worker, extending beyond their physical location. Converse to the traditional "brain drain" or *Japa patapata* [62] model, where the country permanently loses its brightest talent with no intention of returning to work, the newer emigration and distributed modes of working, such as "digital diaspora" introduce a newer dynamic of globally connected and mobile human assets available for rent irrespective of employer location. This new dynamic presents both a risk to the Nigerian Tech economy (of not capturing the full economic value) and an opportunity (to benefit from real-time knowledge spillovers from more advanced Tech hubs.

[59]*Business Day (2025), Top 10 tech careers in Nigeria with the best salaries in 2025 https://businessday.ng/technology/article/top-10-tech-careers-in-nigeria-with-the-best-salaries-in-2025/*

[60]*Jennifer Obado-Joel and Helen Dempster ([2021]). Nigeria's Tech Sector Could Benefit from More Managed Migration. Centre for Global Development blogpost. https://www.cgdev.org/blog/nigerias-tech-sector-could-benefit-more-managed-migration#:~:text=Formal%20tech%20training%20courses%20are,full%20array%20of%20digital%20skills.*

[61]*Victor Ejechi (2025)* ***Living Here, Earning There: The Rise of Nigeria's Digital Migrants .*** *Blogpost published on April 10, 2025.* ***https://diasporaafrica.org/living-here-earning-there-the-rise-of-nigerias-digital-migrants/***

[62]*Japa patapata translated from the Yoruba language spoken widely in southwestern Nigerian means to flee permanently or emigrate permanently with no intentions to look back or return*

Summary of Literature Review

From the literature review, there is no comprehensive general theory of international migration for skilled professionals, owing to the multifaceted nature of the process. [63] [64] Similar to global patterns of increasing migrants globally, the number of emigrants from Nigeria has been increasing in recent years. However, available data is insufficient to statistically analyze the exact skill base and seniority levels of the skilled IT professionals emigrating from Nigeria. The United States has remained a major destination, if not the most important migrant destination in the world, as a haven to about one-fifth of the world's migrants. For Nigeria, the United States is equally the top destination and has been the prime destination for highly-skilled Nigerian professionals since the mid-1980s. [65] [66]

Based on the reviewed literature, Figure 3 summarizes the global and local drivers of technology skills shortages in Nigeria. While a lot of emphasis is placed on the push-pull factors by business owners in Nigeria, external factors such as global skills shortages and technology revolution across industries have also been identified to be equally strong determinants of skills emigration from Nigeria. The latter two factors are less within the control of business owners and policy-makers in Nigeria.

The major limitation of existing studies on the subject of brain drain and skills shortage in Nigeria is the focus on issue identification based on secondary data. Very few of the available published research studies utilise field surveys to provide new primary data to further understand the quantitative impact of the skills challenge. This study attempts to fill that gap in the literature. Section 3 of this report will cover the findings of the empirical survey on tech skills shortage in Nigeria.

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[63] *Mahdi Ghodsi, Michael Landesmann and Antea Barišić (2024) Working Paper 242 Technological Push and Pull Factors of Bilateral Migration The Vienna Institute for International Economic Studies Wiener Institut für Internationale Wirtschaftsvergleiche https://wiiw.ac.at/technological-push-and-pull-factors-of-bilateral-migration-dlp-6809.pdf*

[64] *The Evolution of Global Bilateral Migration: 1960-2000 Caglar Ozden Christopher Parsons Maurice Schiff Terrie L. Walmsley.... Caglar Ozden, Christopher Parsons, Maurice Schiff and Terrie Walmsley (twalmsle@usc.edu); The World Bank Economic Review, 2011, vol. 25, issue 1, 12-56*

[65] *Migration Policy Institute (2015) The Nigerian Diaspora in the United States. https://www.migrationpolicy.org/sites/default/files/publications/RAD-Nigeria.pdf*

[66] *UN Migration (2019). Migration in Nigeria – A Country Profile 2019 . https://nigeria.iom.int/sites/g/files/tmzbdl1856/files/documents/2024-04/the-national-migration-profile-2019_0.pdf*

[67] *Folarin Alayande, (2025) Understanding Shifts in Africa's FinTech Industry (Unpublished manuscript)*

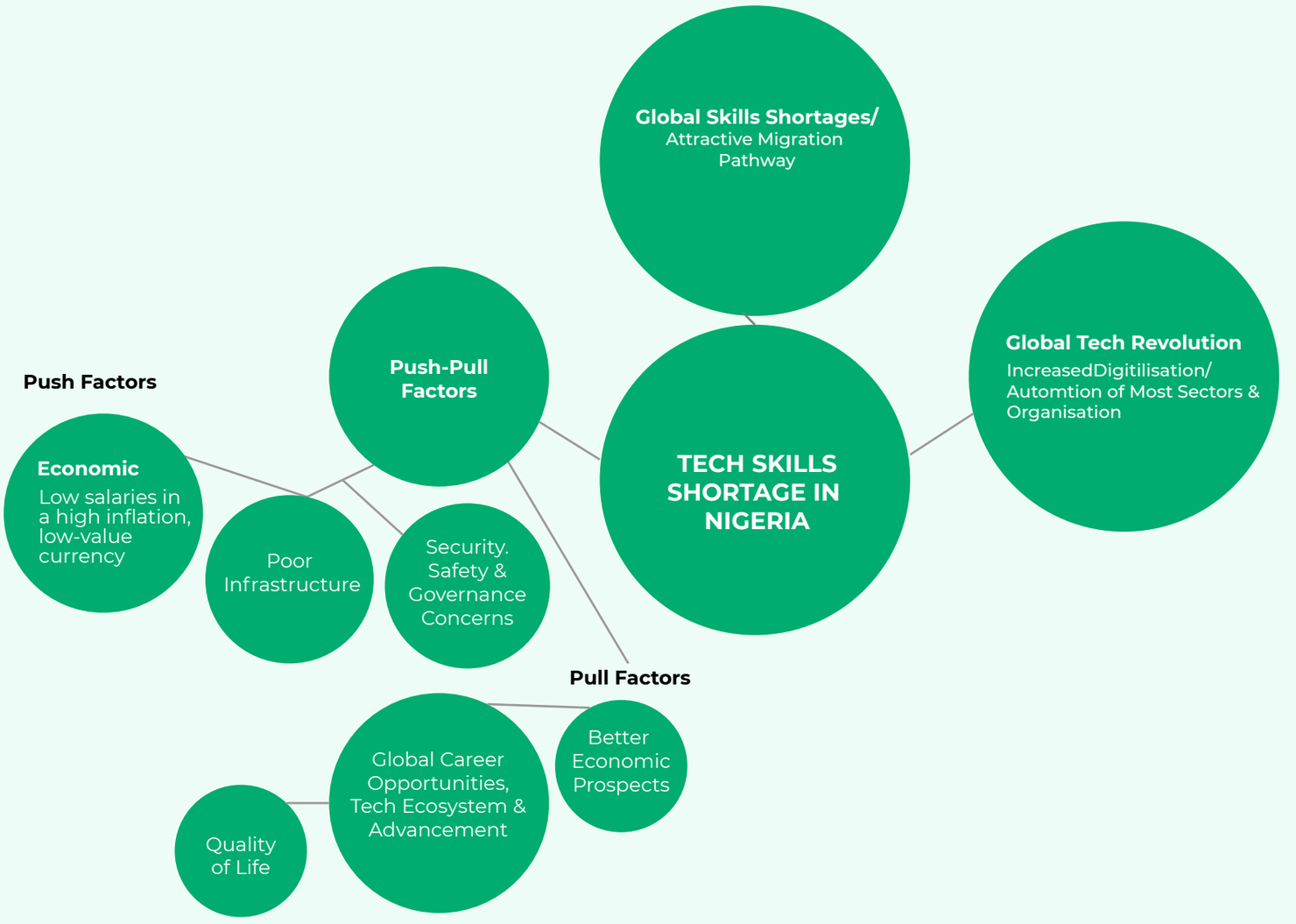

Fig 3: Drivers of Technology Skills Shortages in Nigeria
Source: Alayande, F. (2025) Understanding Shifts in Africa's FinTech Industry

3. EMPIRICAL SURVEY APPROACH

Empirical research on the tech skills shortage in Nigeria has historically been characterized by fragmented and outdated data. Most available information, often of limited accuracy and validity, stems from surveys conducted years ago, failing to capture the dynamic and rapidly evolving landscape of the *"Japa"* phenomenon. While some studies may have attempted to quantify this issue, they often provide only a snapshot in time or lack the sector-specific detail required for a comprehensive analysis.

