REPUBLIC OF KENYA

MINISTRY OF INFORMATION, COMMUNICATIONS AND THE DIGITAL ECONOMY (MICDE)

REPUBLIC OF KENYA

ICT Authority

german cooperation
DEUTSCHE ZUSAMMENARBEIT

Co-funded by the European Union

Unlocking current and future employment for ICT professionals in Kenya

A strategic priorities report

Implemented by

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

DIGITAL TRANSFORMATION CENTER KENYA

G:ENESIS UNLOCKING VALUE

DOCUMENT REFERENCE
Unlocking current and future employment for ICT professionals in Kenya

DATE
December 2024

AUTHORS
Genesis Analytics

ACKNOWLEDGMENTS
The ICT Authority of Kenya collaborated with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of German Development Cooperation and the European Union (EU) to formulate a strategy to unlock inclusive employment in Kenya's ICT sector. Genesis Analytics was identified to conduct research and analysis for this report.

We extend our gratitude to all those who contributed to the successful completion of this report. In particular, we are grateful to Director Zilpher Owiti and the officials at the ICT Authority, Katharina Mengede and Giulia Menghi at GIZ, for their invaluable and generous coordination, guidance, insights and other contributions. We wish to express our gratitude to Dr. Ehud Gachugu at KEPSA and Japhet Ngeno at the TVET Authority for their valued assistance with the survey data collection.

Finally, we extend our gratitude to the diverse and engaging set of stakeholders who generously contributed their time and insights to key informant interviews and joint solutions workshops. Their contributions have been invaluable in shaping the outcomes of this report. A full list of these stakeholders can be found in the Annex.

Executive Summary

Kenya is cementing its status as an African leader in digital development, generating new employment opportunities for information and communication technology (ICT) professionals. The country's ICT sector has grown at 10.8% annually since 2014, and its contribution to GDP sits at 9.24%.[1] There are approximately 1.9 million people employed in digital and digitally-enabled jobs. Of these, estimates suggest that there are approximately 330 000 ICT professionals working in Kenya today.[2]

Most are working in four job families: IT operations and support, network and architecture, software and application development and data science and analytics. This pipeline is driven by a wide range of skills and training programmes universities, TVETs, NGOs, private skilling providers and online courses. The sector at large is driven by a robust strategy & policy environment, led by Kenya Vision 2030 and the National Digital Master Plan 2022-2032.

However, accessing ICT work remains challenging for many, and the sector retains long-standing challenges that constrain the scale and inclusiveness of the ICT opportunity. Youth unemployment is reported to be as high as 65%, while economic growth has hovered between 4-6% for the last decade, well below the target figure of 10%. Four persistent challenges constrain employment in Kenya's ICT sector:

1. A lack of intentional, well-coordinated efforts backed by comprehensive, accessible and timely labour market information
2. Regulatory, cultural and capability barriers that constrain ICT skills export at scale
3. Misalignment between Kenya's digital skills pipeline and future demand
4. Sectoral norms that favour urban men alongside continued experiences of undignified work

Addressing these challenges requires urgent intervention, particularly in light of two overarching drivers of change:

- **The accelerating development of AI** is transforming the global ICT market, resulting in both challenges and opportunities. AI's growing capabilities in complex tasks are poised to reshape demand work for ICT professionals, automating more routine roles but also generating opportunities for new skill sets, such as cybersecurity and data governance.
- **The global ICT skills shortage**, exacerbated by demographic shifts in OECD countries, presents a substantial opportunity for Kenya's skilled ICT workforce. With an anticipated population decline by 2040 affecting labour supply in countries across the Global North, which faces a significant IT skills gap, Kenya's large and growing digital talent pool can be an attractive source for IT outsourcing and remote work.

To provide a more granular view of future employment opportunities for Kenya's ICT professionals, this study conducts a role-by-role analysis in which key ICT roles were assessed against five criteria. Through survey data, market research and expert interviews, ICT roles were analysed against the estimated current scale of employment, projected growth in demand, automation exposure, opportunities to tap into global demand, and Kenyan talent readiness. The study identifies eight roles that present ICT employment opportunities, across three categories, as outlined in the table below.

[1] International Trade Administration, 2024

[2] Genesis Analytics survey. See Annex 1 for estimation methodology

Archetype	Role	Est. Num.[3]	Growth potential	Automation exposure	Global demand	Kenyan talent readiness
Leadership opportunities Opportunities for regional or even global leadership, with significant progress already made	Software development	58 000	**Growth expected**	Augmentation expected	Good opportunity	Steady supply
	Data science & analytics	27 000				Steady supply with gaps
	Data annotation & labelling	10 000	**Growth expected** in the short-run	Significant exposure over time		Steady supply
Growth opportunities Emerging 'open field' opportunities that Kenya can tap into, from a lower base of overall employment	Information & cyber security	4 000	**Growth expected** Off a low base	Augmentation expected	Some in-person preference	Insufficient supply
	AI governance & ethics	*limited*		Limited exposure		
	Data centre technicians & support	*limited*		Augmentation expected	In-person preference	
Stable giants More saturated roles that remain critical for ICT employment and delivery	Networking & architecture	81 000	**Some growth potential**	Augmentation expected	In-person preference	Steady supply with gaps
	IT operations & support	108 000			Good opportunity	Steady supply

To inclusively realise the opportunities while mitigating the potential risks, four interventions are required. These strategic measures aim to position Kenya to harness these changes and create new job opportunities, particularly for its burgeoning young digital talent pool, thereby addressing the pressing issue of youth unemployment. Interventions were designed with key actors in Kenya's ICT sector in mind from government entities, industry bodies, private sector firms and skilling and academic institutions.

[3] Genesis calculation based on survey results and market research. See methodology in Annex 1.

Intervention 1: Strengthen sector coordination and improve labour market intelligence.

Key Stakeholders: Government entities, industry bodies, skilling and educational institutions.

Current ICT initiatives in Kenya lack cohesion and data-driven insight. To address this, the ecosystem requires the establishment of a centralised ICT sector body to unify efforts among stakeholders. Additionally, the Kenya Labour Market Information System should be enhanced to provide up-to-date, comprehensive labour data that informs supply and demand dynamics in the ICT workforce.

Intervention 2: Land demand in Kenya that creates inclusive employment at scale.

Key Stakeholders: Government entities, private sector, consulting firms and regulatory experts.

The challenge for Kenya in establishing itself as a desirable IT outsourcing destination is profound, not only due to misconceptions of Africa but also due to the intense global competition in the ICT sector. In order to increase competitiveness and take advantage of global IT shortages, three interventions are required: creating a compelling shared value proposition for Kenya's ICT sector, ensuring data regulation adequacy to align with international outsourcing standards, and expanding local operators' capacity to meet the stringent demands of global markets.

Intervention 3: Align skilling efforts with market needs and scale-up work-ready talent

Key Stakeholders: Educational institutions, Industry Bodies and private sector companies.

Skilling efforts must be aligned with market needs, therefore, fragmentation and inconsistency of digital skills training in Kenya must be addressed. We propose advancing a common national digital skills framework and updated curricula. Kenyan ICT skilling initiatives should also be more attentive to sector demands and therefore interventions such as providing outcomes-based subsidies to Kenyan demand-driven skilling initiatives that demonstrate successful demand-driven training are essential to incentivise demand-led skilling initiatives.

Intervention 4: Ensure opportunities are accessible, inclusive and dignified for all.

Key Stakeholders: Government entities, industry bodies and private sector companies

Kenya's ICT sector is burgeoning but grapples with inclusion issues that could impede its expansion and detract from its international standing. To address these challenges, it is proposed that a multi-stakeholder initiative be launched to co-create a Kenyan ICT Sector Labour Charter. This charter will serve as a voluntary set of principles and standards to which companies can commit, ensuring that the growth of the sector is both equitable and ethical. High costs of devices and inadequate internet access, particularly in rural areas, are substantial obstacles to an inclusive industry, therefore we propose strategic interventions to improve internet connectivity and hardware access through government negotiations with hardware providers as well as exploring innovative financing options.

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1 | Introduction

Kenya is an African leader in information and communication technology (ICT), and this sector presents significant strides in addressing Kenya's unemployment challenge. The country's ICT sector has grown at 10.8% annually since 2014, and its contribution to GDP sits at 9.24%.[4] There are approximately 1.9 million people employed in digital and digitally-enabled jobs, with estimates suggesting that there are approximately 330,000 professionals working in the ICT sector in particular in Kenya.[5]

The growth and dynamism of the sector is in part due to a robust strategic and policy framework, which acknowledges the sector's critical role in advancing major national development goals. This framework builds on the Kenya National ICT Masterplan (2014-2017) and continues into the more recently adopted Kenya National Digital Masterplan (2022-2032). It is complemented by the ICT Authority's recently published Strategic Digital Plan (2024-2027). These policies and others intend to guide Kenya toward the overarching objectives as set out in Kenya's Vision 2030. Vision 2030 aims to transform Kenya into a newly industrialising, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. In particular, amongst other goals, the vision outlines a target of 10% economic growth per annum, and highlights business process outsourcing (including IT-enabled services) as a sectoral priority for achieving this aim. In support of the overarching goals of Vision 2030, the Kenya National Digital Masterplan 2022-2032 specifies some more specific sectoral ambitions, including closing the digital divide, a structured deployment of ICTs across the public service and overcoming the digital and ICT skill shortage. It also specifies the objective to generate 2% of GDP through the export of a skilled ICT workforce.[6]

However, inclusive work and jobs for all remains a pressing challenge for Kenya. For instance, youth unemployment is reported to be as high as 65%, while economic growth has hovered between 4-6% for the last decade, well beneath the target figure of 10%.[7] Moreover, these challenges are more significant for women, rural people, people with disabilities and refugees. For example, 25% of Kenya's female labour force is not in education, employment or training, compared to 19% of the labour force at large.[8]

Clear and strategic intervention is needed to address persistent constraints. Sector diagnostic studies[9] find that:

- Digital skills are often insufficient and mismatched with future demand from employers, such that individuals still struggle to find work after being trained, and employers still struggle to find the right people for their needs.
- Coordination and information gaps prevail, with limited real-time data available on the landscape of ICT professionals and no widely accepted coordinating actors and frameworks to ensure that skills provided match demand
- ICT opportunities that do exist remain primarily accessible to able-bodied men in urban areas, and there have been incidents of work indignity across the sector.

Addressing these challenges is urgent, given the rapid rise of emerging technologies - particularly AI - and the opportunity presented by international ICT skills shortages. The rapid advancement of AI presents both opportunities and challenges for ICT professionals, with automation threatening certain jobs while creating demand for new, specialised skills. This is particularly urgent given the global shortage of ICT professionals, especially in the ageing populations of the Global North, where the need

[4] International Trade Administration, 2024
[5] See Annex 1 for the quantification of ICT jobs methodology.
[6] The Kenya National Digital Masterplan 2022-2032. Available Here.
[7] With the exception of 2020, where, during the COVID-19 pandemic, the economy contracted. Figures are sourced from the World Bank.
[8] World Bank, 2021
[9] Including but not limited to the World Bank (2019) Digital Economy for Africa Country Diagnostic; Huawei & UNESCO (2021) White Paper on ICT Talent Cultivation for Kenya's Digital Economy; Federation of Kenyan Employers (2023) Skills Needs Report; Moringa School & MercyCorp (2019) The Development of IT Skills and Jobs in Kenya and Uganda.

for tech talent is outpacing supply. Tapping into this growing demand offers a transformative opportunity for countries like Kenya, which can position itself as a key player in the global tech workforce. It is imperative that Kenya navigates these transitions and challenges skillfully, to mitigate the risks of automation and exclusion, and to capitalise on the booming international demand for ICT professionals, driving economic growth and job creation.

To support Kenya's adaptation to rapid changes in ICT work, and in alignment with the goals of Kenya Vision 2030 and the National Digital Master Plan 2022-2032, this report provides:

- An assessment of Kenya's current ICT sector, examining how two major change drivers — the rise of AI and the growing global ICT skills shortages — are shaping the future of work. Special attention is given to the opportunities and challenges of connecting Kenyan talent to the **European market**, where a strong demand for skilled ICT professionals exists. Since mapping the entire European market exceeds the scope of this study, Germany was chosen here as a case study
- A detailed role-by-role analysis, forecasting shifts in both the quantity and nature of ICT jobs over the next three years, influenced by AI adoption and remote work trends.
- Actionable recommendations for maximising opportunities and minimising risks, helping Kenya capitalise on global demand for ICT skills while addressing barriers.

Box 1: Method, scope & limitations

Method

This study employed a mixed-methods approach. This included an online survey of 47 employers of IT talent and 23 organisations involved in skilling IT talent in Kenya. These insights were enriched by 25 in-depth stakeholder interviews, a review of approximately 50 pieces of academic and grey literature and 3 validation and co-creation workshops. These workshops brought together around 70 participants from skilling providers, industry, government, and research sectors to ensure a collaborative and comprehensive perspective on the ICT landscape in Kenya. Please see Annex 2 for more details on stakeholder participation.

Scope & limitations

This eight-month study focuses specifically on jobs within the ICT sector, adapting frameworks such as SFIA and the UK D-DAT framework to fit the Kenyan context.[10] As such, this study focuses on roles related to the creation, maintenance, innovation and implementation of ICT technologies. It does not consider "digitally-enabled" roles. This study complements an ongoing study on digital skills capacity among citizens and public servants. The survey conducted uses a purposive rather than a nationally representative sample, and provides a strategic overview rather than a detailed implementation roadmap — it does not include specific costing or key performance indicators (KPIs).

[10] The SFIA framework defines the skills and competencies required by professionals who design, develop, implement, manage and protect the data and technology that power the digital world. SFIA has become an accepted language for the skills and competencies in the digital world. Additionally, the D-DAT stands for the Digital, Data and Technology Profession Capability Framework and is owned by the UK Central Digital and Data Office. The framework highlights what different digital and data roles do and what skills are needed at each role level.

