# IT Talent Gap Assessment, Nigeria

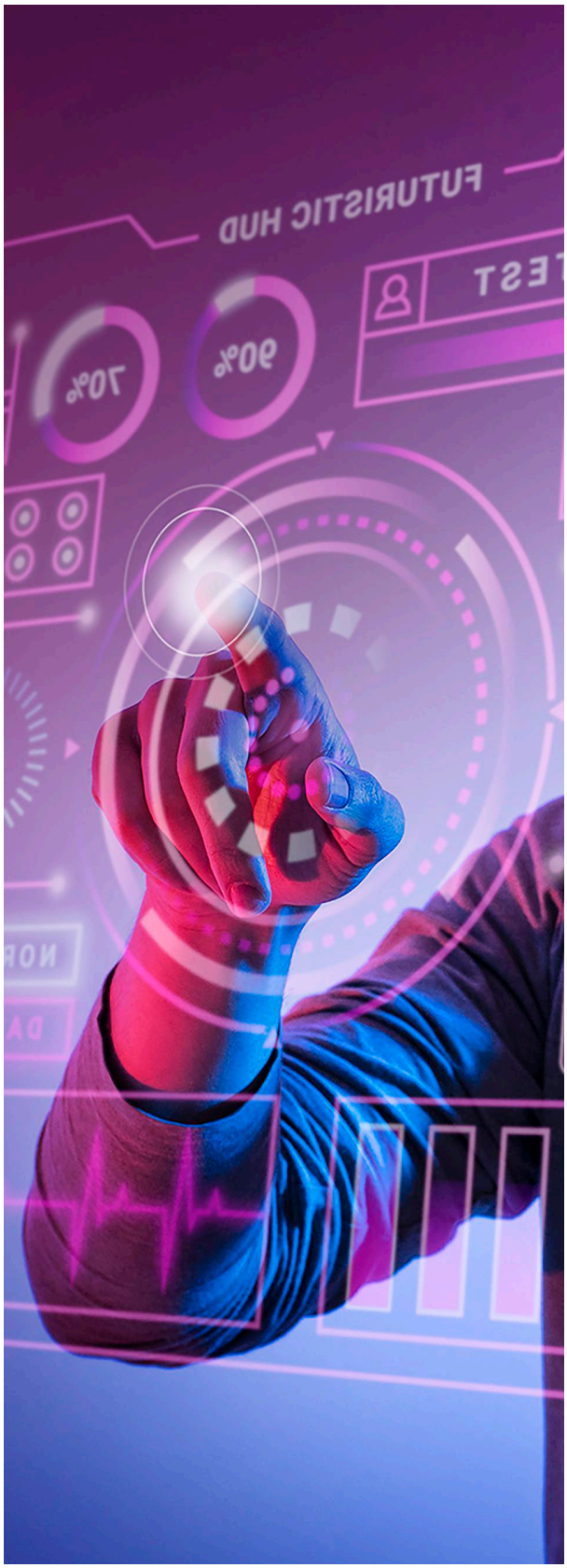
Co-Creation Hub

NITDA

# Executive Summary

The IT industry in Nigeria is experiencing significant growth, but the availability of skilled IT talent has not kept pace with this expansion. This research report presents the findings of the IT talent gap assessment conducted in Nigeria, which aimed to identify the challenges and opportunities facing the IT talent market in the country with specific focus on talent demand and supply spectrums.

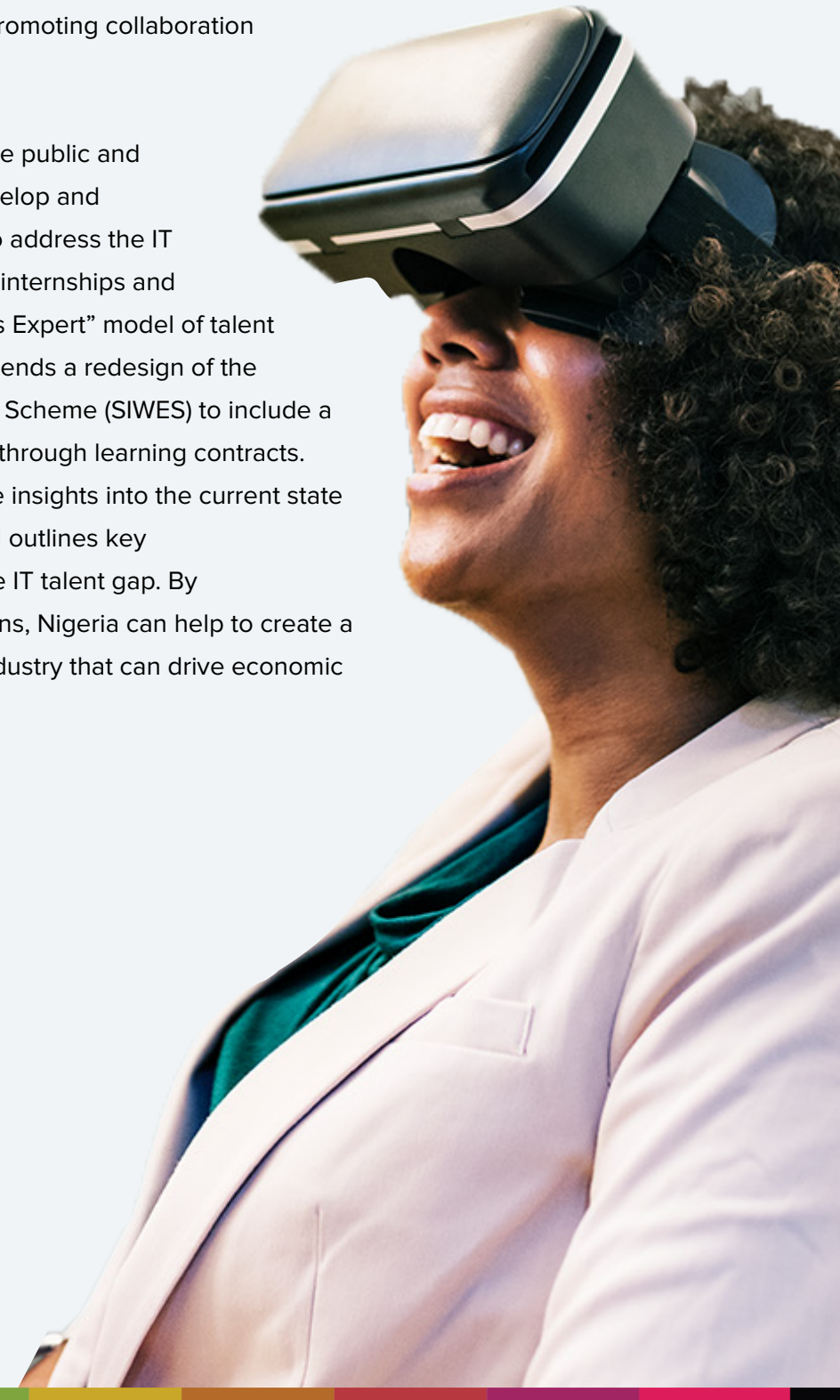
The participants in the assessment include tertiary education institutions students, leaders of universities, ministries, leaders of alternative IT skills training platforms, organizations dependent on IT talents and technology talent headhunters. Surveys and in depth interviews were used in engaging students and other stakeholders respectively. A total of 667 students and 30 stakeholders participated in this assessment. The research established that there has been some gap closing between the 2016 assessment and 2023 such as an increase in IT talent supply through the alternative IT skills training organizations,a rise in tech hubs, an increase in foreign investment for the technology ecosystem, and growth in remote work. However, the report also identifies the scarcity of  senior IT talents to handle high level  technology projects due to their massive exit from the country and also  the scarcity of internship, apprenticeship, and mentorship programs for the junior IT talents to sharpen their skills.



The study recommends more investment in mentorship and apprenticeship programs to bridge the gap and ensure a more adequate supply of quality IT talent to meet the high demand locally and internationally.

The research also highlights the need for increased investment in IT education and training programs in Nigeria. Furthermore, the report identifies the importance of building a supportive ecosystem for IT talent and digital entrepreneurship in Nigeria. This includes creating favorable policies and regulations, providing funding and investment opportunities, and promoting collaboration and partnerships.

The report recommends that both the public and private sectors work together to develop and implement initiatives that can help to address the IT talent gap, such as apprenticeships, internships and adoption of the “Google  Developers Expert” model of talent mentorship. The report also recommends a redesign of the Students Industrial Work Experience Scheme (SIWES) to include a more practical approach of learning through learning contracts. Overall, this report provides valuable insights into the current state of the IT talent market in Nigeria and outlines key recommendations for addressing the IT talent gap. By implementing these recommendations, Nigeria can help to create a more dynamic and competitive IT industry that can drive economic growth and development.



Keywords:

“Skills”, “Nigeria”, “Technology”,
“Training”, “Students”, “IT Talent”,
“Talent Gap”, “Talent Supply”
“Talent Demand”

## About NITDA (National Information Technology Development Agency

The National Information Technology Development Agency (NITDA) was created in April 2001 to implement the Nigerian Information Technology Policy and co-ordinate general IT development in the country.

The Act (National Information Technology Development Act (2007) mandates the organization to create a framework for the planning, research, development, standardization, application, coordination, monitoring, evaluation and regulation of Information Technology practices, activities and systems in Nigeria.

Its role therefore is to develop, regulate and advise on Information technology in the country through regulatory standards, guidelines and policies. Additionally, NITDA is the clearing house for all IT projects and infrastructural development in the country. It is the prime agency for e-government implementation, Internet governance and general IT development in Nigeria. NITDA is poised to actualise its mammoth mandate through strategic and inclusive stakeholder management, local and international partnership and efficient utilization of resources in the interest of Nigeria

## About CcHUB (Co-creation Hub)

CcHUB is a social innovation center dedicated to accelerating the application of social capital and technology for economic prosperity. The technology hub is the first in Nigeria to serve as an Open Living Lab in which user-driven innovation is fully integrated in the co-creative process of new services, products and societal infrastructures.

CcHUB's methodology is hinged on engaging a community of progressive stakeholders (end-users, subject matter experts, government agencies, businesses, academics, civil societies etc.) who bring their creativity and knowledge to play in co-creating solutions to social challenges faced by the average Nigerian through our open living labs. The resulting innovations are then supported to become sustainable market solutions by providing proactive business support, advice, mentorship and funding through our pre-incubation & research unit.

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# List of Acronyms & Abbreviations

**AFG:** Africa Foresight Group

**CcHUB:** Co-creation Hub

**DEAG:** Ogun State Digital Ecosystem Advisory Group

**GDP:** Gross Domestic Product

**ICT:** Information and communications technology

**MAS:** Minimum Academic Standards

**NBS:** National Bureau of Statistics

**NCC:** Nigerian Communications Commission

**NICTIBIO:** National Information Communications Technology Infrastructure Backbone

**NITDA:** National Information Technology Development Agency

**NUC:** National Universities Commission

**NUS:** Nigeria University System

**OTC:** Ogun Tech Community

**P-YES:** Presidential Youth Empowerment Scheme

**SIWES:** Students Industrial Work Experience Scheme

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# Chapter 1: Introduction

## 1.1 Background

Nigeria's tech ecosystem has evolved over the past decade. With this growth, the shortage of talent has become more apparent; with talent now being sought outside of Africa to build products used in the country. With a population of over 200 million and an astounding unemployment rate of 33.3%, one in three Nigerians who are able and willing to work are unemployed.

Some of the initiatives to solve the talent problem aim to increase the number of people working in the tech ecosystem. This has welcomed the various developer training services such as Semicolon and Decagon, and most recently AltSchool, a Nigerian startup that aims to solve Africa's talent shortage by training newbies to become junior developers. Other programs are also widely used, such as the HGN internship, which finds, develops and places software developers in a 3-month internship. The programmes started by Hotels.ng founder, Mark Essien, began as a pipeline for developers to support Hotels.ng, but has since grown into a key entry point into the technology for thousands of students. This shows how much need it is filling and how much room there is for more services to meet the need.

The National Information Technology Development Agency (NITDA) collaborated with CcHUB in 2016 to conduct a comprehensive analysis of the IT talent gap in the country, with a particular emphasis on the demand and supply sides of IT talent and on elucidating the discrepancies between what IT professionals are taught and what employers need. Insightful information was uncovered. Six years after the initial assessment, on August 16th, 2022[1], NITDA and CcHUB officially re-teamed to conduct a follow-up on the 2016 assessment, but with new data and insights, a more rigorous study approach, and a better grasp of the shifts in both the demand for and supply of technology talent.

*this IT talent gap assessment comes at a crucial time because it will reveal how best to carry out plans for two key areas of His Excellency, President Bola Ahmed Tinubu's governance priority list on job creation and youth engagement:*

It is also important to note that this IT talent gap assessment comes at a crucial time because it will reveal how best to carry out plans for two key areas of His Excellency, President Bola Ahmed Tinubu's governance priority list on job creation and youth engagement: promoting economic growth and development through job creation, and prominently including women and young people in all of our activities.

[1]https://disrupt-africa.com/2016/02/18/cchub-to-lead-analysis-of-nigerian-technical-talent-gap/

## 1.2 The Nigerian IT Talent ecosystem overview

The literature reviewed in this area focuses on topics such as emerging trends in the Nigerian information technology sector, current interventions and support in the Nigerian technology ecosystem from government, academic and private sector perspectives, and employment opportunities and suggestions for improvement. Some important observations:

### (a) Leadership Talent in Technology

Nigeria now leads Africa in the vitality of its tech talent and has made significant strides in its growth over the past decade. According to (Bright, 2016), many young Nigerians living abroad are returning home to develop and start digital businesses because of the rapid growth in its tech sector. Two instances are the co-founders of Jumia and Andela.

### (b) Investment in the technology ecosystem

The Nigerian tech ecosystem has received significant investment in recent years. For example, the startup ecosystem in Nigeria attracted about US$1.8 billion in 2021, which accounts for 35% of all investments made in Africa (Partech, 2021).

Nigeria continued to outperform the rest of Africa in deal volume and size in Q1 2022, raising more than $540 million in 28 deals.

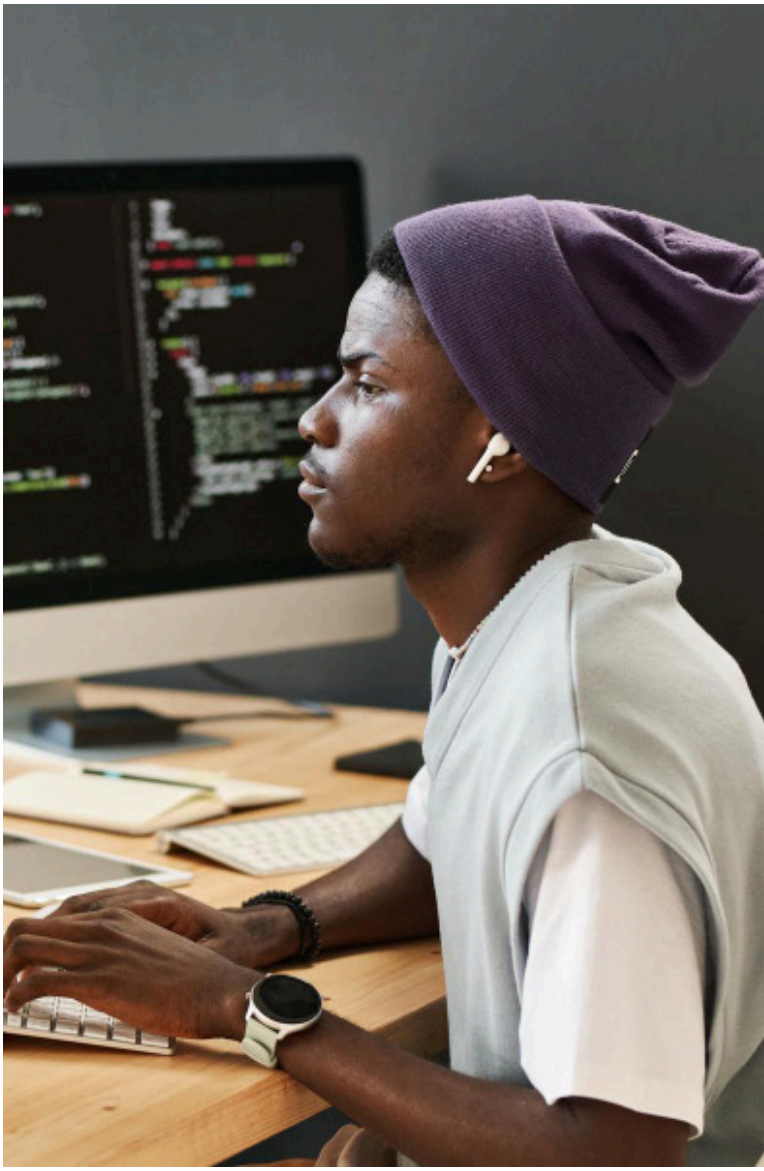
### (c) Youthful Population and Technology

With a population of about 206 million (as of 2020), a developing middle class and a sizable young market, Nigeria is without a doubt Africa's largest market. Around a third of the population between the ages of 15 and 35 years is said to represent a growing pool of tech-savvy people ready to embrace the latest innovations as they become available. A ready market for technology is provided by the large population. The study has shown that Nigeria is on the right track to developing technology talent, but there is still work to be done to create more support, pass more supportive legislation for technology experimentation and invest in its technological infrastructure.

### (d) Gaps and Opportunities

Despite the wealth of ideas that have been voiced and published about the lack of technology talent in Nigeria, the following notable gaps and opportunities for contributions have been identified in the literature:

- There is little or no literature on specific technological skills gaps in the Nigerian information technology sector. This is a fantastic opportunity for this research to detail the key and specialized technology talents and forecast for their supply and demand in Nigeria.
- There is a knowledge gap about the export pipelines of technology talent from Nigeria to other parts of the world. The who's who of technological talent exported from Nigeria and the technical talent that some foreign countries usually seek from Nigeria are subjects that are not well covered in the literature. This is another opportunity for this study to gain some understanding.
- There is a knowledge gap between the perspectives of organizations dealing with youth and labor issues in Nigeria and their efforts to develop technology skills, create technology jobs and create technology employment prospects. The Department of Youth and Sport, the Department of Labor and other semi-government agencies focused on youth development have an excellent opportunity to participate in this inquiry and share their perspectives on technology talent and programs, if any are in the works.
- There are gaps in understanding of the impact of technology education programs by the majority of Nigerian higher education institutions. This is an opportunity for the study to solicit input on the impact from study participants, including students.
- There is little to no literature on the contributions of the Polytechnics to the Nigerian technology talent landscape. Because colleges will be one of the focal points of interaction with respondents in this study, it will be distinctive.



### (e) Top Nigeria Technology Businesses

Over the past decade, Nigeria has seen a significant increase in the number of tech businesses, both large and small, across various sectors. This growth has been fueled by a number of factors, including increased investment, government support, and a growing demand for technology solutions combined with the vibrant youthful population of the country. One of the key drivers of the rise of tech businesses in Nigeria has been the growth of the country's economy. Nigeria is the largest economy in Africa, and its GDP has grown steadily over the past decade. GDP in Nigeria is expected to reach 454.05 USD Billion by the end of 2023, according to Trading Economics (2022) global macro models and analysts expectations. This has led to a rise in consumer spending, as well as increased investment in infrastructure and other areas.

*One of the key drivers of the rise of tech businesses in Nigeria has been the growth of the country's economy.*

Another factor driving the growth of tech businesses in Nigeria has been the increasing availability of funding. In recent years, there has been a significant increase in the amount of venture capital and other funding available for tech startups in Nigeria. According to Disrupt Africa (2022), Nigerian startups raised 5.4 billion USD in 2022 alone. This has helped to support the growth of new businesses, as well as the expansion of existing ones.

The Nigerian government has also played a role in supporting the growth of technology businesses in the country. In recent years, the government has implemented a number of initiatives aimed at promoting entrepreneurship and innovation, including tax incentives and funding programs.Worthy of note also is the Nigerian Startup Act that was passed in 2022. According to the information on nigeriastarupact.ng (2023), the Nigeria Startup Act project is a joint initiative by Nigeria's tech startup ecosystem and the Presidency to harness the potential of the country's digital economy through co-created regulations. The Act is aimed at ensuring that Nigeria's laws and regulations are clear, planned and work for the tech ecosystem. This, we believe, will contribute to the creation of an enabling environment for the growth of the ecosystem, as well as the attraction and protection of investment in tech startups. The Act was signed into law by H.E. President Muhammadu Buhari on the 19th of October, 2022. Over 30 leaders in Nigeria's tech ecosystem contributed to its drafting between June and September 2021.

*Worthy of note also is the Nigerian Startup Act that was passed in 2022.*

One of the most notable success stories in the Nigerian tech scene has been the rise of fintech startups. In the Nigerian Fintech Map by Pulse (2022), the 2022 map features 236 companies under 14 categories. These companies are using technology to disrupt the traditional financial sector, offering services such as mobile payments, digital lending, and insurance.

Other sectors that have seen significant growth in the Nigerian tech scene include e-commerce, education, healthcare, and agriculture. In each of these areas, startups are using technology to address long-standing challenges and create new opportunities.

Below is the list of tech businesses in Nigeria with emphasis on the solutions they offer and the types of IT talents that work for them.