This chapter presents the findings of a focused industry survey conducted between June and August 2025 to address this critical gap. The first objective is to dimension the impact of professional mobility and migration on the availability of skilled talent within Nigeria's organized private sector. The focus is specifically on the ICT sector and other industries that require intermediate-to-advanced digital skills. Second, the survey seeks to move beyond problem identification by eliciting actionable suggestions from key stakeholders on holistic and sustainable solutions to rectify the skills imbalance. The survey data is further enriched through interviews with technology executives and a case study of an outlier company, providing qualitative insights to complement the quantitative findings.

3.1 Methodology and Survey Approach:

The focus of this study is on the Tech skills of core information technology (IT/ ICT) workers in the organised private sector in Nigeria, as well as the exit drivers of these skilled technology professionals who currently or previously worked within Nigeria.

This research employs a mixed-methods approach, combining quantitative and qualitative data collection and analysis, to investigate the technology skills shortage and brain drain phenomenon in Nigeria.

3.1 Research Design and Analysis

Phase 1: Quantitative Survey: A structured twin-survey was designed and administered to technology professionals in Nigeria to assess the current skills landscape, identify critical skills gaps, and quantify the extent of brain drain. The first survey was targeted at Tech leaders, mainly heads of information technology departments in the organised private sector. The survey group for the institutional category was targeted at four groups of companies. The first sub-group in the institutionals includes publicly listed companies in Nigeria. The second sub-group is the larger companies in the Information and Communications Technology sector of the economy, who though not listed, recruit a significant amount of tech talent.

The third sub-group is a composite of the other key stakeholder groups in information technology and digital economy who either supply or demand tech talent, as identified by the National Information Technology Development Agency (NITDA). The fourth sub-group of companies categorised as "Others" comprises other companies that may not be publicly listed or heavily digital-oriented or tech-oriented. This group of companies are captured via administering the questionnaires to industry groups such as the Nigerian Economic Summit Group (NESG) and the FinTech Association of Nigeria (FinTechNGR). For this category, questionnaires were also administered through not-for-profit trade associations and interest groups such as Chambers of Commerce.

- The survey instrument deployed using the Survey Monkey is a structured questionnaire of open-ended and closed-ended questions, covering the following areas:

  • Industry or sector affiliation (what industry or sector is the institution affiliated with)

  • Current employment status and sector

  • Identification of technology skills available or in the current employment of the company (e.g., software development, data science, cybersecurity)

- The second survey is administered directly to individuals who are skilled technology and digital professionals, who provide their services either as employees, individual contractors, freelancers, or in another hybrid individual service provider capacity. These individuals may or may not currently reside in Nigeria. However, all respondents in this category must either be Nigerian citizens or professionals who have schooled or worked within Nigeria at some point during their career.

Phase 2: Qualitative Interviews: The key findings and patterns from responses to the anonymously administered questionnaires were further examined in deep-dive, semi-structured interviews conducted with selected stakeholders.

Phase 3: Data Analysis: The data was analysed to identify key drivers of exit or staff attrition of IT professionals, critical technology skills in demand or at risk, perceived skills gaps in the Nigerian workforce, and suggestions by IT professionals to address any skills shortages or gaps. For grouped data, numerical encoding was used to transform the data after a review of individual data patterns.

3. 2. Survey Sample and Administration:

- The target population for the institutional survey is the organised private sector. Given the population of publicly listed companies on the Nigerian Stock Exchange NGX of about 146 to 150[68] companies, a representative benchmark of 150 organisations, including private and public companies, was targeted. A target minimum response rate of 30% is expected.
- Qualitative interviews leveraged the outcomes of the questionnaire and covered themes on:

  • Perspectives on the current state of the technology skills landscape in Nigeria

  • Key drivers of brain drain from their respective viewpoints

  • Challenges faced in attracting and retaining skilled technology professionals

  • The impact of the skills shortage and brain drain on business operations and economic growth

  • Recommendations for policy interventions, industry initiatives, and educational reforms.

[68] *Number of listed companies on the NGX as at September 2024 is 151 companies with 136*** companies on the Main Board*

4. KEY FINDINGS: TECH SKILLS IN NIGERIA

This chapter presents the key results and findings from surveys and interviews with tech stakeholders in Nigeria. By analysing data from both the institutional survey of over 130 organizations and over 170 individuals, the findings provide insights into the current skills distribution, current proficiency levels, and the key factors shaping the IT workforce. Section 4.1 discusses the findings and implications for organizations, section 4.2 discusses the data on emigration of Nigerian tech professionals while Section 4.3 presents the findings from the survey of individual tech professionals. Section 4 provides a summary of suggestions and recommendations made by respondents with respect to the enabling environment for skilled tech workers in Nigeria.

4.1 Specialisation of Skilled Tech Professionals in Nigeria's Organized Private Sector

Table 4.1 provides the survey summary of technology staff in Nigeria categorised into seven main IT domains: software, hardware, cyber, AI, IT Architecture, Other IT business services, and IT program management.

In addition to providing information on total staff strength and the size of the IT workforce, respondents also provided data on distribution of IT staff based on IT skill domains. The raw data are transformed via numerical encoding into the summary distribution of employed IT professionals in Nigeria based on skill areas.

About 21% of employed Nigerian IT professionals in the organized private sector are software programmers, developers or software engineers.

	SOFTWARE Programmers/ Developers/ Software Engineers	**HARDWARE** IT infrastucture (e.g networking, cloud, advanced tech)	**CYBER SECURITY** (e.g network secutity or infrastructure security	**ICT Rank** (Access + Mean download speed)	**Skills Rank** (HighSkill Employment	**R & D Rank** (Publications + Patents)	**Tech + Digital Services Exports' Ranking**
All sectors (%)	21%	19%	13%	8%	11%	15%	135
ICT	23%	20%	10%	11%	11%	14%	11%
ICT-Telecomms	18%	18%	6%	16%	13%	15%	14%
ICT-Others	32%	24%	15%	4%	8%	12%	6%
Financial Services	28%	17%	14%	9%	9%	135	105

The distribution of IT staff in Nigeria in terms of weighted average across all sectors is represented below.