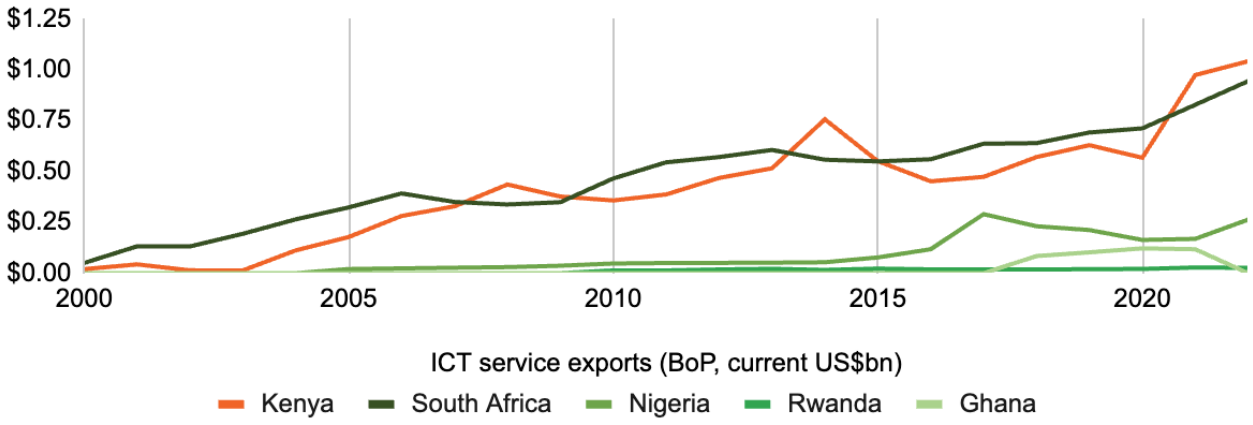
2 | Kenya's ICT sector in context

2.1. Current dynamics of ICT work in Kenya

Kenya is cementing its status as an African leader in digital development, generating robust employment opportunities for ICT professionals

Kenya's digital story was first captured in the public eye with the rise of the mobile payment service M-Pesa, and the country is popularly known as the "Silicon Savannah". This moniker is largely reflected in the official statistics. Kenya is an African leader in the global digital economy, ranking first in Africa on the digital economy component of the UNDP's Digital Development Compass. The sector has grown at 10.8% annually since 2014, and its expected contribution to GDP sits at 9.24%.[11] The most recent available data shows that Kenya recorded over $1 billion in trade in ICT services in 2022, a figure unmatched in Sub-Saharan Africa.[12] Looking ahead, the digital economy as a whole in Kenya is expected to grow to $23 billion by 2025.[13]

Figure 1: ICT service trade amongst selected Sub-Saharan African countries



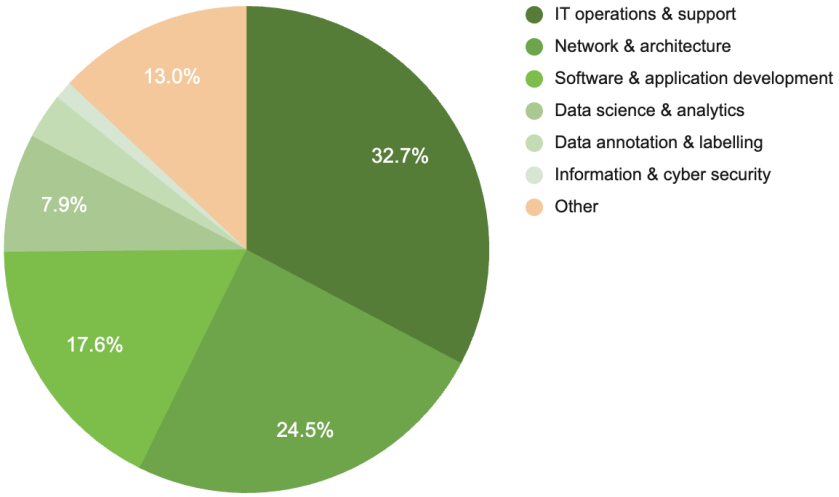
Digitalisation is creating real job opportunities for Kenyan ICT professionals — a population charged with talent. Kenya reported 1.9 million people working in digital and digitally enabled jobs in 2022, up from 638,000 in 2019.[14] This figure is expected to grow rapidly: over 50% of jobs will require digital skills in Kenya by 2030.

This figure is unique in Africa: it outpaces peers like Cote d'Ivoire, Rwanda, Nigeria, countries that estimate the proportion of jobs that require digital skills to sit in the 35-45% range.[15] This is despite data gaps on digitally-enabled jobs; for instance, limited reliable and nationally representative information available on how many will be in the ICT sector specifically (as set out in Box 1). Estimates suggest that there are approximately 330 000 ICT professionals working in Kenya today.[16] Most are working in four job families, as outlined in Figure 2.[17] These professionals have unique strengths. For example, Big Tech investment created exposure to and opportunity for "gold standard" ICT jobs.[18] Kenya also ranks 8th in

[11] International Trade Administration, 2024
[12] UNCTAD, 2024
[13] ILO News, 2023.
[14] ILO News, 2023.
[15] World Bank Demand for Digital Skills in SSA 2021
[16] Genesis Analytics survey. See Annex 1 for estimation methodology
[17] See Section 3 for a role-by-role breakdown
[18] As an example: Microsoft invested $1bn in digital ecosystem funding in Kenya in May 2024

Africa on Github activity, and has one of the fastest growing developer communities in the world, recording year-on-year growth of 41% in 2023.[19]

Figure 2: Most ICT professionals work in one of four job families



There are a wide range of skills and training programmes for aspiring ICT professionals to meet this opportunity. These initiatives create pathways for young people, and provide a strong foundation for the future. Programmes are distributed across universities, TVETs, NGOs, private skilling providers and online courses, as outlined in the table below.

Table 1: A non-exhaustive snapshot of providers of ICT skills for work in Kenya

Public & PPP			Private & Non-Profit	
Universities	TVETs & Colleges	Bespoke	In-Person or Hybrid	Online
Jomo Kenyatta University of Agriculture and Technology University of Nairobi Strathmore University The Aga Khan University	The Meru National Polytechnic Kisii National Polytechnic The Nyeri National Polytechnic Maasai Mara Technical & Vocational College MMTVC	Ajira ajiradigital.go.ke Presidential Digital Talent Programme Huawei ICT Academy ICT Authority	tana CareerBox Results Driven Empowerment Generation Na'amal Propel AkiraChix She Builds · She Serves · She Leads konexio Next Step Foundation Learning Lions Moringa Discover · Grow · Transform	alx gebeya coursera edX Google Digital Skills for Africa

Skilling and work opportunities are underpinned by strategic prioritisation of the sector and a robust enabling environment. Kenya has a set of overlapping strategy & policy documents that

[19] Github, 2023.

together present a clear strategic framework for the sector, as outlined in Table 2. These documents are informed by and build upon diagnostic work completed, such as the World Bank's Digital Economy for Africa Country Diagnostic in 2023 and the Kenya Digital Economy Assessment in 2019. Diagnostics and indices reveal that Kenya has a robust enabling environment for ICT professionals. For example, on connectivity, Kenya is ranked 7th amongst African peers, with 97% of Kenyans covered by a 4G connection and 79% of Kenyan firms with access to a computer.[20] For quality, comprehensiveness and enforcement of digital regulation, Kenya is ranked second only to Ghana in Africa, with a wide range of regulation across cybersecurity, competition, human rights, privacy, consumer protection and more.[21] On digital public infrastructure, Kenya is a global leader with respect to digital payments, ranked in the UNDP's top 10 countries for digital payments and as a "leader" in govtech maturity by the World Bank.[22]

Table 2: Strategies and policies relevant for advancing ICT employment in Kenya

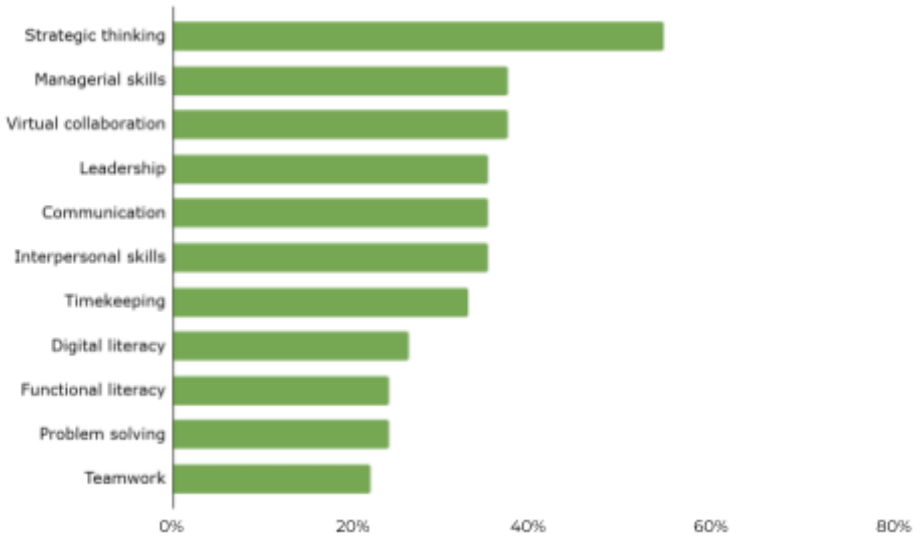
Strategy or Policy	**Owner**	**Launch**
Kenya Vision 2030	NTEP	2008
National ICT Policy Guidelines	CAK	2020
Kenya National Digital Master Plan	MoICT-DE	2022
National Skills Development Policy	MoLSP	2023
ICTA Strategic Digital Plan	ICTA	2024

However, the sector retains long-standing challenges that constrain the scale and inclusiveness of the employment opportunity for ICT professionals

Kenya experiences persistent mismatches in skills supplied and demanded, such that skilled ICT professionals can still struggle to find work and employers continue to face hiring difficulties. Across multiple levels of experience, employers report technical skill shortages amongst ICT professionals. Amongst high-potential jobs families like software developers and data science & analytics, technical skills gaps in debugging, version control, agile, data modelling, predictive analytics and more constrain the growth of employment opportunities. Amongst more emerging job families, there is a significant undersupply of skilled cybersecurity, data centre technicians and digital governance professionals. Equally important are persistent soft skill shortages that employers report. Noteworthy gaps are in strategic thinking, leadership, interpersonal skills and virtual collaboration, as outlined in Figure 3.[23] Finally, employers note particular difficulties with hiring for intermediate-level ICT professionals with 3-5 years of experience, and professionals with the requisite combination of both technical skills and strategic & commercial nous.[24] These gaps indicate a refresh of ICT training curricula and pathways to employment are required. In particular, it shows that in general, **skilling is insufficiently demand-driven**. Skill gaps are discussed in further detail – on a role-by-role basis – in Section 3.

[20] UNDP, 2024
[21] Ibid
[22] World Bank GovTech Maturity Index, 2023
[23] Genesis Analytics surveys
[24] Genesis Analytics interviews

Figure 3: Soft skills are consistently noted as lacking amongst employers



Moreover, absent intervention, future employment opportunities will be disproportionately inaccessible to marginalised populations, including women, rural people, people with disabilities and refugees.

With respect to gender, employers report that over 70% of ICT professionals in their employ are men. Moreover, this divide is exacerbated at more senior levels of work. These challenges directly reflect a male-dominated ICT talent pipeline: only ±30% of STEM students in Kenya are women.[25] In turn, this continued exclusion is driven by a number of different factors, including societal norms, cultural practices, outright discrimination and limited access to digital resources.[26] There are dedicated organisations (e.g. Akirachix) focusing on digital skills and pathways to ICT work for women, but these initiatives need to be scaled.

With respect to urban-rural inequality, the majority of ICT professionals live and work in urban areas, despite the fact that around 71% of Kenyan people live in rural areas.[27] This is largely driven by country-level variation in digital usage and infrastructure. For example, less than 10% of the population in Tana River, Turkana and West Pokot use the internet, compared to ±40% of the population at large.[28] To further highlight the gap: 97% of households in highest income households (which are typically urban) have access to the internet, while only 17% for the lowest income households have internet access.[29] Initiatives like Jitume and Learning Lions are looking to solve rural infrastructure and skill gaps, but more scale is required.

With respect to people with disabilities and refugees, there remain significant barriers to employment. For people with disabilities, stigma remains a major barrier to employment, in addition to lack of accessible devices and workplaces, and limited disability sensitivities amongst employers. Lack of self-confidence in a work environment also remains a major barrier.[30] With respect to refugee populations, stigma, hardware access and confidence remain barriers. Other critical barriers are linguistic and infrastructural. Refugee camps are poorly connected - for example, only 40% and 15% of refugees in the Kakuma camp have a smartphone and feature phone respectively, with 92% and 64% of those with a smartphone and feature phone have internet access.[31]

[25] Mbirianjau, 2018.
[26] CIGI, 2023
[27] Ibid
[28] KIPPRA, Advancing Digital Readiness 2023
[29] CIGI, 2023
[30] Shakespeare et al. (2019). Success in Africa: People with disabilities share their stories. Available here.
[31] ILO, 2021. Digitally empowering young people in refugee and host communities: a mapping study in Kenya.

Skill mismatches and exclusion challenges are difficult to solve because of long-standing information gaps and insufficient collaboration between training providers and industry. For one, there is no common framework for measuring digital skills provision such that comparability and record-keeping across programs is challenging, meaning employers and policymakers cannot assess the quality and relevance of training with ease.

In turn, although there have been efforts to advance labour market intelligence through the Kenya Labour Market Information System (KLMIS), the data remains largely inaccessible on the front-end, and there are concerns about the timeliness and comprehensiveness of the data.[32] Without a common framework or timely data, it has proven challenging to ensure that industry and skilling providers are making evidence-based decisions about what skills are provided to learners.

Curriculum update processes at tertiary institutions present as highly onerous, requiring up to seven layers of authorisation to update. This can be problematic in an evolving sector, where the frontier practices that prepare students for the workforce change rapidly. Bureaucratic "red tape" processes tend to constrain the provision of demand-driven skilling.

Finally, there is no centralised coordinating intermediary that is collating and sharing information on industry demand, skilling provision and government requirements. In Kenya, there are multiple relevant coordinating bodies across government, industry and skilling, including the Information and Communication Technology Authority (ICTA), Information Communication Technology Association of Kenya (ICTAK), Business Processes Outsourcing Association of Kenya (BPOAK), Technology Service Providers of Kenya (TESPOK), Association of Computing Practitioners Kenya (ACPK), Fintech Association of Kenya (FINTAK), Kenya Private Sector Alliance (KEPSA), Technical and Vocational Education and Training Authority (TVETA), and the JobTech Alliance, but no dedicated team to facilitate dialogue and leverage their combined strengths.

[32] KLMIS is accessible here. Concerns surfaced during stakeholder interviews.

2.2. Key driver of change: Rapidly increasing capabilities and accessibility of artificial intelligence

AI capabilities are expanding rapidly, and adoption is already impacting ICT work in pockets across Kenya

The rapid evolution of AI is significantly enhancing the technology's capacity to address complex tasks. This includes tasks that were previously challenging, such as local language processing, mathematical computations and physical interactions. Advanced models such as OpenAI's o1 now demonstrate reasoning abilities, while Google Gemini and Apple Intelligence integrations have made multimodal AI accessible to millions of consumers. This progress is driven by a vast ecosystem of innovation, supported by major investment, a burgeoning open-source community and declining costs of computation. Compared to the year 2000, computing is approximately 100 times more affordable and assuming a continued acceleration in GPU adoption, this figure could be closer to 300 times.[33] The inclusion of innovative chip types contributes to this overall decline, partially mitigating the slowdown observed around 2015. Notably, GPU prices remained more stable during this period compared to CPUs.[34]

Simultaneously, AI models continue to expand in size and scope, drawing on larger datasets and employing new techniques, such as synthetic data generation and reasoning algorithms, to overcome the limits of traditional machine-readable data.[35] As AI capabilities broaden, they unlock new opportunities across sectors by automating tasks, improving decision-making, and fostering greater innovation. This positions AI to significantly impact industries such as ICT, where these advancements will drive demand for skilled professionals capable of developing, implementing, and managing AI-powered solutions.