*Table 1.2.1: Nigerian top tech businesses*

| Company Name | Website | Description | IT Talents |
|---|---|---|---|
| Flutterwave | https://flutterwave.com/ | Payment Solutions | Software Developers, Data Scientists |
| Paystack | https://paystack.com/ | Online Payment Solutions | Software Developers |
| Interswitch | https://www.interswitchgroup.com/ng | Digital Payment Solutions | Software Developers, Data Scientists |
| Paga | https://www.mypaga.com/ | Payment Solutions | Software Developers |
| Konga | https://www.konga.com/ | E-commerce | Software Developers, UX/UI Designers |
| Jumia | https://www.jumia.com.ng/ | E-commerce | Software Developers, UX/UI Designers |
| FarmCrowdy | https://www.farmcrowdy.com/ | AgriTech | Software Developers, Data Scientists |
| GIGM | https://gigm.com/ | Transport & Logistics | Software Developers |
| Jobberman | https://www.jobberman.com/ | Job Recruitment | Software Developers, Data Scientists |
| Hotels.ng | https://hotels.ng/ | Hotel Booking | Software Developers, Data Scientists |
| Cellulant | https://cellulant.com/ | Mobile Payment Solutions | Software Developers |
| Wakanow | https://www.wakanow.com/ng/ | Online Travel Agency | Software Developers, UX/UI Designers |

| | | | |
|---|---|---|---|
| BuyPower | https://www.buypower.ng/ | Online Electricity Bills Payment | Software Developers |
| Rensource | https://rensource.energy/ | Renewable Energy | Software Developers, Data Scientists |
| Softcom | https://softcom.ng/ | Digital Services | Software Developers, Data Scientists |
| Paylater | https://www.paylater.ng/ | Digital Lending | Software Developers |
| TeamApt | https://teamapt.com/ | Financial Solutions | Software Developers, Data Scientists |
| AppZone | https://www.appzonegroup.com/ | Financial Solutions | Software Developers |
| Thrive Agric | https://thriveagric.com/ | AgriTech | Software Developers, Data Scientists |
| PrepClass | https://prepclass.com.ng/ | Online Tutoring | Software Developers, Data Scientists |
| Terragon Group | https://terragongroup.com/ | Marketing Technology | Software Developers, Data Scientists |
| Printivo | https://www.printivo.com/ | Online Printing | Software Developers, UX/UI Designers |
| TradeDepot | https://www.tradedepot.co/ | B2B e-commerce | Software Developers, UX/UI Designers |
| Okra | https://okra.ng/ | Open Finance | Software Developers, Data Scientists |
| OneFi | https://onefi.com/ | Digital Lending | Software Developers |
| PayCentre | https://www.paycentre.com.ng/ | Payment Solutions | Software Developers |
| Mines.io | https://mines.io/ | Digital Credit Scoring | Software Developers, Data Scientists |
| Lidya | https://www.lidya.co/ | Digital Lending | Software Developers Software Developers, |
| Social Lender | https://sociallenderng.com/ | Social Micro-Lending | Data Scientists Software Developers, |
| FarmCrowdy | https://www.farmcrowdy.com/ | AgriTech | Data Scientists |

### (f) Growth and attractiveness of the technology sector

The tech sector in Nigeria has experienced significant growth in recent years, making it an attractive destination for both local and foreign investors. For example, according to a recent Gross Domestic Product (GDP) report by the National Bureau of Statistics, the information and communications technology (ICT) sector contributed 18.44% to Nigeria's GDP in the second quarter of 2022. This was almost triple the contribution by the oil sector, which used to dominate the country's GDP that stood at 6.33% in Q2 2022. This is widely attributed to several factors such as a large population and a fast growing middle class. Having the largest population in Africa with over 200 million people makes Nigeria an attractive market for tech companies that are looking to offer digital solutions to the country's growing consumer base. This is further supported by a vibrant startup ecosystem, with many successful startups such as Paystack, Flutterwave, and Andela, among others. This has attracted the attention of venture capitalists, accelerators, and angel investors, who are looking to invest in the next big tech startup in Nigeria. There is also a large pool of talent who are tapped into by the tech companies operating in Nigeria. Furthermore, Nigeria has seen a significant rise in the number of tech hubs and incubators, which provide a supportive environment for tech entrepreneurs and startups to thrive. According to a mapping report by brighter bridges in 2019, Nigeria has the highest number of active tech hubs (85 tech hubs) on the Continent. These hubs and incubators offer resources such as mentorship, training, and funding to help startups grow and scale. The country also has a growing pool of skilled tech professionals who are able to develop and deliver innovative tech solutions. This local talent pool has been a key factor in the growth of the sector, as it ensures that companies have access to the talent they need to develop and scale their products and services.The government of Nigeria has also been a key player in

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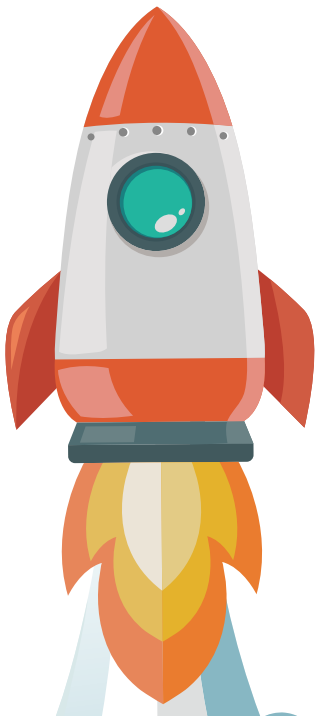


boosting the growth of the tech sectors both in infrastructural set up and providing a conducive policy environment. Initiatives by the government such as the National Information Communications Technology Infrastructure Backbone (NICTIB II) that aims to improve broadband infrastructure in 19 Northern federal government states. This has led to a ripple effect in growth of internet access in the country. The number of internet users in Nigeria has been growing rapidly, which has created new opportunities for tech companies to reach and engage with consumers. Indeed, the Nigerian Communications Commission (NCC) puts Internet users in Nigeria at 199.6 million as at march 2022. There have also been a number of policy initiatives to support the growth of the tech sector, such as tax incentives and startup incubators.

### (g) Factors Narrowing the Talent Gap since the last Assessment (2016 - 2022)

We noticed some improvements that have happened between 2016 and this current assessment. They are highlighted below;

1. **Government Investment in IT Training:** The government's investment in IT training is one of the factors that are narrowing the IT talent gap in Nigeria. The government is investing in training programs to improve the skills of the IT workforce. This investment is helping to narrow the gap by providing more qualified candidates for the job market. Below are some of the IT skills training that the Nigerian government has implemented since 2016. These initiatives and programs demonstrate the Nigerian government's commitment to developing the IT workforce in the country. By providing training and job opportunities, the government is helping to narrow the IT talent gap and create a more competitive IT industry in Nigeria.

*The government is investing in training programs to improve the skills of the IT workforce.*

   (a) **Digital Skills for Africa Program:** In 2016, the Nigerian government partnered with Google to launch the Digital Skills for Africa Program. The program aimed to provide free digital skills training to one million young Nigerians. The program covered topics such as online marketing, mobile app development, and web development.

   (b) **N-Power:** The N-Power program was launched in 2016 to provide job opportunities for young Nigerians. The program aimed to provide training in various sectors, including IT. The IT component of the program provided training in areas such as software development, hardware repairs, and networking.

   (c) **ICT for Change:** The ICT for Change program was launched in 2017 to provide free training in software development and entrepreneurship to young Nigerians. The program aimed to equip participants with the skills needed to develop innovative IT solutions and start their own businesses.

(d) **Presidential Youth Empowerment Scheme (P-YES):** The P-YES program was launched in 2020 to provide training and job opportunities for young Nigerians. The program provided training in various sectors, including IT. The IT component of the program provided training in areas such as software development, database management, and cybersecurity.

(e) **National Information Technology Development Agency (NITDA) Innovation and Entrepreneurship Program:** The NITDA launched the Innovation and Entrepreneurship Program in 2020 to provide training and support for startups and entrepreneurs in the IT sector. The program aimed to help startups and entrepreneurs develop innovative IT solutions and create jobs.

(f) **NITDA Virtual Academy:** On Wednesday, April 26, 2020, the National Information Technology Development Agency (NITDA) launched its virtual academy for information technology. Over 14,000 active students nationwide were enrolled for 47 different courses across emerging technologies such as cloud computing, artificial intelligence and many more at the Academy.

(g) **NITDA 1 million Developers Program (Blockchain/Coursera):** The NITDA 1 million Developers Program is an initiative launched by the National Information Technology Development Agency (NITDA) in Nigeria in collaboration with Coursera in October 2022. The program aims to empower and train one million Nigerian youths in various digital skills, including blockchain technology. As part of the NITDA 1 million Developers Program, participants have the opportunity to access blockchain-related courses and training programs on Coursera. Coursera offers a wide range of online courses and specializations in blockchain technology, covering topics such as blockchain fundamentals, smart contracts, decentralized applications (DApps), blockchain for business, and more.

2. **Private Sector Investment in IT Infrastructure:** Private sector investment in IT infrastructure is another factor that is narrowing the IT talent gap in Nigeria. Private companies are investing in IT infrastructure to improve the skills of their employees. This investment is helping to create a more skilled IT workforce and close the talent gap. Below are some examples of private sector led investment in IT talent development in Nigeria since 2016;

*This investment is helping to create a more skilled IT workforce and close the talent gap.*

(a) **Google Nigeria:** In 2017, Google Nigeria launched a program called "Digital Skills for Africa" to provide free online courses in digital skills such as web development, social media marketing, and search engine optimization.

(b) **IBM Nigeria:** In 2016, IBM Nigeria partnered with the Nigerian government to launch the "IBM Digital Nation Africa" program, which provides free online courses in digital skills to young Nigerians.

(c) **Microsoft Nigeria:** In 2018, Microsoft Nigeria launched the "Microsoft 4Afrika" initiative to provide digital skills training to young Nigerians in partnership with local organizations.

(d) **Huawei Nigeria:** In 2019, Huawei Nigeria launched the "Huawei ICT Academy" to provide training in ICT skills such as cloud computing, big data, and cybersecurity to students and professionals.

(e) **Cisco Nigeria:** In 2017, Cisco Nigeria launched the "Cisco Networking Academy" to provide training in networking and cybersecurity skills to students and professionals.

(f) **Oracle Nigeria:** In 2018, Oracle Nigeria launched the "Oracle Academy" to provide training in database management, programming, and other IT skills to students and teachers.

(h) **IBM SkillsBuild:** In 2020, IBM SkillsBuild Africa launched in Nigeria. This program provides access to free online courses, mentoring and personalized coaching to young Nigerians to develop their IT skills.

(i) **SAP Nigeria:** In 2017, SAP Nigeria launched the "SAP Skills for Africa" program to provide training in IT skills to young Nigerians in partnership with local organizations.

(j) **BeMINT by Siemens:** In 2022,Siemens Stiftung launched the first-of-its-kind hands-on Information Technology (IT) training project “BeMINT_Nigeria” for high-school students and recent school graduates in Lagos. Funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) and supported by the Delegation of German Industry and Commerce in Nigeria (AHK), it hopes to train 300 students and 60 teachers from low-income communities.

(k) **The Keystone Bank Digital skills Training Program:** In 2022, Keystone bank launched phase one of its digital skills training program. As part of the Bank’s commitment to empower youths, selected University undergraduates and fresh graduates in Lagos state were provided with access to tech skills and job opportunities. The beneficiaries were enrolled on tech related training programs.

(l) **Smart Africa Digital Academy (SADA) and MTN Skills Academy:** In October, 2022, on the side-lines of MWC Africa, Smart Africa and MTN signed a Memorandum of Understanding to advance digital skills in Africa in an effort to develop capacity for Africans to utilize ICTs and be fully empowered participants of an ICT-driven economy and society.

## (h) Policies and Regulations Supporting the IT Talent Development in Nigeria

In today's interconnected world, the development and harnessing of IT talents play a pivotal role in propelling a nation's progress and competitiveness. Nigeria, with its burgeoning population and growing digital landscape, recognizes the immense potential of nurturing a skilled workforce in the field of information technology. To support this vision, various policies have been put in place to promote the cultivation and advancement of IT talents across the country. Below are some of the policies and and National Strategic Plans driving Nigeria's technological talent development, shedding light on the initiatives aimed at equipping individuals with the necessary skills, fostering innovation, and positioning Nigeria as a leading force in the global IT arena.

- **The National Digital Economy Policy and Strategy[2]**

The National Digital Economy Policy and Strategy of Nigeria plays a significant role in IT talent development in the country. The policy recognizes the importance of digital transformation and the need for a skilled workforce to drive the digital economy (Ufua et al., 2021). It aims to promote the development of digital skills and capabilities among Nigerians, particularly in the areas of science, technology, engineering, and mathematics (STEM) (Ufua et al., 2021). By focusing on talent attraction, development, and retention, the policy seeks to ensure that Nigeria has a pool of highly skilled IT professionals who can contribute to the growth of the digital economy (Jimoh & Kee, 2022).

[2]https://doi.org/10.1017/jmo.2021.45

One of the key aspects of the policy is the emphasis on diversifying the economy and reducing Nigeria's dependence on revenue from crude oil export (Ozili, 2020). This is important for IT talent development as it creates opportunities for individuals with digital skills to contribute to sectors beyond the traditional oil and gas industry. The policy recognizes that the rapid digital transformation in the banking industry, for example, requires a strategic approach to talent management and development (Jimoh & Kee, 2022). By investing in talent attraction and development, the policy aims to ensure that the banking industry has the necessary skills to thrive in the digital age. The policy also recognizes the role of digital transformation in achieving the United Nations Sustainable Development Goals (SDGs), particularly SDG 4 (quality education) and SDG 9 (industry, innovation, and infrastructure) (Ufua et al., 2021). It highlights the need for stakeholder input and effective governance in the implementation of digitalization for educational development and industrial collaborations (Ufua et al., 2021). By promoting digital transformation in these areas, the policy contributes to the development of IT talent in Nigeria.

*One of the key aspects of the policy is the emphasis on diversifying the economy and reducing Nigeria's dependence on revenue from crude oil export (Ozili, 2020).*

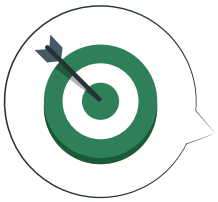
Furthermore, the policy acknowledges the importance of foreign direct investment (FDI) in accelerating digital development (Zatonatskiy, 2022). It recognizes that FDI can bring in new technologies, create business opportunities, and provide strategic opportunities for digital development (Zatonatskiy, 2022). By creating a favorable investment climate and attracting investments from digital multinational enterprises, the policy supports the growth of the digital economy and the development of IT talent in Nigeria.

### The National Broadband Plan (2020-2025)

The National Broadband Plan (2020-2025) of Nigeria plays a significant role in IT talent development in the country[3]. The plan recognizes the importance of broadband infrastructure in driving economic growth and development, and it aims to provide affordable and reliable broadband access to all Nigerians (Salemink et al., 2016). By improving access to broadband, the plan creates opportunities for IT talent development by enabling individuals to access online educational resources, participate in online training programs, and engage in remote work and freelancing opportunities.

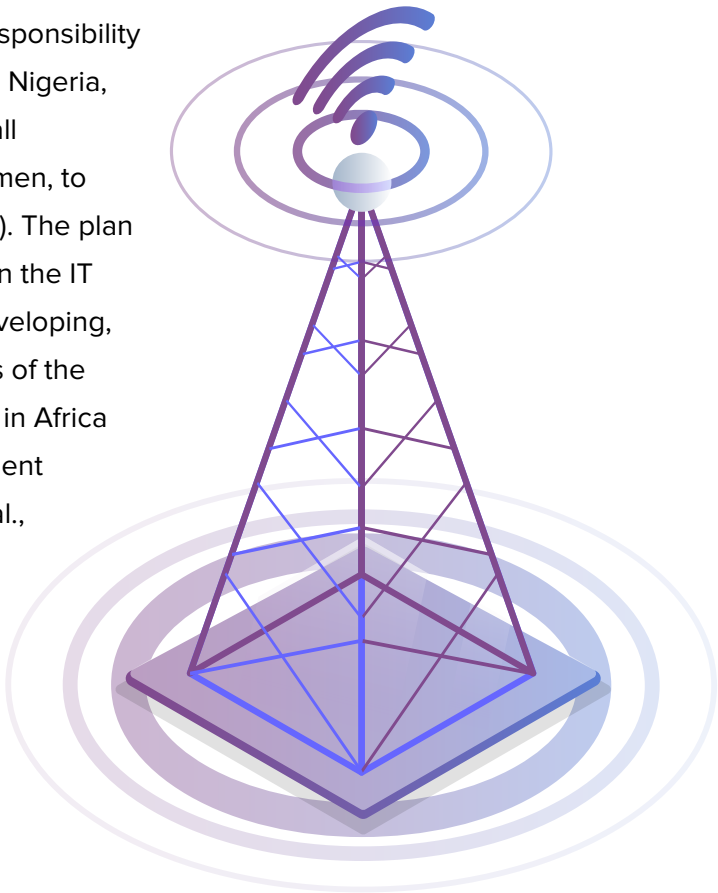
[3]https://ngfrepository.org.ng:8443/handle/123456789/3349

The plan also emphasizes the need to develop digital skills and competencies among Nigerians. It recognizes that the availability of broadband alone is not sufficient to fully harness its potential for IT talent development. Therefore, the plan includes initiatives to promote digital literacy and provide training programs to enhance the digital skills of Nigerians (Okeji et al., 2019). This is in line with the findings of a study that investigated the digital literacy skills and knowledge-based competencies among librarians working in university libraries in Nigeria, which highlighted the importance of digital literacy skills for librarians in managing digital resources and protecting digital content (Okeji et al., 2019). Furthermore, the National Broadband Plan acknowledges the role of the private sector in driving IT talent development. It encourages private sector investment in broadband infrastructure and promotes public-private partnerships to ensure the sustainability and effectiveness of broadband initiatives (Salemink et al., 2016).



*It recognizes that the availability of broadband alone is not sufficient to fully harness its potential for IT talent development.*

This aligns with the concept of corporate social responsibility (CSR), as discussed in a study on CSR initiatives in Nigeria, which emphasizes the importance of drawing on all resources and talents, including those of rural women, to promote development (Uduji & Okolo-Obasi, 2019). The plan also recognizes the need for talent management in the IT sector. Talent management involves attracting, developing, and retaining skilled individuals to meet the needs of the industry. A review of talent management research in Africa highlighted the contributions and challenges of talent management in the African context (Anlesinya et al., 2019). The National Broadband Plan can contribute to talent management in Nigeria by creating an enabling environment for IT talent development and attracting investment in the IT sector.



## The National Policy on ICT in Education

The National Policy on ICT in Education of Nigeria plays a significant role in IT talent development in the country. The policy recognizes the importance of integrating technology in teaching and learning in the education sector (Yakubu et al., 2020). It presents a holistic and broad vision for ICT integration in education, aiming to fulfill the national technology aspirations and achieve sustainable development goals (Danner & Pessu, 2013). One of the components of the policy is the implementation of learning management systems (LMS) in universities for teaching and learning purposes. The policy also emphasizes the importance of ICT infrastructure and access to technology for teachers and students. Furthermore, the policy recognizes the role of management information systems (MIS) in the smooth running of secondary schools and the overall improvement of students' academic success (Yusuf et al., 2022). MIS plays a crucial role in collecting, managing, and analyzing information for effective decision-making in educational institutions (Yusuf et al., 2022). Integrating MIS in secondary schools can enhance educational management and contribute to the development of IT skills among students. The policy also highlights the need for ICT policy implementation in tertiary education institutions. The implementation of ICT policies in institutions like Hussaini Adamu Federal Polytechnic has been shown to be fundamental to students' academic accomplishment, job satisfaction, productivity, and globalization (Matthew et al., 2022). The adoption of top ICT infrastructure in academic environments can provide opportunities for students to develop IT skills and thrive in the digital age (Matthew et al., 2022).

*The policy also emphasizes the importance of ICT infrastructure and access to technology for teachers and students.*

### The National Industrial Revolution Plan

The National Industrial Revolution Plan (NIRP) program of Nigeria is a government initiative aimed at promoting industrial development and economic growth in the country (Ishieka, 2023). The program was established in 2011 with the goal of transforming Nigeria into a globally competitive industrialized nation by 2020 (Ishieka, 2023).

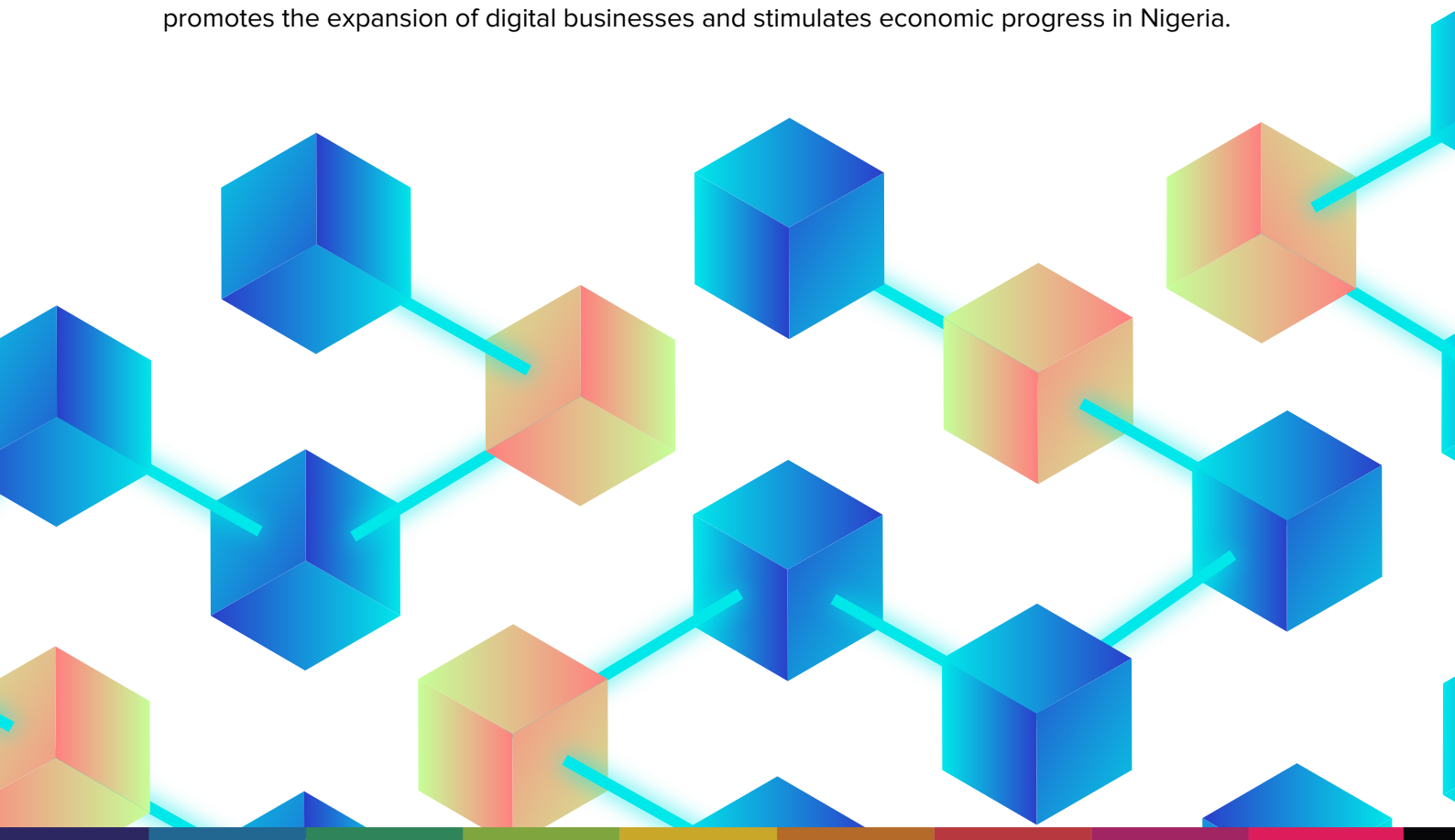
One of the key objectives of the NIRP is to develop and nurture talent in various sectors, including the IT sector. The NIRP recognizes the importance of IT talent development in driving innovation, productivity, and competitiveness in the digital economy (Ishieka, 2023). It aims to create an enabling environment for the growth of the IT industry by providing support and incentives for IT startups, promoting research and development in IT, and improving the quality of IT education and training (Ishieka, 2023). The program also seeks to attract foreign direct investment in the IT sector and

*One of the key objectives of the NIRP is to develop and nurture talent in various sectors, including the IT sector.*

facilitate technology transfer (Ishieka, 2023). To achieve these objectives, the NIRP focuses on several key areas. Firstly, it emphasizes the establishment of technology incubation centers (TICs) as tools for fast-tracking entrepreneurship development and IT talent development (Akhuemonkhan et al., 2014). TICs provide a supportive ecosystem for IT startups, offering infrastructure, mentorship, and access to funding and networking opportunities (Akhuemonkhan et al., 2014). By nurturing and supporting IT startups, the NIRP aims to foster the growth of the IT industry and create employment opportunities for IT professionals (Akhuemonkhan et al., 2014). Secondly, the NIRP recognizes the importance of talent identification and development in the IT sector (Jacobs, 2014). It aims to improve the quality of IT education and training by promoting collaboration between academia and industry, updating IT curricula to align with industry needs, and providing scholarships and grants for IT students (Jacobs, 2014). The program also seeks to attract and retain IT professionals by offering competitive salaries, career development opportunities, and a conducive work environment (Jacobs, 2014).

- **The National Blockchain Policy**

On May 3rd, 2023, the Federal Ministry of Communications and Digital Economy (FMCDE) made an announcement approving a national blockchain policy in Nigeria. This decision demonstrates the government's support and endorsement of blockchain technology to foster the growth of the country's digital economy and enhance trust in digital platforms among citizens. The primary objective of the national blockchain policy is to capitalize on the potential of blockchain technology in improving transparency, efficiency, and innovation across various sectors. By embracing blockchain, the government aims to create a conducive environment that promotes the expansion of digital businesses and stimulates economic progress in Nigeria.



The policy recognizes the importance of blockchain technology in establishing trust in digital transactions and safeguarding the integrity of data. Through the promotion of blockchain solutions, the government intends to boost citizens' confidence in utilizing digital platforms and increase their active involvement in the digital economy. The approval of the national blockchain policy signifies the government's dedication to harnessing the advantages offered by emerging technologies for driving socio-economic development in Nigeria. It exemplifies a proactive approach toward embracing blockchain technology as an integral part of the country's digital transformation endeavors. This policy, combined with the different efforts of training more Blockchain talents such at the NITDA's 1 million developers program in collaboration with Coursera, will drive a robust talent pool for Blockchain innovation in Nigeria.