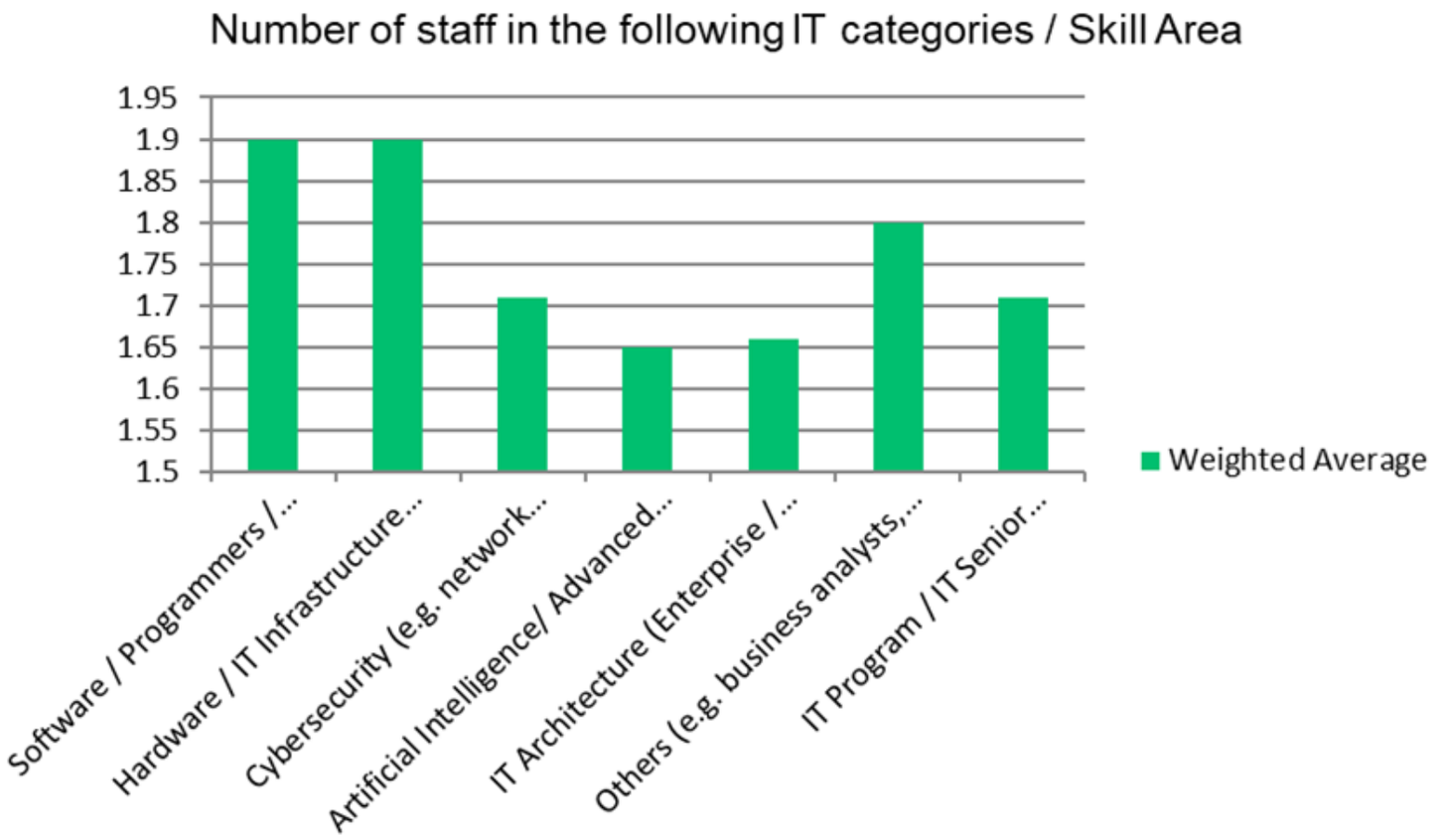

Figure 4.1 IT Staff per Skill Area

Based on the survey findings, the ratio of IT staff to total staff for the average Nigeria company is between 2-3% across all companies surveyed. This ratio increases based on two factors: size of company and digital intensity of the industry, with companies in the ICT in the 3%- 3.5% range while Financial Services having this ratio closer to the 3.5% - 4.5% range. Financial service institutions and ICT companies therefore have some of the largest IT teams relative to total staff strength, with some of the largest companies in these sectors exceeding the 5% ratio.

The findings from this survey are validated by published data in annual reports of quoted Nigerian companies. For comparison, GTCO one of Nigeria's largest financial services institutions has a "Technology" function to total staff strength of 4.54%, and 4.67% inclusive of the data analytics team of its workforce. [69]MTN Nigeria Plc [70] has a 6.5% ratio, excluding its digital services and network group which both host some IT professionals.

A correlation analysis between total employee strength and IT staff strength reveal a moderate positive correlation coefficient of 0.416 between two variables, [71] [72] indicating the existence of multiple other factors that determine IT staff demand by organizations.

Beyond the industry ratios, personal interviews with CTOs suggest an appetite for recruiting more middle-level IT professionals in key domains like DevOps and AI, though the absence of a ready supply of ready talent without going into a talent war appears to limit their desire to expand their IT staff strength. Much of this demand for additional tech talent lies in Financial Services, the prime sector that is driving Nigeria's digital services exports. [73] [74]Given that there are no ideal tech staffing ratios and the different operating contexts across countries, the fact that the tech to total staff ratio for large Nigerian banks is smaller than for some large African banks[75] and global banks[76] may only suggest room for growth.

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[69] GTCo Plc 2024 Annual Report
https://gtbank-plc.files.svdcdn.com/production/annual-reports/2024-annual-report/GTCO-FY-2024-Annual-Report_2025-04-15-073543_bafs.pdf?dm=1744702544
GTCo reported gross revenue of N2.148 trillion ($1.4 billion USD), MTN Revenue N3.358t

[70] MTN (Digital Services 34 , Inf Systems 124, Network Group 312)
https://doclib.ngxgroup.com/Financial_NewsDocs/43206_MTN_NIGERIA_COMMUNICATIONS_PLC-_QUARTER_5_-_FINANCIAL_STATEMENT_FOR_2024_FINANCIAL_STATEMENTS_FEBRUARY_2025.pdf

[71] A two-tailed p-value of 9.80249×10-7 is well below the common significance level of 0.05 suggesting a rejection of the null hypothesis. This means that there is a statistically significant, positive, and moderate correlation between the two datasets of total staff strength and total IT staff.

[72] Fischer's z transformation is ~0.442, standard error SE is ~0.164, confidence interval for z is: (0.121, 0.763) and the 95% confidence interval for the Pearson correlation coefficient is (0.261, 0.549) for sample size of 128.

[73] World Trade Organization's (WTO) Trade Policy Review of Nigeria, WT/TPR/S/462
https://www.wto.org/english/tratop_e/tpr_e/s462_sum_e.pdf

[74]https://intelpoint.co/insights/financial-services-dominated-nigerias-1-5bn-digital-services-exports-in-2024-2/

[75]Kevin Johnston and Grandon Gill (2017). Standard Bank: The Agile Transformation
January 2017. Journal of Information Technology Education Discussion Cases6(1):1-31

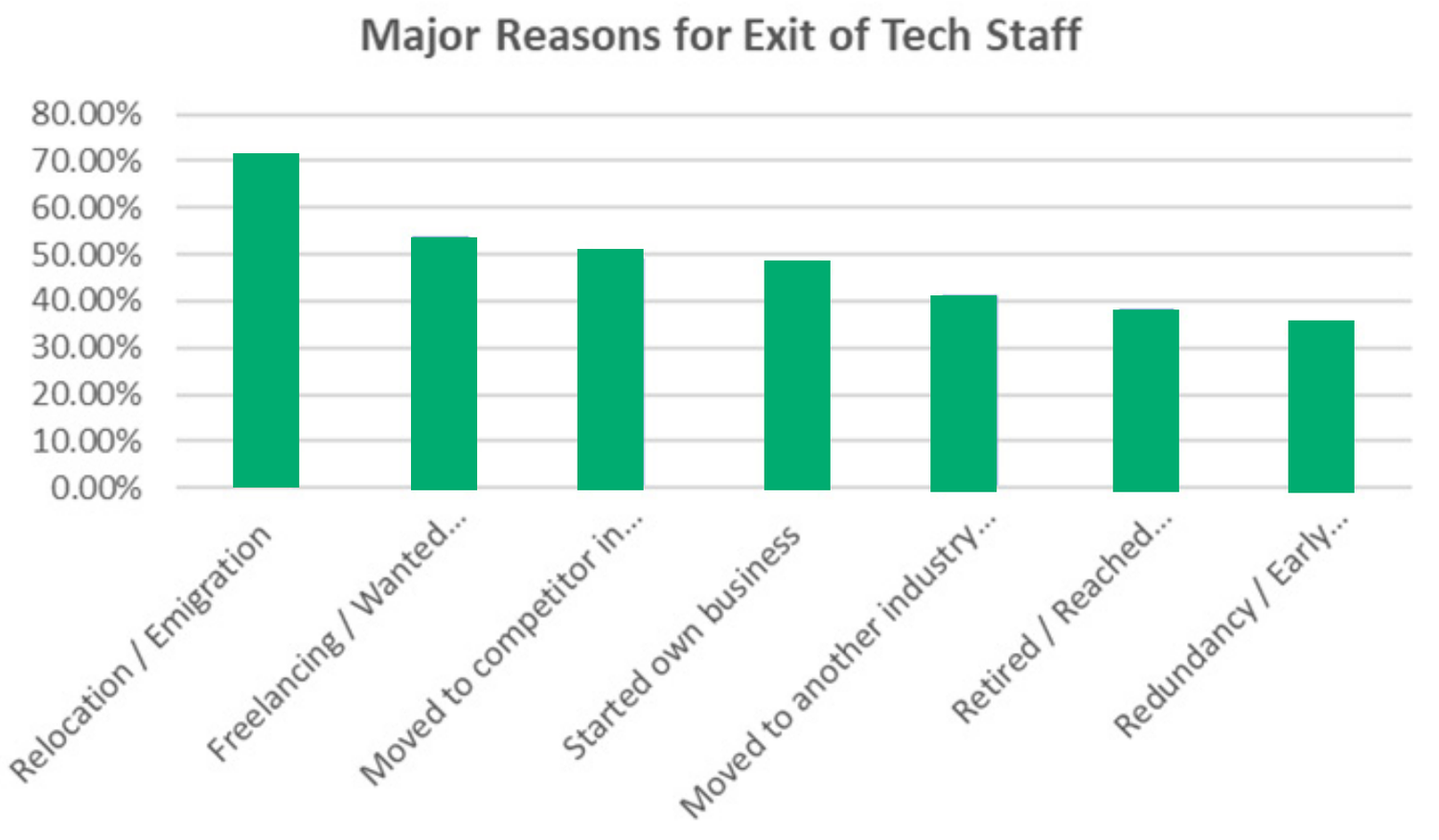
[76]https://www.jpmorganchase.com/newsroom/stories/driving-innovation-from-our-global-headquarters#:~:text=Watch%20the%20video%20to%20learn,tech%20innovation%20for%20the%20firm.