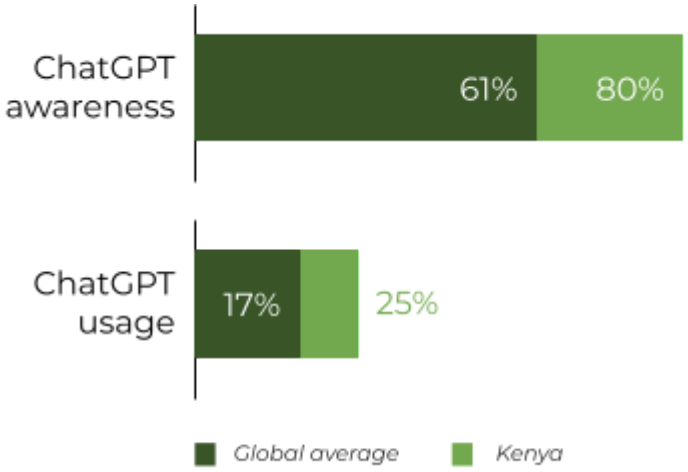
AI adoption in Kenya is accelerating, with the technology beginning to make an impact across multiple sectors. The agriculture sector, in particular, is experiencing rapid innovation, driven by a vibrant agri-tech ecosystem. AI-powered solutions in agriculture now account for nearly half of all identified use cases across industries in the country.[36] In healthcare, AI-powered tools are enhancing diagnostics, enabling early detection of diseases, and expanding access to affordable care. Mobile-based health platforms are delivering personalised maternal and child healthcare information, helping to reduce mortality rates.[37] In finance, AI is being used for credit scoring, fraud detection, customer support, and personalised financial services, increasing financial inclusion for previously underserved populations. In education, AI-driven platforms offer personalised learning by analysing student performance, promoting self-paced education.[38] Additionally, AI-powered chatbots are transforming learning environments by fostering collaboration and reshaping classroom interactions. These applications demonstrate how AI is driving innovation across sectors, improving service delivery, and creating opportunities for growth.[39]

Kenya demonstrates a notably high level of engagement on the potential for AI to deliver economic and socio-economic change, though usage levels remain slightly below global averages.[40] According to the Global Public Opinion on AI survey, 61% of Kenyans are aware of ChatGPT, compared to the global average of 80%, with 17% reporting usage, below the 25% global benchmark.[41] This is outlined in Figure

[33] Epoch AI (2024) Trends. Available here
[34] Bennett Institute (2023) The cost of computing and the productivity puzzle. Available here
[35] Epoch AI (2024) Will we run out of data? Limits of LLM scaling based on human-generated data. Available here.
[36] GSMA (2024) AI for Africa: Use cases delivering impact - Kenya deep dive. Available here
[37] Kenya Innovation Agency (2024) KIO Outlook - Emerging technologies edition. Available here
[38] Ibid
[39] Ibid
[40] Kictanet (2024). Artificial Intelligence for Inclusive Development: Guiding Kenya's policy landscape. Available here.
[41] University of Toronto (2024) The Global Public Opinion Artificial Intelligence Survey. Available here

4. Many AI-enabled services in Kenya are delivered through mobile and digital platforms, reflecting the country's reliance on these channels. However, low digital literacy rates, especially in rural areas, present a barrier to broader adoption and usage.[42]

Figure 4 : ChatGPT awareness and usage in Kenya



AI adoption in Kenya and Sub-Saharan Africa remains limited to specific pockets, with the region generally experiencing lower exposure compared to global trends. While 2.3% of jobs globally are at risk of automation, only 0.6% of jobs in Sub-Saharan Africa face similar risks, and 10.2% of jobs in the region are likely to be augmented, compared to 13% globally.[43] Adoption rates will vary significantly, influenced by factors such as use cases, firm size, and exposure to international markets. Additionally, the cost of compute remains a barrier; for instance, computing power in Kenya is 31 times more expensive than in Germany in purchasing power parity (PPP) terms, despite similar absolute costs.[44] These dynamics highlight the need for context-specific strategies to increase AI adoption and manage its impact on the workforce.

The adoption of AI is expected to reshape both the nature and quantity of work for ICT professionals, with varying effects depending on specific roles and tasks. Some roles, particularly those involving routine or repetitive tasks with lower emotional intelligence (EQ) requirements, such as entry-level software development and data annotation, are more likely to be automated. Others, such as software development and data analytics, will see task augmentation, with AI taking over specific aspects of the work. However, AI will also generate new opportunities, driving demand for emerging roles in areas like cybersecurity and expanding the need for data centre technicians, AI governance specialists, and data annotators within the growing AI ecosystem.

Box 2: Examples of AI disruption to ICT labour in Kenya

Emergence of New Demand for Advanced Digital Skills

AI technologies are driving the need for advanced digital skills across Kenya's labour market. It is estimated that by 2030, 50% of jobs will rely on digital skills, creating a surge in demand for specialised roles, including data scientists, machine learning engineers, and AI ethics consultants.[45] These skills are not only essential for individual career advancement but also critical for building a

[42] GSMA (2024) AI for Africa: Use cases delivering impact - Kenya deep dive. Available here
[43] ILO (2023) Research Brief on Generative AI and Jobs: Policies to Manage the Transition
[44] Genesis Analytics (2023) Identifying and Quantifying the investment gaps for Compute in partnership with the IDRC.
[45] World Bank Group (2021) Demand for Digital Skills in Sub-Saharan Africa - Key Findings from a Five-Country Study: Côte d'Ivoire, Kenya, Mozambique, Nigeria, and Rwanda. Available here.

workforce capable of leveraging new technologies effectively.[46] The government is addressing this demand through the Competency-Based Curriculum (CBC), aimed at equipping future generations with the skills required to navigate emerging technologies.[47]

Job Automation and Displacement

As AI becomes integrated into industries like finance, manufacturing, and telecommunications, certain roles will grow while others face the risk of automation.[48] High-growth roles include e-commerce and digital marketing, software development, IT support, and data analytics, which are becoming central to the evolving economy. [49] However, entry-level data analysis and data management roles are increasingly at risk of being automated, underscoring the need for reskilling programs to mitigate job displacement and ensure sustainable employment opportunities.[50]

Skilfully navigating the trade-offs of AI in the ICT sector requires advancing responsible adoption though infrastructure and skilling, while protecting those who might be displaced

While AI holds significant potential to enhance productivity for ICT professionals, challenges related to infrastructure and AI readiness limit its effective adoption.[51] Although Kenya is positioning itself to partake the benefits of AI, current connectivity gaps remain a major hurdle. Only 60% of the urban population and 42% in rural areas have access to mobile internet, restricting the reach and impact of AI-powered tools.[52] In terms of AI readiness, Kenya ranks 101st globally and is among the few African countries making progress, driven by government efforts across policy, technology, and data infrastructure.[53] While indicative of progress, the current levels of connectivity and readiness remain insufficient, constraining the ability of ICT workers to fully harness AI's potential for productivity gains.

While Kenya is making strides in promoting AI education, skills mismatches between industry demand and academic offerings hinder workforce readiness. Universities, including Strathmore University, University of Nairobi (UoN), Dedan Kimathi University of Technology (DEKUT), and Jomo Kenyatta University of Agriculture and Technology (JKUAT), offer AI-related programs, but the focus has historically been placed on software development and engineering, with a growing need for essential complementary skills such as mathematical foundations.[54] The limited availability of advanced AI courses and the removal of AI-adjacent programs, such as mathematics PhDs, further exacerbate the gap.[55] A further educational challenge identified in AI education in Kenya is the absence of a clear translation of knowledge to actionable AI use cases.[56] This misalignment between curricula and market needs complicates efforts to develop a workforce equipped to meet the evolving demands of AI, highlighting the need for closer coordination between academia and industry.

AI's growing influence in Kenya poses a unique challenge for young employees and marginalised populations, who are more vulnerable to job displacement. Access to AI-related careers remains

[46] Ministry of Information, Communications and the Digital Economy (2024) Report of the Information, Communications and Digital Economy Sectoral Working Group. Available here
[47] Ibid
[48] Ibid
[49]Ministry of Information, Communications and the Digital Economy (2024) Report of the Information, Communications and Digital Economy Sectoral Working Group. Available here
[50] Ibid
[51] Paradigm Initiative (2022) Artificial Intelligence in Kenya. Available here
[52] GSMA (2024) The State of Internet Connectivity. Available here
[53] Oxford Insights (2023) Government AI Readiness. Available here
[54] Ibid
[55] Paradigm Initiative (2022) Artificial Intelligence in Kenya. Available here
[56] Global Partnership for Sustainable Development Data (2023) Artificial Intelligence Practitioners Guide: Kenya. Available here

limited, as formal employment in this field often requires a bachelor's degree, placing those without higher education at a disadvantage.[57] Additionally, the high cost of acquiring AI skills, including certifications, research, and computing resources, creates barriers to entry. [58]

A proactive approach to reskilling is essential to align the workforce with evolving demands and ensure that individuals can adapt to new roles created by AI.[59] Job transition support, such as financial assistance, reskilling programs, and career guidance, will be critical to easing the transition for workers impacted by automation and ensuring inclusive growth in the AI-driven economy.[60]

2.3. Key driver of change: Global skills shortages and the rise of outsourcing & remote work

ICT employment in Kenya could increase significantly if Kenyan talent addresses rising global skill shortages through outsourcing & remote work

Significant skill shortages across the Global North alongside digitisation trends are increasing the desire to outsource. By 2040, 14 OECD countries anticipate population declines, with some regions expected to lose over 20% of their residents by 2050.[61] This demographic shift is causing widespread labour and skill shortages. Lightcast has termed this issue "the rising storm," underscoring the urgent need to cultivate a future-ready workforce.[62] Alongside shortage trends, digital work has gained prominence, particularly against the backdrop of the COVID-19 pandemic where local cost increases and digitisation have spurred opportunities for remote and outsourced work.[63] Risk management is also a strong pull factor for outsourcing, allowing businesses to cut-down on personnel costs, having flexibility in hiring and the ability to rapidly scale up and down teams.[64] In the UK for example, 70% of B2B businesses have outsourced key services to third parties, with only 25% having never outsourced in any area of their organisation.[65]

Germany exemplifies these challenges, facing an estimated 149 000 unfulfilled IT jobs, with employment opportunities distributed across sectors and cities.[66] The number of people over retirement age (67) in Germany will rise by 4 million people by the mid 2030s, with the number of people at working age estimated to decrease by up to 4.8 million in the next 15 years.[67] Current skill shortages are most acutely across the science and technology, engineering and healthcare sectors. [68] IT shortages are felt across sectors, with 83% of German companies reporting a shortage of ICT specialists, and 65% expecting that shortage to grow.[69] Across sectors, professions in software development, cyber-security and other roles supporting emerging technologies are set to grow in demand.[70] These roles will be explored in more depth in Section 3. Given skill shortages and the fact it takes approximately 8 months to hire ICT talent, 20% of German companies are considering hiring from

[57] GIZ & Global Partnership for Sustainable Development Data (2023) Artificial Intelligence Practitioners' Guide: Kenya. Available here
[58] Ibid
[59] Kenya ICT Action Network (2024) Artificial Intelligence for Inclusive Development: Guiding Kenya's Policy Landscape. Available here
[60] Ibid
[61] OECD (2024) Demographic change in regions and cities. Available Here.
[62] Lightcast (2013) The Rising Storm: Building a Future-Ready workforce to withstand the looming labour shortage. Available Here.
[63] World Economic Forum (2024) The Rise of Global Digital Jobs. Available Here.
[64] Propel Insights shared with Genesis Analytics.
[65] YouGov (2024) 7 out of ten British Businesses outsource to third parties. Available Here.
[66] Bitkom (2023). Rekord-Fachkräftemangel: In Deutschland sind 149.000 IT-Jobs unbesetzt. Available here.
[67] DeStatis (2022) 4 million more people aged 67 or over will live in Germany in 2035. Available Here.
[68] Make It in Germany (2024) Qualified professionals. Available Here.
[69] Bitkom (2019) Der Arbeitsmarkt für IT-Fachkräfte. Available Here.
[70] Make It in Germany (2024) Qualified professionals. Available Here.

abroad.[71] The opportunities for outsourced work are spread geographically across the country. Munich, Berlin, Hamburg, Stuttgart and Dusseldorf are highlighted as key cities based on cultural openness, thriving economic environments and strong job markets. [72]

Kenya's burgeoning digital ecosystem offers a rich talent pool, positioning the country as a prime candidate for global IT outsourcing and remote work, especially from Europe. As indicated previously, Kenya is home to an estimated 330 000 ICT workers, a workforce which is expected to grow at an annual rate of 8.9%.[73] Additionally, there is an estimated talent pool of 596 000 possessing a B2 level and higher English-speaking capability.[74] In addition, there are ±580 000 refugees in Kenya who speak a variety of languages including French, Arabic and more.[75] For European markets there is the added value of time zone proximity which can allow for real-time communication. In terms of cost, Kenya presents a competitive advantage, offering significantly lower fully loaded monthly costs for IT outsource employers, 3.1 times cheaper than European markets and 1.3 times more affordable than other African hubs.[76] Kenya ranks as a competitive outsourcing destination, recognised on the Global Business Services World Competitive Index, where it is among the top 20 countries.[77]

Moreover, there is already significant traction in looking to make economic connections between Kenyan talent and German demand for ICT skills. There are at least three major initiatives and agreements recently completed. First, there is the Kenya-Germany digital dialogue, a high-level agreement between the German Federal Ministry for Digital and Transport (BMDV) Kenyan Ministry of Information Communications Technology and the Digital Economy (MoICT-DE) to cooperate on various digital economy issues, including ICT skills and exports.[78] Second, at the German Import Promotion Desk, IT outsourcing has been designated as a priority as of January 2024, with Kenya as a priority country for partnership.[79] Third, the State Department for Diaspora Affairs, Ministry of Foreign & Diaspora Affairs of the Republic of Kenya has officially entered into a partnership with the Hamburg Chamber of Commerce, aiming to localise job opportunities through BPO and IT outsourcing.[80] These agreements are undergirded by research activities, such as a collaboration between MercyCorps and JobTech Alliance to map regulatory barriers for exporting IT service from Kenya to Germany.[81]

Tapping into global demand for ICT talent through multiple channels will require targeted interventions to overcome existing barriers

While Kenya is establishing itself in the IT outsourcing and remote working markets, it faces significant competition. Kenya's position in the global outsourcing market, while growing, remains less established compared to that of frontrunners like India and the Philippines. These markets also boast cost advantages with fully loaded monthly expenses being approximately 1.2 times lower than Kenya's.[82] In relation to German markets, Kenya also has to compete with nearshore competitors such as Hungary, Poland and other Eastern European countries. Compliance with EU security standards, such as the General Data Protection Regulation (GDPR), is an inherent advantage for nearshore and onshore providers.[83] Adhering to these stringent data privacy and security laws not only minimises the risk of

[71] Bitkom (2023). Rekord-Fachkräftemangel: In Deutschland sind 149.000 IT-Jobs unbesetzt. Available here.
[72] Propel Insights shared with Genesis Analytics.
[73] Methodology for estimated numbers outlined in Annex 2.
[74] Genesis.GBS Insights.
[75] UNHCR (2023) Registered refugees and asylum seekers. Available here.
[76] GBS (2023) Digital ITO Global Location Rankings Unveiled from the 2023-24 GBS World Competitive Index. Available Here.
[77] Ibid.
[78] Digital Dialogues, 2024. Kenyan-German Digital Dialogue: Signing of the work plan and stakeholder meeting. Available here.
[79] Genesis Analytics interviews.
[80] Mumbua, 2024. Kenya signs deal to connect local talent with global IT jobs. Available here.
[81] Genesis Analytics interviews
[82] Genesis GBS Insights.
[83] European Council (2018) The general data protection regulation. Available Here.

data breaches but also streamlines the integration with clients' existing compliance frameworks, offering a smoother and more secure outsourcing experience.[84]

Kenya's IT outsourcing sector also lacks a shared national value proposition and associated business development and investment attraction activities. A value proposition, which clearly sets out Kenya's competitive advantages in delivering IT outsourcing services, provides local Kenyan operators with a clear evidence base to compellingly communicate the country's strengths. It also means that smaller operators with limited capacity for research and marketing can still present themselves convincingly to potential buyers, and help economic and trade attaches with presenting the investment opportunities in high-level trade discussions. However, no such document exists.

Existing gaps in business culture and linguistic compatibility between Kenya and Germany must be addressed. Nearshore and onshore markets share similar business cultures and practices which can facilitate smoother communication and collaboration. Additionally, while international companies operate in English, smaller organisations might prefer conducting business in German, which could pose a challenge for many Kenyan workers. It is noteworthy that a significant portion of ITO/BPO budgets (46%) are allocated onshore, largely driven by such compatibility considerations.[85] Alongside compatibility considerations, ethical work practices including around the quality and dignity of outsourcing work persist. In Kenya, there have been notable cases in the data annotation and labelling sector where BPO firms have been challenged on account of low-wages and difficult working conditions.[86]

Local Kenyan operators report difficulty in connecting with global buyers, with limited certifications to successfully expand into export markets. Specific large-scale Kenyan IT operators successfully deliver ICT services to global markets, including Sama, TechnoBrain, Teleperformance and Marjorel. However, smaller operators struggle to connect sales teams with global buyers, as this requires deep knowledge of international markets. One operator noted that if they could "wave a magic wand, they would have sales teams dotted across Europe".[87] European buyers have shared challenges with perceptions of Kenya's ability to deliver IT services, particularly with respect to consistently meeting output and efficiency standards.[88] In some cases, this perception is perpetuated when local operators are not able to demonstrate requisite export certifications.