*The policy recognizes the importance of blockchain technology in establishing trust in digital transactions and safeguarding the integrity of data.*

- **The Nigeria Startup Act**

According to the Nigeria Startup Act website (NSA, 2022), The Nigeria Startup Act project is a joint initiative by Nigeria's tech startup ecosystem and the Presidency to harness the potential of our digital economy through co-created regulations. The Act is aimed at ensuring that Nigeria's laws and regulations are clear, planned and work for the tech ecosystem. The act aims to support and contribute to the creation of an enabling environment for the growth of the ecosystem, as well as the attraction and protection of investment in tech startups. The Act was signed into law by H.E. President Muhammadu Buhari on the 19th of October, 2022. Over 30 leaders in Nigeria's tech ecosystem contributed to its drafting between June and September 2021.

Among its focus, the act provide opportunities for capacity building and technology talent development such as the;

(a) Provision for startups to assess training and capacity-building workshops. The council plans to work with universities, colleges, and polytechnics to train students with the requisite knowledge to start and run a startup.

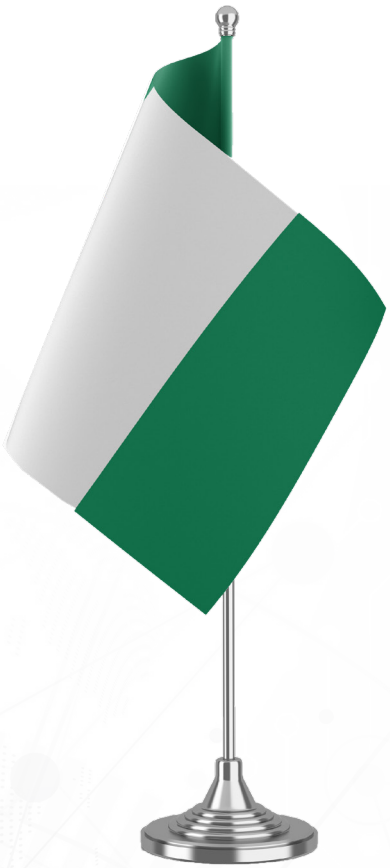
(b) Set up digital technology acquisition centers across the six geopolitical zones in Nigeria to advance digital technology usage, managerial competencies, and information systems.

(c) Provision to create support for academic research in institutions to support the development and advancement of startups.

## The National Digital Literacy Framework

According to the National Digital Literacy Framework document, the Digital Economy Initiative for Africa (DE4A) aims to ensure that every individual, business, and government in Africa will be digitally enabled by 2030 in support of the African Union's "Digital Transformation Strategy in Africa". The Federal Government of Nigeria through the Nigeria Digital Economy Policy and Strategy (NDEPS) document has set a corresponding target of achieving 95 per cent digital literacy by 2030. However, there is currently no national framework that can serve as a guide for stakeholders on what constitutes the competence areas and specific competencies of digital literacy and skills required for a digital Nigeria. Thus, the National Information Technology Development Agency (NITDA), the apex IT agency responsible for developmental regulation of the sector in Nigeria, has taken up responsibility to lead the development of a national digital literacy framework. The document outlines the proposed framework. It aims to set a digital literacy and skills agenda for Nigeria by providing a clear and consistent definition of digital literacy for the purpose of building curricula, modules and programs that will;

*It aims to set a digital literacy and skills agenda for Nigeria by providing a clear and consistent definition of digital literacy*



- Afford proper coordination and standardization of digital literacy training and development in Nigeria;
- Enable data collection, analyses and measurement of the number and/or percentage of digitally literate Nigerians and their level of digital literacy;
- Offer policy makers a means to monitor the diffusion of digital skills across the country and progress in achieving policy targets.

## 1.3 Global IT Talent Landscape and Key Insights for Nigeria

### (a) Country 1: United States of America

The United States has long been a leader in technology innovation, and its talent management strategies have played a significant role in maintaining this position. The country has a robust education system that emphasizes STEM (science, technology, engineering, and mathematics) education, which helps develop a pool of skilled professionals (Napp & Breda, 2022). Additionally, the United States has a strong culture of entrepreneurship and innovation, which attracts top talent from around the world (Canavan et al., 2013). Other countries can learn from the United States' focus on STEM education and fostering an entrepreneurial ecosystem to bridge their own technology talent gaps.

### (b) Country 2: Singapore

Singapore has emerged as a global technology hub and has implemented effective talent management strategies to support its growth. The country has invested heavily in education and skills development, with a particular focus on digital skills (Wissemann et al., 2022). Singapore also actively promotes collaboration between academia, industry, and government to ensure that the skills being taught align with industry needs (Buysse et al., 2021). Other countries can learn from Singapore's emphasis on digital skills and the importance of collaboration between different stakeholders to bridge their technology talent gaps.

### (c) Country 3: Germany

Germany is known for its strong manufacturing and engineering sectors, and it has implemented innovative talent management strategies to address its technology talent gap. The country has a well-established dual education system that combines classroom learning with practical training, allowing students to gain hands-on experience (Fahmy et al., 2022). Germany also places a strong emphasis on apprenticeships, which helps bridge the gap between education and industry needs (Napathorn, 2020). Other countries can learn from Germany's focus on practical training and apprenticeships to develop a skilled technology workforce. Lessons for Other Countries:

### (d) Country 4: India

India has emerged as a global technology powerhouse, and its talent management strategies have played a significant role in its success. The country has a vast pool of highly skilled technology professionals due to its strong emphasis on STEM education and a large number of engineering and technical institutions. Additionally, India has a thriving startup ecosystem that fosters innovation and entrepreneurship, attracting top talent from around the world. Other countries can learn from India's focus on STEM education, the abundance of technical institutions, and the promotion of entrepreneurship to bridge their own technology talent gaps.

*Table 1.3.1 Specific IT Talent Initiatives by these countries*[4]

| Count | IT talent strategy | Focus |
|---|---|---|
| India | Strategy of Data Science, Technology, Research, and Application. | This strategy focuses on developing talent in the field of data science and technology, which are crucial for the digital transformation of industries. India recognizes the importance of technology skills in driving innovation and competition. |
| Germany | Industry 4.0 Apprenticeship Training Program. | This program aims to train and develop talent in the field of engineering education, specifically focusing on the skills required for Industry 4.0. Germany's focus on apprenticeship training highlights the importance of practical skills and hands-on experience in technology talent development. |
| Singapore | Foreign Talent Programme | This program is designed to attract highly skilled labor from around the world, particularly in knowledge-intensive sectors such as academia, banking and financial services, biosciences, engineering, high technology, medicine, and science. Singapore's strategy emphasizes the importance of attracting global talent to enhance its competitiveness and build its cosmopolitanism. |
| United States of America | T-Type Talent Training Program | This program aims to train and develop talent in various technology fields, with a focus on interdisciplinary skills. The United States recognizes the importance of breaking through disciplinary boundaries and blending knowledge to drive technological innovation and competition. |

[4]hao & Yao, 2022; Harvey & Beaverstock, 2016

### (e) Top IT Skills in demand in 2023 and opportunities for skills investment.

With the nature of business needs rapidly evolving across the globe, there has been increasing demand for digital transformation and the need for cost-effective and scalable IT infrastructure leading to the rise in adoption of cloud computing. The covid 19 pandemic for example disrupted traditional IT infrastructure.Many companies were forced to adopt remote work policies to maintain social distancing and reduce the risk of transmission. This accelerated the shift to cloud computing, as it provides a more agile and flexible alternative to traditional IT infrastructure. Particularly in Nigeria , adoption of cloud has created a significant skills gap, as there are not enough trained professionals to manage the cloud infrastructure. Additionally with businesses launching new products in various sectors, such as fintech, e-commerce, and healthtech, the demand for product designers and product managers in Nigeria has been on the rise.

*Particularly in Nigeria , adoption of cloud has created a significant skills gap,*

To address this skills gap, organizations, educational institutions, and governments in Nigeria are investing in training programs to build cloud computing skills as well as other necessary no-code skills such as product design, user experience design, user interface design, product marketing- and product management.

For instance, some universities are incorporating cloud computing courses in their curricula, while private organizations are offering specialized training programs and certifications to IT professionals.Some cloud providers like Microsoft and Google are partnering with local organizations to offer training programs and certifications to IT professionals, which helps to bridge the skills gap in the industry. These programs provide practical training, hands-on experience, and industry-recognized certifications that enhance the employability of IT professionals .

As the need for the competencies listed in table 3.4.3 grows, there is a global call to address the gap between the demand and supply of these skills. The following sources have validated the insufficiency of global supply for different IT skills:

1. "The demand for technology professionals continues to outstrip supply, with more than half of companies struggling to fill open positions." - (Gain, 2022)
2. "By 2030, the technology industry could be short 4.3 million skilled workers globally." (Franzino et al., 2021)
3. "There is a 40% shortage of cloud computing talent in the US, with similar gaps in Europe and Asia." - (Atos, 2022)

4. "There is a significant talent gap in artificial intelligence, with 40% of companies struggling to find skilled AI talent." - (LinkedIn, 2020)
5. "The data science talent gap will reach 250,000 positions by 2025." - (Neil & Kayvaun, 2022)
6. "The demand for blockchain talent is growing by 40% annually, with a predicted shortfall of 1.5 million blockchain developers by 2020." - (Iredale, 2021)
7. "The talent gap in quantum computing could reach 1 million by 2030." - (Mateusz et al., 2022)
8. "There is a severe talent shortage in the DevOps industry, with 60% of companies reporting a lack of qualified candidates." - (Fenyn, 2022).

A number of trusted platforms have published on the top IT skills in demand in 2023. The skills have been presented below under each of the platforms;

*Table 1.3.2: Top 5 common IT skills in demand globally*

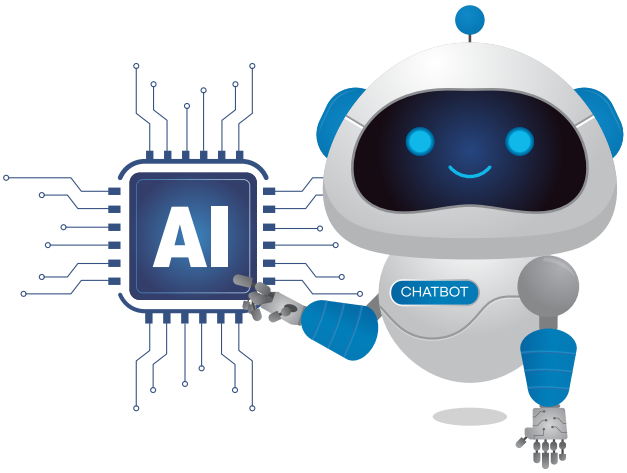
| **Cousera (2023)** | **HRforecast (2023)** | **Forbes (2022)** | **Udacity (2022)** | **Linkedin (2023)** |
|---|---|---|---|---|
| - Cloud Computing<br>- Cybersecurity<br>- Data Science<br>- Artificial Intelligence (AI)<br>- Machine Learning (ML)<br>- Internet of Things (IoT)<br>- Blockchain<br>- User Experience (UX) Design<br>- Web Development<br>- Mobile Development | - Cybersecurity<br>- Cloud Computing<br>- Artificial Intelligence (AI) and Machine Learning (ML)<br>- Data Science and Analytics<br>- Blockchain<br>- Internet of Things (IoT)<br>- Agile and DevOps<br>- Full Stack Development<br>- UX/UI Design<br>- Quantum Computing | - Artificial Intelligence and Machine<br>- Learning<br>- Cybersecurity<br>- Cloud Computing<br>- Data Science and Analytics<br>- Full-stack Development | - Artificial Intelligence (AI)<br>- Data Science and Analytics<br>- Cybersecurity<br>- Cloud Computing<br>- Full-stack Web Development | - Artificial Intelligence (AI)<br>- Blockchain<br>- Cloud Computing<br>- Analytical Reasoning<br>- User Experience (UX) Design<br>- Business Analysis |

From table 1.3.2, the top 5 common IT skills in demand globally are;

1. **Cloud Computing:** This skill is consistently mentioned across all classifications. With the increasing demand for cloud-based services, it's essential to have expertise in cloud computing technologies such as AWS, Azure, and Google Cloud.

2. **Cybersecurity:** This skill is also consistently mentioned across all classifications. With the increasing threat of cyber-attacks, it's essential to have knowledge and skills in cybersecurity to protect sensitive data and systems.

3. **Data Science and Analytics:** Data is an essential aspect of businesses today, and the ability to gather, analyze, and interpret data is crucial. Skills in data science and analytics, including statistical analysis, data visualization, and machine learning, are highly sought after.



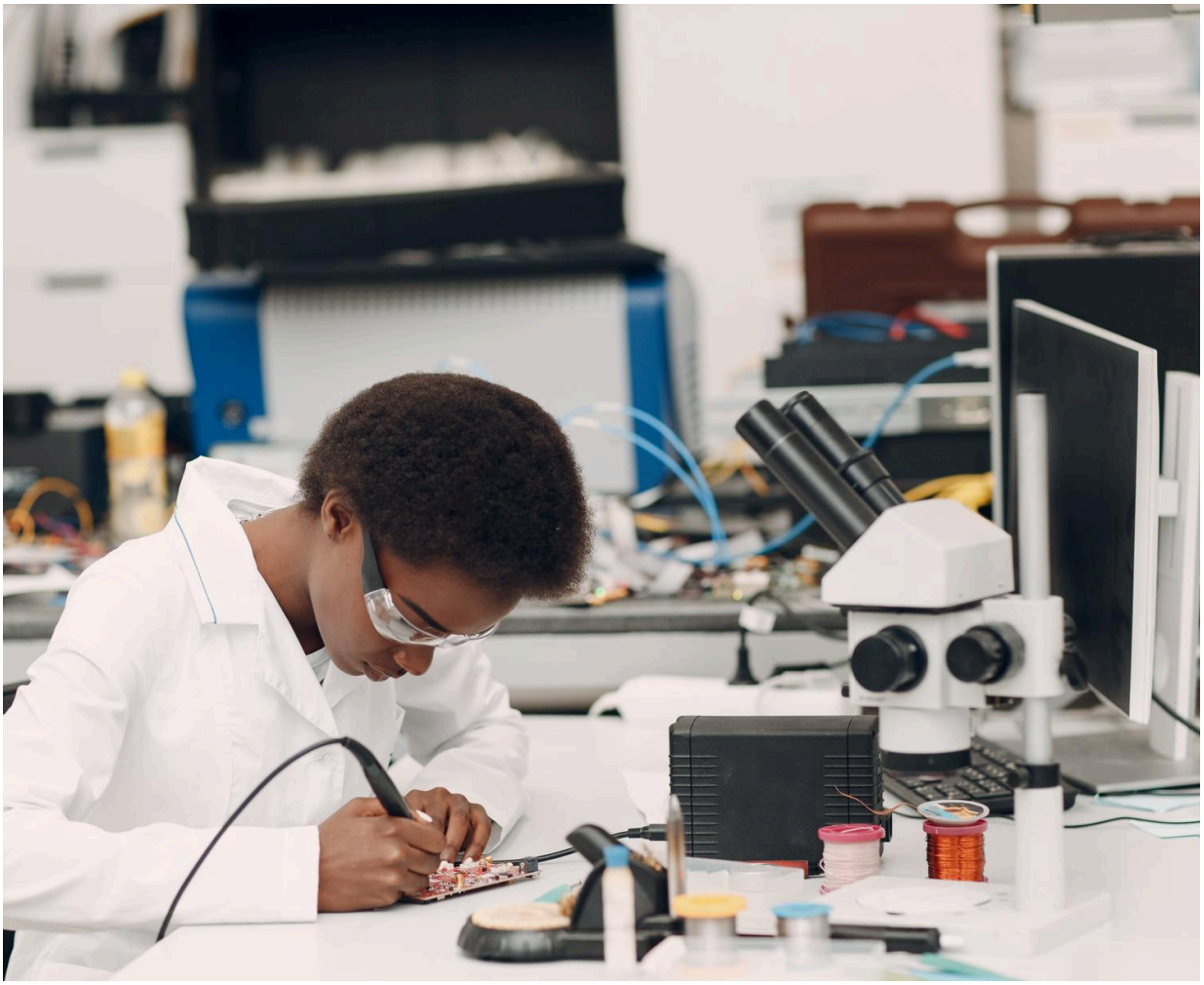

4. **Artificial Intelligence (AI) and Machine Learning (ML):** As businesses continue to adopt AI and ML technologies to automate processes, increase efficiency, and gain insights from data, expertise in these areas has become crucial.


5. **User Experience (UX) Design:** With the increasing competition in the digital world, it's essential to provide a seamless user experience to customers. UX design skills are valuable for creating user-friendly interfaces and improving customer satisfaction.

### (f) Summary of key opportunities and lessons for Nigeria

A thorough synthesis of all the information above presents Nigeria with some key lessons. These include:

**1. Emphasizing STEM education:** Investing in STEM education from an early age can help develop a pipeline of skilled professionals in the technology field (Stahl et al., 2016).
**2. Fostering an entrepreneurial ecosystem:** Creating an environment that encourages entrepreneurship and innovation can attract top talent and drive technological advancements (Canavan et al., 2013).
**3. Promoting collaboration between academia, industry, and government:** Collaboration between different stakeholders can ensure that the skills being taught align with industry needs and bridge the gap between education and employment (Buysse et al., 2021).
**4. Incorporating practical training and apprenticeships:** Providing opportunities for hands-on experience and apprenticeships can help develop practical skills and bridge the gap between education and industry needs (Fahmy et al., 2022).



## 1.4 The Nigeria IT Talent Gap Assessment Aspirations

### (a) Research Objectives

The objective of this assessment are to;

1. identify in-demand technological skills and competencies in Nigeria
2. examine the current state of skills supply
3. make strategic recommendations to bridge the skills gap to nurture a skilled workforce for Nigeria.

### (b) Scope

The scope of this assessment was comprehensive and focused on addressing the shortage of skilled professionals in the domain of Information Technology and Computer-related IT skills. Our study delved into the intricate nuances of the IT sector, specifically excluding vocational skills, and examined the critical factors contributing to the scarcity of proficient individuals in this domain. Narrowing our investigation to core IT competencies enabled us to provide a targeted analysis that sheds light on demand and supply issues and other general insights from the ecosystem.

*Narrowing our investigation to core IT competencies enabled us to provide a targeted analysis that sheds light on demand and supply issues and other general insights from the ecosystem.*

To ensure a thorough and well-rounded exploration, our research engaged a diverse range of stakeholders. We collaborated with alternative technology education companies, enabling us to understand their approaches to skill development and their impact on bridging the talent gap. Additionally, we consulted academic leaders to gain insights into the curricular aspects and educational initiatives aimed at nurturing IT expertise. Engaging students provided us with the perspective of the future workforce, aiding our understanding of their aspirations and challenges. Furthermore, our interactions with government ministries, development partners, and companies reliant on tech talents allowed us to grasp the regulatory and economic dimensions of the IT talent gap. Finally, by involving tech talent headhunting companies, we gained valuable insights into the recruitment landscape and the intricacies of talent acquisition in the IT sector. Through this comprehensive approach, our research sought to offer a holistic view of the IT talent gap and contribute meaningful recommendations for bridging the gap in Nigeria.

*Engaging students provided us with the perspective of the future workforce, aiding our understanding of their aspirations and challenges.*

# Chapter 2: Research Methods And Analytical Framework

## 2.1 Research Design

This study employed a descriptive research methodology and triangulation of data. As a fundamentally multi-stakeholder study, the research design approached the Talent gap issue in the Nigerian Information Technology Sector from a robust perspective, involving all of the key stakeholders and participants across all variable spectrums. The descriptive design is appropriate for this study because it afforded us the opportunity and potential to uncover fresh insights and data that were not originally anticipated at the outset of the research planning process.

## 2.2 Justification for this Design

*Table 2.2.1 Study design justification*

| Highlight | Justification in this study |
|---|---|
| Defines subject characteristics | The descriptive design helped guide us in categorizing the diverse technological talents, skill requirements, and talent alignment within the sector. |
| Measure Data Trends | This design assisted us in identifying patterns of change, evolution, or a full transition in Nigeria's technological talent landscape over time. This is clear from the empirical analysis of current reports and pieces of literature, as well as the in-depth interviews. |
| Objective Comparison | This approach enabled us to gain insights into how various stakeholders and demographics respond to key variables in the study, hence facilitating the development of valuable comparisons. |

## 2.3 Research Strategy

This research applied a mixed method approach, blending qualitative and quantitative techniques. Below is a breakdown of the strategies that was implemented;

*Table 2.3.1 Research strategy*

| Approach | Method of Data Collection | Respondents | |
|---|---|---|---|
| Quantitative Approach | Quantitative Survey | • Practicing Technology Developers<br>• University Undergraduates in the faculty of technology and computer science | Technology Talent Supply |
| Qualitative Approach | In Depth Interview and qualitative survey | • Technology startup founders<br>• Organizations heavily reliant on technology talents<br>• Technology Talent HeadHunters<br>• Universities(Computer Science/technology departments) | Technology Talent Demand |
| | Document Analysis | • Previously published reports on technology talent and technology skills gap | General insight on both technology talent supply and demand |

## 2.4 Sampling Procedure

**Multistage sampling** was used in this study across the 36 states and the 6 geopolitical zones in Nigeria.

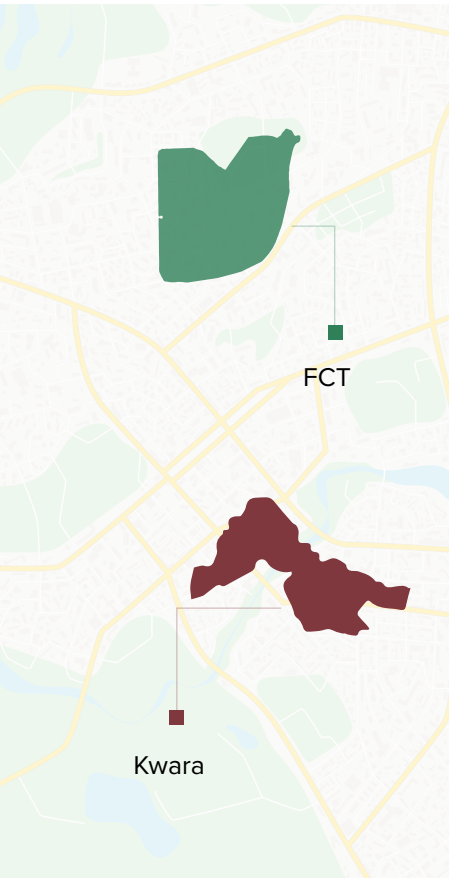
The sampling procedure was guided by the following factors *(variables*):

1. Geo political zones
2. States
3. Universities
    a. Category of the university
        I. Public universities *(Federal or State Universities)*
        ii. Private Universities
    b. Number of Computer Science or Computer Science related courses offered
    c. Number of students enrolled in the programme
4. Polytechnics
    a. Category of the university
        i. Public universities (Federal or State Universities)
        ii. Private Universities
    b. Number of Computer Science or Computer Science related courses offered
    c. Number of students enrolled in the programs
5. Colleges of Education
    a. Category of the university
        i. Public universities (Federal or State Universities)
        ii. Private Universities
    b. Number of Computer Science or Computer Science related courses offered
    c. Number of students enrolled in the programs.

The first stage broke down the 36 states of Nigeria into 6 clusters (geopolitical zones). Stage two used purposive sampling to select two states from each cluster. The purposive nature of stage two was determined by the prior understanding of the states that are vibrant in technology and innovation with criteria such as presence of technology skills acceleration programs, presence of university of technologies and the general strong outlook of their technology ecosystem. A public and private tertiary institution were selected from universities, polytechnics and colleges of education from the selected states in each geopolitical zone.

The selection criteria for the institutions (stage three) were based on the number of computer science-related courses offered and the enrollment of students in IT departments. And finally, a proportional sampling is used to randomly select study participants in each department based on student enrollment.