4.2 Mobility and Emigration and Nigerian Tech Professionals

Survey findings confirm that emigration remains the major reason for Tech professionals in Nigeria to quit their jobs. The United States remains the largest destination country for Nigeria's Tech talent with increasing numbers for Canada.

The major reasons for IT staff exits are depicted in Figure 4.2 below:

Regression analysis of the survey data of skilled IT persons that left Nigerian organizations between 2023 and 2025 is inconclusive. Based on the information provided, very limited extrapolations may be made. This is due partly to the limited disclosure of data on emigrated ex-employees by the respondent organizations who are their former employers. In addition, some employers have limited information on the destination of exiting employees. However, the ICT telecoms segment recorded a higher emigration data of their skilled IT employees relative to other segments.



Key Findings on Emigration of Tech Staff

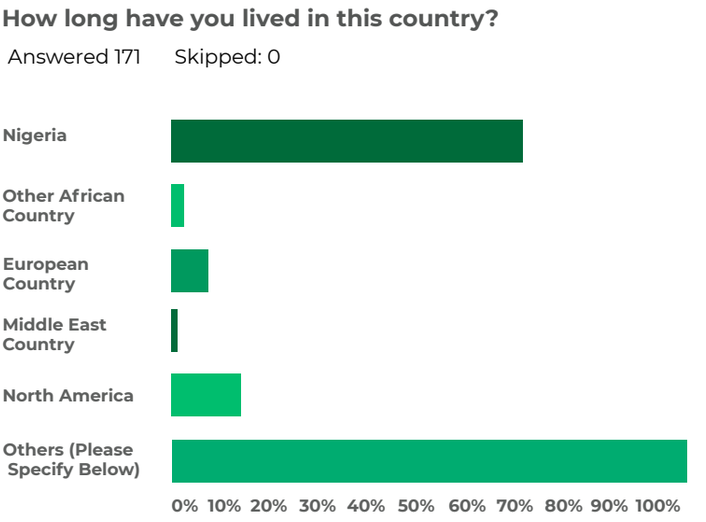
Of the 109 companies that completed the question on the total number of skilled staff in IT, there were an aggregate of 1478 staff with an arithmetic mean of 13.5 skilled employees in the IT function. Of the seven main drivers for IT staff leaving their places of employment, relocation or emigration was the clear and foremost driver, with over half of the organizations losing key staff to other countries in the recent 24 months.

From the survey data analysis, there is a pattern of limited inter-sector mobility of IT professionals, with most persons working in the same industry. This is supported by secondary data collection and a randomised review of profiles of Nigerian IT professionals on LinkedIn, the leading online professional networking platform, which suggests that many IT/ ICT professionals who are in full-time employment stay in the same industry for most of their employment careers. Further investigations suggest that this limited inter-sector mobility of IT/ICT professionals who stay within Nigeria may be linked to a wide gap in compensation packages, and the general observation that only a few industries, such as ICT, Oil & Gas, Financial Services and Professional Services, can afford the higher bracket of skilled ICT professionals. Another contributory factor based on comments from industry professionals is that many IT/ICT professionals in Nigeria are skilled in very narrow domains, and despite acquiring softer skills and project management capabilities as they progress through middle management, they may really not be willing to move outside their comfort zones and risk moving to another industry.

The broader impact of this skilled labour immobility is that in the short-term, certain sectors or segments, such as healthcare or education, would continually have less and less of high-quality and skilled Tech talent to support them. The longer-term impact is that this domestic immobility of labour would further suffocate key sectors such as education, leading to a cyclical spiral where available Tech talent is concentrated in a few high-paying sectors, leaving key IT gaps in the other key sectors of the economy.

4.3: Results and Findings from the Individual Survey

A total of 171 individuals completed the individual survey of IT professionals. Most of the respondents, approximately 77% are based in Nigeria, while 12.9% are based in North America and 6% in Europe.

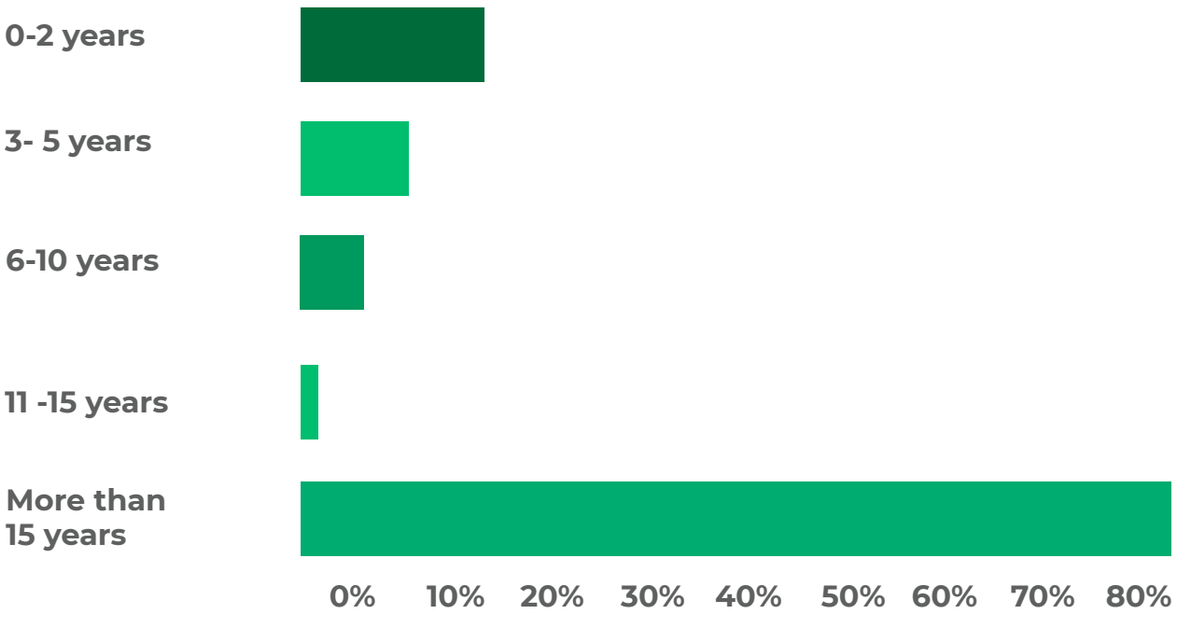


About two-thirds of the respondents have at least a university first degree or a Bachelor's degree, with 30% having a first degree as their highest academic qualification and 32% a Master's degree as their highest academic qualification. With respect to the field of study or professional qualifications, about 65% of respondents had backgrounds in technology, engineering, software, and computing.