It is important to recognise that not every ICT role is equally suited to outsourcing or remote work. For instance, while software development is considered prime for remote work, other roles that require in-person interaction or are sensitive to location-specific requirements are less likely to be outsourced. Additionally, the prospect of automation, particularly in a country such as Germany where AI adoption rates are high, adds another layer of complexity to the outsourcing readiness of certain ICT roles. For example, automation-exposed roles which may still be candidates for outsourcing in Kenya may not be outsourced by German companies, which are turning to AI ahead of international outsourcing more quickly than other firms.[89] Propensity to outsource by role will receive more detailed examination in Section 3.

[84] Think Beyond (2024) Nearshoring in the EU: Balancing Quality and Budget in the IT Industry. Available Here.
[85] Ibid.
[86] Fairwork (2023) Fairwork AI Ratings 2023: The Workers Behind AI at Sama. Available Here.
[87] Genesis Analytics interviews.
[88] Genesis Analytics interviews.
[89] Insights from stakeholder consultations and workshops conducted by Genesis Analytics.

3 | Future of ICT roles in Kenya

In order to understand how these drivers of change will affect opportunities within the ICT sector at a more granular level, we conducted a role by role analysis in which key ICT roles were assessed against five criteria.

1. **Estimated Current Scale of Employment** using survey data and market research to gauge the local demand and the current supply of talent across roles.

2. **Projected Growth in Demand**, for example due to AI and increasing digitisation, was determined through a combination of market research and insights from expert interviews.

3. **Automation Exposure** was assessed through a task content review that incorporated survey data, market research, and expert insights which allowed roles to be classified into 3 core categories: automate, augment and create.

4. **Opportunities to Tap into Global Demand** was assessed through Industry research and discussions with experts which highlighted propensity to outsource as well as Kenya's global competitive advantages on a role by role basis.

5. **Kenyan Talent Readiness** was primarily evaluated via surveys, market research, and expert interviews to determine if Kenyan professionals are equipped to win international work in light of AI trends and outsourcing demands, with a particular focus on alignment with skill demand trends.

From the analysis we were able to categorise roles into three categories.

Leadership Opportunities are roles in which Kenya can differentiate itself and is already making significant progress. Within the leadership category, three key roles are identified: software development, data science and analytics, and data annotation and labelling. These sectors have seen increased demand and present a significant global opportunity that Kenyan ICT professionals are already capitalising on or are well-positioned to leverage. As standout examples, software development and data annotation are areas where Kenya could distinguish itself on the international stage. Kenya is already becoming an 'advancing' software development hub with a large and experienced workforce with an average of 4 years professional experience.[90] Despite the prospects of automation and augmentation, in the short term, Kenya remains strategically placed to capture the growing global and local demand within these roles.

Growth opportunities are emerging 'open field' opportunities that Kenya can tap into, from a lower base of overall employment. Information and cyber security, AI governance and ethics and data centre technicians all present important growth opportunities given the adoption of emerging technologies. While these roles do not currently employ Kenyan IT professionals at scale, the importance these roles play in advancing emerging technologies, coupled with their resistance to automation, suggests that

[90] Google (2021) Africa Developer Ecosystem Report. Available Here.

their demand will continue to rise. These fields not only offer substantial employment prospects but also present a clear mismatch between supply and demand, primarily because they represent nascent roles within the industry. In the case of cybersecurity, for example, demand for skilled and experienced cybersecurity professionals in Kenya was estimated at approximately 40-50,000 compared to the estimated 4,000 currently employed in the sector.[91]

Stable Giants are more saturated roles that are still important for ICT employment and delivery. The roles of IT operations and support, along with network architecture, represent the most substantial employment numbers, collectively employing 55.4% of Kenya's ICT sector.[92] While they are currently sizable employment drivers, it is important to note that the demand for these roles may not accelerate at the same pace as those in the aforementioned categories. By 2030, demand for cybersecurity roles, for example, is projected to increase by 31% compared to the projected 6% increase in demand for computer support specialists.[93] IT operations and support and network and architecture roles, however, are foundational to the support of digitisation efforts. Therefore these roles are likely to continue to provide ongoing and stable employment opportunities especially in local and regional markets.

The following table provides an overview on a role by role basis:

<table>
<tr><th>Archetype</th><th>Role</th><th>Est. Num.[94]</th><th>Growth potential</th><th>Automation exposure</th><th>Global demand</th><th>Kenyan talent readiness</th></tr>
<tr><td rowspan="3">Leadership opportunities</td><td>Software development</td><td>58 000</td><td rowspan="2">Growth expected</td><td rowspan="2">Augmentation expected</td><td rowspan="3">Good opportunity</td><td>Steady supply</td></tr>
<tr><td>Data science & analytics</td><td>27 000</td><td>Steady supply with gaps</td></tr>
<tr><td>Data annotation & labelling</td><td>10 000</td><td>Growth expected in the short-run</td><td>Significant exposure over time</td><td>Steady supply</td></tr>
<tr><td rowspan="3">Growth opportunities</td><td>Information & cyber security</td><td>4 000</td><td rowspan="3">Growth expected Off a low base</td><td>Augmentation expected</td><td rowspan="2">Some in-person preference</td><td rowspan="3">Insufficient supply</td></tr>
<tr><td>AI governance & ethics</td><td>limited</td><td>Limited exposure</td></tr>
<tr><td>Data centre technicians & support</td><td>limited</td><td>Augmentation expected</td><td>In-person preference</td></tr>
<tr><td rowspan="2">Stable giants</td><td>Networking & architecture</td><td>81 000</td><td rowspan="2">Some growth potential</td><td rowspan="2">Augmentation expected</td><td>In-person preference</td><td>Steady supply with gaps</td></tr>
<tr><td>IT operations & support</td><td>108 000</td><td>Good opportunity</td><td>Steady supply</td></tr>
</table>

[91] M. Kaibiru et al. (2023) Closing the Cybersecurity Skill Gap in Kenya: Curriculum Interventions in Higher Education. Available Here.
[92] Genesis Survey (Figures downloaded 17/10/2024)
[93] World Economic Forum (2023) The Future of Work Report. Available Here; U.S. Bureau of Labour Statistics (2024) Occupational Outlook Handbook. Available Here.
[94] Genesis calculation based on survey results and market research. See methodology in Annex 1.

3.1 Leadership Opportunities

Software development

Role	Est. Num.	Growth Potential	Automation Exposure	Global demand	Kenyan talent readiness
Software development	58 000	**Growth expected**	Augmentation expected	Good opportunity	Steady supply

There are an estimated ~58 000 software developers in Kenya who support the conception, design, programming, testing and bug-fixing involved in creating and maintaining applications, frameworks, and other software components. Software development roles tend to specialise in different aspects of the tech stack and development process, for example, front-end, back-end and, full-stack and Quality Assurance (QA) engineers. Skills required for these roles include proficiency in various programming languages, such as Java, Python, C++, an understanding of software development methodologies and a strong grasp of data structures and algorithms. Technical skills need to be balanced with problem-solving and communication skills. Software developers can work across a number of sectors, however, retail, healthcare solutions, banking and financial services and IT services are prominent. [95] Software development employs the third highest number of IT professionals in Kenya and this subsector is male predominant, even in comparison to the broader ICT sector, as reflected in figures 4 and 5.

Figure 4: Proportion of Software Development within Total IT Sector Employment

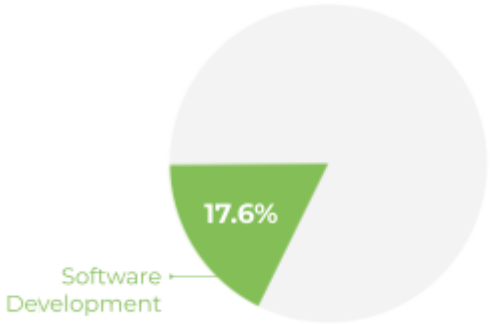
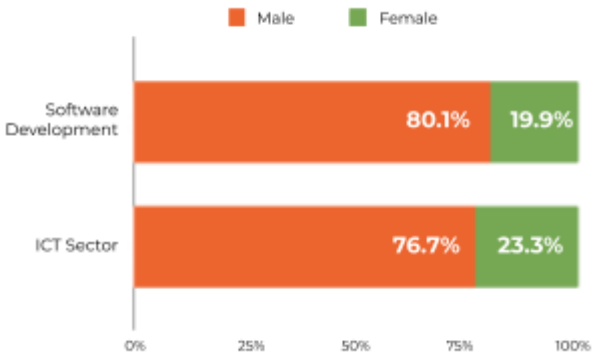


Figure 5: Comparative Gender Breakdown between Software Development and IT sector



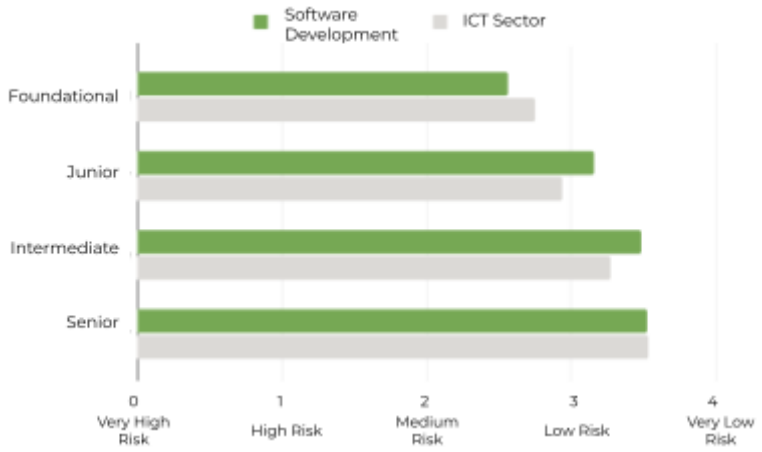
The global and Kenyan demand for software developers is set to grow over the next three years. The U.S. Bureau of Labour Statistics projects the overall employment of software developers, QA analysts, and testers to increase by 17% from 2023 to 2033.[96] The increase in demand for software developers stems from the continued expansion of software development for AI, Internet of Things (IOT), robots, and other automation applications.[97] Similar trends are expected in the Kenyan market given the country's 'advancing' software development ecosystem, categorised by a large developer population, strong start-up ecosystem and funding environment and stable economic conditions.[98] Kenya's start-up market, responsible for hiring more than half of local software developers, is growing,

[95] General Assembly (2024) The Top 5 Industries Hiring Software Engineers. Available Here.
[96] U.S. Bureau of Labour Statistics (2024) Occupational Outlook Handbook. Available Here.
[97] Ibid.
[98] Genesis Survey (Figures downloaded 17/10/2024); Google (2020) Google Developers Ecosystem Report. Available Here.

accounting for 86% of East Africa's total VC funding in the first half of 2024, the region which led the continent by attracting 37.5% of Africa's total VC.[99] In terms of specific skill demands, the most in-demand role is a back-end developer followed by front-end and full stack. In terms of programming languages only about 1 in 5 interview assessments require a specific language. If there is a requirement, demand is concentrated in the top 5 languages: Java, Python, SQL, C++ and Javascript.[100]

While increased demand for AI will generate demand for software development, AI is also fundamentally redefining and augmenting the role of software developers. AI can automate routine and repetitive tasks like code generation, testing, and debugging for common functionalities.[101] AI, therefore, has the potential to boost productivity and allow developers to focus on the creative aspects of problem-solving and designing innovative solutions. These trends are already occurring, with 76% of developers using AI throughout their projects through platforms such as Github Copilot and ChatGPT.[102] AI has been found to be most effective, however, for low-complexity tasks where GenAI tools can support developers to complete code documentation and generation tasks by up to 50 and 45% faster.[103] This contrasts with high-complexity tasks, for which GenAI only reduces task time by 10%. [104] As a result, AI is technically lowering the barrier to entry for software development, as individuals without significant coding experience can use GPT and AI-driven no-code tools to deliver passable code and output. Concurrently, skilled engineers are now not only more productive but are able to spend more time on complex tasks that AI, at this stage, isn't equipped to carry out. With this in mind, demand for developers will likely be concentrated for those with 3-5 years of experience, a requirement which is more likely to be felt by women who typically have 1.3x fewer years of professional experience than their male counterparts.[105]

Figure 6: Perceived risk of automation across seniority levels for software development



Demand for software developers in Germany is likely to increase, and Kenyan IT professionals are well positioned to tap into this market now. Germany's software development and testing industry is sized at 45bn, with a 9% CAGR and a workforce Gap of 71K[106]. When assessing development of AI and ML applications in particular, the industry is valued at a significant 4bn with a 30% CAGR.[107] Software developers across Africa are tapping into this growing global demand, with 38% of African software

[99] Africa Solutions Media Hub (2024) Shift in Investor Focus as Kenya tops Africa in H1 Venture Capital. Available Here.
[100] Hacker Rank (2024) Developers Skill Report. Available Here.
[101] IBM (2024) AI in Software Development. Available Here.
[102] Stack Overflow (2024) 2024 Developer Survey: AI. Available Here.
[103] Mckinsey (2024) Unleash Developer Productivity with Generative AI. Available Here.
[104] Ibid.
[105] Google (2021) Africa Developer Ecosystem Report. Available Here.
[106] Bitkom (2022)
[107] Ibid.

developers already working for at least one company based outside of the continent.[108] Kenyan software developers offer globally competitive rates and share a time-zone with Germany, enabling real-time communication and quicker turnaround for projects. In addition, frameworks, documentation and coding are typically in English, which means language gaps may be less important.

Table 4: Estimated hourly rates for software developers across select markets

Country/Region	Average software development hourly rate[109]
Germany	$61
Eastern Europe	$57
Asia	$28
Africa	$31
Kenya	**$24**

Kenya's pool and pipeline of software development professionals have strong core skills and significant experience, requiring only limited intervention to meet global and national demand. Consultations revealed that Kenyan software developers are self-taught or have upskilled through non-traditional pathways with 89% of Kenyan software developers having a diploma as their highest educational certificate.[110] The software development talent pool has strong core skills, as highlighted in figure 7, with 76% of employers signalling that employees have sufficient frontend and backend web development skills.[111] Additionally figure 8 shows that the majority of employees within the field are working at an intermediate (29.41%) and senior (17.16%) level. Kenyan developers employed in local start-ups have an average of 4 years experience.[112] These seniority and experience levels indicate that the existing talent pool has the skills to meet the growing demand for more complex tasks. At the same time there is a perceived 'over-supply of junior developers in Africa compared to senior developers [...] and recent graduates struggle to meet the demands of most companies'.[113] With this in mind, providing junior developers with vocational training and work experience in order to better meet professional demands will be essential as entry level requirements become more advanced.

Figure 7: Percentage of employers which indicate skills lacking across software development skills

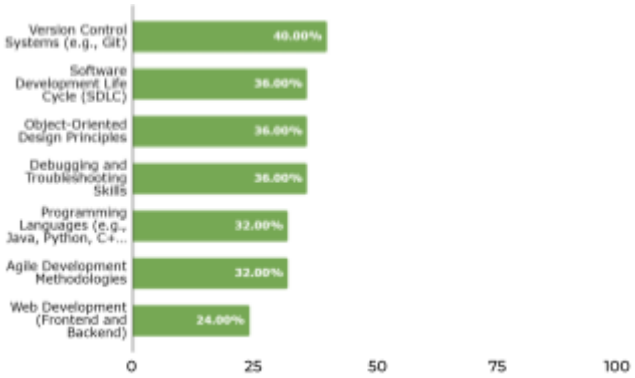
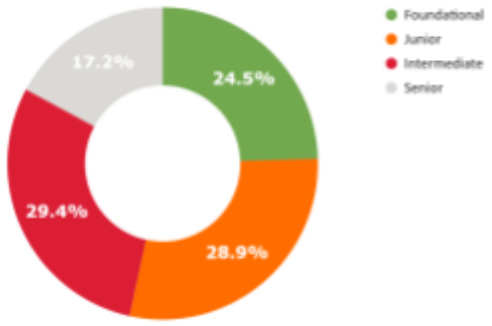


Figure 8: Proportion of software developers employed across seniority levels



[108] Google (2021) Africa Developer Ecosystem Report. Available Here.
[109] YouTeam (2020) Offshore Developers rates in 2020: Best countries and best platforms to hire a remote development team. Available Here.
[110] Genesis Survey (Figures downloaded 17/10/2024).
[111] Genesis Survey (Figures downloaded 17/10/2024).
[112] Google (2021) Africa Developer Ecosystem Report. Available Here.
[113] Ibid.