## 2.5 Justifications of selected states

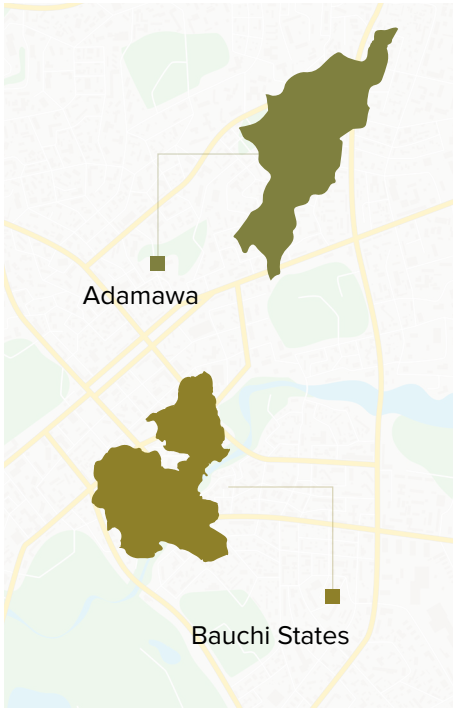


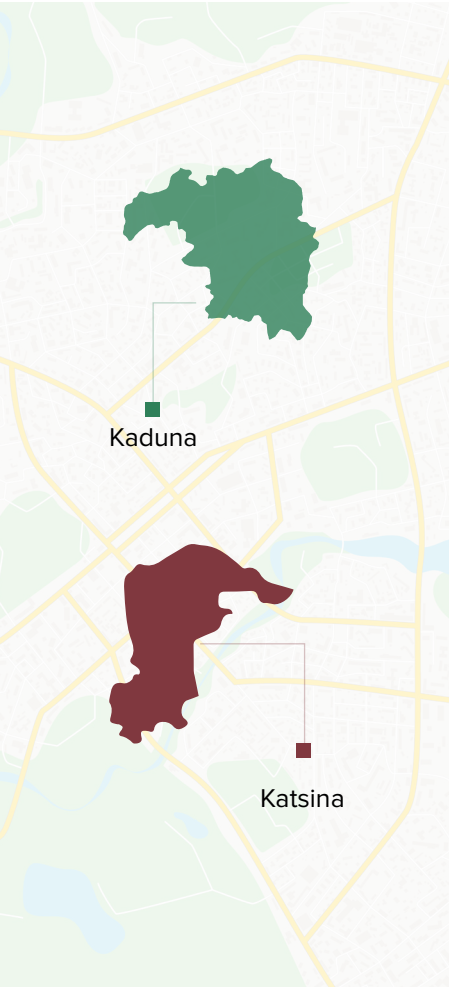

**North Central - Abuja and Kwara States**

As the seat of the Nigeria national government and the most cosmopolitan location in the North Central geo-political zone of Nigeria, Abuja is home to Universities strong in technology and computer science such as the African University of Science and Technology, University of Abuja and Baze University. On the informal technology education and acceleration side, Abuja boasts of Convexity Hub, the first Blockchain Incubator and Accelerator in Nigeria and Ventures platform. On the technology startup side, Abuja is home to ThriveAgric and BuyPower amongst other vibrant technology startups who are employers of technology talents. Abuja is also home to many big corporations who are dependent on technology talents in driving their day to day organization objectives. Kwara state on the other hand has been selected because it is home to Landmark University and the University has the highest number of technology and technology related programs in the region. Kwara also has a vibrant technology startup ecosystem with technology hubs such as the MALhub, Founders Hub, technology incubation center Ilorin and Probity Hub.

**North East - Adamawa and Bauchi States**

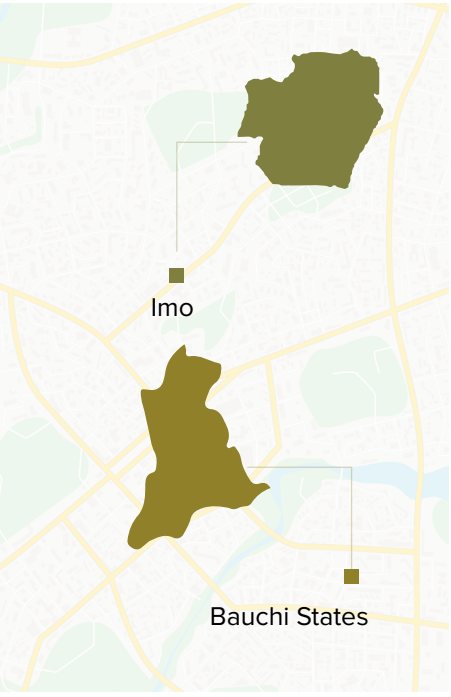
Out of all the states in the NorthEastern geo-political zone of Nigeria, Adamawa state stands out in its technology outlook. Adamawa state has three Universities including the American University of Nigeria, in the capital city of Yola. The American University of Nigeria is claimed to be one of the best universities in Nigeria with a strong technology and computer science faculties. The Modibbo Adama University of Technology in Yola is also known to be the major University of technology in the state. The “startup grind Yola”, a community that has been bringing together the technology enthusiasts and entrepreneurs, has also been in the news of late as one of the most vibrant in North East Nigeria. Bauchi state is home to the prestigious Abubakar Tafawa Balewa University with vibrant technology programs. The university is one of the top 50 universities in Nigeria as it took the 39th position in Nigeria in the 2022 university ranking in Nigeria.






**North West - Kaduna and Katsina States**

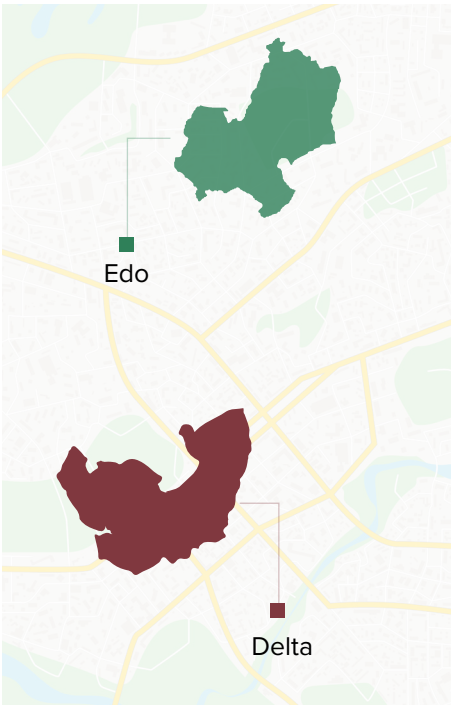
Kaduna state has topped the list in innovation and technology skills acceleration in the last decade with major investments from the government and the private sector in the ICT sector. Kaduna state boasts of major technology hubs helping shape and support technology skills development in the state. CoLab, GreyyHobb, Ihifix Hub and KAD ICT hub and others have pioneered major technology skills acquisition initiatives in the state. On the formal technology front, Kaduna is home to the popular Ahmadu Bello University in Zaria. ABU has ranked in several university ranking lists as one of the best 20 universities in Nigeria. There is also the Kaduna State University with faculty of technology and computer science programs. Katsina state has also been selected in this region and specifically Al-Qalam University because of the testimonials of great things its computer science graduates have been achieving over the years. Between 2017 and 2021, a number of computer science graduates of the Al-Qalam University have been in the news for transforming the technology ecosystem of Katsina state either as tech startup founders or technology hub founders to help other innovators and technology developers in the state. An example is the story of Huzaifa who co-founded the very first technology acceleration hub in katsina state in 2018 by that name of Kirkira Innovation Hub.




**South East - Imo and Anambra state**

Apart from the fact that these two states have been sampled and in the past by similar research projects, Imo state is home to the prestigious Federal University of Technology Owerri with three strong computer and technology focused programs. Imo is also home to the Owerri Tech Hub which has been a storing pillar of technology innovation and support for young technology enthusiasts in the state. Anambra state has also been selected in this region because of Madonna University, one of the earliest private universities in the country with deep curricula focused on technology and innovation. Madonna University has two strong technology programs where top technology developers in the country have graduated and innovation for a better society. Anambra state is also home to a number of tech hubs such as the Innovation growth hub, Ajie Hub, EduFun academy and the supportive Anambra state Information and Communication Technology Agency.

### South South - Edo and Delta state




Edo state has been in the news of late as its technology talent investment has soared in the past years. The government of Edo state through its Edo Jobs program recently partnered with Decagon to train thousands of Edo youths on various technology skills. The inner city tech hub in Benin has also been very instrumental to accelerating technology talent development in Edo state. The startup grind group of Edo state is one of the most vibrant in the country and receives a number of micro-grants from the government to develop the technology talents in the state. Delta state is home to Edwin Clark University, one of the newest private universities in Nigeria with an innovative computer science curriculum. On the tech ecosystem and support front, the Warri Innovation Hub has continued to support the technology ecosystem of the state with records of community engagements, tech skills training and an attraction to investors in startups ideas.


### South West - Lagos and Ogun state

Lagos is undoubtedly the most vibrant technology ecosystem in Nigeria and not only in South West Nigeria. It is a representation of what this research focus will be and almost all the alternative technology education and training platforms in Nigeria are headquartered in Lagos. The notable technology talent headhunters are located here as well as the technology accelerator and incubators.

Ogun state is home to the topmost ranking private university in Nigeria (covenant university) and known to be one of the topmost technology talent producers from the education sector in Nigeria. Worthy of mention is the tech summit Ogun movement which has placed Ogun state on the innovation and technology map in the South West region of Nigeria. In the last four years, the Ogun State technology ecosystem has grown and become more cohesive through the deliberate actions of some ecosystem actors like Ogun Tech Community (OTC), an association or community of technology/innovation hubs, startups, skill development organizations and government officials; Ogun State Digital Ecosystem Advisory Group (DEAG), a think tank of high profile

individuals, present/past government officials & stakeholders with a vested interest in the development of Ogun State digital ecosystem; LEAD Resources, first innovation hub in Ogun State, Nigeria Computer Society, Ogun State chapter; Cologeny, a community of digital creatives, enthusiasts and marketers; and iFrameworks Consulting, a technology and strategy consulting company leading the knowledge – driven development of the Ogun State technology ecosystem.

## 2.6 Talent Supply/Demand: In depth Interviews

*Table 2.6.1 Talent supply and demand interviews .*

| Organization | Website |
|---|---|
| **Alternative Technology Education Companies** | |
| Univelcity | https://univelcity.com/ |
| Cloudboosta | https://cloudboosta.com/ |
| AltSchool | https://www.altschoolafrica.com/ |
| Stutern | https://www.stutern.com/ |
| Treford | https://treford.africa/ |
| Utiva | https://treford.africa/ |
| **Development Partners** | |
| ITU/ILO | https://www.itu.int/ |
| Mind the Gap | https://mindthegap.ng/ |
| Cisco System | https://www.cisco.com/ |
| Steamledge | https://steamledge.com/ |
| DO Take Action | https://dotakeaction.org/ |
| **Technology Talent Headhunters and Organizations Reliant on Technology Talents** | |
| Findworka | https://findworka.com/#/ |
| Kimberly Ryan | https://kimberly-ryan.com/ |
| AppZone Limited | https://appzonegroup.com/ |
| Revwit | https://revwit.com/ |

| | |
|---|---|
| **University Leadership** | |
| Ahmadu Bello University, Zaria | https://www.abu.edu.ng/ |
| Ahmadu Bello University, Zaria | https://www.abu.edu.ng/ |
| Olabisi Onabanjo University, Ago Iwoye | https://oouagoiwoye.edu.ng/ |
| Ibrahim Badamasi Babangida University | ibbu.edu.ng |
| Abubakar Tafawa Balewa University | https://www.atbu.edu.ng/web/front |
| University of Jos | https://www.unijos.edu.ng/ |
| University of Abuja | https://www.uniabuja.edu.ng/ |
| **Federal Ministries and Parastatals** | |
| Federal Ministry of Science Technology and Innovation | https://www.scienceandtech.gov.ng/ |
| Federal Ministry of Labour and Employment | https://fmic.gov.ng/tag/federal-ministry-of-labour-and-employment/ |
| National Universities Commission (NUC) | https://www.nuc.edu.ng/ |
| Federal Ministry of Education | https://education.gov.ng/ |
| National Institute for Educational Planning and Administration | https://niepa.gov.ng/ |
| **NITDA Digital Capacity Training Centers** | |
| Katsina NITDA Hub | https://nitda.gov.ng/nitda-empowering-citizens-through-tech-innovation-hubs/5446/ |
| Abuja NITDA Hub | |
| Bauchi NITDA Hub | |

## 2.7 IT Talent: Student Survey

A total of 667 students were surveyed from various geopolitical regions. 72% (n = 480) of the participants were studying at different universities, 23% (n = 156) were in polytechnics, and 5% (n = 30) were enrolled in colleges of education. The majority of the participants were male, making up 58% (n = 390), while females accounted for 42% (n = 277).

*A total of 667 students were surveyed from various geopolitical regions.*

Figure 2.7.1 shows the leading universities attended by students, with the University of Abuja having the highest number of students at 20.2% (n = 97). Following closely are Benin University, Lagos University, Landmark University, and Covenant University with 13.3% (n = 64), 9.8% (n = 47), 8.3% (n = 40), and 8.3% (n = 40) of students respectively.

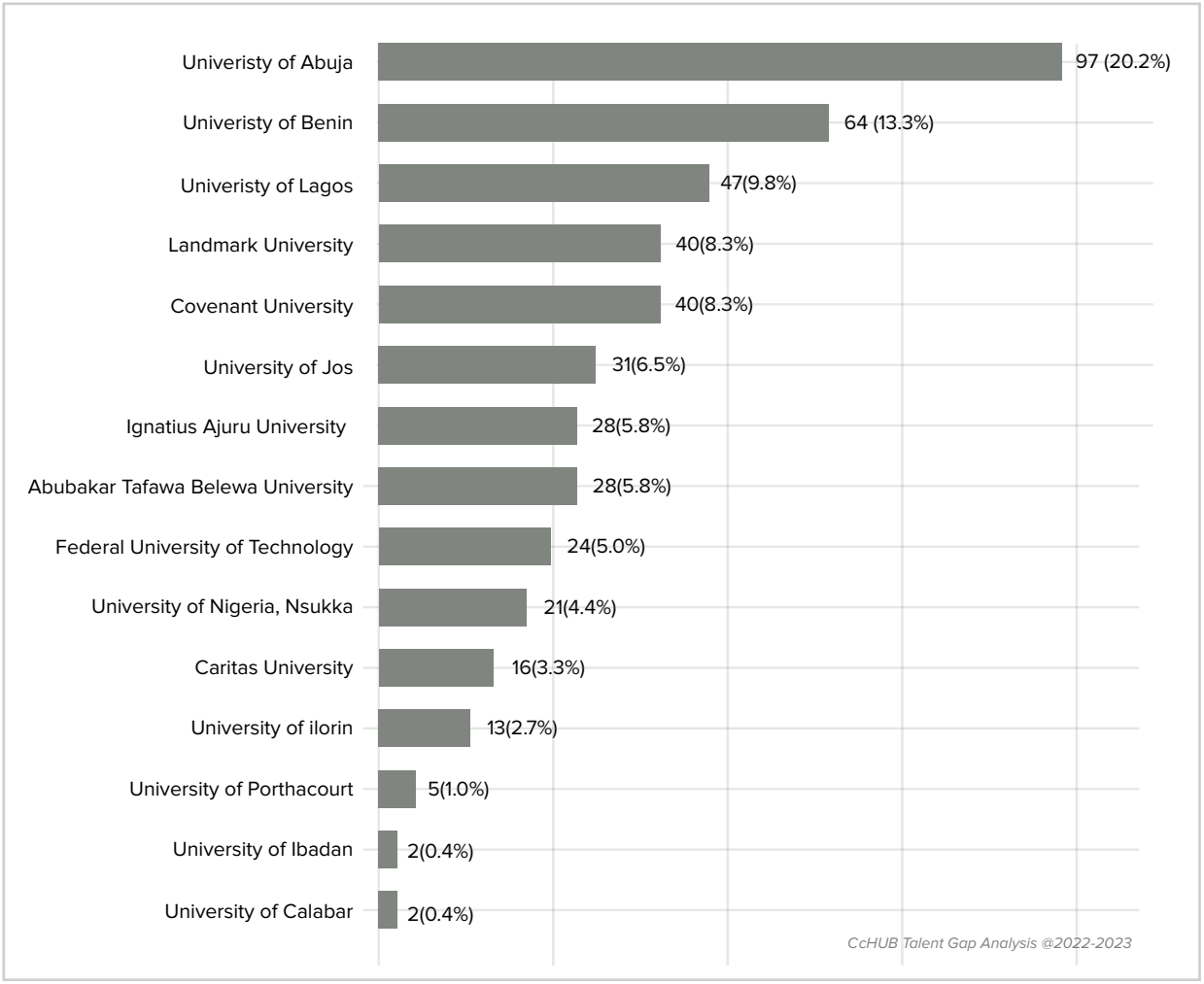



*Figure 2.7.1: Top Surveyed Universities*

The Federal Ohodo polytechnic had the highest representation among the polytechnic students who were surveyed, making up 23% (n = 36) of the sample (as shown in figure 2.7.2). Other polytechnics that were well-represented in the survey included Kwara State Polytechnic, Moshood Abiola Polytechnic, Auchi Polytechnic, and Kaduna Polytechnic. Figure 2.7.3 shows that half of the participants from colleges of education were from Osiele college of education, while the remaining half were  from Zaria Federal College, Ebonyi College, Ignatius College, and Akwanga College.

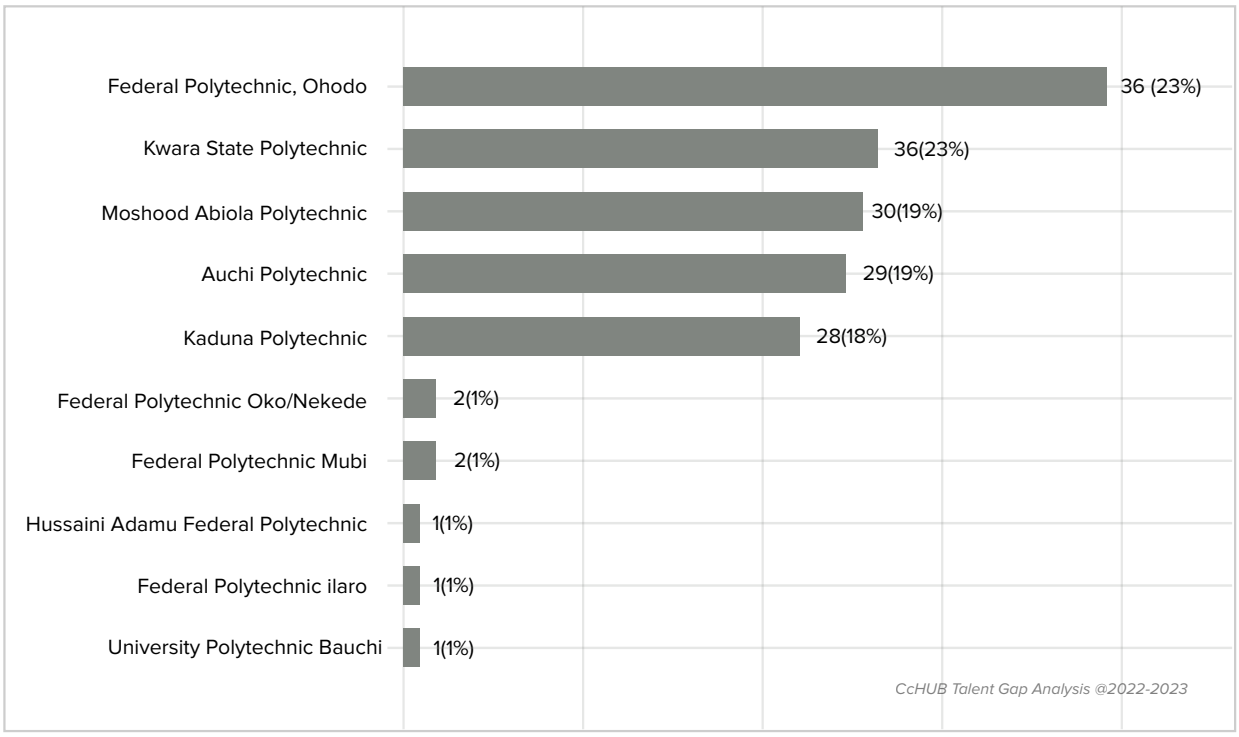



*Figure 2.7.2: Top Surveyed Polytechnics*

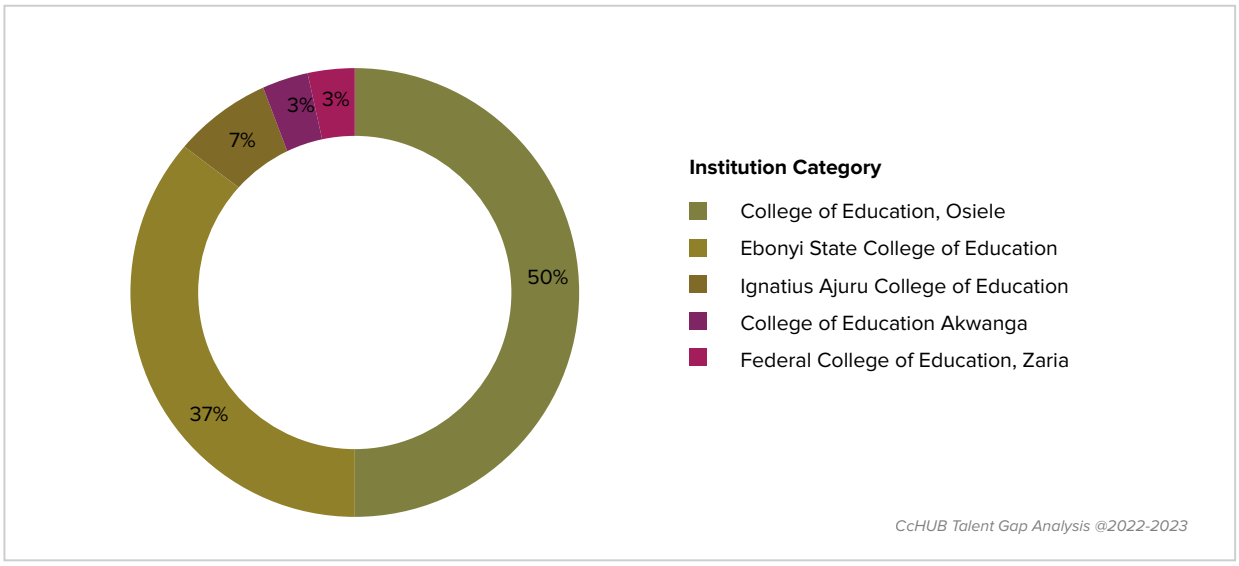



*Figure 2.7.3: Surveyed College of Education*

# Chapter 3: Nigeria IT Talent Gap Assessment Findings

This section presents the key findings of the study, shedding light on the landscape of IT talent in Nigeria. The findings offer a comprehensive overview of both the supply and demand aspects of IT skills within the country. From the types of IT skills being taught in Nigerian tertiary institutions to the in-demand skills, this chapter provides a clear and informative picture of the IT talent ecosystem. Moreover, the challenges encountered in building and nurturing IT talent are explored, offering insights into the complexities faced by organizations and individuals alike.

Through an analysis of the sources and providers of IT talent, the study unveils the rich diversity of initiatives that contribute to the development of IT skills in Nigeria. The subsequent exploration of the most sought-after IT skills for the present and future underscores the dynamic nature of the industry and its alignment with global trends. Furthermore, the chapter delves into the significance of complementary skills, such as communication, that accentuate the multifaceted nature of IT talent requirements.

*Through an analysis of the sources and providers of IT talent, the study unveils the rich diversity of initiatives that contribute to the development of IT skills in Nigeria.*

Moving beyond the confines of supply and demand, the findings navigate through funding models and prevailing challenges that shape the journey of cultivating a skilled IT workforce. From identifying the persistent dearth of senior talent to addressing the intricacies of remote work negotiations, these findings illustrate the nuanced intricacies faced by stakeholders in the IT talent domain.

## 3.1 IT Talent Demand Findings

### (a) Who needs the skills

In an era dominated by digital disruption, the demand for IT skills has surged across sectors, propelling organizations and economies toward innovation, efficiency, and growth. From technology companies to governments and academia, the need for proficient IT professionals has become paramount in Nigeria, reshaping the way industries function and paving the path for a technology-driven future.