Nigerian tech ecosystem and the Nigerian Tech Job Market. Third, the realistic view by business strategists argue that long-run business planning should factor in anticipated market shocks, business pivots and business model innovation. Key issues in the pause of some Nigerian Tech bootcamp companies for their apprentice program for junior Tech talent raise some critical issues:

How long have you lived in this country?

Answered 127 Skipped: 1



Key themes from the individual survey comments included the following.

- "Improving the quality and quantity of skilled digital and tech professionals in Nigeria requires a multi-pronged approach involving education reform, infrastructure investment, ecosystem development, and regulatory support."

- "Revamp Education and Training Systems for Policy-Makers: Integrate digital skills (e.g., coding, data science, cybersecurity) into the basic and secondary school curriculum. Revamp Education and Training Systems for Policy-Makers: Integrate digital skills (e.g., coding, data science, cybersecurity) into the basic and secondary school curriculum. Invest in teacher training and up-to-date equipment for STEM-related subjects. Revamp Education and Training Systems for Policy-Makers: Integrate digital skills (e.g., coding, data science, cybersecurity) into the basic and secondary school curriculum."

- "More industry and institution linkages beyond internship alone. Alignment of curriculum with industry needs"

- "Focus on skill building and practiced-based education. Especially in areas of digital transformation that are relevant to the business. One of those areas is AI, software engineering and cybersecurity".

4.4 Qualitative Analysis: Recommendations from Respondents

A thematic analysis of the survey responses reveals that the themes associated with recommendations from smaller firms with less than 100 employees differ from the priorities of firms with more than 500 employees. The relatively smaller firms recommend policy changes around the educational curriculum and "educational infrastructure" while larger firms' recommendations focus more on professional development.

Key themes from respondents centred around:

- Strengthening the Quality of ICT Pipeline from Nigerian Schools: "More relevant and current curriculum for employability. Readiness to contribute straight out of school"
- Continuous training in new domains
- Enabling Infrastructural adequacy,
- Encouraging local governments to serve as skilling centres (through public-private partnerships) across Nigeria
- Intensify training and capacity building
- Enhance relevant and current curriculum for employability
- Greater support for learning digital technology in schools. Provision of exchange programs.

Overall, two major broad themes emerge from the respondent comments. The first is the challenging operating environment for IT and by implication for IT professionals in Nigeria. This is reflected in various comments around the cost of doing business and the lack of reliable infrastructure that continues to be a push factor Tech professionals. The second is the professional training for emerging Tech professionals and the imperative for having a structured approach to redesigning the educational curriculum to be more digital-friendly and forward-looking towards emerging technologies. The detailed application of these recommendations would be reflected in the next section on recommendations and conclusions.

SUMMARY OF KEY FINDINGS

INDUSTRY CASE STUDY: TECH SKILL SHORTAGE, SKILLS MISMATCH OR LACK OF DYNAMIC MANPOWER PLANNING

Tech bootcamps or software bootcamps in Nigeria became popular in Nigeria beginning around 2012-2014. The first era led by Andela lasted from 2014 to 2019. By 2019, the company had made a significant shift in its business model in [2019] when it began to focus on placing more experienced talent and transitioned to a fully remote, global talent marketplace. The in-person, junior-focused training programs ceased, and focus shifted to connecting pre-vetted, mid- and senior-level developers from across the globe with partner companies. This marked a clear end to the earlier bootcamp model.

Interestingly, as Andela was pivoting, Decagon was launching its own bootcamp in 2018 with its first cohort of programming or software engineering students beginning same November of that year. By 2023, Decagon decided to pause its developer training and focus on placing its existing backlog. Three expert explanations have been proffered. First, manpower economists argue that this may be linked to "business cycles". Every economy and every market has its cycle. It is no coincidence that Andela's era was [5] years and the same with Decagon. Second, from the perspective of Nigerian business, pragmatists argue that this is simply an indicator of the current challenges in the Nigerian tech ecosystem and the Nigerian Tech Job Market.

Third, the realistic view by business strategists argues that long-run business planning should factor in anticipated market shocks, business pivots and business model innovation. Key issues in the pause of some Nigerian Tech bootcamp companies for their apprentice program for junior Tech talent raise some critical issues:

• Market Saturation at the Junior Level: While there's a huge demand for experienced, senior developers globally, the market for junior-level developers, especially within Nigeria, is becoming increasingly saturated. Many companies, both local and international, are reluctant to hire and train junior talent due to the time and resource investment required.

• Economic Headwinds: Nigeria's economic conditions, including high inflation and a volatile exchange rate, have had a direct impact. The cost of living and operations has risen, making it harder for bootcamps to sustain their business models, particularly those that relied on income-sharing agreements where graduates pay back a percentage of their salary.

• Loan Repayment and Recovery Challenges: Recovering costs from trained apprentices could be contingent on several factors including the timeliness of the trainee getting a job that could reasonably repay the loan, integrity of the apprentice, and security of the contract.

- Shift in Business Model: Pivoting to a marketplace or to alternative placement models may be an alternative business model move to focus on different revenue streams and a different kind of placement, which avoids local job market risks and volatilities.

The Broader Picture

This situation isn't unique to Nigerian bootcamps. It reflects a broader trend within the African tech space, where companies shifted their focus from training junior developers to placing experienced senior talent.

This strategic shift away from training and toward talent placement or a different business model altogether demonstrates a recognition that the previous models may not be long-term sustainable. The intent may be sound, but the long-term sustainability of industry training programs is a key success factor in economies across the world.

5.FIXING THE GAPS: RECOMMENDATIONS AND CONCLUSIONS

Key findings from the industry survey confirm that industry stakeholders in the Nigerian Tech industry are unanimous that there is both a Tech skills gap and a skills mismatch. Indeed, the findings of the industry survey presented in Section 3 confirm that emigration or brain drain is the single most important driver of why existing Tech talent leave their current employment in Nigeria. However, the extent of this problem varies significantly depending on whether the lens is from the perspective of the **startup ecosystem** or **legacy private-sector institutions**. Nonetheless, all parties agree that fixing the Nigerian Tech skills shortage would require fixing the talent pipeline as well as reinventing the incentive system for Tech talent. Both industry and government policy-makers also agree that Nigeria has a fundamental pipeline problem deeply-rooted in an outdated educational system whose curriculum and orientation are decades behind industry requirements.

Noteworthy is that the Federal Ministry of Education in August 2025 announced a bold curriculum redesign in basic and technical education as "a *comprehensive shift to make education relevant, inclusive, and transformative*". Beyond this policy announcement, industry stakeholders still recommend a transparent implementation plan for this new curriculum so that it does not end up as another superficial policy change killed by weak coordination at the state government level and inadequate education budgets. However, the shift from Nigeria's legacy education models to a more agile, skills-focused approach would need to transcend basic education and be more comprehensive. The broken pipeline must be fixed concurrently at all three levels – basic education, technical and vocational, and at the university level. Until this pipeline problem is fixed or at the minimum addressed in a holistic manner, any industry solutions or even Governmental solutions from an ICT perspective that do not have the Federal education regulators taking full ownership of cleaning the problem, would at best be another band-aid.

Reviews of Nigeria's attempts to build junior Tech talent in the past decade, from 2015 to 2025, have provided some initial learning points worthy of reflection. Many of these reviews are mixed, and there have been as many successes as failures. Although commendable, private interviews conducted on an anonymous basis with key players in the non-accredited private sector Tech academies or bootcamps attempting to restart Nigeria's Tech talent training confirm that these solutions are neither holistic nor sustainable.