Data science & analytics

Role	Est. Num.	Growth Potential	Automation Exposure	Global demand	Kenyan talent readiness
Data science & analytics	27 000	**Growth expected**	Augmentation expected	Good opportunity	Steady supply with gaps

There are ~27 000 Kenyan data professionals interpreting, organising and visualising complex data to support decision-making and strategic planning.[114] This job family comprises a broad range of roles, including data scientists, engineers, architects and analysts. While data scientists and analysts will focus on drawing meaning and insights from data, data engineers and architects optimise the data systems for data scientists and analysts to use. Data engineers can specialise in operations like ETL, data warehousing, database management, and data mining, to name a few.[115] Key skills across the data science and analytics roles are programming languages for data such as SQL and R, data visualisation skills and critical analysis.[116] Box 3 outlines the core differences between these roles.

Box 3: What is the difference between data scientists, engineers and analysts?

Data Scientist

Uses statistics and machine learning to make predictions and answer key business questions

Skills
- Maths
- Programming
- Statistics
- SQL, Python, R
- Cloud

Data Engineer

Build and optimise the systems that allow data scientists and analysts to perform their work

Skills
- BigData
- Cloud
- Programming
- SQL, Python
- Distributed Computing

Data Analyst

Deliver value by drawing insights from data and communicating results to make business decisions

Skills
- Communication
- Business Knowledge
- Data Visualisation
- SQL
- Excel, Tableau

While data analytics is becoming prevalent across most industries, professionals are likely to be employed in the banking and finance, marketing, healthcare and business intelligence sectors. [117] Data science and analytics is the 4th largest employer within Kenya's ICT sector and the sector mirrors the gender split of the broader industry with 75.3% and 24.7% of employees being men and women respectively.[118]

[114] Genesis Calculation based on survey results and market research. See methodology.
[115] BrowserStack (2024) What are the different types of Software Engineers? Available Here; Extract, transform, and load (ETL) is the process of combining data from multiple sources into a large, central repository called a data warehouse.
[116] Ibid; SQL stands for Structured Query Language, SQL and R are both programming languages used in database management systems.
[117] Career Foundry (2024) The Top Industries hiring data analysts right now in 2024. Available Here.
[118] Ibid.

Figure 9: Proportion of Data Science and Analytics within Total IT Sector Employment

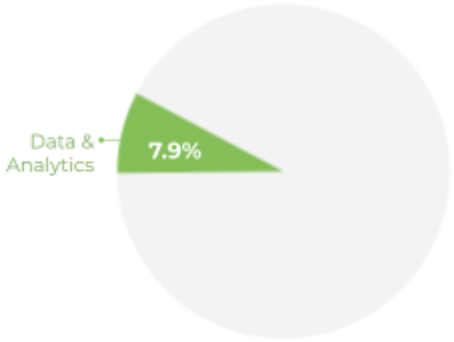
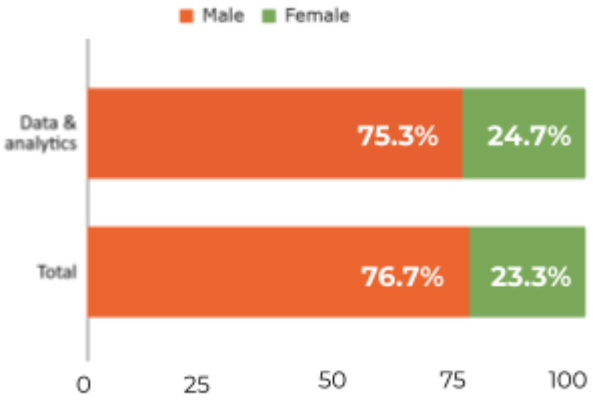


Figure 10: Comparative Gender Breakdown between Data Science and Analytics and IT sector

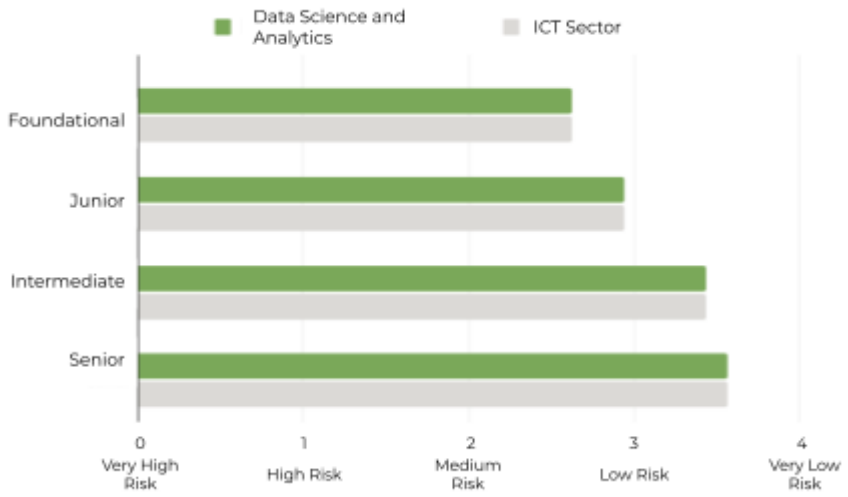


The global data analytics market is anticipated to grow substantially from USD$ 61 billion to USD$ 581 billion over the next 10 years.[119] With this growth, there will be an estimated 30-35% increase in demand for roles such as Data Analysts and Scientists, Big Data Specialists, Business Intelligence Analysts, Database and Network Professionals, and Data Engineers driven by advances and growth of frontier technologies which rely on big data.[120] This demand is already being seen with 43% of employers indicating that data analytics was the business area with the greatest need to address potential skill gaps.[121] These trends are also emerging in Kenya with 26.3% of employers citing big data analytics as a key area of competence they are currently lacking.[122]

AI is set to augment data science and analytics by automating a range of tasks including data entry, cleaning and visualisation. AI is already automating some basic tasks such as data entry and cleansing. Most data analysts, scientists and engineers, however, will find their roles augmented rather than at risk of loss due to automation. This view is supported by figure 11 which highlights minimal and low risk of automation across levels of seniority.[123] For data scientists and analytics, as AI automates routine tasks, roles are likely to shift to focus on higher-level problem solving, for example, interpreting and drawing insights from data.[124] For data engineers and architects, these roles are responsible for developing and maintaining the data structures behind AI models and are therefore becoming increasingly desirable to support the development of AI and ML applications.[125] These roles will also be required to have an understanding of ML and other AI applications, as AI tools are used to complement data engineering processes.[126]

[119] Spherical Insights (2024) Data Analytics Market Size 2024. Available Here.
[120] World Economic Forum (2023) The Future of Work Report. Available Here.
[121] Mckinsey (2020) Beyond Hiring: How companies are reskilling to address talent gaps. Available Here.
[122] Federation of Kenyan Employers (2023) Skills Need Survey Report. Available Here.
[123] Genesis Survey (Figures downloaded 17/10/2024).
[124] International Institute of Business Analysis (2023) How AI is Rewriting the rule of Data Analysis. Available Here.
[125] Addepto (2024) Data Engineering and AI Collaboration -Why is it essential for Making AI Investments profitable? Available Here.
[126] Ibid.

Figure 11: Perceived risk of automation across seniority levels for data science and analytics



Kenya's large talent pool is well placed to win work in Germany's data and analytics market, however, there might be more barriers to winning this work as roles become increasingly technical. Germany's data analytics market is currently sized at 9 million, with a CAGR of 8%, creating an estimated workforce gap of 93,000.[127] Outsourcing data analytics is a popular strategy for companies to handle large volumes of data efficiently, leveraging service providers' specialised skills and advanced tools. Given the substantial investment in technology, infrastructure and skilled personnel that is required to establish an in-house data analytics team, the global data analytics outsourcing market is sized at USD$ 9.24 billion and is expected to grow by 32% from 2024 to 2030.[128] As AI augments data and analytics roles to become more specialised and technical, however, trust issues may arise which could push German employers to hire or outsource within local or regional markets. The technical skills required within data science and analytics are highlighted in the fact that 76% percent of Kenyan data science and analytics professionals have a bachelor's degree.[129] Considering the demand for higher education, it is vital to ensure that Kenyan qualifications are respected and acknowledged internationally, affirming credibility and competitiveness within competitive job markets. Kenya has a clear cost advantage by offering lower rates compared to European countries, combined with strong English language proficiency and time zone proximity.[130] These factors enhance Kenya's attractiveness as a prime destination for outsourcing data science and analytics roles.

Kenya's data and analytics talent pool is well-qualified, however, there are skill gaps which need to be addressed to meet global demand and support more advanced AI applications within the local market. Kenya's data science and analytics talent pool is well-qualified with professionals being ~3x more likely to have a bachelor's degree than across the broader ICT sector.[131] Despite these qualifications, as highlighted in figure 12, 75%, 62.5% and 50% of Kenyan employers indicated that data modelling, predictive analytics and data visualisation were lacking amongst data scientists and analysts.[132] Crucially, data modelling and visualisation were cited in the top ten in-demand skills for employers, indicating that Kenyan professionals in the field might not be ready to meet global and national

[127] Data & Analytics workforce gap is sourced from Mighty Data analysis of Linkedin data.
[128] Grand View Research (2023) Data Analytics Outsourcing Market Size, Share & Trends Analysis Report. Available Here.
[129] Genesis Survey (Figures downloaded 17/10/2024).
[130] YouTeam (2020) Offshore Developers rates in 2020: Best countries and best platforms to hire a remote development team. Available Here.
[131] Genesis Survey (Figures downloaded 17/10/2024).
[132] Genesis Survey (Figures downloaded 17/10/2024).

demand.[133] Core and foundational skills, however, such as data analysis and interpretation were seen as sufficient by .[134] Figure 13 shows that while data and analytics professionals are relatively evenly distributed across seniority levels, employers indicated much higher recruitment effort for intermediate and senior roles, suggesting that skill gaps are concentrated in more advanced areas and experience.[135]

Figure 12: Percentage of employers which indicate skills lacking across data science and analytics competencies

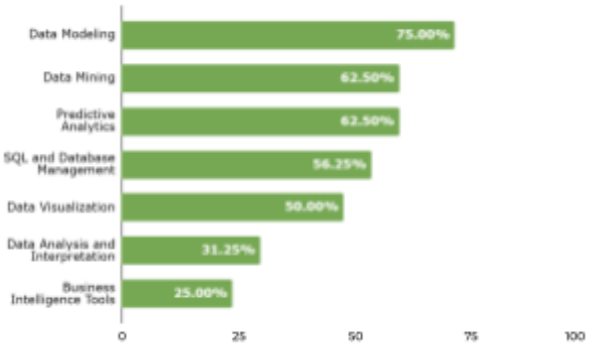
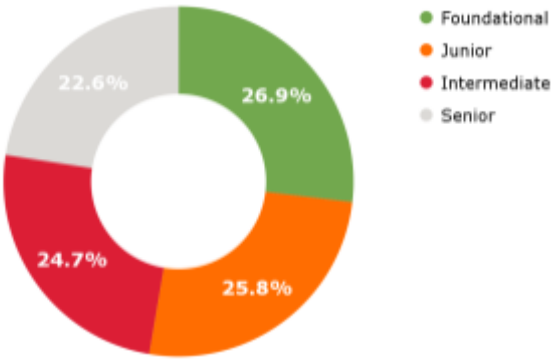


Figure 13: Proportion of data science and analytics professionals employed across seniority levels



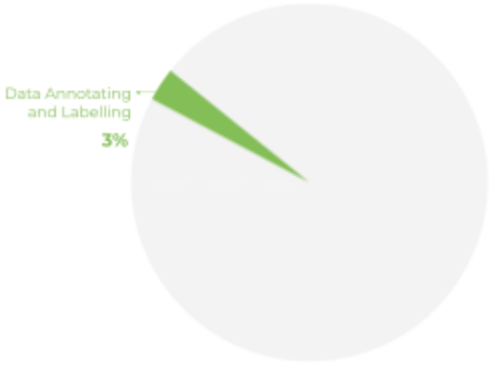
AI data annotating & labelling

Role	Est. Num.	Growth Potential	Automation Exposure	Global demand	Kenyan talent readiness
Data annotation & labelling	10 000	**Growth expected** in the short-run	Significant exposure over time	Good opportunity	Steady supply

Approximately 10 000 AI Data services professionals in Kenya are preparing, cleaning and labelling the data which trains AI/ML algorithms. This work can also range in relation to technicality: from labelling more simple imagery to much more complex data for applications in the medical, industrial, retail sectors.[136] Professionals can also be involved in correcting and validating AI outputs through 'human-in-the-loop' services. As the AI data services industry has grown, Kenya has emerged as a leading global hub with key Kenyan firms such as Sama and Cloud Factory supporting huge global clients such as Google, Microsoft and OpenAI.[137] Professionals will also be performing 'human-in-the-loop' services which validate AI outputs when labelling data itself. Sama and Cloud Factory are key BPO companies which have established Kenya as a key hub for these activities.

[133] Hacker Rank (2024) Developers Skill Report. Available Here.
[134] Ibid.
[135] Ibid.
[136] Humans in the Loop (2024). Available Here.
[137] Sama. Available Here; Cloud Factory Available Here.

Figure 14: Proportion of Data Annotation and Labelling within Total IT Sector Employment



Given the proliferation of AI, there is a growing global demand for AI-ready data and related data services. The global data annotation tools market was estimated at $1.02 billion in 2023 and is projected to grow at a CAGR of 26.3% from 2024 to 2030.[138] This growth can be attributed to the importance of quality AI-ready data, especially given that AI and ML developers cite that between 70-80% of AI or ML models fail because of poor quality training data. [139]

Data annotation roles are likely to be exposed to automation, however, there are key roles which professionals can play to supplement AI tools within the field. Human-led data annotation is often a bottleneck in AI projects due to its complexity and resource requirements.[140] As a result, AI tools are increasingly being used to generate synthetic data for training models.[141] Relying solely on automation, however, runs the risk of automation bias where machine decisions can introduce errors and perpetuate biases inherent in training data.[142] With this in mind, rather than a complete loss of data labelling jobs due to automation, AI is more likely to become a complementary tool that enhances efficiency rather than completely replacing human oversight.[143] Opportunities for data services will centre around ensuring the quality and reliability of AI-generated labels, addressing potential biases introduced by generative models and balancing automated tasks with human-in-the-loop workflows where AI and human annotators collaborate iteratively. [144] Overall, demand for data workers is likely to decrease and existing roles will augment to be more specialised, analysing edge cases and conducting audits on quality of training data. [145]

Germany has a strong ecosystem for start-ups and SMEs creating advanced AI and machine learning solutions, which will likely drive demand for both human-led and tool-based annotation. The Europe data annotation services and tools market size was estimated at 281 million in 2023 and is

[138] Grand View Research (2024) Data Annotation Tools Market Size, Share & Trends Analysis Report. Available Here.
[139] Sama (2023). Data Annotation Benefits and Advantages in 2023. Available Here.
[140] BBVA (2024) Our approach to human data annotation in the age of Gen AI. Available Here.
[141] KeyLabs AI (2024) When to use Automatic vs Manual Automation. Available Here.
[142] BBVA (2024) Our approach to human data annotation in the age of Gen AI. Available Here.
[143] Ibid.
[144] SaprePC (2024) Why Data Annotation Shouldn't be AI. Available Here.
[145] BBVA (2024) Our approach to human data annotation in the age of Gen AI. Available Here.