Technology enterprises have consistently occupied a prominent position in the pursuit of Information Technology (IT) expertise, triggering an unceasing requirement for proficient software developers, adept data scientists, and vigilant cybersecurity specialists, among others. Within the purview of this assessment, it is discernible that the surveyed technology firms have

routinely expressed a recurring demand for a minimum of 20 novel technology-savvy professionals per annum. Extrapolating from this, when juxtaposed against the extant count of technology-oriented enterprises presently operational within Nigeria, a figure ascertained to be 481 according to Disrupt Africa's 2022 report, it becomes evident that these technology firms within the nation would collectively necessitate an estimated aggregate of approximately 9,620 fresh IT talents on a yearly basis.

> *the surveyed technology firms have routinely expressed a recurring demand for a minimum of 20 novel technology-savvy professionals per annum.*

Furthermore, governments worldwide are embracing digital transformation as a catalyst for revolutionizing public services, streamlining operations, and fostering innovation. The potential impact of this shift is staggering, with the World Bank estimating that global digital transformation could contribute a remarkable $1.5 trillion to the economy by 2025. Governments are recognizing the pivotal role of IT skills in achieving digital inclusion, enhancing citizen engagement, and optimizing public service delivery. The importance of IT skills resonates not only in government corridors but also within academia, where institutions are adapting to the digital age. Academic professionals require proficiency in IT skills for several reasons. Firstly, IT skills are essential for conducting research and accessing academic resources. With the increasing digitization of academic materials, researchers need to be proficient in using online databases, search engines, and other digital tools to find relevant literature and gather information (Kurth & Mastergeorge, 2010). Additionally, IT skills are necessary for data analysis and statistical analysis, which are crucial components of academic research in various fields (Neacy et al., 2000).

> *an estimated aggregate of approximately 9,620 fresh IT talents on a yearly basis.*

> *IT skills are necessary for data analysis and statistical analysis, which are crucial components of academic research in various fields*

In the healthcare sector, technology integration is reshaping the landscape, with IT professionals driving advancements from electronic health record (EHR) management to telemedicine and data analysis. The healthcare industry is undergoing a transformation with the advent of Industry 4.0 technologies (Mustapha et al., 2021). These technologies, such as blockchain, big data, cloud computing, and IoTs, have the potential to significantly enhance healthcare standards (Mustapha et al., 2021). IT talents are needed to implement and utilize these technologies effectively, enabling the tracking of patients' medical records and improving healthcare outcomes (Mustapha et al., 2021).

### (b) IT Skills in demand in Nigeria

The skills in demand is a blend of insights from the survey with students interviews with alternative technology education companies and companies reliant on tech/outsourcing/talent headhunters. The top 6 IT skills in demand in Nigeria from this assessment are Blockchain, machine learning, cybersecurity, data engineering,artificial intelligence and cloud computing.

*The top 6 IT skills in demand in Nigeria from this assessment are Blockchain, machine learning, cybersecurity, data engineering,artificial intelligence and cloud computing.*

According to some of the alternative technology training companies, the demand for the aforementioned skills are on rise daily both within Nigeria and globally and they are positioning themselves to be able to produce IT professionals that can take on these roles. Below are some of the quotes from them;

A representative from a cloud training company had this to say;

> *"The cloud computing industry is currently in a phase where it's been actively adopted right by organizations all over the world, especially in Nigeria. It's in fast adoption, hence the increasing need for these professionals. We discovered that as companies are trying to move to the cloud, they don't have enough skills to help them do that, which is why we decided to train people"*

In addition, in addressing the IT skills demand across the 6 skills area highlighted above, a representative of one of the IT skills training firms had this to say;

> *"We are fundamentally here to solve the skill crisis on the African continent. The major challenge that we're trying to solve is the challenge of moving more talent into the tech ecosystem. Wew get consistent demand everyday for talents to fill roles across block-chain, artificial intelligence, data engineering and cloud computing and this puts on our toes to train at scale to be able to fill these gaps"*

Furthermore, a representative of another IT skills training firms had this to say

> *"What informed our decision on the skills to train on are the current market demand across Blockchain. Machine learning, cybersecurity, data engineering, artificial intelligence and cloud computing and what the job market will look like in the next ten years for these skills. We are empowering people to have access to the skills needed to access these job opportunities that we get demand for in our daily work. We have the school of engineering, which covers front end, back end, and cloud engineering. We have the school of products and also school of data, which covers data analytics, data science, and data engineering"*

It is important to also highlight that one of the companies reliant on tech analogy talent stated thus;

> *"We leverage blockchain technology in payment processing and settlements and we are always looking for local talents in this area. We also require people that are good DevOps engineers and understand container technology as most of our data is stored in the cloud. It has however been very difficult to find talent locally to take on these tasks"*
> - *A company reliant on tech talent.*

To corroborate the different insights above, a technology talent headhunting company stated thus;

> *"Request for data engineers and scientists is the topmost on the list of IT talent demands that we have. In addition, we get high demand for Cloud/ DevOps engineers and we take a long time to find talents to fill these roles"*

Summarily, these insights underscore the criticality of addressing the IT skills gap in Nigeria to fulfill the mounting demand for professionals adept in emerging technologies, specifically in blockchain, machine learning, cybersecurity, data engineering,artificial intelligence and cloud computing. The convergence of perspectives from training institutions, technology-reliant companies, and talent headhunters accentuates the urgent need for targeted efforts to cultivate and equip IT professionals with the requisite skills to thrive in an ever-evolving digital landscape.

### (c) Estimate of the IT talent demand in Nigeria (Immediate and projected)

Contained within the following table is a comprehensive overview encompassing both present-day and projected estimates concerning the burgeoning demand for IT talent in both the Nigerian and global contexts. The table below provides a valuable insight into the anticipated trajectory of IT workforce requirements, offering a nuanced understanding of the opportunities within the Information Technology talent development sector.

*Table 3.1.1: National & Global Anticipated Trajectory of IT Workforce*

| **Supply** | **Demand**<br>Estimates show that there will be a global shortage of more than 85 million tech workers by 2030[5] |
|---|---|
| Average University Yearly Graduation from IT courses[6].<br><br>Current -<br>**9,432**<br><br>Projected by 2030 -<br>**75,456** | 85 million IT job shortages by 2030 (Korn Ferry)<br><br>Current Global Population -<br>**8,045,311,447**<br>(Worldometer)<br><br>Current Nigeria Population -<br>**223,804,632**<br>(Worldometer)<br><br>Projected Global Population by 2030 -<br>**8,546,141,327**<br>(Worldometer)<br><br>Nigeria Gap by 2030 -<br>**2,611,627**<br>IT Job Shortage |
| The major top 25 Alternative IT skills training companies in Nigeria train averagely 1000 Nigerian IT talents a year<br><br>Current -<br>**9,432**<br><br>Projected -<br>**200,0000** | |

[5]https://www.kornferry.com/insights/this-week-in-leadership/talent-crunch-future-of-work
[6]https://www.nuc.edu.ng/

| | |
|---|---|
| Total Average Yearly Supply Current = **34,432** | Total Projected Demand by 2030 = **2,611,627** |
| Total Projected Average Yearly Supply by 2030 = **275,456** | |

The projections presented in the table 3.1.1 above are based on a careful analysis of both the demand and supply data in the context of the IT job market. The aim is to understand the potential gap between the number of IT jobs required and the number of skilled IT professionals available. Here's a summary of how these projections were made:

- **Demand Data**
  - The source estimates a global shortage of over 85 million tech workers by 2030 according to Ferry (2022). This substantial gap in IT professionals highlights the growing demand for skilled individuals in the tech sector globally.
- **Supply Data**
  - The average annual university graduation from IT courses in Nigeria was 9,432 in the year 2020 which is the recent data on graduation from IT courses by the National University Commission (2020)
  - The top 25 alternative IT skills training companies in Nigeria are currently training approximately 25,000 Nigerian IT talents per year according to the estimation from this assessment.
  - This number is projected to increase to 200,000 by 2030, indicating a growing effort to bridge the IT skills gap.
  - The projection for IT course graduates by 2030 is 75,456, using the average of 2020 data of 9,432 graduates per year, reflecting a significant increase in the number of skilled IT professionals entering the job market.

*The source estimates a global shortage of over 85 million tech workers by 2030 according to Ferry (2022).*

*The average annual university graduation from IT courses in Nigeria was 9,432 in the year 2020*

*The top 25 alternative IT skills training companies in Nigeria are currently training approximately 25,000 Nigerian IT talents per year*

- **Population Data**
  - The current global population is 8,045,311,447, with Nigeria's population at 223,804,632 according to Wordometer (2023)
  - The projected global population by 2030 is expected to reach 8,546,141,327,with Nigeria's population projected to be 262,580,426 according to Worldometer (2023)

- **Gap Analysis**
  - Given the projected global IT job shortage of 85 million by 2030, it's determined that Nigeria's gap in IT jobs by 2030 will be 2,611,627.
  - This gap represents the deficit between the projected demand for IT professionals and the projected supply of skilled graduates.

- **Aggregate Supply and Demand**
  - The total average yearly supply of skilled IT professionals in Nigeria's job market is calculated by adding the annual university graduates (9,432) to the annual training from IT skills training companies (25,000), resulting in a current total of 34,432.
  - The projected average yearly supply by 2030 is expected to be 275,456, reflecting the increase in IT course graduates and skilled professionals trained by IT skills training companies.

- **Projected Demand**
  - The total projected demand for IT professionals in Nigeria by 2030 is estimated to be 2,611,627 based on the global shortage of IT jobs.

The projected shortage of over 2.6 million IT jobs in Nigeria by 2030 indicates a significant demand for skilled professionals, offering economic growth potential and career opportunities. This gap underscores the need for enhanced skills development initiatives, from universities to IT training companies, to address the demand and create pathways for individuals to enter the expanding technology sector. By bridging the skills gap, Nigeria can drive innovation, attract investments, and build a competitive edge in the global tech landscape.

*The total projected demand for IT professionals in Nigeria by 2030 is estimated to be 2,611,627 based on the global shortage of IT jobs.*

### (d) Key challenges faced during recruitment and retaining talent

There are some insights that have emanated from the assessment on the challenges companies face in recruiting and retaining IT talents such as abundance of junior talent and scarcity of senior talents, remote role negotiations and preferences, request for payment in foreign currencies and lack of commitment on the job due to multiple jobs. These issues have been expanded upon below;

#### 1. Abundance of Junior Talents and Scarcity of Senior Talents

It is worth noting that a large number of ecosystem leaders we interviewed continued to echo the same fact around scarcity of senior and more experienced IT talents. In fact, many stated that Nigeria has no IT talent scarcity but a scarcity of Senior IT Talents. What is responsible for this has been largely the effect of more alternative technology education platforms who continue to train more talents but with the lack of opportunities to test and implement the knowledge they have gathered through practical internships and apprenticeship. In addition, the few IT talents who had the opportunity to develop themselves beyond the training and become senior talents are mostly shipped out of the country for bigger remunerations and more impactful projects. Another important insight is the reason why there is high unemployment amongst the junior IT talents despite their levels of skills that can at least serve the local ecosystem. This research confirmed the sentiment that has been around for a while on the inability of many firms in Nigeria to afford senior IT talents and how expensive it is to employ junior IT talents because of training on the job cost and the danger of leaving the company after getting trained.

*In fact, many stated that Nigeria has no IT talent scarcity but a scarcity of Senior IT Talents. What is responsible for this has been largely the effect of more alternative technology education platforms who continue to train more talents but with the lack of opportunities to test and implement the knowledge they have gathered through practical internships and apprenticeship.*

#### 2. Remote Role Negotiation and Preference

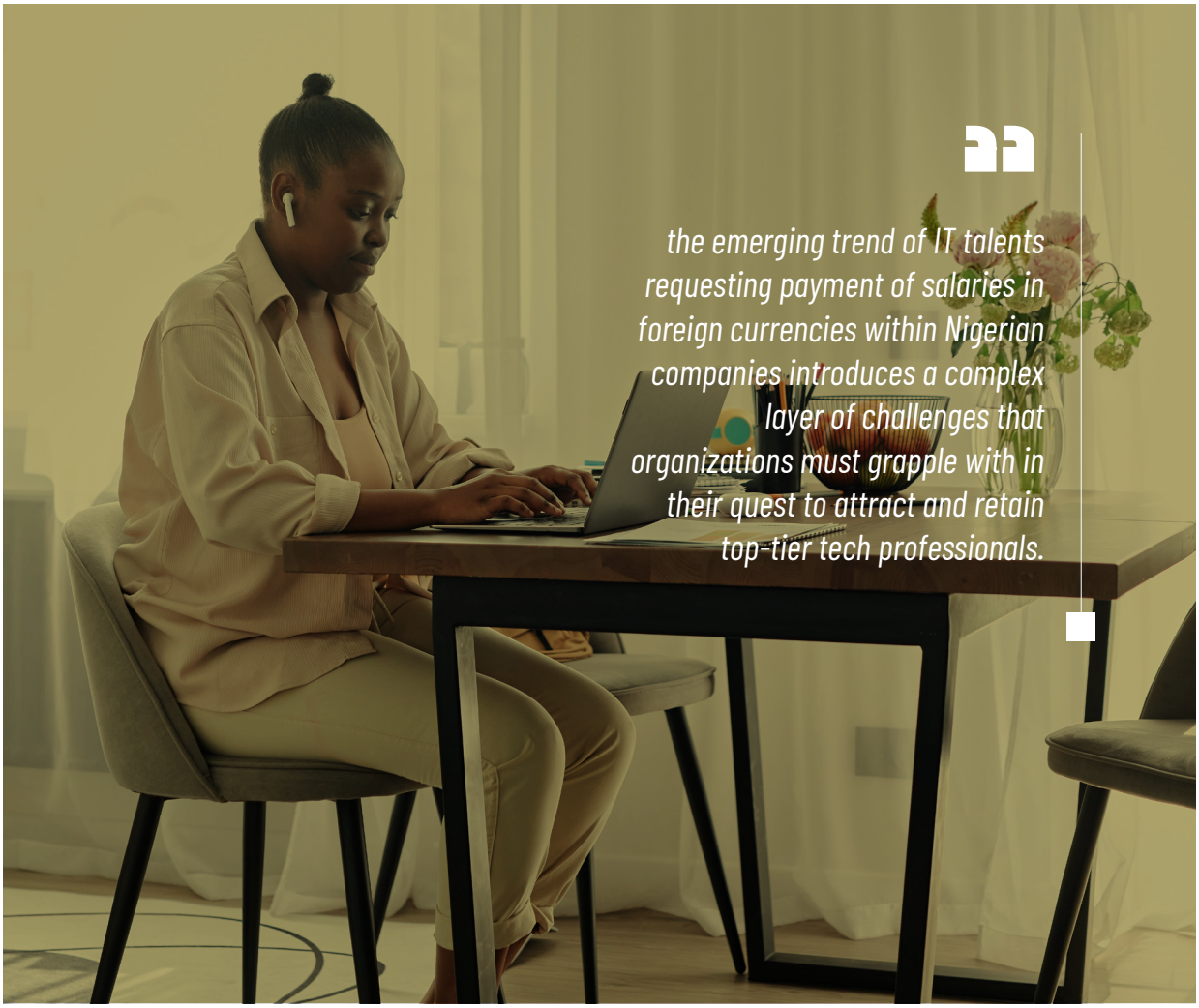
The technology talent headhunters noted that there is a growing inclination of IT talents towards remote roles, even in job positions that traditionally require on-site presence, presenting a multifaceted challenge within talent acquisition. This phenomenon stems from the evolving dynamics of work in the digital age, influenced by factors such as technological advancements, changing employee expectations, and the normalization of remote work arrangements. While remote work offers undeniable benefits in terms of flexibility, work-life

*The technology talent headhunters noted that there is a growing inclination of IT talents towards remote roles,*

balance, and geographical freedom, it also introduces complexities that companies must navigate when hiring and retaining tech talents. They note that  a number of Nigeria tech companies raise concerns about team cohesion, effective communication, and productivity as remote work can potentially hinder spontaneous interactions, impede swift decision-making, and create challenges in aligning diverse team members toward common objectives.

### 2. Remote Role Negotiation and Preference

The tech talent headhunters noted another issue on currency negotiation for salary. They noted that the emerging trend of IT talents requesting payment of salaries in foreign currencies within Nigerian companies introduces a complex layer of challenges that organizations must grapple with in their quest to attract and retain top-tier tech professionals. This phenomenon is influenced by a confluence of factors, including the global nature of the tech industry, exchange rate fluctuations, and the perceived stability of foreign currencies. While this request reflects the aspirations of IT talents seeking to optimize their financial earnings, it gives rise to a range of considerations and potential obstacles that companies must carefully navigate.



## 3.2 IT Talent Supply Findings

### (a) Sources of IT talent supply in Nigeria

Below are the findings on the sources of IT talent supply in Nigeria's evolving tech ecosystem. As the demand for skilled IT professionals continues to rise, it is imperative to identify the channels through which the industry is obtaining its workforce. The assessment unearthed three key sources contributing to the inflow of IT talent into the sector: Higher Education Institutions, Alternative Technology Education and Training Companies, and Self-Education.

#### 1. Higher Education Institutions

Higher education institutions, such as universities, polytechnics and colleges of education, have traditionally been a primary source of IT talent. The study revealed that these institutions offer a range of computer science, information technology, and other IT related programs. Graduates from these programs often possess a foundational understanding of IT concepts and principles, providing a pool of potential candidates for the industry. The curriculum of these institutions typically covers a broad spectrum of IT topics, from programming languages to networking and software development. However, the study also highlighted that there might be a gap between the skills acquired through formal education and the practical demands of the rapidly evolving IT landscape.

*Table 3.3.1: Universities providing IT-related courses and the corresponding student enrolments*

| Program | Universities Offering IT-related Courses | Students Enrolment |
|---|---|---|
| Computer Science | 148 | 94715 |
| Computer Engineering | 36 | 11135 |
| Cyber Security | 17 | 2038 |
| Electrical Electronics Engineering | 57 | 19285 |
| Electrical Engineering | 13 | 6658 |
| Information Communication Technology | 10 | 1510 |
| Information Systems | 4 | 679 |
| Information Technology | 13 | 36505 |
| Software Engineering | 14 | 1219 |
| Systems Engineering | 1 | 390 |
| Telecommunications Engineering | 6 | 954 |
| Telecommunications Management | 1 | 2 |
| Telecommunications Science | 2 | 382 |

According to the National University Commission Report (2020), Table 3.2.1 above presents a diverse range of programs offered by universities across Nigeria, with a total enrollment of 2,181,116 students. The data reveals Computer Science as the most studied program, with 148 universities providing it and a student enrollment of 94,715. Notably, IT-related programs collectively attract a significant enrollment of around 170,000 students, indicating the growing significance of technology fields in the job market. While some engineering programs, like Electrical Electronics Engineering and Electrical Engineering, remain popular, more specialized programs such as Telecommunications Management and Telecommunications Science have limited availability and enrollment.

*Table 3.2.2 Enrollment and graduation in IT-related courses in Nigerian universities, 2020.*

| Program | Admitted | Graduated |
|---|---|---|
| Computer Science | 19050 | 6144 |
| Computer Engineering | 2315 | 634 |
| Cyber Security | 409 | 59 |
| Electrical Electronics Engineering | 4514 | 1400 |
| Electrical Engineering | 1193 | 483 |
| Information Communication Technology | 535 | 131 |
| Information Systems | 75 | 73 |
| Information Technology | 2099 | 394 |
| Software Engineering | 667 | 0 |
| Systems Engineering | 60 | 61 |
| Telecommunications Engineering | 312 | 53 |

In addition, the report from the National Universities Commission in 2020 presents information on the popularity of different IT-related programs and the job prospects in Nigeria IT industry. This is determined by analyzing the total number of graduates and admissions in these programs (Table 3.2.2). The analysis indicates that among other programs, computer science and information technology programs in 2020 were highly sought-after among students and successfully produced a significant number of graduates. The larger pool of qualified graduates demonstrates a substantial supply of individuals who meet the demands of the job market, thereby contributing to the growth of the technology industry.

### 2. Alternative Technology Education and Training Companies

The study identified a growing trend of alternative technology education and training companies that offer specialized and intensive programs to equip individuals with practical skills for the IT industry. These companies, sampled by six of those who engaged with us in this assessment (Altschool, Uitva, Cloudboosta, Univelcity, Stutern and Treford) have gained prominence as sources of highly trained IT talent. The programs offered by these companies often focus on real-world project-based learning, offering participants an opportunity to work on industry-relevant projects and develop hands-on skills. The study revealed that these initiatives have gained traction due to their ability to bridge the gap between theoretical knowledge and practical application, catering to the industry's specific needs.

### 3. Self-Education

Self-education emerged as another noteworthy source of IT talent supply. The study indicated that many students are self-taught, leveraging online resources, tutorials, and open-source platforms to acquire skills at their own pace. This source of talent supply reflects the dynamic and adaptable nature of the tech industry, where motivated individuals can carve their paths to proficiency.

## (b) Students IT Skills Competencies

The figure 3.2.1 below indicates the distribution of students' responses on their IT skills competency level ratings. The survey outcome indicated that the majority of the students had basic or novice level of IT competency accounting for 50% of total number of students, 35% were competent and only 15% were proficient and experts in their respective IT fields.

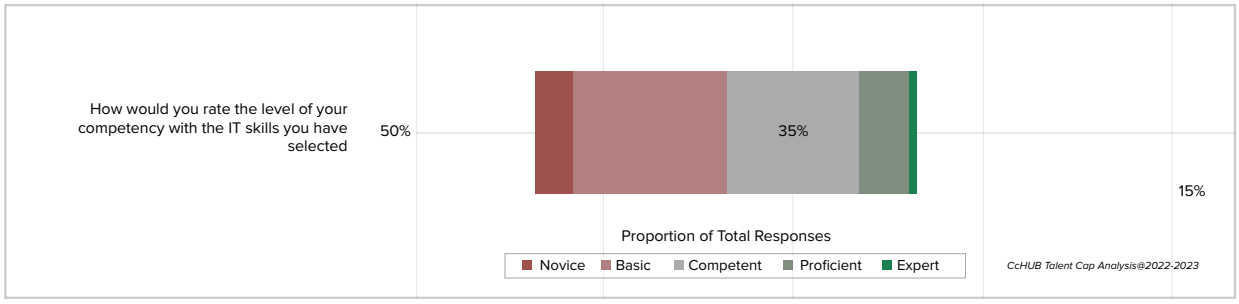



*Figure 3.2.1: IT competency rating*

In today's digital age, IT skills are no longer considered an added bonus but are essential for anyone looking to succeed in the job market. As technology continues to evolve, IT skills have become a prerequisite for almost all industries. Employers in Nigeria and world over are on the lookout for professionals who can navigate the latest technological advancements and help their businesses stay ahead of the curve. IT skills competencies refer to a range of abilities and knowledge that individuals possess in the field of information technology. These competencies can vary based on the role or industry in which they are applied. However, some basic IT skills competencies include computer programming, database management, network administration, cybersecurity, and data analysis.

Computer programming is an essential IT skill that involves writing code for software and applications. To support the data above from the student IT skills competencies, Burning Glass Technologies (2021), stated that computer programming is one of the most in-demand IT skills in the job market, with 18% of all job postings requiring it (Burning Glass Technologies, 2020). Some of the most popular programming languages popular among Nigeria IT talents include Java, Python, and C++.

Database management is another crucial IT skill that involves designing, maintaining, and securing databases. With the proliferation of big data, organizations require professionals who can handle large datasets and extract meaningful insights from them. Some of the commonly used database management systems include Oracle, SQL Server, and MySQL. Network administration involves managing and maintaining computer networks, including LANs, WANs, and VPNs. It includes tasks such as setting up and configuring network hardware, managing user accounts, and ensuring network security. According to a report by LinkedIn, network administration is among the top five IT skills that are in high demand (LinkedIn, 2021).

*With the proliferation of big data, organizations require professionals who can handle large datasets and extract meaningful insights from them.*

Furthermore, Cybersecurity is an increasingly important IT skill that involves protecting digital assets from unauthorized access, theft, and damage. With the rise of cyber threats, cybersecurity has become a top priority for organizations across all industries. Some of the skills required in cybersecurity include vulnerability assessment, penetration testing, and incident response. Data analysis is another critical IT skill that involves collecting, cleaning, and analyzing data to derive insights and inform business decisions. With the growing demand for data-driven decision-making, data analysis has become a crucial skill for professionals across all industries. Some of the most commonly used data analysis tools include Excel, R, and Tableau.