Since 2023, the Federal Ministry of Communications and Digital Economy has launched laudable initiatives to develop Nigeria's Tech talent.

These initiatives, such as the National Talent Export Programme (NATEP) and the 3 Million Technical Talent (3MTT) Programme, aimed at developing and exporting Nigerian digital talent. NATEP, has the objective of positioning Nigeria as a global hub for talent sourcing and exports. Specifically, the National Talent Export Programme (NATEP) aims to create 1 million jobs in Nigeria by facilitating talent outsourcing and physical talent exports, focusing on enhancing competitiveness and driving sustainable growth through service exports. Similarly, the 3 Million Technical Talent (3MTT) Programme, supported by MTN Nigeria initiative, aims to build Nigeria's technical talent backbone and power the digital economy, positioning Nigeria as a net talent exporter.

Building on the quick wins of the combination of the ambitious initiatives of the Federal Government of Nigeria and the various private-sector-led Tech academies, leading Nigerian experts [77] recommend that an integrated programmatic approach that introduces some modifications to the current approach while giving the Federal Ministry of Education a frontal role in its implementation so as to have a policy and sustainability element. In line with global best practices, close cooperation across all regulatory and governmental agencies in Nigeria would be key in triggering a technology-led structural transformation that is sustainable.[78]

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[77] Private interviews with a former Professor and Cabinet-level officer in The Presidency of Nigeria who was involved in some of Nigeria's manpower planning and policies

[78] UNCTAD (2025) Technology and Innovation Report. https://unctad.org/system/files/official-document/tir2025_en.pdf

COUNTRY CASE STUDY I: FIXING THE BRAIN DRAIN

Several developing countries, particularly in Asia, have successfully addressed the "brain drain" of their tech workers by shifting focus from reactive measures focused on preventing emigration to actively promoting "brain circulation" and "brain gain." The key recipe has been by combining deliberate government policies with robust private sector investment to create a more attractive and competitive tech ecosystem. Relevant country case studies with learnings for Nigeria are **China, India, South Korea and Taiwan.**

However, any cross-country learnings must recognize Nigeria's unique peculiarities as many of the Asian strategies may not be applicable to Nigeria for 2 reasons. First Nigeria has a Federal system so implementing any reforms or initiatives have to be done in a well-thought through manner that recognizes the authority, autonomy and priorities of the respective 36 State Governments. Second, the exchange rate of I US dollar to about 1,560 Nigerian Naira creates a major pull factor to earn foreign currency for skilled Tech workers, an offer that cannot be matched by many domestic companies or state governments.

Key Learnings

1. Adopt a unique Nigeria-specific strategy and don't copy the Asian multi-pronged approach of "Creating strong "pull" factors to counter the "push" factors that drive skilled workers away.

While many of the Asian countries placed emphasis on **Strategic Investment in Research and Development (R&D) and Education** and making massive, sustained investments in science and technology education, research institutions, and innovation hubs and world-class research parks and labs, often in partnership with leading global institutions, Nigeria's fiscal realities would require innovative thinking to adequately fund such investments on a massive scale large enough to have an impact.

- **Practical Lesson for Nigeria:** While many of the Asian examples rely on a fully developed sector of the economy to catalyse the Tech ecosystem or a huge, centralized government budget to succeed, Nigeria could consider the Starting Small, Thinking Big approach. These targeted, strategic investments can have a ripple effect.

- Nigeria's ability to significantly increasing the national budget for education, especially in STEM fields may be constrained by short-term implementation challenges. Nonetheless, a practical option for Nigeria is to enable and steer private sector institutions to make these targeted investments such as establishing specialized tech universities and research centers.

An immediate quick-win is offering incentives to new vocational centres, polytechnics and universities that focus only on very well-defined STEM courses and industry-relevant skills, with clear fast-track timelines to meet global benchmarks. Learning from Taiwan, rather than continue to award new university licences to universities offering 20 courses and 6 Faculties in their first 3 years, juicy incentives can be provided for institutions that focus on only 3 Tech courses for their first 5-10 years , with a clear vision to attain regional and global benchmarks thereby attaining global competitiveness

2. Decentralized Incentive Programs: Nigeria's current fiscals, exchange rate and security situation may not position it in the short term to provide sizeable incentives to returnees similar to **China's "Thousand Talents Plan"** and India's " **Re-entry Fellowship**" with competitive salaries, research grants, and subsidized housing. Nonetheless, the Asian examples indicate that the incentive structure changes for skilled professionals once they approach financial independence, so the incentives do not have to be monetary.

- **Practical Lesson for Nigeria:**
  Nigeria's federal structure provides a strategic opportunity for Decentralised, Market-driven Innovation and Incentives enabled by the Federal Government yet designed by participating State Governments . Instead of mandating or suggesting one-size-fits-all policies from the Federal level, a collab between the Federal Ministry of Education and the Ministry of Communications and Digital Economy could act as **enablers and coordinators,** not as implementers.

For instance, given the inclination by some Nigerians who have obtained their citizenship in Western countries and settled their families comfortably to consider returning home, a State-Govt Tech Hub model that is Federal Government-incentivised yet supported by multilaterals in terms of quality assurance standards is a practical option for fast-track career pathways. Learnings from Nigeria's mistakes and slow progress with earlier Federally-driven laudable initiatives such as the Special Economic Zones for Agriculture suggest that a State-driven , Federally-enabled model may work best given Nigeria's peculiarities

- A "Tech Hubs of Excellence" Model: The Tech Hub of Excellence focuses on lean and agile mini Tech parks rather than the big Tech campuses of Asia.

By implementing a leaner, quicker -to-deploy model and offering Nigerians in Diaspora the opportunity to run these new Tech Hubs on a shared revenue model, Nigeria would benefit more from the lean models of South Korea and Taiwan.

For instance, based on comparative advantage, Lagos could focus on fintech and software-as-a-service (SaaS), Rivers State could leverage its oil and gas expertise to develop energy tech, and Kano could build an e-commerce and logistics tech ecosystem. This specialization allows for concentrated investment and fosters local expertise.

3. Leveraging the Digital Diaspora as an Asset

- Learning: Many of the Asian countries' success stories began with their citizens abroad. Instead of seeing them as a loss, they were viewed as a vital network. Indians in the United States that have risen to become Global CEOs of Fortune 500 companies are soft bridges for knowledge transfer, investment, and business connections. Similarly Indian engineers in Silicon Valley, for example, were instrumental in the outsourcing boom in India.

- Practical Lesson for Nigeria: While skilled IT Nigerian professionals who have physically emigrated may not be abundantly at C-level in Fortune 500 companies, Nigeria's emerging demographics reveal a subset of Digital Diaspora who don't necessarily want to live permanently in a cold Western country yet want to enjoy the benefits of earning premium salaries in USDollars while living in a relatively low-cost city in Nigeria. Such Digital Diasporan Nigerians have strong global networks that can be tapped by their respective State Governments if a structured mechanism or digital platform is provided. The focus should be on building a global community that actively contributes to Nigeria's growth from wherever they are.

COUNTRY CASE STUDY II: FIXING THE SKILLS MISMATCH - A COORDINATED APPROACH TO FIXING THE COUNTRY'S TECH TALENT PIPELINE

Certain countries have been able to successfully address their tech skills mismatch by tackling all three levels of education—basic, vocational, and university—through a holistic, long-term national strategy.

The most prominent examples are **Estonia** and **Finland** in terms of speed of implementation, and **Germany** in terms of long-term proven sustainability.

These nations recognized that a robust tech talent pipeline is neither about a one-track solution of producing more computer science graduates or creating bootcamp academies to retrain non-technical graduates into junior developers or programmers: it's about systematically creating a culture of digital literacy and innovation from a very young age.