anticipated to grow at a CAGR of 27.8% from 2024-2030.[146] Increasing developments in autonomous vehicle technologies are fueling the market growth followed by healthcare, retail and financial services sectors. By 2030 for instance, up to 10,000 autonomous shuttle buses are expected to be deployed in the Hanseatic city of Hamburg alone, and in the next 12 months the first shuttles are set to be integrated into the regional and local public transport system.[147] Germany is also home to the AI company DeepL, a world leading translation program, which might increase demand for language data.[148] In relation to data protection and governance, the German federal and state data protection authorities have recently published guidelines for the implementation and use of AI in compliance with the European Union's regulation of personal data to mitigate the risks of privacy breaches and discrimination bias.[149] In order to comply, businesses might be pushed to choose human-led annotation in order to avoid increased data bias risks. Kenya has emerged as a globally recognised hub for data annotation services, a reputation which can be leveraged for work opportunities in Germany. One important barrier, however, are the reported experiences of low-wages and poor working conditions within Kenya's AI data services sector, specifically within content moderation.[150] While studies evidence significant improvements with Kenyan data annotation companies guaranteeing the living wage for its workers, eliminating unpaid overtime and extending employment contracts, these improvements, these cases may present a barrier to future outsourcing. [151]

Kenya's current pool of data annotators is sufficient to meet the global and local demand for AI-ready data, with only limited intervention required to stay competitive within the field. There are around 10,000 professionals working in the data annotation field, especially for globally recognised BPOs like Sama and CloudFactory which have strong bases in Kenya.[152] However, there might in reality be many more who are working on platforms such as ClickWorker or Amazon MTurk, which are much harder to trace. ILO surveys found that the majority of professionals working on web-based platforms are below the age of 35 years and highly educated, particularly in developing countries.[153] As AI annotation and labelling tools become more advanced, however, AI data professionals will need to be experienced in techniques for both image and video classification as well as language labelling for natural language processing models. Similarly, as more complex data is needed for sector specific AI applications, professionals are likely to need domain specific knowledge, for example in agriculture, geospatial analysis, healthcare and medical knowledge.[154]

3.2 Growth opportunities

Information & Cybersecurity

Role	Est. Num.	Growth potential	Automation exposure	Global demand	Kenyan talent readiness
Information & Cybersecurity	4 000	**Growth expected** Off a low base	Augmentation expected	Some in-person preference	Insufficient supply

There are an estimated ~4 000 cybersecurity professionals in Kenya, protecting organisational networks, hardware and data from cyber threats. Cybersecurity professionals identify vulnerabilities, implement security measures and respond to incidents. This job family includes cybersecurity

[146] Grand View Research (2023): Europe Data Annotation Tools Market: Industry Report 2030. Available Here.
[147] IOKI (2023) Autonomous vehicles: turning point in European regional and local transport. Available Here.
[148] DeepL (2024) Available Here.
[149] DSK (2024) Guidelines of the German Data Protection Conference of May 6, 2024, Available Here.
[150] The Guardian (2023) 'It's destroyed me completely': Kenyan moderators decry toll of training of AI models. Available Here.
[151] Fairwork (2023) Fairwork AI Ratings 2023: The Workers Behind AI at Sama. Available Here.
[152] Genesis Calculation based on survey results and market research. See methodology.
[153] ILO (2021) The role of digital labour platforms in transforming the world of work. Available Here.
[154] Labelvisor (2024) Enhancing your skills as a Data Annotator. Available Here.

architects, cybersecurity analyst, digital forensic investigator as well as cybersecurity policy and compliance officers.[155] Cybersecurity roles require a mix of technical and soft skills, typically accrued via a combination of a degree, certifications and/or 2-3 years of work experience. Our surveys reflect these requirements with 54.9% of Kenyan cybersecurity professionals having completed a bachelor's degree compared to 26% across the broader ICT sector.[156] Key sectors hiring cybersecurity professionals include financial services, healthcare, and information technology with these sectors often handling sensitive data and therefore require robust cybersecurity measures.

Figure 15: Proportion of Cybersecurity within Total IT Sector Employment

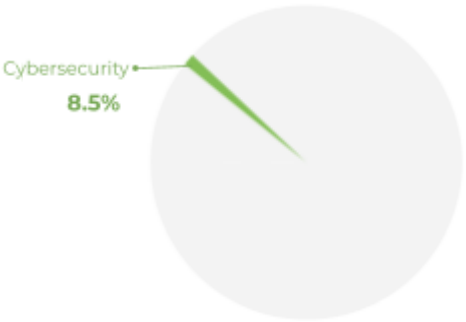
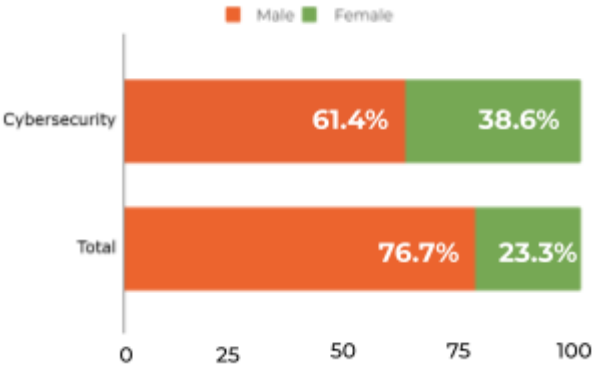


Figure 16: Comparative Gender Breakdown between Cybersecurity and IT sector



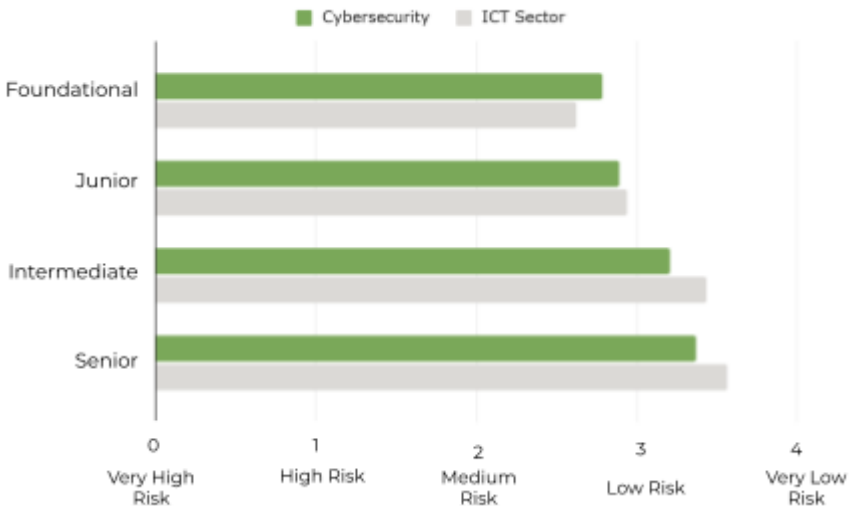
We expect demand for cybersecurity professionals to grow more rapidly than any other ICT job family, albeit off a relatively low base. Cyber threats like data breaches, identity theft and phishing scams are increasingly prevalent due to a combination of technological advancements, digital dependency and the evolving sophistication of cybercriminals. Given these increased cybersecurity risks, there will be an estimated 31% increase in demand for Information-Security Analysts with the cybersecurity workforce already growing by 8.7% in 2023.[157] The supply for cybersecurity professionals, however, does not align with the growing demand and the WEF estimates a global shortage of 85 million cybersecurity professionals.[158] Mirroring global trends, cybercrime costs in Africa are estimated to reach $10 billion in 2023, with Kenya's costs potentially reaching $383 million.[159] To address these cybersecurity risks, the demand for skilled and experienced cybersecurity professionals in Kenya was estimated at approximately 40-50,000 compared to the estimated 4,000 currently employed in the sector.[160]

Cyber security roles are likely to be resilient to AI automation, with roles being augmented and created by AI. AI can support organisations to have more robust cybersecurity processes, for example, AI-powered security systems leverage ML to detect potential threats, enabling organisations to respond more quickly. [161] AI can also sift through security alerts and filter false positives.[162] Rather than replace the roles of cybersecurity professionals, there is likely to be a greater demand for trained professionals to complement the role of AI in cybersecurity. Cybersecurity professionals play a complementary role by identifying unknown threats that AI systems might not be trained against, identifying misclassified malicious codes as safe and bringing contextual and decision-making capabilities.[163] Given the

[155] ENISA (2024) European Cybersecurity Skills Framework Role Profiles. Available Here.
[156] Genesis Survey (Figures downloaded 17/10/2024).
[157] World Economic Forum (2023) The Future of Work Report. Available Here; ISC2 (2023) Cybersecurity Workforce Study. Available Here.
[158] Ibid.
[159] Serianu (2023) Kenyan CyberSecurity Report 2023. Available Here.
[160] M. Kaibiru et al. (2023) Closing the Cybersecurity Skill Gap in Kenya: Curriculum Interventions in Higher Education. Available Here.
[161] ISC2 (2023) ISC2 Artificial Intelligence Survey. Available Here.
[162] Secureframe (2024) AI in Cybersecurity: How it's used + 3 latest developments. Available Here.
[163] ISA Global Cybersecurity Alliance (2023) The Danger of Overreliance on Automation in Cybersecurity. Available Here.

advanced technical nature of these roles there is a concentrated demand for mid-level cybersecurity analysts and advanced level cybersecurity managers and engineers.[164] Similarly, given the rise of AI within the industry, it is unsurprising that 28% of managers cite AI/ML as a key skill for security professionals looking to advance their careers via new jobs and promotions.

Figure 17: Perceived risk of automation across seniority levels for cybersecurity roles



The growing global and German demand for cybersecurity professionals presents a promising market for Kenyan cybersecurity professionals, however, is one that is likely to be difficult to break into. Mirroring global trends, demand for cybersecurity professionals in Germany is rising rapidly. The German Cybersecurity market is currently sized at €11bn with a CAGR of 11%.[165] The German cybersecurity workforce gap is estimated at 105K with organisations looking for work-ready and intermediate-level talent.[166] Specific challenges, however, need to be navigated. Firstly, concerns around data privacy and security are particularly prevalent as outsourcing cybersecurity functions involves the risk of exposing sensitive data to third-party service providers.

Kenya's small but growing cybersecurity workforce must grow to fill rising demand, creating a significant future opportunity for new employment. As mentioned previously, there are only ~4,000 cybersecurity professionals in Kenya compared to the demand for between 40 and 50,000 cybersecurity specialists in Kenya.[167] In a survey on the African cybersecurity ecosystem, 1 out of 4 respondents felt that sourcing talent was a major problem.[168] That being said, as shown in figure 19, 68% of Kenyan cybersecurity professionals are currently employed in senior and intermediate positions which aligns with the global demand for more advanced technical expertise.

[164] Cyber Seek (2024) Cyber Security Career Pathways. Available Here.

[165] Cybersecurity market size and CAGR is sourced from Morder Intelligence. Cybersecurity workforce size gap is sourced from ISC2 Cybersecurity Workforce Study 2023.

[166] Cyber Seek (2024) Cyber Security Career Pathways. Available Here.

[167] Genesis Survey (Figures downloaded 17/10/2024); M. Kaibiru et al. (2023) Closing the Cybersecurity Skill Gap in Kenya: Curriculum Interventions in Higher Education. Available Here.

[168] KPMG (2022) Africa Cyber Security Outlook. Available Here.

Figure 18: Percentage of employers which indicate skills lacking across cybersecurity competencies

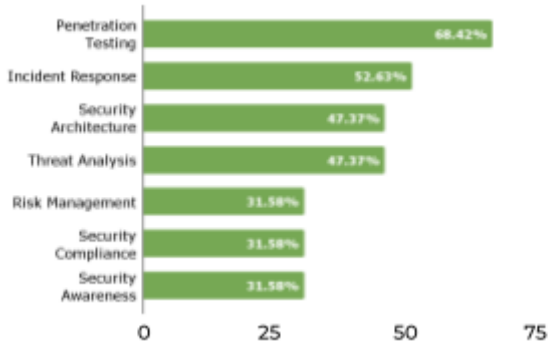
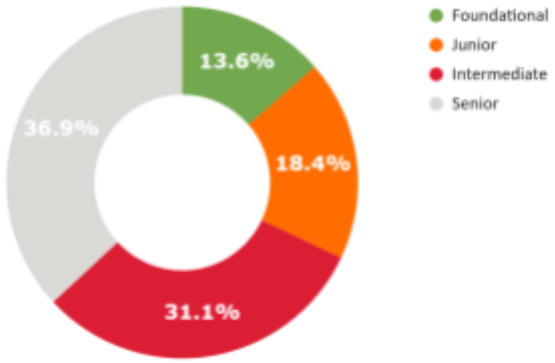


Figure 19: Proportion of cybersecurity professionals employed across seniority levels

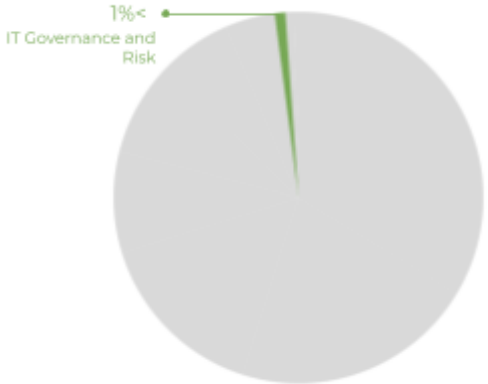


AI Governance & Ethics

Role	Est. Num.	Growth potential	Automation exposure	Global demand	Kenyan talent readiness
AI Governance	Limited	**Growth expected** Off a low base	Limited Exposure	Some in-person preference	Insufficient supply

The AI governance and ethics field is rapidly evolving, comprising a range of roles designed to address the complex challenges of managing artificial intelligence responsibly. The field includes positions such as policy and compliance specialists, AI safety experts, auditors and evaluators as well as ethical and legal advisors.[169] AI governance professionals are responsible for shaping an organisation's strategy and approach toward ethical, transparent, and responsible use of AI. Key responsibilities include the creation of comprehensive governance frameworks, ensuring compliance with regulatory requirements, and aligning with best practices in AI ethics. Professionals are likely to work closely with technical, legal, and operational teams across the public and private sector to ensure AI technologies are deployed responsibly, minimising risk while maximising innovation.[170] In Kenya, there are currently a limited number of AI governance and ethics professionals, as figure 20 highlights, there are less than 1% of ICT professionals working in the IT governance and ethics field more broadly.[171]

Figure 20: Proportion of IT Governance and Risk within Total IT Sector Employment

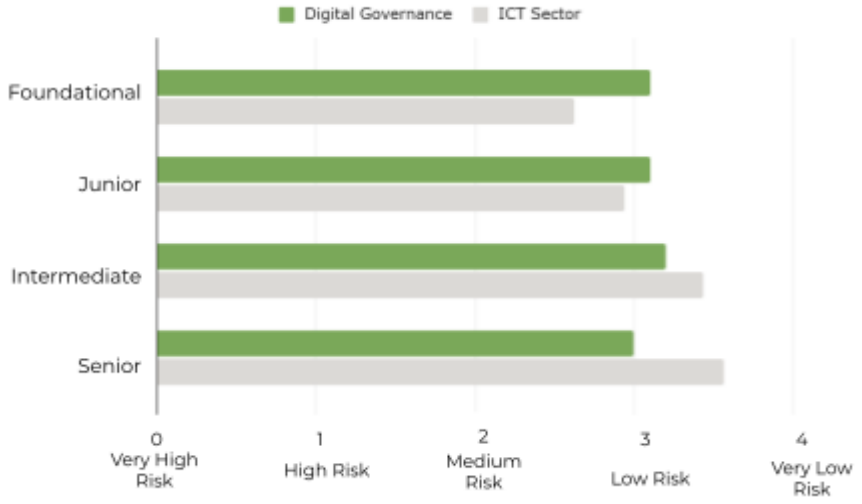


[169] IBM (2024) What is AI Governance? Available Here.
[170] EY (2024) AI Governance and Risk Consulting. Available Here.
[171] Genesis Survey (Figures downloaded 17/10/2024).