## (c) School curriculums and current trends

35% of the students reported that the current curriculum in their respective institutions of higher learning has been revised to align with the latest industry standards and trends. On the other hand, 31% of the students expressed their discontent with the outdated curriculum being taught in their institutions (figure 3.3.3).

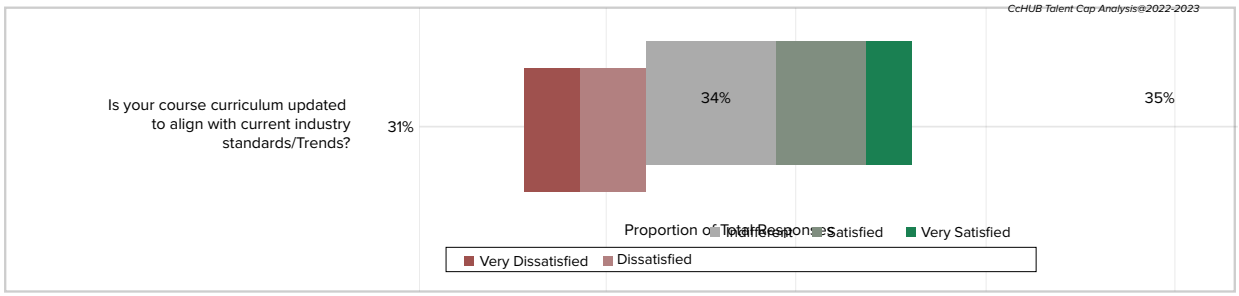



*Figure 3.2.2 : Aligned schools curriculum with current industry trends*

Technology has become an essential part of our daily lives. With advancements in technology happening at a rapid pace, it is crucial for educational institutions to adapt their curriculums, IT bases courses and subjects to keep up with current IT trends. The alignment of school curriculums with the latest IT trends is essential to prepare students for the job market and equip them with the necessary skills to succeed in a technology-driven world.

One of the key ways that Nigerian educational institutions can align their curriculums with the latest IT trends is by introducing courses that focus on emerging technologies such as artificial intelligence, machine learning, and cybersecurity. With these technologies becoming increasingly important in today's job market, it is essential for students to have a strong foundation in these areas. Moreover, educational institutions can also integrate IT into traditional subjects such as mathematics, science, and language arts. For instance, students can learn coding languages such as Python to solve complex math problems or use virtual reality to explore scientific concepts. Integrating IT into traditional subjects can enhance learning and help students develop a deeper understanding of the subject matter. Another way that educational institutions can align their curriculums with the latest IT trends is by providing students with opportunities to learn through project-based learning. Project-based learning allows students to work on real-world problems and develop crucial skills such as collaboration, communication, and problem-solving. With technology being an integral part of many industries, project-based learning can help students develop the skills needed to succeed in a technology-driven world.

*Project-based learning allows students to work on real-world problems and develop crucial skills such as collaboration, communication, and problem-solving.*

### (d) Teachers capacity

With the increasing demand of IT talents in Nigeria, the capacity of teachers is now more crucial than ever. Teachers need to have a solid understanding of various digital tools and technologies to effectively integrate them into their teaching methods. This includes skills such as:

- using educational software,
- creating online courses,
- managing learning management systems, and
- incorporating multimedia content into lessons.

Furthermore, teachers must be able to adapt to new technological advancements and keep up with the latest trends to ensure that they are providing students with the most relevant and up-to-date education possible. In recent years, there has been a concerted effort to improve the skills and knowledge of teachers in this field, with many institutions offering training programs and professional development opportunities (such as re:learn at CcHUB).

The unavailability of evidence on the number of Nigerian university teachers trained in teaching subjects with ICT has hindered the assessment of their capabilities. Nonetheless, UNESCO reported in 2017 that only 11% of primary and secondary school teachers in Nigeria had received training in using ICT for instruction. This emphasizes the urgent need for substantial investments in teacher training programs to bridge the digital gap and provide educators with the essential skills to effectively utilize ICT tools in their classrooms. Additionally, there is a need to promote a culture of sharing information and research findings.

*The unavailability of evidence on the number of Nigerian university teachers trained in teaching subjects with ICT has hindered the assessment of their capabilities.*

The level of utilization of ICT tools in teaching can be heavily influenced by a teacher's experience. Typically, teachers who have been in the profession for an extended period may not have as much exposure or familiarity with newer ICT tools and technologies. Additionally, they may have established teaching methods that do not rely on technology, which can make it difficult for them to adopt new practices. However, this is not always the case, as research conducted in Nigeria by Yushau & Nannim (2020) found that teaching experience is a significant factor affecting the level of ICT utilization in teaching (teachers who have been teaching for a longer period tend to use ICT facilities more extensively than those with less experience). This could be because some experienced teachers have taken proactive steps to develop their skills and integrate technology into their teaching methods.

*Additionally, they may have established teaching methods that do not rely on technology, which can make it difficult for them to adopt new practices.*

The level of utilization of ICT tools in teaching can be heavily influenced by a teacher's experience. Typically, teachers who have been in the profession for an extended period may not have as much exposure or familiarity with newer ICT tools and technologies. Additionally, they may have established teaching methods that do not rely on technology, which can make it difficult for them to adopt new practices. However, this is not always the case, as research conducted in Nigeria by Yushau & Nannim (2020) found that teaching experience is a significant factor affecting the level of ICT utilization in teaching (teachers who have been teaching for a longer period tend to use ICT facilities more extensively than those with less experience). This could be because some experienced teachers have taken proactive steps to develop their skills and integrate technology into their teaching methods.

*The technology talent headhunters noted that there is a growing inclination of IT talents towards remote roles,*

The student-teacher ratio is another crucial factor to consider when evaluating the capacity of teachers. The National Universities Commission (NUC) reported that the average student-teacher ratio in Nigerian universities is approximately 30:1, indicating that there are about 30 students for every teacher in a typical tertiary institution. This can have a significant impact on the quality of IT education since teachers may find it challenging to provide personalized attention and support to each student in a large class. It can also make it more difficult to integrate technology effectively into teaching since teachers may lack the time and resources to provide individualized instruction and support. To enhance the capacity of IT teachers, it is vital to address the issue of high student-teacher ratios through measures such as hiring more teachers, increasing funding for education, and providing tailored training and support to help teachers effectively integrate technology into their teaching practices.

*The National Universities Commission (NUC) reported that the average student-teacher ratio in Nigerian universities is approximately 30:1*

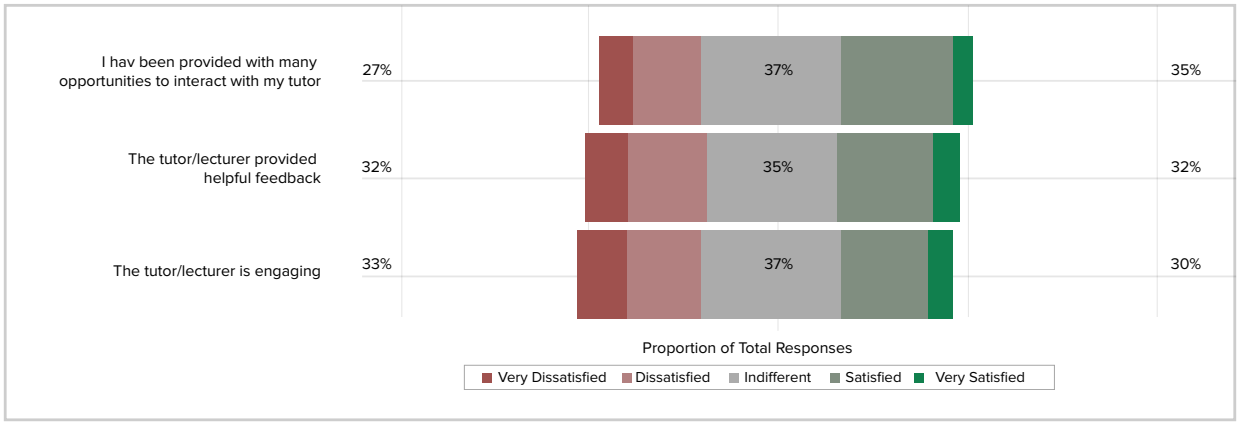



*Figure 3.2.3: Tutors/lecturers capacity*

37% of the total responses from the students showed that they did not have any opinion on whether their degree program provided them with sufficient opportunities to interact with their tutors. On the other hand, 35% agreed that they had enough opportunities, while 27% disagreed (figure 3.2.3). Similarly, 35% of the total responses from the students did not express any opinion on the helpfulness of the feedback provided by their tutors. However, 32% agreed that the feedback was helpful, while 32% disagreed. Regarding the engagement level of their tutors, 37% of the students did not express any opinion on this matter, while 33% disagreed that their tutors were engaging enough. Only 30% of the students were satisfied with how their tutors were engaging them.

The implication of the insight above is that the majority of the students might have become indifferent about their teachers performance or classroom instructions as prior data from the survey has confirmed the high level of self learning engagements by the students through other independent platforms. While this may be true or not, it is important to note that each student's learning experience is unique and influenced by various factors such as their motivation, learning style, and external environment. It is essential to emphasize the importance of effective teaching practices and building strong teacher-student relationships that foster engagement and active learning. While independent self-learning can be an effective supplement to traditional teaching methods, it should not be considered a substitute for quality teaching and student-teacher

*each student's learning experience is unique and influenced by various factors such as their motivation, learning style, and external environment.*

## (e) Other key findings

### 1. IT Skills Spectrums: Code, No-Code and Complementary Skills

The interviews with the founders of alternative technology education platforms in Nigeria revealed that their IT skills training is broadly categorized into either code or no-code skills. Some platforms focus on teaching only one of these aspects, while others teach both. Code skills such as cybersecurity, software development, machine learning and blockchain development are more technical, costly, intense, and time-consuming to acquire compared to non-code competencies. On the other hand, no-code skills like product design, user experience design, user interface design, product marketing, and platform testing are less technical and have lower barriers to entry. The founders suggest that IT talent acceleration efforts should not be restricted to code-based technical abilities, as no-code IT skills are becoming increasingly valuable, especially for young professionals looking to transition into the IT field.

*The founders suggest that IT talent acceleration efforts should not be restricted to code-based technical abilities, as no-code IT skills are becoming increasingly valuable, especially for young professionals looking to transition into the IT field.*

The study also found that demographic trends play a role in determining the choice of code or no-code skills training. Young people aged 20 to 24 tend to enroll more in code-based IT skills training, while persons aged 30 and above prefer no-code IT skills training. This could be due to the fact that younger individuals are more likely to be able to manage greater mathematical and logical difficulties while being new to their career path. In contrast, older individuals may be in a job and seek IT tech training as a career change, and they may not have the patience or mental capacity to handle code-based technology skills training.

*Young people aged 20 to 24 tend to enroll more in code-based IT skills training, while persons aged 30 and above prefer no-code IT skills training.*

### (i) Technical Skills

Figure 3.2.4 provides a summary of the IT skills that students have been exposed to during their education. The results indicate that coding and programming were the most common skills among the surveyed students, accounting for 37.3% of the total sample. Other skills, such as data analytics, systems and networks, machine learning, system security, cloud computing, DevOps, and blockchain, had smaller proportions of participants. Conversely, only 1% of the participants had exposure to system maintenance, hardware maintenance, documentation, data science, computer maintenance, graphic design, and back-end development each.

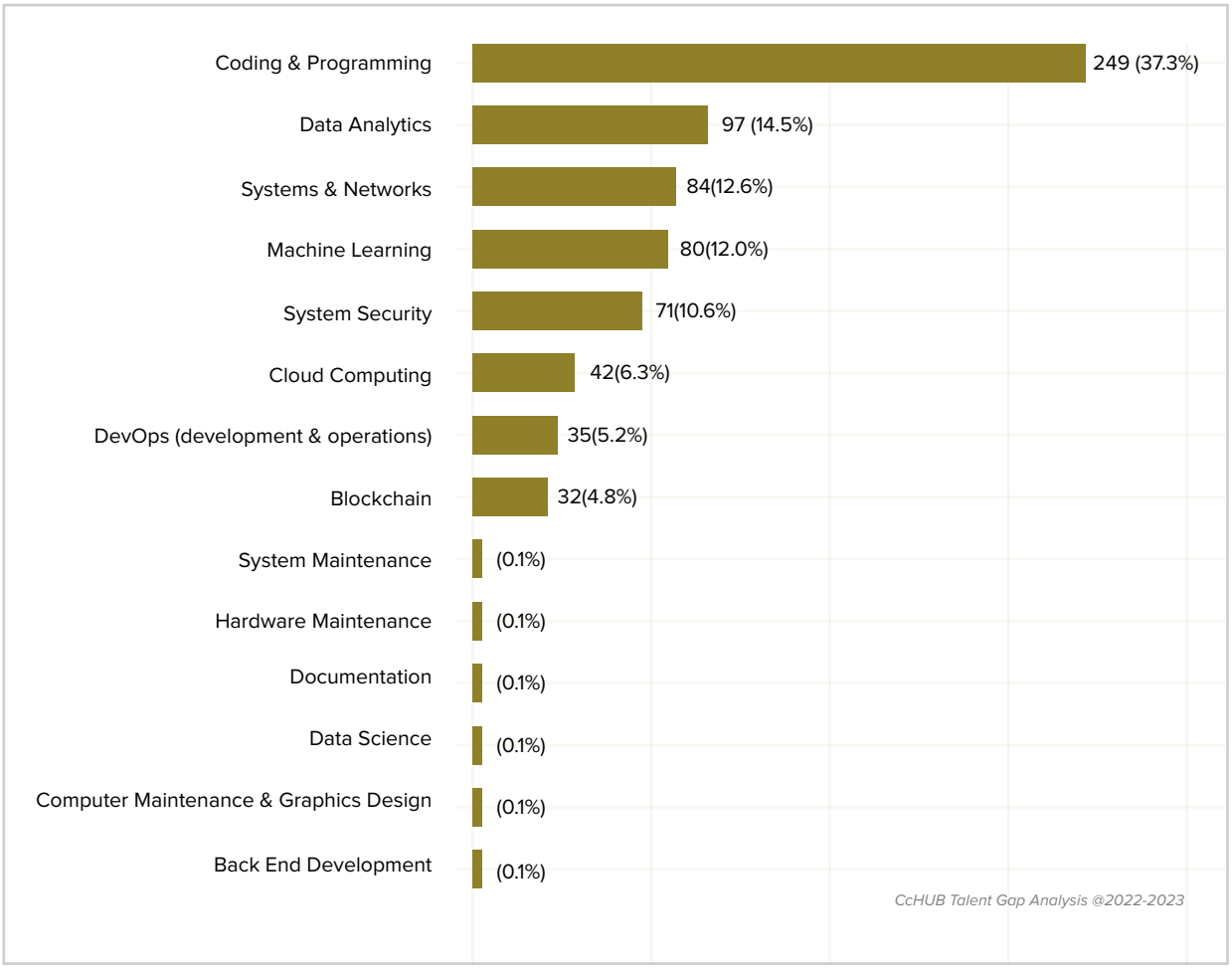



*Figure 3.2.4: Technical skills*

This result is not surprising since coding and programming are fundamental skills required for any career in the tech industry (Prasant, 2022). Data analytics is the second most preferred technical skill, with 14.5% of the surveyed learners exposed to it. The demand for data analytics skills has been on the rise in recent years due to the increasing need for data-driven decision-making (University of Pennsylvania, 2022). Systems & networks, machine learning, system security, cloud computing, DevOps, and blockchain follow with 12.6%, 12.0%, 10.6%, 6.3%, 5.2%, and 4.8%, respectively. These technical skills are also highly valued in the tech industry and are in demand due to the growth of emerging technologies (Richardson, 2021).

> *coding and programming are fundamental skills required for any career in the tech industry*

### (ii) Coding self learning

In terms of learning, the study shows that a number of young people in the higher institutions of learning are not only relying on the regular classroom lessons. They are also engaging in self-learning of coding skills outside of school. Figure 3.2.5 shows that 51% of the students learned programming languages and other technologies on their own.

*a number of young people in the higher institutions of learning are not only relying on the regular classroom lessons.*

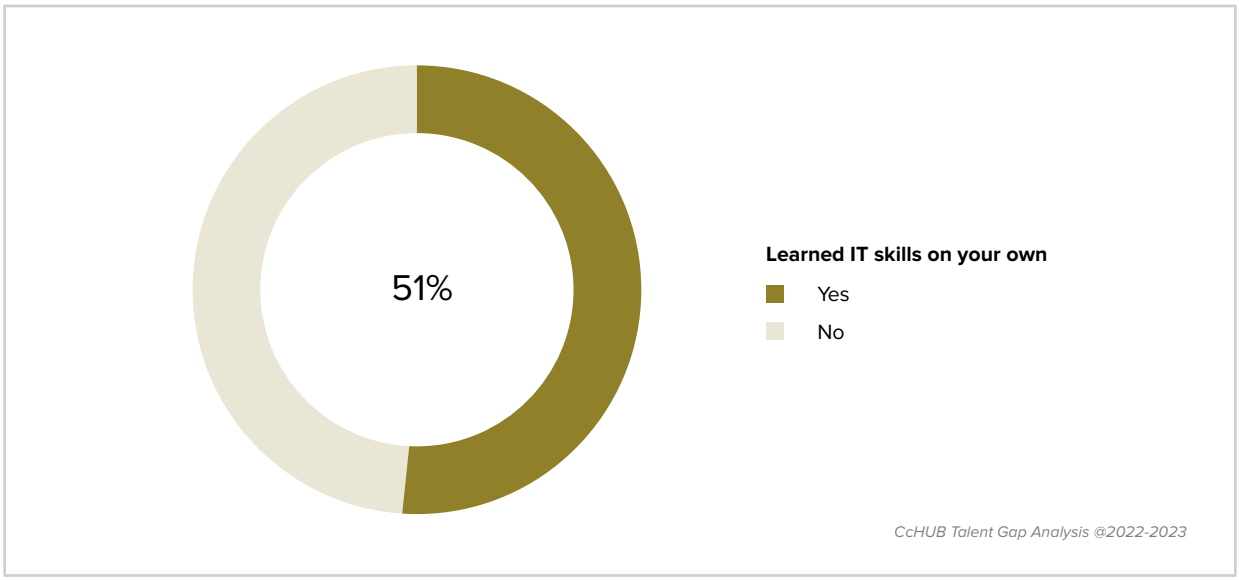



*Figure 3.2.5 : Learn IT Skills*

Another interesting insight to note is the gender complexion of the issue of self learning of code skills. Out of the 51% of the students who had taught themselves programming languages and other technologies, 65% were males, and 35% were female (figure 3.2.6).

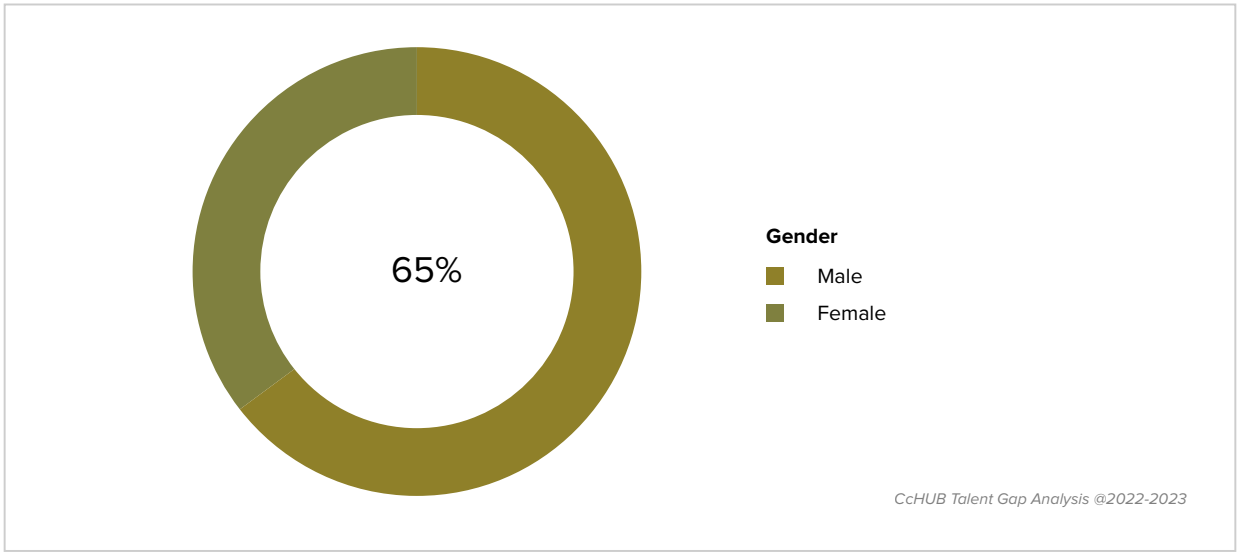



*Figure 3.2.6: Self-Taught Programming by Gender*

A further look into the way students are self learning code skills according to institutional classifications shows that **university students topped the list of self-taught programmers** representing **70%** of the total self-taught learners, 27% were polytechnic students and only 3% were colleges of education as shown in figure 3.2.7.

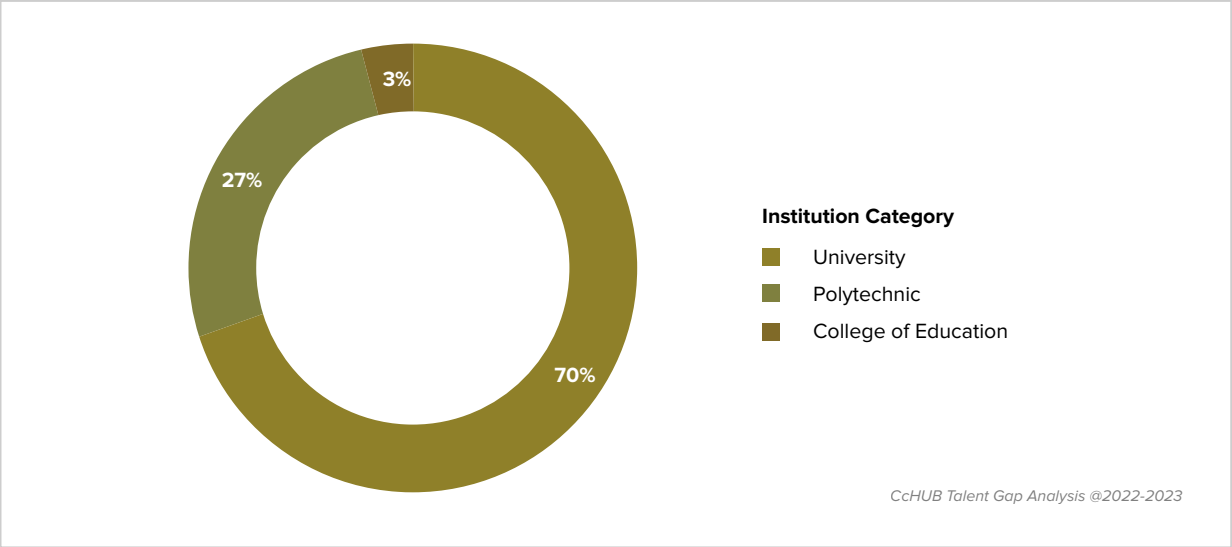



*Figure 3.2.7:Self-Taught Programming by Institutions*

### (iii) Programming language students learn on their own

The popularity of Python as a programming language among students is consistent with data from several other sources who have studied the coding languages that students prefer. According to the data presented in figure 3.2.8, Python programming is the most popular programming language among students, accounting for 22.6% of the total number of surveyed students. This result is consistent with the findings of other studies that have shown Python to be a widely popular programming language among students and developers alike (Zhang, 2020). Javascript is the second most popular programming language, with 17.2% of the surveyed students learning it. Javascript is widely used in web development and has become increasingly popular in recent years (W3Techs, 2021). SQL is the third most popular programming language among the surveyed students, with 11.8% of them learning it. SQL is a programming language used for managing and manipulating data in relational databases, making it a critical tool for data scientists and database administrators (Oracle, 2021).