While Nigeria has a more heterogenous and diverse population with a Federal system and runs a concurrent educational system that may make it complex to run the Estonia or Finland model

The Coordinated Approach

The success of these countries lies in a few key, interconnected strategies:

1. Basic Education (Primary and Secondary):

Digital literacy and coding are integrated into the national curriculum from an early age, often starting in elementary school. The goal is not just to teach children how to use technology but to understand it and think computationally. This creates a large pool of digitally competent young people who are prepared for more advanced learning.

2. Vocational and Technical Education:

They have a strong and highly valued system of vocational education that is closely aligned with the needs of the industry.

Students can choose to pursue specialized technical programs that provide hands-on skills in areas like cybersecurity, mechatronics, and IT administration.

These programs are often designed in collaboration with the private sector, ensuring that the skills taught are directly applicable to the job market. This provides a clear, high-quality alternative to a traditional university degree.

3. University Level: Universities focus on cutting-edge research and development, producing graduates in high-demand, specialized fields like artificial intelligence, data science, and advanced software engineering.

4. Lifelong Learning: A critical component of their strategy is the focus on continuous learning and upskilling. They offer government-supported programs that help existing workers re-skill and adapt to new technologies throughout their careers. [79]

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[79] OECD https://www.youtube.com/watch?v=9QOyBVr0cV4

PRACTICAL APPLICATION TO NIGERIA

Nigeria's Federal system where State Governments have concurrent powers on basic education and technical/ vocational education, as well as budgetary constraints, indicate that adopting a big-bang approach in a country would not work. Other practical implementation considerations also indicate that simplistic cross-country transplants of what has worked in other countries may not apply to Nigeria,

While the Estonia and Finland successes may be in much smaller countries, a hybrid model run with elements of Singapore's Skills Future and Germany's dual education as a PILOT PROGRAM in some selected states in Nigeria may be more relevant to Nigeria's realities.

Key steps include:

- **Federal Govt and selected State Govt jointly approach a VET (Vocational Education and Training) program** focused on IT/ ICT Skills. Students can choose a vocational track that combines classroom instruction at a public vocational school with apprenticeships at a private company. This model, which is a major part of the German economy, ensures that graduates have both the theoretical knowledge and the practical, hands-on skills needed for the job from day one.

- **Federal Govt and selected State Govt jointly approach a VET (Vocational Education and Training) program** focused on IT/ ICT Skills. Students can choose a vocational track that combines classroom instruction at a public vocational school with apprenticeships at a private company. This model, which is a major part of the German economy, ensures that graduates have both the theoretical knowledge and the practical, hands-on skills needed for the job from day one.

- **Network of Pilot Partners form a Collaboration**: Selected secondary schools and VET institutions together with ICT-focused universities such as Covenant University and NUTM together with large corporates like Airtel, MTN or Dangote Group have an industry-focused path where students learning, and certifications culminate in industry-recognised ICT qualifications.

This approach is more systematic and structured than the ad-hoc private sector academies in Nigeria aiming to retrain graduates to become junior IT programmers over 6 months, with no guarantees of knowledge retention of the domestic economy.

- **Develop a sustainable incentive-led financing system to ensure risk mitigation:**

  For the pilot State Governments and pilot schools, eligible students could for instance be wards of low-income workers who have been consistent tax papers in that State Government. This condition would minimise arbitrage. By designing modular programs as is applicable in certain areas of Singapore, India and Germany, graduates from the industry-focused training, the focus is not to provide an all-in-one solution to the country's ICT shortages. Rather, the programmatic benefit is to provide a domestic model that works. From country experiences, once a workable industry-led program is successful even if only a small scale in one State Government in an integrated manner with private sector universities and industries, this would trigger innovation in the country's educational system for other more creative experiments that are sustainable. Based on cross-country success stories, well-designed industry-led training programs in conjunction with universities are proven to be more effective than the ad-hoc bootcamps that Nigerian have witnessed in the decade from 2015-2025.

- **Industry Partnership:** The success of the dual system is predicated on the deep partnership between the government, the education system, and the private sector. Companies are heavily invested in training their future workforce, viewing it as a long-term investment rather than a cost.

Both Singapore and Germany demonstrate that irrespective of a country's ordinated approach is possible on a larger scale. They show that by creating a national strategy that values technical and vocational skills as highly as university degrees and by fostering a culture of lifelong learning, a country can build a robust and future-proof tech talent pipeline.

Interestingly, this model has worked even in some African countries and was partly used in the early post-independence days in Nigeria where the pipeline of engineers in Nigeria's

This comprehensive, top-down approach ensures that the entire educational pipeline is geared towards producing a tech-savvy and highly skilled workforce, effectively addressing the skills mismatch from multiple angles.

5.1 Implementation Pathways

Beyond a holistic revamp of Nigeria's educational system with an industry-led programmatic approach for IT/ ICT Training, global leading practices suggest that Nigeria may be able to implement at least 3-4 structured pathways to boost skills availability and retention of IT/ ICT professionals.

- First, most stakeholders in both the **startup ecosystem** and the legacy **private sector** institutions agree that Nigeria needs a proper IT/ ICT Skills Database. Both the 2017 joint report of the United Nations Industrial Development Organization and Nigeria's Industrial Training Fund (ITF) commissioned to the National Bureau of Statistics (NBS); as well as the 2023 prepared by CcHUb and NITDA acknowledge that from first principes, the development of a systematic and credible database for accurate skills planning is non-negotiable. Ironically, developing a database is an elementary skill for IT professionals so the development of the Nigerian National IT Skills Database can be a profitable venture in itself providing value-added services even beyond the ICT Sector.

  This Tech Database would be very complementary to the new private-public sector collaboration for training junior Tech talent and would be very beneficial to the lower rungs of the Tech pyramid even in today's workforce.

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- Second, virtual emigration and dynamic work models have come to stay. Notwithstanding any changes in geopolitics, immigration policies and macro-economics that may make physical emigration from Nigeria increase, decrease or become less attractive, the current pace of change would gradually redefine the notion of full-time employees (FTEs) of highly skilled Tech workers. The follow-through implementation of newer work models for Nigeria's digital diaspora would therefore become more urgent for Federal authorities in Nigeria. The World Bank in conjunction with the Centre for Global Development had recommended structured pathways and skills partnership for ICT professionals in Nigeria migrating to Europe.

- By implementing this incentive-led structured bilateral migration pathways, the arrangement may yield more synergies to the sending country (Nigeria) via technology transfers back to Nigeria, and in the human capital accumulation to support prospective ICT professionals. An example of this would instance be a Big Data and AI architect or a Cloud Data Engineer who is originally Nigerian though currently works with a Big Tech company in Ireland agreeing to spend 2 weeks of their annual vacation in Nigeria. One week of the 2 weeks could be working at commercial rates with Nigeria's leading telecoms companies who in turn pay the same engineer for a second week to teach some practical modules at a couple of Nigerian universities. Invariably, this second initiative would also benefit from a dynamic Nigerian National IT Skills Database.