The demand for AI Governance professionals globally and in Kenya is only going to grow with the proliferation of AI. The global AI governance market size was projected at USD 172.6 million in 2023 and is anticipated to cross USD 3.5 billion by 2032. [172] Regulatory pressure is also increasing demand for AI governance and ethics specialists. The EU AI act, for example, is one of the first comprehensive legal frameworks on AI and as more businesses look to comply with global best practice the demand for AI governance and ethics professionals will grow. These trends will be mirrored in Africa, especially as more businesses start adopting AI. Currently only 27% of African CEOs report organisation-wide implementation of GenAI, this is expected to increase as 51% of CEOs anticipate that GenAI will enhance the quality of their companies and services over the next year.[173] In addition to these benefits of AI, 48% of surveyed African CEOs agree that AI may increase legal liabilities and reputational risk. As a result, AI governance and ethics professionals will be needed to ensure companies have established clear policy and procedures to mitigate potential legal risks and comply with international standards.[174]

AI governance and ethics roles are being created to oversee and manage AI systems and are therefore unlikely to be automated. The fundamental nature of AI governance and ethics requires human judgement, values, and contextual understanding that current AI systems lack. The EU AI act specifically emphasises a human-centric approach to the deployment of AI systems, which means that these jobs are unlikely to be automated, as reflected in figure 21.[175]

Figure 21: Perceived automation risk across seniority levels for IT governance and risk roles



The growing German demand for AI governance professionals presents a clear employment opportunity but one that might be difficult for Kenyan professionals to break into. AI governance often requires direct interaction with local regulators, policymakers, and stakeholders, as well as in-depth knowledge with national and regional regulation.[176] Therefore, the sensitive nature of AI data and the dependencies in governance roles to establish close ties to national and regional regulations mean that these roles are less likely to be outsourced.

Currently, there are only a limited number of Kenyan AI governance and ethics professionals which will need to grow to meet expected demand. With less than 1% of ICT professionals in Kenya working in IT governance and risk more broadly, there is an insufficient supply of professionals to meet the

[172] Fundamental Business Insights (2024). AI Governance Market Share and Size. Available Here.
[173] PWC (2023) African Business Agenda: Tech-enabled business transformation. Available Here.
[174] Ibid.
[175] EU AI Act (2024) Key issues: Human Oversight. Available Here.
[176] Data & Society (2024) Policy Brief: AI Governance Needs Socio Technical Expertise. Available Here.

expected demand. [177] There are also clear skill gaps, with 60% and 30% of surveyed employers citing core skills such as developing governance frameworks and risk assessment as skills which are lacking. Given the interdisciplinary nature between data governance, cybersecurity governance and AI governance, talent in these roles could be leveraged and upskilled to meet AI governance and ethics role requirements. Several institutions specialise in Internet Governance training, such as the Kenya School of Internet Governance, which has thus far educated over 420 individuals in areas related to public policy and decision-making. [178] When it comes to corporate governance or risk assessment, a variety of online short courses are available, provided by entities like Skills for Africa, offering both online and in-person learning opportunities.[179]

Data centre technicians

Role	Est. Num.	Growth potential	Automation exposure	Global demand	Kenyan talent readiness
Data Centre technicians	Limited	**Growth expected** Off a low base	Augmentation expected and some exposure	In-person preference	Insufficient supply

Data Center Technicians manage and maintain the hardware infrastructure in data centres. Professionals are responsible for setting up and configuring servers, troubleshooting technical issues, conducting inspections, and handling hardware upgrades. Ultimately, data centre technicians play a vital role in ensuring the efficient and secure operation of the critical systems that store and manage digital information. Roles typically require the completion of secondary school, an apprenticeship or vocational equivalent and basic knowledge of computer hardware and components plus experience supporting IT equipment or related technology.[180] The industry offers opportunities for career progression and once professionals gain experience they can advance from entry level roles such as data centre technicians to more advanced positions such as data centre engineer, data centre manager or data centre architect.[181]

The global demand for data centre technicians is increasing due to the expanding reliance on digital infrastructure driven by cloud services, big data, online services, and the Internet of Things (IoT). The amount of data being generated worldwide is increasing at an unprecedented rate. In 2024 alone, the world is expected to generate 1.5 times the amount of digital data it did just two years ago.[182] The rise in data production demands the development of data centres across the world. As international and African companies look to establish data centres in Africa to reduce latency for African users and comply with data sovereignty requirements, the demand for local data centre technicians is also set to rise. In collaboration with Microsoft and other stakeholders, G42, a leading AI company, is leading the arrangement of an initial investment of USD $1 billion for various data and compute infrastructure across the African continent.[183] One of the Kenyan investment priorities is a state-of-the-art green data centre that will be built by G42 and its partners to run Microsoft Azure in a new East Africa Cloud Region.[184] These investments will trigger the demand for data centre technicians and engineers as well as professionals with knowledge of innovative power solutions, such as battery storage and solar energy to support the data centre's renewable energy supply.

Data centres technicians will be required to monitor and work closely with AI and IoT tools as AI is increasingly adopted in data centres. Many of the operational processes in traditional enterprise data

[177] Genesis Survey (Figures downloaded 17/10/2024).
[178] The Kenya School of Internet Governance.
[179] Skills for Africa Training Institute.
[180] PRS (2024) Data Centres. Available Here.
[181] IBM (2023) Infrastructure and technology roles. Available Here.
[182] KKR Insights (2024) Data Centers: The Hubs of Digital infrastructure. Available Here.
[183] Inspired PLC (2021) Is Africa the new hotspot for data centres. Available Here.
[184] Ibid.

centres like server upgrades, scheduling, monitoring and maintenance are repetitive and error prone. [185] To address these issues, AI, IoT technologies can be used to facilitate efficiency, reduce human error and improve productivity.[186] Despite many operators planning or already using these technologies, trust on AI for use in data centre operations has declined for a third year in a row, in 2022 24% of respondents indicated that they wouldn't trust an AI model to make operational decisions in a data centre whereas in 2024 this has increased to 58%.[187] Therefore, while AI tools are likely to be adopted in data centres, data centre technician roles will be augmented to ensure the efficiency and quality of AI systems. Looking forward, data centre technician roles will require a solid understanding of AI and ML principles and more advanced networking skills.

Employment opportunities for Kenyan data centre technicians are more likely to be locally based, however, opportunities could be facilitated by both global and African firms. Due to the hands-on nature of managing physical infrastructure and monitoring equipment and systems, data centre technician roles are more likely to be in-person.[188] While there might be opportunities to apply for data centre technician positions in Germany and other European markets, visa restrictions may be a challenge for Kenyan talent.[189] Germany and Kenya's recent cooperation to drive labour exchange aims to ease visa requirements for skilled and semi-skilled Kenyan workers and might make German-based opportunities more accessible.[190]

While there is a limited number of Kenyan data centre technicians, there is a strong and large talent pool with transferable skills that can be leveraged to meet growing demand. There are currently 15 data centres in Kenya which are employing local data centre technicians. [191] That being said, this is a relatively small number compared to other more advanced data markets such as South Africa which leads the continent with 41 and Germany which houses nearly 350 data centres.[192] As set out above, core skills for data centre technicians require basic knowledge of computer hardware and components plus experience supporting IT equipment or related technology.[193] These skills are similar to those required by IT operations and junior network and architecture professionals, which are currently the two largest subsectors in the Kenyan ICT market. Similarly, for more advanced data centre roles such as data centre engineers, managers and architects, there are over 20,000 registered Kenyan engineers of which only 5% are in employment. With this in mind, these professionals could be up or reskilled to meet growing demand.[194]

3.3 Stable Giants

IT operations & support

Role	Est. Num.	Growth potential	Automation exposure	Global demand	Kenyan talent readiness
IT operations & support	108 000	**Some growth** expected	Augmentation expected	Good opportunity	Steady Supply

IT operations and support is the largest sub-sector of IT professionals in Kenya, with over 100 000 individuals employed in this area. The roles within this sector are varied, encompassing general IT operations, which involve daily monitoring and management of IT services and infrastructure, as well as

[185] EY (2024) How AI and automation make data centres greener and more sustainable. Available Here.
[186] Uptime Intelligence (2024) Uptime Institute Global Data Center Survey 2024. Available Here.
[187] Ibid.
[188] Microsoft (2024) Microsoft jobs at a glance: Data Centre Technician. Available Here.
[189] Sifted (2023) Germany desperately needs tech-savvy migrants - but visa rules haven't caught up. Available Here.
[190] BBC (2024) Germany to welcome Kenyans in labour deal. Available Here.
[191] Data Centre Map (2024) Data Centres Dashboard. Available Here.
[192] Ibid.
[193] Microsoft (2024) Microsoft jobs at a glance: Data Centre Technician. Available Here.
[194] The Star (2022) EBK to overhaul engineering curriculum to match market demands. Available Here.

specialised positions such as network and system administrators who oversee system installation and maintenance.[195] Additional roles include security management, service desk support, and IT procurement.[196] Professionals in IT operations and support must possess a broad skill set, including a thorough understanding of hardware and software systems, problem-solving capabilities, technical proficiency, and communication skills. Specific expertise with tools such as Windows Server and Oracle is often required, along with specialised knowledge in areas like cloud computing. As illustrated in Figure 22, 32.7% of ICT professionals in Kenya are employed in this sector, which is the largest employment field in ICT. In terms of gender breakdown, figure 23 shows that 73.3% of IT operations and support roles are filled by men, which is similar to the sector average. [197]

Figure 22: Proportion of IT operations and Support within Total IT Sector Employment

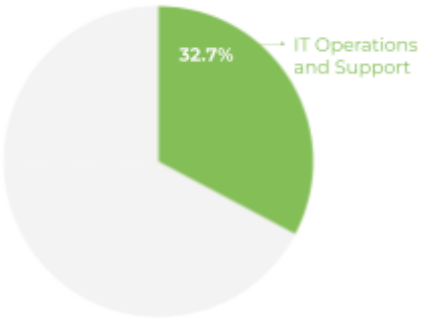
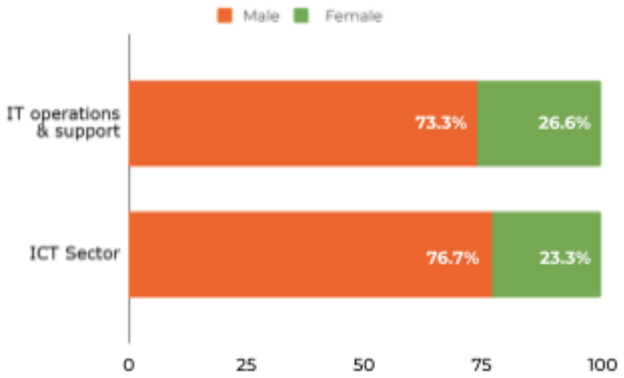


Figure 23: Comparative Gender Breakdown between IT operations and support and IT sector

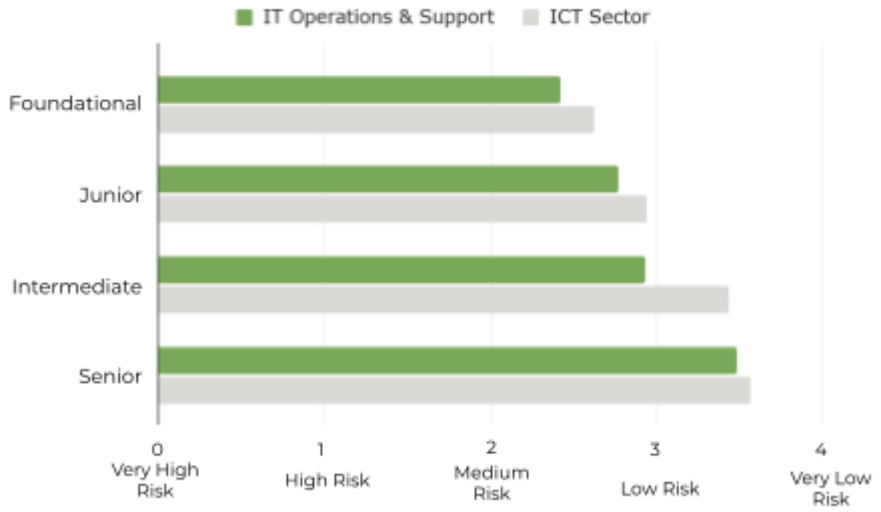


Global demand for IT professionals will continue to grow as organisations increasingly rely on digital technology throughout business processes. The global spending on IT operations and support services is expected to reach $445 billion by 2025, driven by factors such as digital transformation, cloud adoption, and the growing complexity of IT environments.[198] The number of computer support specialists jobs is, therefore, projected to grow by 6% from now to 2033.[199] By 2030, 50-55% of jobs in Kenya will rely on digital skills and as more businesses digitise processes and incorporate emerging technologies there will be greater demand for IT operational expertise.[200]

Key tasks performed by IT operations and support personnel are likely to become more complex over time as AI automates routine tasks. First-line IT support tasks like information provision and ticket routing are routine and can be resolved by information-first models or AI chatbots. [201] Apps such as ZenDesk, for example, are widely adopted for automated IT ticket routing and IT helpdesk chatbots. The automation of such routine tasks is likely to reduce the need for entry-level IT support roles as highlighted in figure 24 which shows moderate risk of automation for foundational roles. With this in mind, there are shifting skills requirements for IT operations professionals with increased demand for professionals with more advanced technical skills and the ability to work alongside AI and cloud computing systems.

[195] IBM (2023) What is IT operations (ITops)? Available Here.
[196] Ibid.
[197] Genesis Survey (Figures downloaded 17/10/2024).
[198] Gatner (2024) Gartner Forecasts Worldwide IT Spending to Grow 6.8% in 2024**.** Available Here.
[199] U.S. Bureau of Labour Statistics (2024) Occupational Outlook Handbook. Available Here.
[200] ECDPM (2023) The Achilles' heel of Kenya's growing digital economy. Available Here.
[201] CueDesk (2024) The Future of Customer Service: How Ai agents are changing the way we connect. Available Here.

Figure 24: Perceived risk of automation across seniority levels for IT operations and support roles



Germany offers a growing market for Kenyan IT operations and support professionals, especially for remote and outsourced opportunities as hybrid settings have become the norm. The current German IT operations and support services is sized at USD 49bn with a 5% CAGR and an estimated 78k workforce gap[202]. As employers accommodate hybrid work arrangements, remote IT support is essential and opens opportunities for outsourcing. Remote support allows technicians to manage files on the user's computer, update software, or run hardware diagnostics completely remotely. Global competition within the sector, however, is intense with India winning 60% of the world's leading companies IT outsourcing contracts.[203] Kenyan BPO companies are already winning IT operations and support outsourcing work, for example Outsource Kenya and TechnoBrain are both offering IT helpdesk services.[204]

While there are clear employment opportunities within IT operations and support, current Kenyan professionals may require upskilling or reskilling to meet the demand for advanced ICT roles. A significant portion, 66.8%, of IT operations and support professionals are working at junior and foundational levels, compared to 33.2% at intermediate and senior level positions.[205] As automation threatens front-line roles, there will be a growing need for in-depth technical knowledge and experience in IT systems and networks. Given the lower proportion of professionals at senior and intermediate levels, there could be skill gaps to meet advanced and technical IT operations and tasks. Additionally, this is reflected in the statistic that 34.5% of employers report skill gaps in advanced roles working with smart components, which typically utilise IoT technology.[206]

[202] Bitkom (2022)
[203] FDM (2024) The pros, cons and alternatives to outsourcing IT in India. Available Here.
[204] Techno Brain, Outsource Kenya.
[205] Genesis Survey (Figures downloaded 17/10/2024).
[206] Moringa School & MercyCorp (2019) The Development of IT Skills and Jobs in Kenya and Uganda. Available Here.