*Python programming is the most popular programming language among students*

Java, C++, C, and BASIC follow with 10.8%, 7.3%, 6.1%, and 5.2%, respectively. Java is a popular programming language used for building enterprise-level applications and Android mobile apps. C++ is commonly used in developing operating systems, game engines, and other performance-intensive applications. C is used in developing system-level software, such as operating systems and device drivers. BASIC is a beginner-friendly language that was widely used in the early days of personal computing (GeeksforGeeks, 2021).

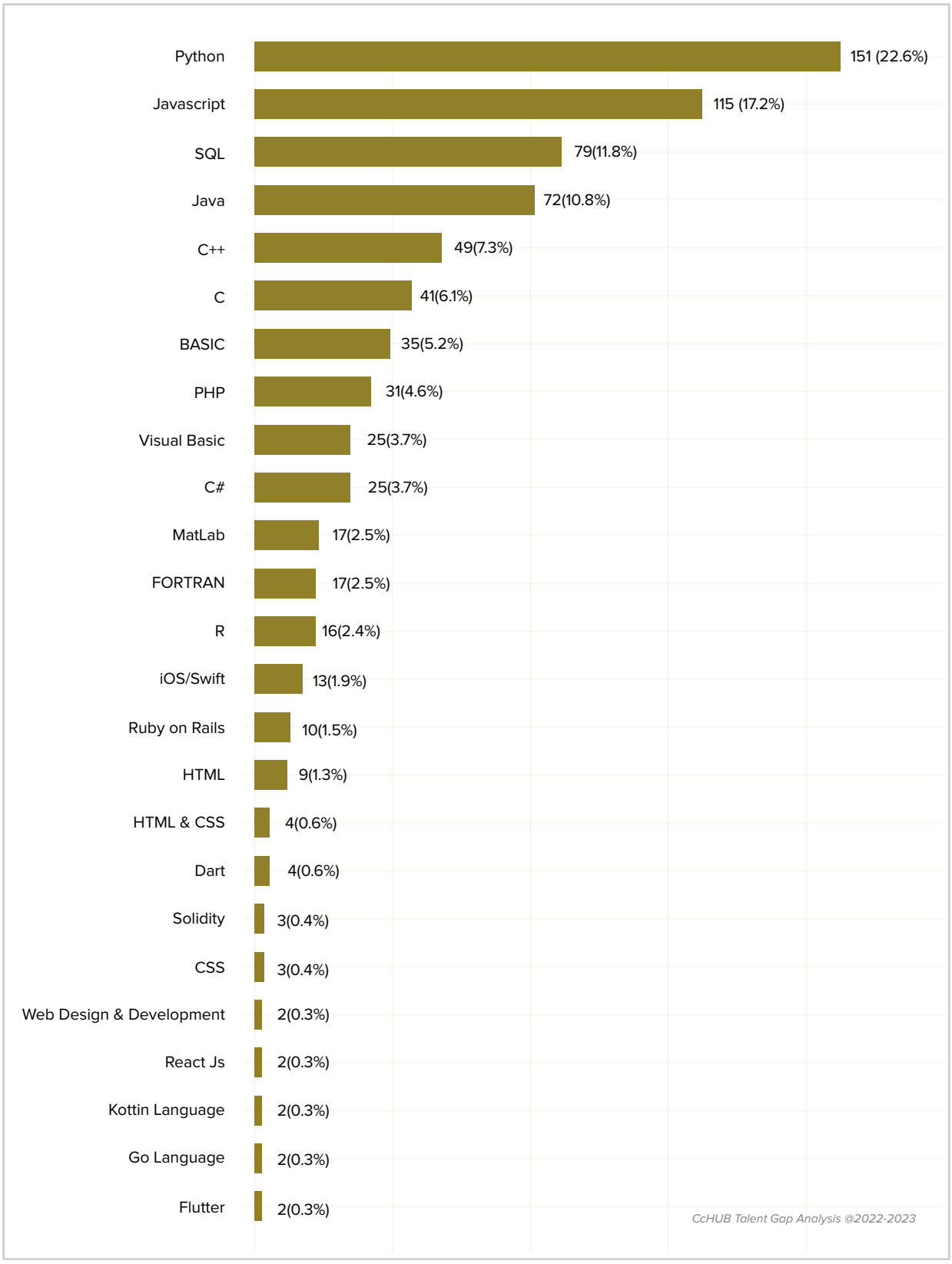


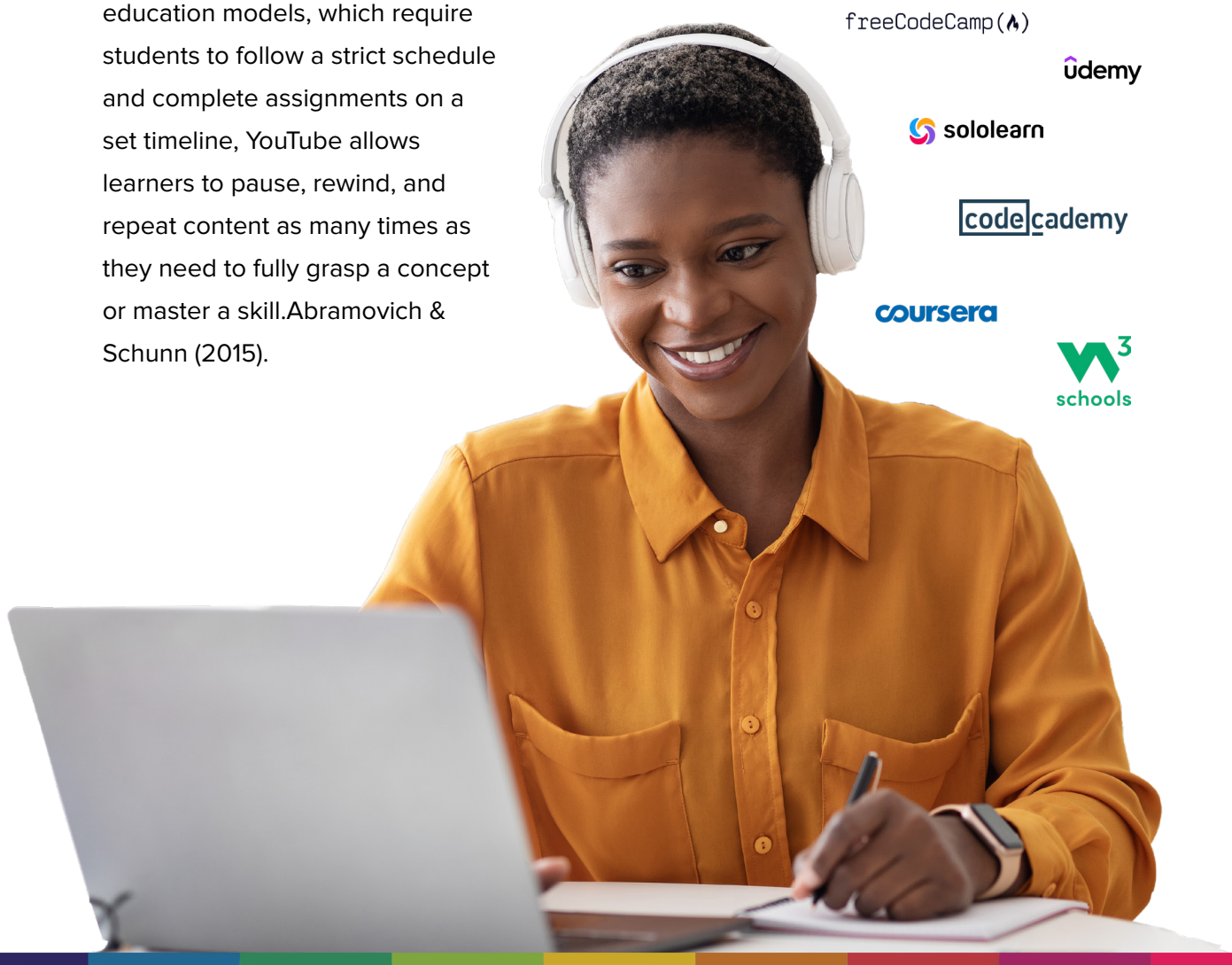

*Figure 3.2.8: Programming Languages learnt by students*

### (iv) Platforms students use for self learning

The primary resources (online platforms) used by students to acquire programming and other IT-related skills are Youtube, Udemy, Coursera, W3Schools, FreeCodeCamp, Code Academy, Solo Learn, Online courses, and Data camp (Figure 3.2.9). In corroborating these insights, Koto (2020) noted that one of the reasons why YouTube is so popular among students and upcoming IT talents is that it provides access to a wealth of high-quality content that is both informative and entertaining. From tutorials and lectures to live streams and demos, YouTube offers a vast library of videos that cover a wide range of topics related to tech, including programming, web development, data science, cybersecurity, and more.

*In corroborating these insights, Koto (2020) noted that one of the reasons why YouTube is so popular among students and upcoming IT talents is that it provides access to a wealth of high-quality content that is both informative and entertaining.*

In addition to the sheer volume of content available on YouTube, another reason why it has become such a popular self-education platform is that it allows users to learn at their own pace and on their own schedule. Unlike traditional education models, which require students to follow a strict schedule and complete assignments on a set timeline, YouTube allows learners to pause, rewind, and repeat content as many times as they need to fully grasp a concept or master a skill.Abramovich & Schunn (2015).

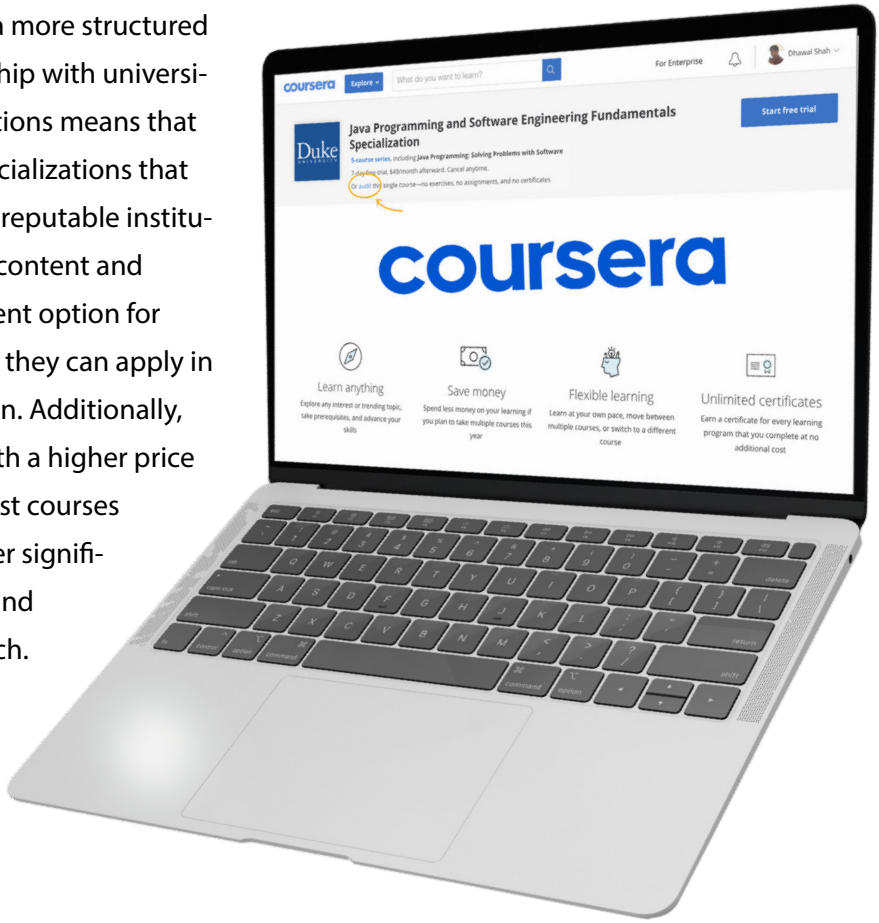



YouTube also offers a sense of community and collaboration that is often missing from traditional education models. IT talents can use YouTube to connect with other learners, share knowledge, and collaborate on projects. This can be especially beneficial for people who are learning on their own and may not have access to a supportive environment in their local community. Moreover, YouTube is free and accessible to anyone with an internet connection, which makes it an excellent resource for people who are looking to improve their skills but may not have the financial means to attend a traditional college or university. This democratization of education is a key reason why YouTube has become such a popular self-education platform. Finally, YouTube is constantly evolving and adapting to the needs of its users. As new technologies and trends emerge in the tech industry, YouTube creators are quick to respond, producing content that is up-to-date and relevant. This means that IT talents can rely on YouTube to provide them with the latest information and insights they need to stay ahead of the curve.

Udemy and Coursera are also two of the most popular online learning platforms, offering a range of courses and specializations for those looking to learn new tech skills. Both platforms have gained significant attention from learners worldwide due to their flexible course offerings, affordable pricing, and accessible learning materials. However, while they share some similarities, there are also some differences between these two learning platforms, which we will explore in this report. One of the significant advantages of Udemy is its vast course selection. With over 155,000 courses, learners can find courses on virtually any topic, including tech skills. This wide selection makes it easier for learners to find a course that meets their needs, regardless of their level of experience or interest. Additionally, Udemy's courses are relatively affordable, with most courses ranging from $10-$20, making it an accessible platform for learners who might not have the budget to pay for more expensive courses.

*These platforms have continued to inspire and support Nigerian IT talents to learn new skills, brush up some skills and challenge themselves to new learning opportunities.*

On the other hand, Coursera has a more structured approach to learning. Its partnership with universities and other educational institutions means that learners can take courses and specializations that are accredited and recognized by reputable institutions. Coursera's focus on quality content and academic rigor makes it an excellent option for learners looking to gain skills that they can apply in the workplace or further education. Additionally, Coursera's courses often come with a higher price tag than Udemy courses, with most courses priced between $30-$100. Another significant difference between Udemy and Coursera is their teaching approach. Udemy courses are typically created and taught by individual instructors, who have different styles of teaching and course design.



**These platforms have continued to inspire and support Nigerian IT talents to learn new skills, brush up some skills and challenge themselves to new learning opportunities.**

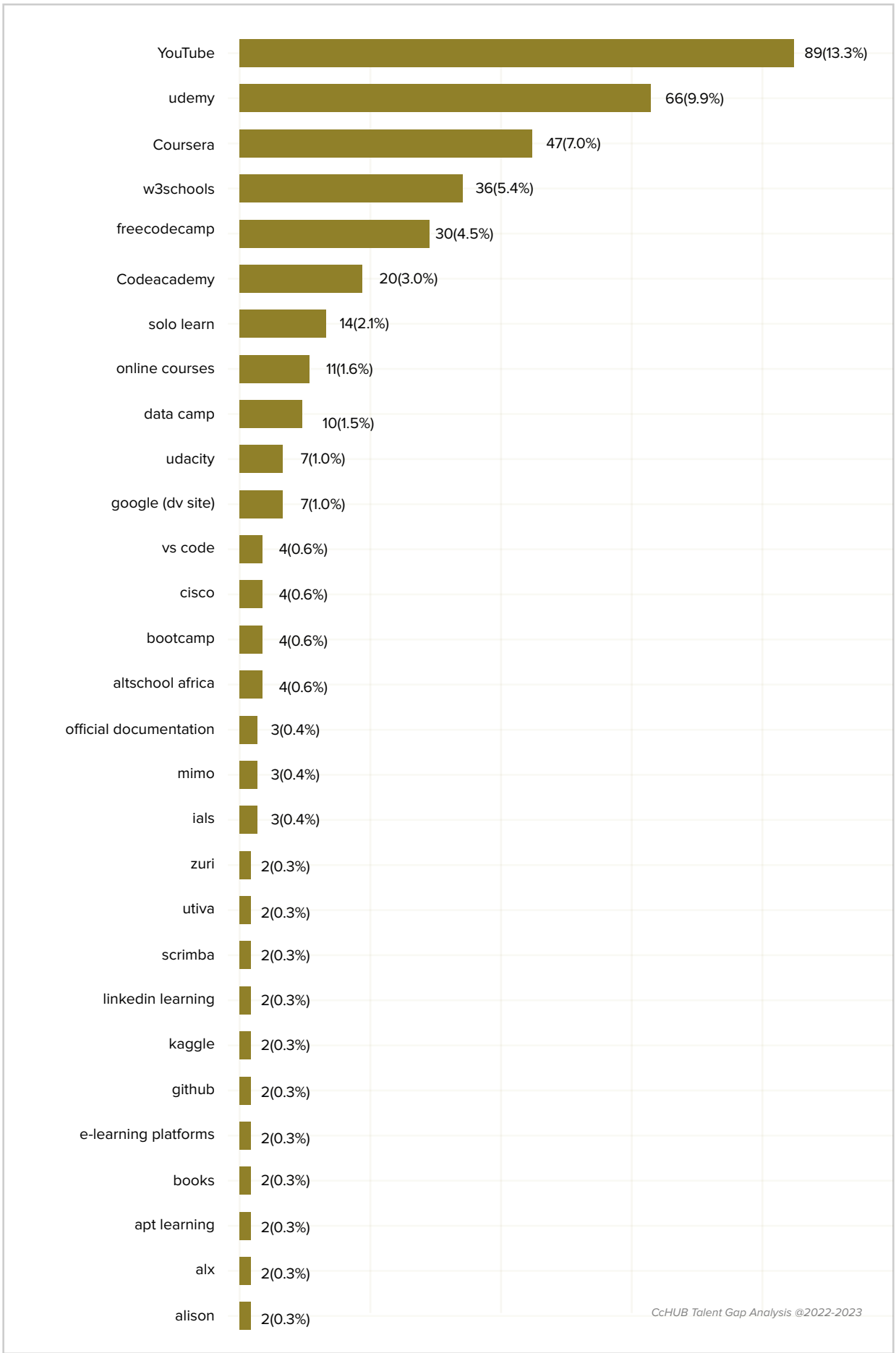



*Figure 3.1.6: self-learning platforms*

### (v) Complementary Skills for IT talents

The interviews with the stakeholders showed vividly that it is not enough to be technical, it is very essential to have complementary skills to support the technical skills. What is very consistent across all the alternative technology education platforms is a post training complementary skills and career readiness coaching given to the trainees to help them connect with great opportunities and give them the confidence to navigate the IT job environment which seems very competitive. The quote below from NITDA's Digital Literacy Framework alluded to the point above.

*What is very consistent across all the alternative technology education platforms is a post training complementary skills and career readiness coaching*

> *"... the core skill of digital literacy can be seen as a discrete skill but with critical interrelationships with other core life skills".*
> *- Principle, NITDA's Digital Literacy Framework*

Technical skills are great and are very germane to the robustness of the IT Talent ecosystem but being technical is not enough for success, there is a need to combine technicality with other major life and soft skills. This is the only way to maximize the technical skills for productivity as confirmed by a number of the stakeholders in the alternative technology education schools.

*being technical is not enough for success, there is a need to combine technicality with other major life and soft skills.*

To corroborate the aforementioned, HackerRank (2022), a technical hiring company, recently stated its intent to use a $60 million series D round of funding to help it move beyond coding skills assessment, highlighting the premium employers place on more diverse skill sets.

> *"We screen for soft skills in our rigorous talent interview process. We account for language and communications skills, professionalism and problem-solving abilities."*
> - Christy Schumann, senior vice president of talent operations for Toptal (on https://techtargets.com/)[7]

[7]https://techtargets.com/

Below are the complementary skills noted in this assessment by stakeholders to be very germane to the success of IT talents in the workplace;

1. **Communication skills:** IT talents should be able to effectively communicate with colleagues, clients, and stakeholders to convey technical concepts and ideas.
2. **Problem-solving skills:** IT talents should be able to analyze and identify problems, develop solutions and implement them in a timely manner.
3. **Time management skills:** IT talents should be able to manage their time effectively, prioritize tasks and meet deadlines.
4. **Adaptability:** IT talents should be able to adapt to new technologies and processes as the industry evolves.
5. **Teamwork:** IT talents should be able to collaborate with others in a team setting, share knowledge, and work towards a common goal.
6. **Creativity:** IT talents should be able to think creatively and come up with innovative solutions to technical problems.
7. **Attention to detail:** IT talents should have a keen eye for detail to ensure accuracy in their work and minimize errors.
8. **Analytical skills:** IT talents should be able to analyze data, identify patterns and draw conclusions to solve complex technical problems.
9. **Customer service skills:** IT talents should be able to provide excellent customer service and support to clients.
10. **Leadership skills:** IT talents should be able to lead and manage teams effectively, delegate tasks, and motivate team members to achieve their goals.

### (vi) No - Code IT Skills

The increase in training by alternative technology skills training platforms has increased the number of no-code skills that are now being taught in Nigeria. The interview with the leaders of these training platforms and insights from students survey showed that the following no-code skills have become popular on Nigeria now;

1. **Web design with platforms like Wix, Squarespace, and Webflow:** These platforms allow users to create professional-looking websites with drag-and-drop tools and customizable templates.
2. **App development with no-code tools like Bubble, Adalo, and Glide:** These tools allow users to create functional apps without needing to write code.

*The increase in training by alternative technology skills training platforms has increased the number of no-code skills that are now being taught in Nigeria.*

3. **Automation with tools like Zapier, IFTTT, and Integromat:** These tools allow users to automate repetitive tasks and integrate different platforms and applications.
4. **Chatbot development with platforms like Chatfuel, ManyChat, and Tars:** These platforms allow users to create chatbots for websites, social media, and messaging apps without any coding knowledge.
5. **E-commerce with platforms like Shopify, WooCommerce, and Big Cartel:** These platforms allow users to set up online stores and sell products without the need for coding expertise.

## 2. Industrial attachments and non-academic events

### (i) Competencies Developed During Internship Programs

As part of their coursework, students must participate in a minimum of two industrial training courses, as noted in previous research (Shazaitul & Maisarah, 2012). This research indicates that industrial training and attachments are crucial for fostering the development of transferable skills.

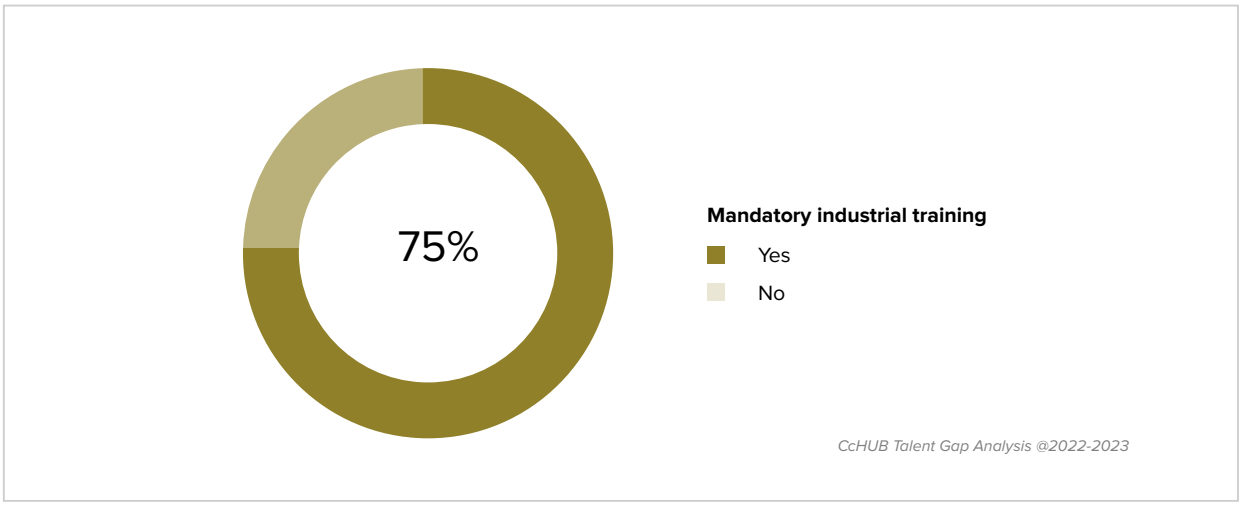



*Figure 3.2.10: Industrial training attendance*

The survey results indicate that a majority of the students who were surveyed had completed at least one industrial training program (as shown in figure 3.2.10). Participating in industrial training is a critical component of preparing students for their future careers as it allows them to gain practical, hands-on experience in applying technology in real-world scenarios. By taking part in such programs, students can improve their skills and enhance their chances of finding employment.