- Third, the digital divide in Nigeria and the disconnect between high mobile phone penetration with low internet and broadband penetration raises a more deep-seated issue of how a digital education program that begins at the basic education level (Primary School to Junior Secondary 3)

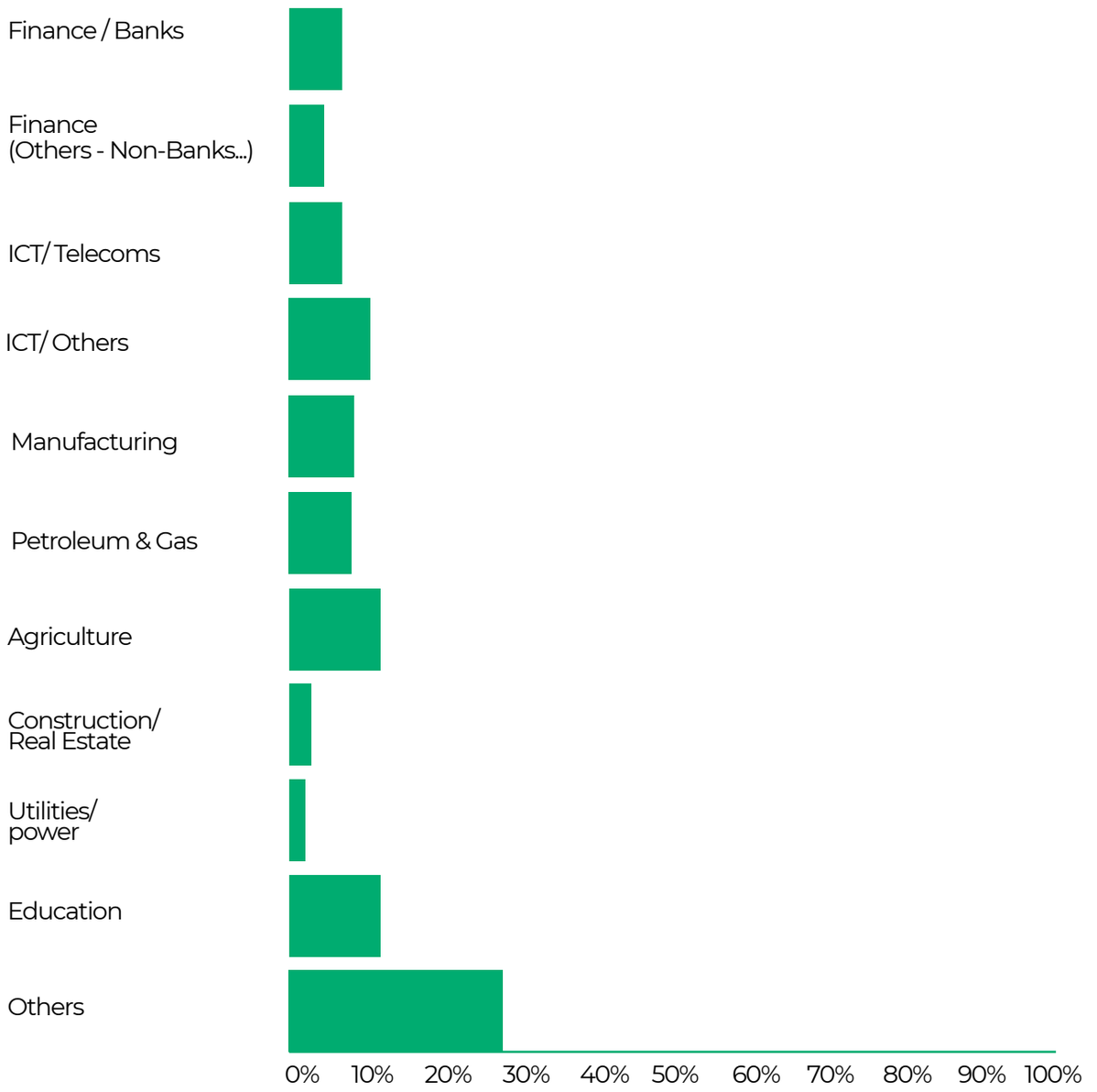
can be implemented when half of the country's population of school age may not have access to these tools or facilities. Experts agree that this is one of the stronger rationale for an integrated collaboration between the Federal Ministry of Communications and Digital Economy to implement a programmatic approach that is owned by the Federal Ministry of Education.

Overall, the implementation pathways would have to be categorised into 4 components :

- Quick-wins
- Short-term Initiatives
- Medium-term Initiatives
- Long-term Initiatives

APPENDICES

Figure A. 1 Industry Classification of Organizations in the Survey



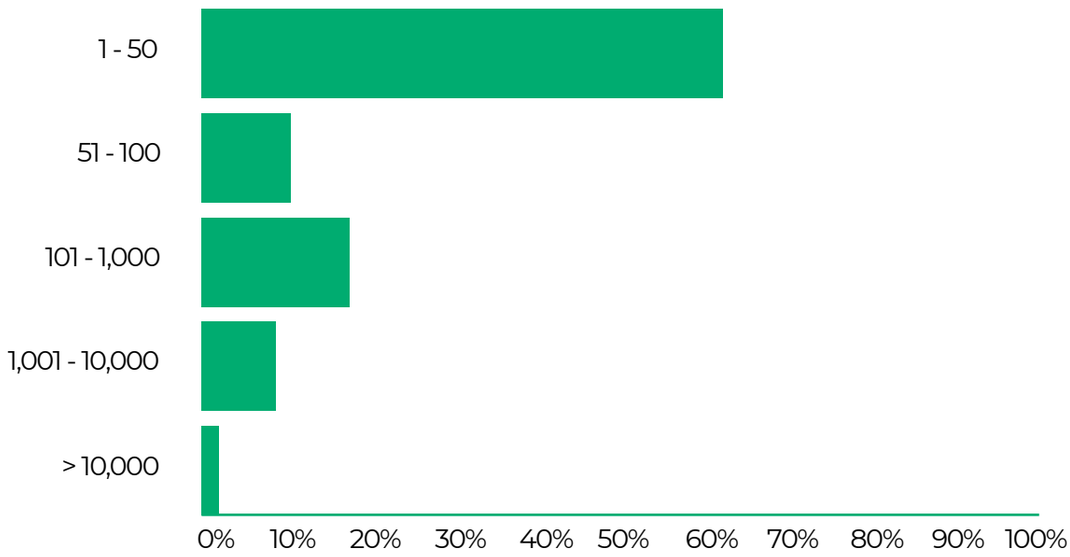
Of the 131 respondent organizations, the highest response rate, apart from those that indicated the broad category of "Others" was the ICT Sector with 17.5% of total responses. This aligns with a priori expectations, as it is expected that a fair number of Tech professionals would work in the ICT industry. In the "Others" category, a quarter of the respondents (10 organizations) identified a "Social Services and Civil Society) while four respondents each identified as "Professional and Consulting Services" and "Government and Public Sector, and three organizations as healthcare services.

Appendix A2 : Employee Size of Respondent Organizations

Most of the organizations (about 72 %) had fewer than 100 employees. 62% of the respondent organizations have between 1-50 employees.

Total number of full-time employees (FTE) in your organization (as of June 2025):

Answered: 129 Skipped: 4



APPENDIX: Chapter 1

Key definitions:

Occupational Approach:

This method focuses on the types of jobs and skills required within different industries.
It uses classifications like the International Standard Classification of Occupations (ISCO) to categorize jobs based on their skill level, tasks, and responsibilities.

ISIC (International Standard Industrial Classification of All Economic Activities):

This method categorizes industries based on the types of goods and services they produce. It provides a framework for classifying economic activities into broad groups, such as agriculture, forestry, fishing, manufacturing, construction, and services. The ISIC is widely used for collecting and reporting statistics on economic activity.

ICT Industry according to Gartner):

According to Gartner, the ICT industry is segmented into five key areas: Data Centre Systems, Devices, Software, IT Services, and Communication Services. These segments represent the major areas of spending and growth within the global IT market.

Data Centre Systems: This includes hardware, infrastructure, and services related to data centres, like colocation, storage, and cloud services

Devices: This segment encompasses electronic devices, including computers, peripherals, and networking equipment.

Software: This includes enterprise-class software, such as applications, operating systems, and software-as-a-service (SaaS) solutions.

IT Services: This segment covers the application of business and technical
expertise to enable organizations in the creation, management, and optimization of information and business processes.

Communication Services: This includes telecommunications services, such as
fixed and mobile network infrastructure, voice and data communication services, and related services

Digital technology sectors outside of ICT:

According to Gartner and PwC, segments of digital beyond traditional Information Communications Technology (ICT) include areas like digital operations, digital product/ customer experience design, and business model transformation.

These areas involve using digital technologies to transform how businesses function, engage with customers, and innovate their business models.

Digital Operations:

This focuses on streamlining and optimizing internal processes using digital tools and technologies.

Digital Product and Customer Experience Design:

This involves digital product design and enhancing the customer journey by leveraging digital channels and technologies to improve interactions and satisfaction.

Digital Trust and Cyber: Digital identity protection, digital safety and transaction integrity.

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