One of the significant advantages of industrial training is that it enables students to apply the theoretical concepts they learn in the classroom to practical situations. This exposure to the latest industry trends and technologies is essential for students who want to remain current with the latest developments in their field. Furthermore, industrial training also helps students develop important soft skills like teamwork, communication, and problem-solving, which are highly sought-after by employers. As demonstrated by the survey results, students were satisfied with their industrial training experiences during their deployment (figure 3.23.11).

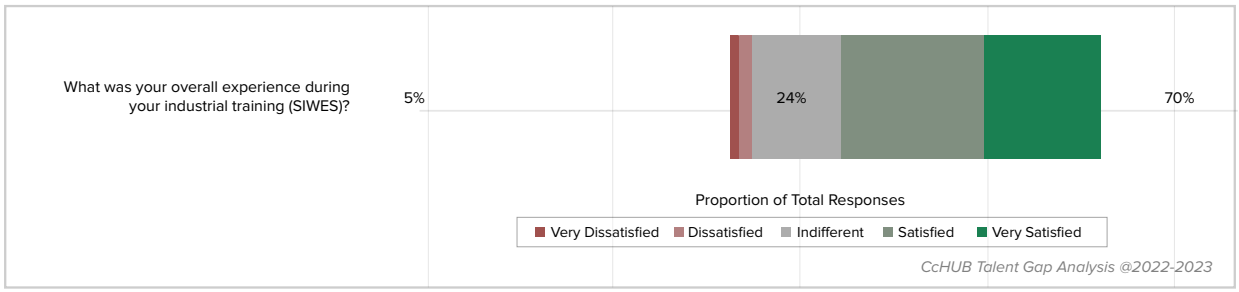



*Figure 3.2.11: Satisfaction with industrial training*

It is very important for us to do a critical analysis of the Students Industrial Work Experience Scheme (SIWES) in Nigeria. The SIWES is a program designed by the Nigerian government to provide university students with practical work experience in their respective fields of study. The program, which was initiated in 1973, is mandatory for all students studying in Nigerian universities. While the program has been successful in providing students with practical work experience, there are both strengths and shortcomings that need to be addressed.

One of the strengths of the SIWES program is that it provides students with practical work experience in their fields of study. This hands-on experience allows students to apply the theoretical knowledge they have gained in the classroom to real-world situations. By working in a professional environment, students can develop a better understanding of their chosen field, and gain valuable skills that will be useful in their future careers. Another strength of the SIWES program is that it helps students to develop a professional network. During their work experience, students have the opportunity to meet and interact with professionals in their field.

This interaction can help students build relationships that may be useful in their future careers. It also provides them with access to industry knowledge and insights that they may not have had access to otherwise.

However, despite these strengths, there are also some shortcomings to the SIWES program. One of the primary shortcomings is that there is a lack of oversight and monitoring of the program. Many students have reported instances where they were placed in companies that did not provide them with any meaningful work experience. The following studies stated the challenges of SIWES as a program;

1. A study conducted by Ogbuanya et.al (2018) found that many students participating in SIWES in Nigeria experienced various challenges such as inadequate supervision, lack of appropriate equipment, and insufficient funding. These challenges were found to negatively impact the quality of the students' learning experiences.
2. A research article by Oladimeji et.al (2016) highlights the inadequate funding and lack of coordination between the government, industries, and universities as major challenges facing the SIWES program in Nigeria. The article also notes that the program has failed to adequately address the skill gaps and unemployment challenges facing Nigerian graduates.
3. In an opinion piece published by NAN in the Guardian Nigeria (2020), the author argues that the SIWES program has failed to prepare Nigerian graduates for the workforce due to the program's limited scope and failure to keep up with the changing demands of industries.
4. A report by the National Bureau of Statistics (NBS) in Nigeria in 2020 found that only 27% of Nigerian graduates were employed full-time, while 21% were underemployed. The report highlights the need for reforms in the education sector, including programs such as SIWES, to better prepare graduates for the workforce.

*Many students have reported instances where they were placed in companies that did not provide them with any meaningful work experience.*

*inadequate supervision, lack of appropriate equipment, and insufficient funding.*

*lack of coordination between the government, industries, and universities as major challenges facing the SIWES program in Nigeria.*

*SIWES program has failed to prepare Nigerian graduates for the workforce due to the program's limited scope and failure to keep up with the changing demands of industries.*

### (ii) Impact on the job market

The job market is highly competitive, and employers are constantly seeking candidates with relevant skills and experience. Industrial training provides students with the opportunity to gain relevant experience in their field of study, making them more attractive to potential employers.

Moreover, industrial training allows students to network with professionals in their field, providing them with valuable contacts that could lead to future job opportunities. According to a report by LinkedIn, networking is one of the top ways that job seekers find new opportunities (LinkedIn, 2021). In addition, industrial training programs often involve working on projects that are relevant to the industry, allowing students to develop a portfolio of work that they can showcase to potential employers. This portfolio demonstrates to employers that the students have the skills and experience required for the job, making them stand out from other candidates.

*In addition, industrial training programs often involve working on projects that are relevant to the industry, allowing students to develop a portfolio of work that they can showcase to potential employers.*

### (iii) Non-Academic Events/Programs

According to figure 3.2.12, IT students from Nigerian universities are less active in non-academic events such as hackathons and seminars, despite the numerous benefits that can be gained beyond practical experience. Such events provide opportunities for students to work collaboratively, under pressure, and within tight deadlines, leading to the development of teamwork, time-management, and organizational skills. Furthermore, students can build their confidence and public speaking skills by presenting their projects and solutions to judges or audiences.

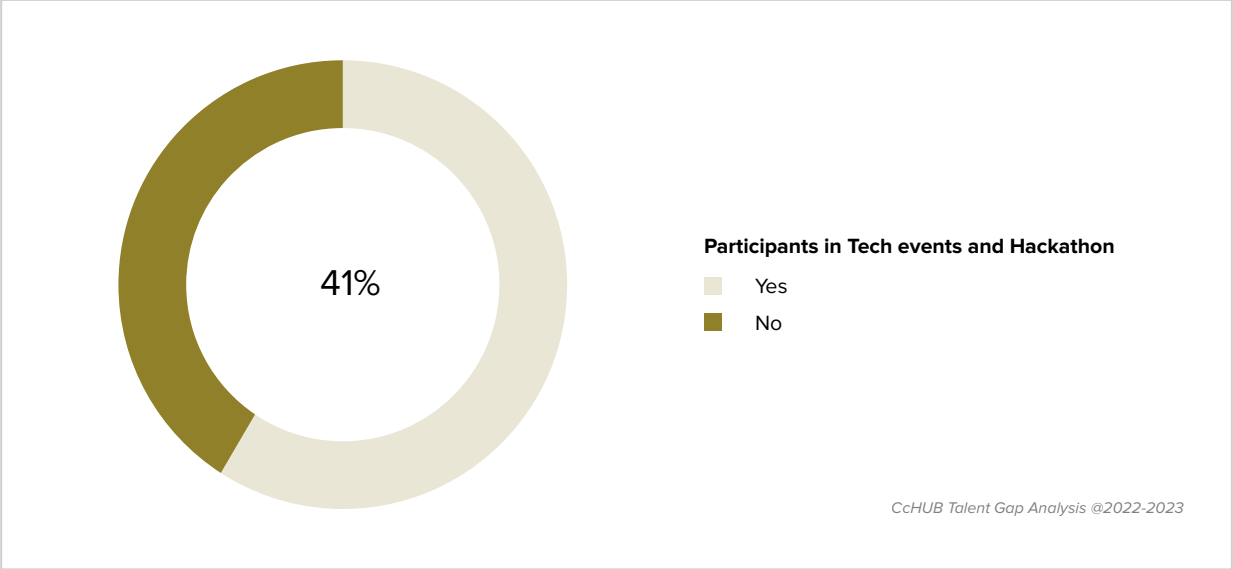



*Figure 3.2.12: Non-academic events*

Another advantage of participating in events is that they provide students with an opportunity to network with professionals and other students in the industry. This can be invaluable when it comes to finding internship opportunities, mentorship, and job offers. It can also lead to collaborations on future projects, research, and even startups. Participating in non-academic events can help IT students develop a portfolio of projects that they can showcase to potential employers. Building a portfolio that demonstrates practical experience and innovative thinking is highly valued by employers, as it shows that the student has the skills and knowledge necessary to succeed in the industry.

### 3. IT skills funding model

*The approach to financing IT skills training in Nigeria is diverse and depends on various factors such as the type of training program, the target audience, and the financial capacity of the trainees.*

The development of IT skills has become increasingly important in Nigeria in the last decade and as a result, various financing approaches for IT talent training and education across alternative technology education and training platforms have emerged. The approach to financing IT skills training in Nigeria is diverse and depends on various factors such as the type of training program, the target audience, and the financial capacity of the trainees. Income Share Agreement is the newest model being attempted by Alternative IT skills training platforms in Nigeria, out of all the IT skills training finance strategies highlighted below. For a long time, the model has been used for technological skills training bootcamps in the United States. It is not clear yet if this model will scale in Nigeria but time will surely tell as more alternative technology training platforms emerge on the scene. In this context, we present a table outlining the different funding models for IT skills training that we have observed from this assessment;

*Table 3.2.3 Skills training funding model*

| S/N | Funding Model | Explanation |
|---|---|---|
| 1. | Learn Now Pay Later Model Pay All Upfront Model | In this model, the training organization applies extremely stringent selection criteria to filter through the pool of applicants in order to find premium individuals who have the prospect of being matched with employment immediately after training, ensuring that their training expenses are repaid. |
| 2. | Pay All Upfront Model | In this model, chosen learners are obliged to settle all financial obligations before they can begin attending training sessions. |
| 3. | Pay In Installment Model | The lump fee is divided into pieces under this arrangement, easing the process for learners to pay in bits as they train. |
| 4. | Corporate Sponsorship Model | In this arrangement, corporate companies that want to invest in educating tech talent contact tech training providers to teach a certain number of students on certain IT skills while footing the training bills for the chosen trainees. |
| 5. | Government Scholarships Model | Training firms contact the government or vice versa to give scholarships for IT talent training. |
| 6. | Income Share Agreement Model | In this structure, training firms instruct students for free with the understanding that they would pay back the training expenses in percentages once they are hired after training. |

*Source: Insights from Stakeholders Interview with Alternative Technology Education Stakeholders*

# Chapter 4: Discussion & Conclusions

## 4.1 Milestones

This assessment is an eye opener into the progress, challenges, opportunities and prospects of bridging the IT talent gap in Nigeria. The study has shown that despite the many challenges facing the country in IT talent development, some progress has been made between 2016 and the present day. Some of the milestones are;

1. Increase in IT talent supply: According to the National Bureau of Statistics, Nigeria's unemployment rate was 23.1% in Q3 2018, but the IT industry has continued to grow, with an estimated 10,000 IT graduates entering the workforce each year since 2016. (National Bureau of Statistics, 2021)
2. Rise in tech hubs: There has been an increase in tech hubs and incubators in Nigeria since 2016, which have helped to foster innovation and provide support for IT entrepreneurs and startups. Lagos has emerged as the leading tech hub in Nigeria, with over 50% of Nigeria's tech startups located in the city. Jackson (2022) in Disrupt Africa.
3. Increase in foreign investment: Foreign investment in Nigeria's tech sector has increased significantly since 2016, with several high-profile investments in startups such as Andela and Paystack. In 2020, Stripe acquired Paystack for $200 million, making it the biggest exit in Nigeria's tech industry to date. (Lunden, 2020) in Techcrunch.
4. Growth in remote work: The COVID-19 pandemic accelerated the growth of remote work in Nigeria's IT industry, with many companies transitioning to remote work and hiring talent from across the country. This has helped to increase access to talent and opportunities for multiple opportunities for Nigeria IT professionals. (Lunden, 2020) in Techcrunch.

## 4.2 Recommendations

After a thorough review of of all the insights from this assessment, the following recommendations are made;

**Funding**

- Set up of IT Skills Acceleration Funds to train more Nigerian young people in IT skills areas identified. These funds should be disbursed through a non-cash scholarship fund paid directly to the certified and selected alternative technology education platforms.

*IT Skills Acceleration Funds*

**Educational Reforms**

- There should be a national drive for curriculum review of IT focused courses to include the latest trends in code, no-code and complimentary skills for IT talents.
- Intentional inclusion of these IT skills in demand into higher education with industry
- partnership delivery executed at Degree and post degree level.
- NITDA should have a yearly “National IT Skills Audit Design Sprint and Co-creation Sessions” using the Human Centered Design Approach with the Ministry of Education,
- Education Sector Leaders, startup ecosystem leaders, the private sector and the IT sector leaders in order to create a list of recommended skills that must continuously be incorporated into teaching curriculums in Higher Education Institutions.

*national drive for curriculum review of IT focused courses*

*National IT Skills Audit Design Sprint and Co-creation Sessions*

**Access to Infrastructure**

- Telecommunication companies have a role to play in making their corporate social responsibility spread to making access to internet data affordable for IT skills trainees.

*internet data affordable for IT skills trainees.*

**Interventions**

- The role of NITDA (and other such Government agencies) in the development of IT talents in Nigeria should move from the "Interventional Approach" to "Systemic Approach". The interventional approach seeks to solve problems through special projects, funds, support and urgent deployment of resources while the systemic approach helps lay foundations for lasting and continuous structural problem solving.

*from the "Interventional Approach" to "Systemic Approach*

**Upskilling more Junior Talents to Senior Talents**

- **Nigerian Technology companies** in collaboration with other **industry experts and educational institutions** should collaborate in implementing comprehensive and structured upskilling programs that are crucial for nurturing the growth of junior talents into senior roles. Companies should establish well-defined training frameworks that encompass a range of technical and soft skills required for senior positions. These programs can include workshops, online courses, and certification pathways tailored to the specific skill sets needed for progression.

*from the "Interventional Approach" to "Systemic Approach*

- Introducing mentorship and apprenticeship initiatives plays a pivotal role in guiding junior talents towards senior positions. **Technology companies** can work with **Senior IT professionals** who can serve as mentors, providing guidance, insights, and real-world experiences to junior talents. This mentorship dynamic facilitates knowledge transfer, encourages skill development, and fosters a culture of continuous learning.

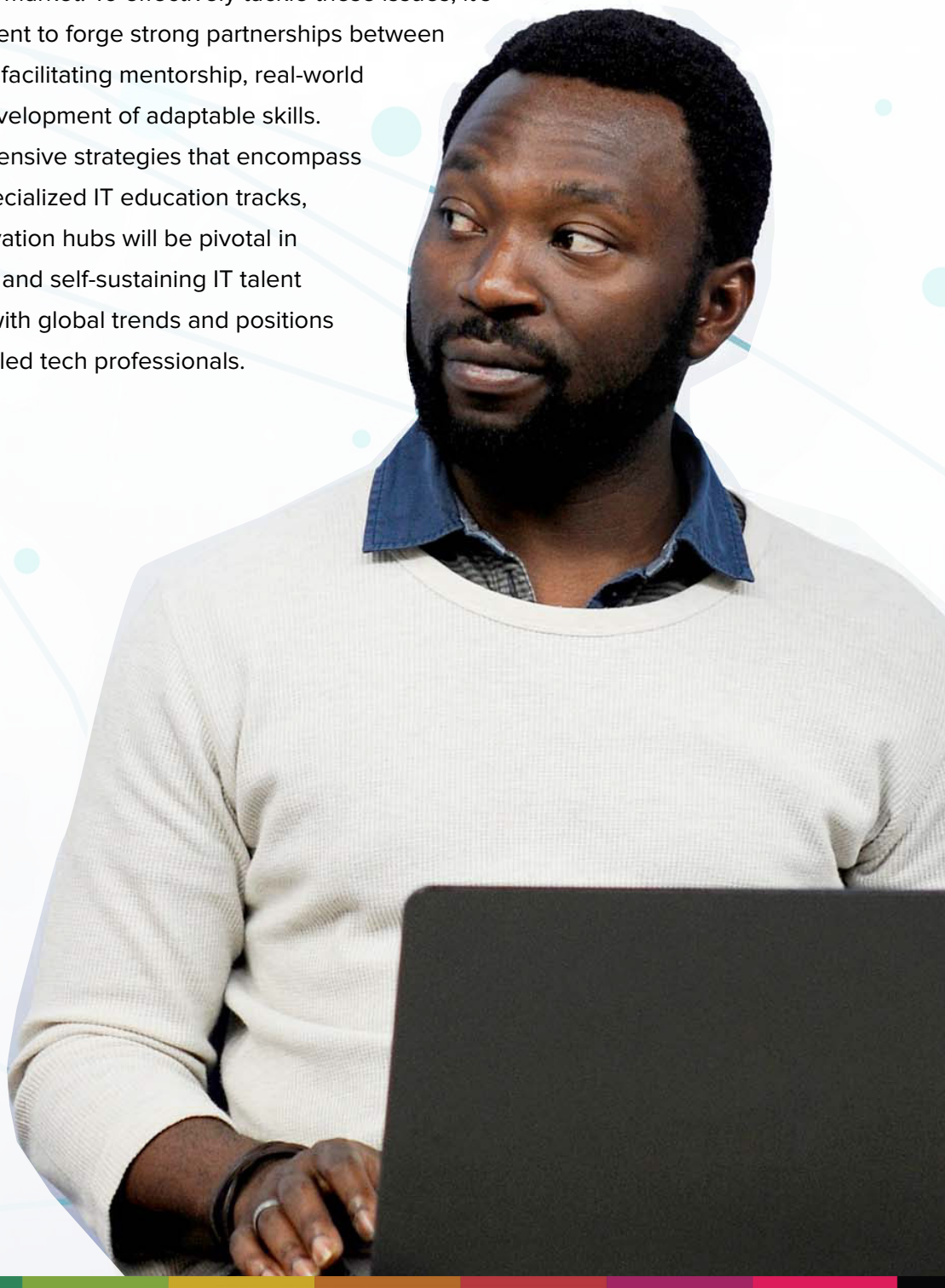
## 4.3 Conclusion

In culmination, the objectives of this study have been resoundingly met, offering a comprehensive illumination of the IT talent landscape within Nigeria. The investigation delved into multifaceted dimensions, encompassing both the supply and demand facets of IT skills. The supply analysis unearthed the prevailing types of IT skills supply, predominantly software development and data analytics.

Central to this assessment were the vital sources and providers of IT talent, along with an exploration of the diverse initiatives aimed at nurturing and cultivating IT expertise within Nigeria. On IT skills in demand,  the study delineated the spectrum of IT skills that hold preeminence within the Nigerian context. The roster of  in-demand IT  skills spans Blockchain development, cybersecurity, machine learning, data engineering, artificial intelligence AND cloud computing. Significantly, the holistic analysis underscored the symbiotic importance of complementary skills, most notably communication skills, as pivotal contributors to the coveted IT talents.

In an exploration that transcended the supply-demand paradigm, the study traversed through funding models intrinsic to fostering IT skills and illuminated the myriad challenges besetting the cultivation of IT talent in Nigeria. These tribulations, ranging from a scarcity of senior talent to the intricacies of remote work negotiations,

etched a poignant narrative of the journey toward a robust IT workforce. The study elucidates a well-spring of recommendations to illuminate the path forward. Evidencing the resonance of global trends within the Nigerian context, the study's confirmation of universal demand underscores the inextricable linkages between national and global IT talent dynamics. The Nigerian government in collaboration with different arms of the private sector attention is urgently needed to address the critical shortage of IT talent in the country. This comprehensive study has shed light on the challenges faced in cultivating skilled IT professionals, ranging from a scarcity of experienced talent to the intricacies of remote work dynamics. The study's findings underscore the pressing need for robust investments in IT skills training, spanning educational institutions and collaborations with industry leaders, aiming to bridge the gap between demand and supply in the IT job market. To effectively tackle these issues, it's crucial for the government to forge strong partnerships between academia and industry, facilitating mentorship, real-world experience, and the development of adaptable skills. Implementing comprehensive strategies that encompass curriculum updates, specialized IT education tracks, certifications, and innovation hubs will be pivotal in nurturing a competitive and self-sustaining IT talent ecosystem that aligns with global trends and positions Nigeria as a hub for skilled tech professionals.

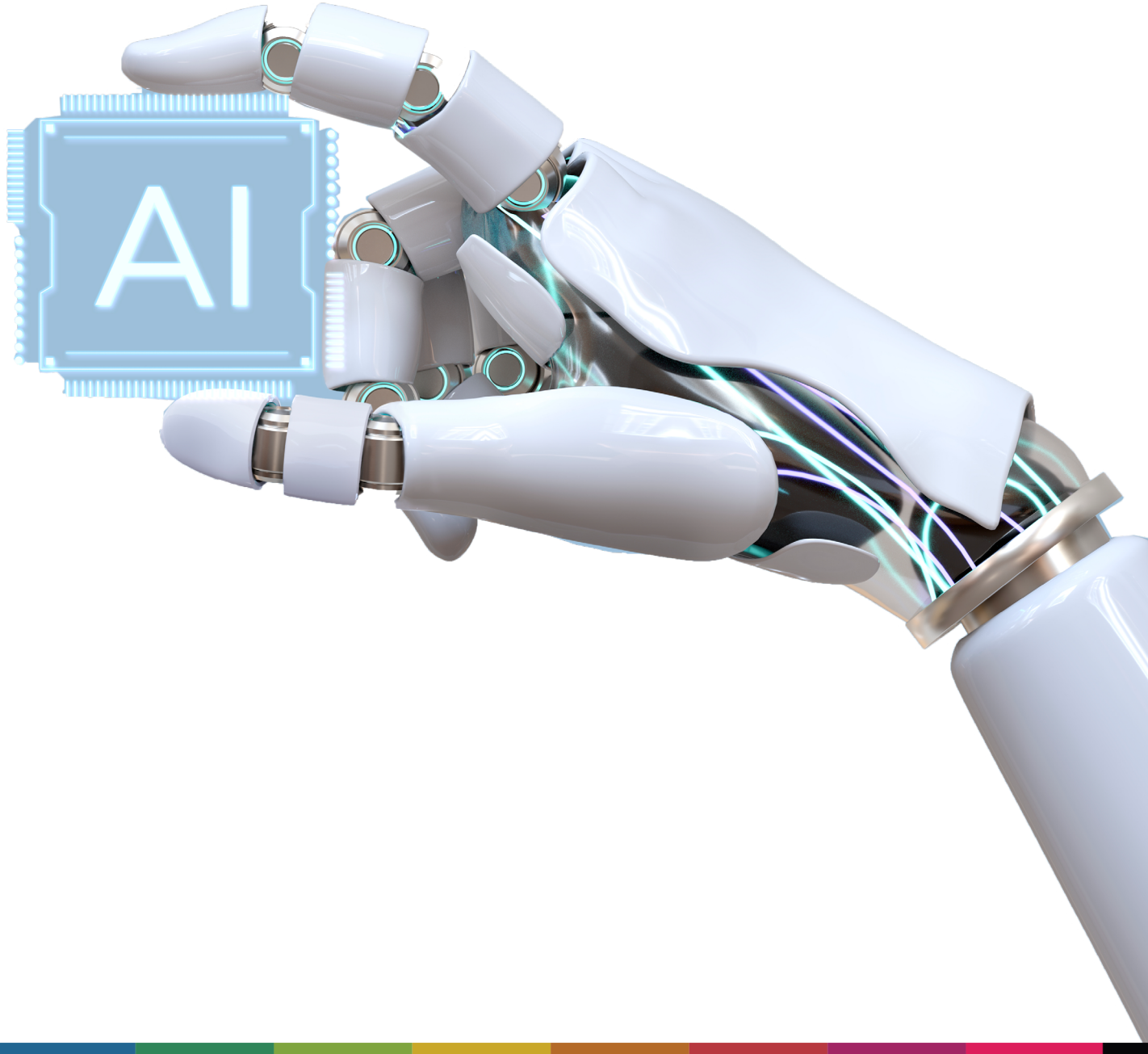


# Appendices

Appendix 1: Implication of the Assessment on Major Areas

Appendix 2: Important links

- IT Talent Gap Assessment 2016:
  https://cchubnigeria.com/talentgap/
- Press release:
  https://techdigest.ng/nitda-cchub-unveil-talent-gap/
- Preliminary reporting of the assessment:
  https://nitda.gov.ng/post-training-support-in-it-talent-development-in-nigeria/6123/



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