Figure 25: Percentage of employers which indicate skills lacking across IT Operations and Support

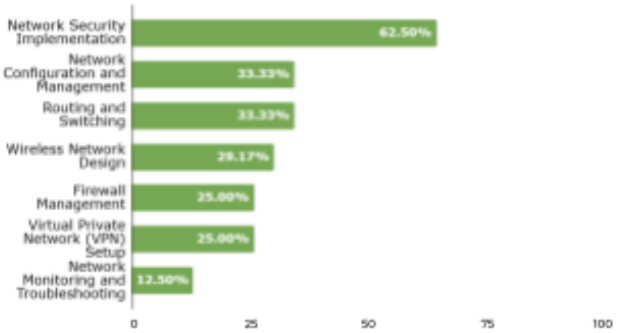
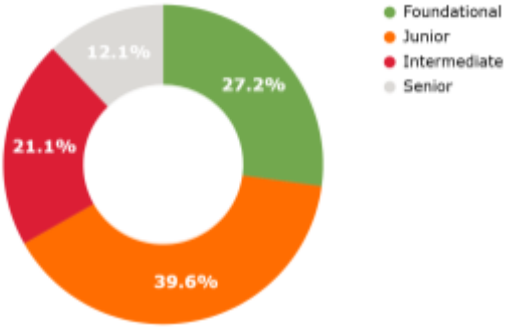


Figure 26: Proportion of IT operations and support professionals employed across seniority levels



Network & engineering

Role	Est. Num.	Growth potential	Automation exposure	Global demand	Kenyan talent readiness
Network & engineering	81 000	**Some growth** expected	Augmentation expected	In-person preference	Steady supply with gaps

The ~80 000 Kenyan IT professionals in network and architecture play a crucial role in designing, implementing, and maintaining the digital infrastructure that organisations rely on. Network architects create, set up, and manage intricate computer networks for businesses. While there are some crossovers with IT operations, Network architects are typically more specialised with 4x the number of network and architecture professionals having bachelor degrees compared to IT operations professionals. Key roles within the field include Cloud Network Architect, Data Center Network Architect and Enterprise Network Architect.[207] Professionals are likely to have advanced problem solving and design skills which are balanced with a technical understanding of computer operations and systems, network protocols and technologies as well as hardware and software expertise. Despite higher qualifications, Network and Architecture employs the second largest proportion of IT professionals in Kenya. Notably, it remains male dominated profession relative to other roles in the ICT sector.

Figure 26: Proportion of Network and Architecture within Total IT Sector Employment

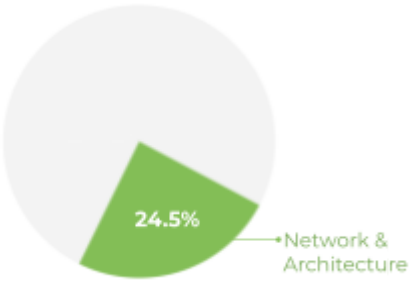
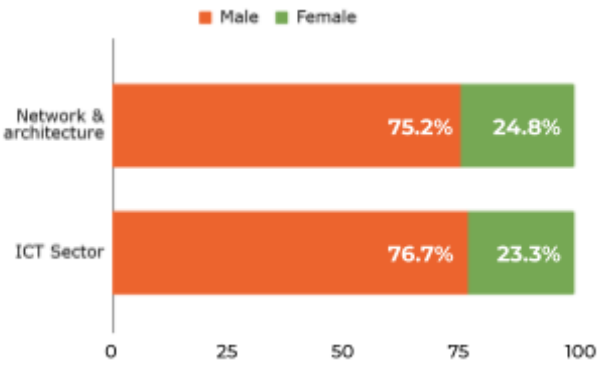


Figure 27: Comparative Gender Breakdown between Network and Architecture and total IT sector

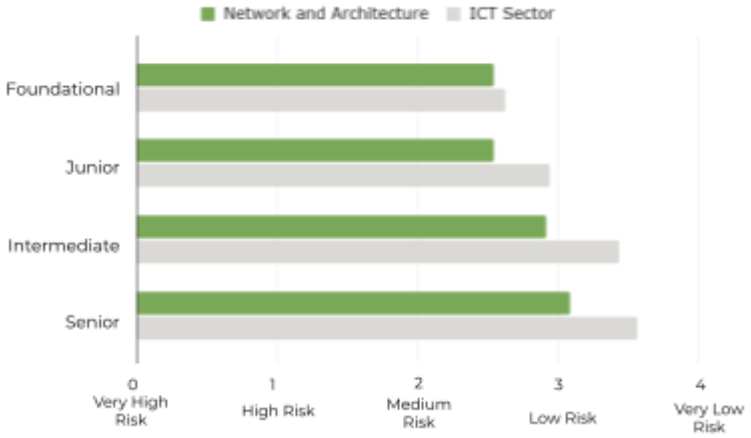


[207] IBM (2024) What is Systems Network Architecture (SNA)? Available Here.

Global demand is increasing for network architects given the proliferation of AI and cloud in business operations. The growth rate for network and enterprise roles is estimated at 13% compared to 6% for IT operations and support roles.[208] This growth in demand is driven by the implementation of AI and cloud infrastructure with Network architects needed to design infrastructures that can seamlessly integrate and manage multiple cloud environments.[209] These trends in demand will be mirrored in the Kenyan market with 38% of African executives having already adopted AI in parts of their business and 32% adopting cloud.[210]

Network architect roles will be resilient to automation, with professionals required to manage and work with AI systems. AI tools can support Network Architecture specialists through monitoring, detecting and responding to security issues as they emerge in real-time.[211] Rather than replace network professionals, AI and ML will enable IT teams to accurately identify issues, trends, anomalies, and root causes.[212] As AI automates more basic tasks, Network Architects will need to have advanced skills in cloud services and AI tools as well as strong knowledge in cloud security protocols to protect data across environments.

Figure 28: Perceived automation risk across seniority levels for network and architecture roles



While there is a growing and significant demand for networking and architecture expertise in Germany the extent to which such roles may be outsourced will need to be assessed. Europe's enterprise network infrastructure market is expected to reach USD 4.3 billion by 2029 with a CAGR of 3.82%.[213] [214] Surveyed Kenyan employers signal the significance of network security skills and the need to address prevalent skill gaps with 100% of employers perceiving network security implementation skills as lacking. Given rises in cybersecurity threats, network security gaps will need to be addressed to correlate with evolving demands in network and architecture roles.[215]

[208] U.S. Bureau of Labour Statistics (2024) Occupational Outlook Handbook. Available Here.
[209] Cisco Learning Network (2023) The Future of Network Engineering in the AI Era. Available Here.
[210] PWC (2023) African Business Agenda: Tech-enabled business transformation. Available Here.
[211] CISCO (204) What is Artificial Intelligence in Networking? Available Here.
[212] Ibid.
[213] Mordor Intelligence (2023) Germany Data Center and networking Market Size: Trends and forecast (2024-2030). Available Here.
[214] PWC (2023) African Business Agenda: Tech-enabled business transformation. Available Here.
[215] Serianu (2023) Kenyan CyberSecurity Report 2023. Available Here.

Figure 29: Percentage of employers which indicate skills lacking across Network and Architecture competencies

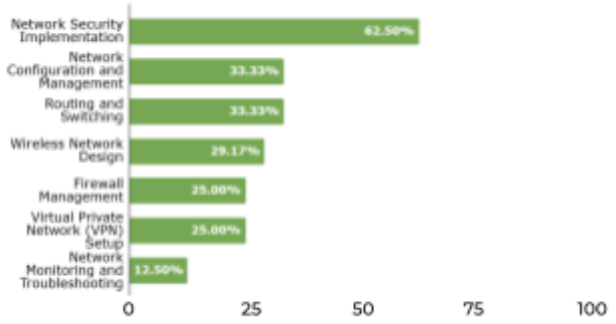
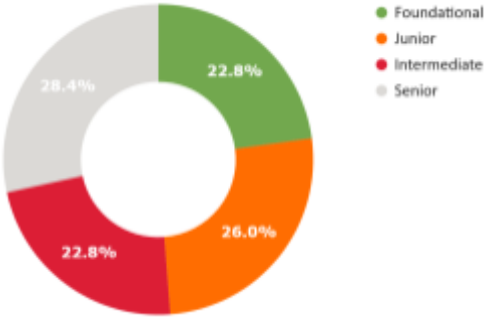


Figure 30: Proportion of Network and Architecture professionals employed across seniority levels



Other emerging IT roles

We focused on roles with high employment potential...

It is important to note that our role by role analysis is not exhaustive and focuses on roles and sub-sectors which have high potential for scaling employment. We drew on employment frameworks such as the SFIA and DDaT which spotlight opportunities for promoting employment for youth, women and vulnerable groups.[216] These frameworks also focus on bridging the gap between skill development and job market demands.

...but there are a number of other existing ICT employment opportunities...

The following opportunities provide examples of other existing roles within the ICT sector. At this stage, however, these roles do not offer opportunities for employment at scale and were therefore not included in our in-depth analysis.

1. 3D printing technician	Operates 3D printers as well as designing and prototyping new products and processes. With manufacturing evolving to accommodate more customisable and local production, this role is critical for innovation and product development in sectors ranging from healthcare to automotive industries. The current limitation in widespread adoption of 3D printing in Kenya's industrial sector means job growth is gradual and concentrated within specific niche markets.
2. Robotics Engineer	Expert engineers which specialise in designing and programming robots to carry out tasks in areas such as manufacturing, agriculture, and service industries. In Kenya, the demand for experts to create robots for tasks in manufacturing, agriculture, and services is emerging, however, the substantial capital investment for robotics infrastructure may initially limit job creation at scale.

[216] SFIA and DDaT are both framework for understanding the core roles available to and skills required by professionals who design, develop, implement, manage and protect the data and technology that power the digital world.

3. Archivist & Digital Cartographer	As cultural and historical preservation shifts into the digital realm, archivists are needed to digitise historical records and cultural artefacts. Digital cartographers complement this process by collecting geographical data to design and produce detailed maps and charts, supporting sectors such as urban planning, environmental conservation, and tourism. While there are an increasing number of funded initiatives to digitise cultural artefacts the demand is limited to experts within the field.
4. Computer Games Developer & Tester	Game developers create immersive digital experiences, while testers ensure a seamless and bug-free user experience. These roles offer a creative opportunity which draws on design, content creation, and the technical skills to translate visual design into C0DE. While Kenya's gaming industry shows potential, it is still nascent and faces challenges in scaling to a level that can generate employment widely across the country.
5. Data and Product Manager	A data delivery manager oversees the provision of data to end-users, ensuring accuracy and accessibility. Product managers guide the development of tech products from conception to launch, usually managing a team of developers and combining technical knowledge with business acumen. The specialised nature of these roles requires a higher level of expertise and experience, which may constrain the immediate scale of job openings until a broader base of qualified professionals develops.
6. E-learning Developer	With the surge in online education, e-learning developers design educational platforms and digital courses. Their work enables remote learning and training, which is especially relevant in the ongoing global shift towards digital education. These roles require expertise in both digitisation and pedagogy meaning that these roles tend to be highly specialised.
7. Web Content Editor	Web content editors play a vital role in creating and managing digital content. This could form part of marketing, brand, or individual content creation. Content editors will also be responsible for ensuring information or visual content is engaging, accurate and optimised for search engines.

...as well as emerging ICT roles based around advanced technologies.

The following roles provide examples of domains where emerging technology may create new roles in the medium to long run future. These domains highlight the limitation of point-in-time skilling studies and showcase the need for continuous forecasting and agility in educational and workforce development programs to anticipate and better prepare for these future trends.

1. Biotech and Healthcare	The use of bioinformatics allows for the processing of large amounts of genomic data, leading to better understanding of diseases and personalised medicine approaches. As the biotech sector evolves, roles such as clinical data analysts and bioinformatic scientists will be crucial to oversee the integration of these technologies into existing healthcare systems. The Kenya Medical Research Institute (KEMRI) is already conducting research in genomics and bioinformatics, creating potential opportunities in this field.
2. Sustainability and Green Technology	There is a growing movement towards smart energy networks. Technology in this domain helps track resource use, optimise grid management and renewable energy production. With high potential for renewable energy production, African countries present some of the best opportunities to experiment with smart grid technologies. The EU research and innovation project ENERGICA is already investigating these opportunities in pilots across

	Kenya, Madagascar and Sierra Leone. This potential could open up opportunities for data scientists, software engineers and other technical roles with expertise in climate and energy management.
3. AI philosophy and ethics	As AI becomes more pervasive in society, questions regarding its ethical use and impact on philosophy are gaining prominence. The discussion around AI ethics involves ensuring that AI systems are developed and deployed in a manner that is fair, transparent, and accountable. With the rise of AI applications in diverse sectors such as finance, healthcare, and agriculture, there is a need for professionals who can navigate the ethical landscape surrounding AI technologies. This includes roles for ethicists specialising in AI, policy advisors to regulate AI use, and educators to raise awareness about the ethical implications of AI.
4. Robots, Self Driving Vehicles and Drones	Robotics, autonomous vehicles, and drones are becoming integral parts of various industries for automation, delivery, and monitoring purposes. In agriculture, drones can survey land and deliver precise agricultural interventions. There is potential for job creation in the manufacturing, maintenance, and operation of these technologies, as well as in software development for their systems.

4 | Strategic interventions

Kenya's ICT sector is undergoing significant change, with global trends like AI, digitalisation and the rise of remote work shifting the quantity and composition of digital roles. In the best case, Kenya can take advantage of this moment of change to generate new employment for its base of young digital talent, making a dent in its youth unemployment challenge. In the worst case, these trends will increase barriers to entry for young people - particularly those in marginalised groups - and existing work will be automated and/or competed away over time.

It is critical that these changes are skillfully navigated and steered toward the former. Achieving this aspiration requires simultaneously addressing four key challenges, as outlined in Section 2:

1. A lack of intentional, well-coordinated efforts backed by comprehensive, accessible and timely labour market information
2. Regulatory, cultural and capability barriers that constrain ICT skill export at scale
3. Misalignment between Kenya's digital skills pipeline and future demand
4. Sectoral norms that favour urban men alongside continued experiences of undignified work

Interventions that directly address each challenge are outlined in the figure below, and detailed in the remainder of this section.

Intervention 1: Equip strong ICT sector champions with robust labour market insights

Intervention 1.1: Capacitate an apex ICT sector coordinating body

Challenge

While there are numerous ICT sector initiatives in Kenya aimed at digital skill development, policy creation, demand generation, and industry regulation, they often operate in silos with little synergy. Fragmentation in the sector is a missed opportunity for collective action on shared challenges and opportunities. As a consequence, skilling programs may not align with industry needs, demand generation efforts might not capitalise on the sector's full potential, and policy advocacy may not effectively address gaps in the sector's regulatory environment.

Countries that have enjoyed massive growth in their ICT sectors, such as India, Egypt, and Rwanda, have all been driven by strong and centralised coordinating entities.[217] In Kenya, there are multiple relevant coordinating bodies across government, industry and skilling, including ICTA, ICTAK, BPOAK, TESPOK, ACPK, FINTAK, KEPSA, TVETA, and the JobTech Alliance, but no dedicated team to facilitate dialogue and leverage their combined strengths, as outlined in Section 2.3. Each of these entities typically perform some but not all of the required functions (as set out below).

Intervention

Drawing inspiration from models such as NASSCOM in India or ITIDA in Egypt, Kenya is poised to capacitate an ICT sector coordinating intermediary, to grow coordination amongst key stakeholders with an ICT labour contribution or focus. Alternatively, a coordinating team may be established in an existing stakeholder entity to perform the following key functions:

Industry Representation and Policy Advocacy: Serve as the united voice for the ICT sector, representing its interests in policy discussions and regulatory reforms. Engage with government stakeholders to ensure that policies bolster industry growth and competitiveness.

Demand Generation and Market Linkages: Spearhead strategies to promote Kenya as an outsourcing hub, coordinating with international and local businesses to map and stimulate demand for Kenyan ICT services.

Skilling and Capacity Building: Align skilling initiatives with market demands by facilitating a dialogue between training providers and industry. Ensure that skill development programs are responsive to evolving industry requirements.

Standards and Certification: Work towards the adoption of industry-wide standards and certifications that enhance service quality and compliance with international best practices.

Coordination and Synergy: Act as the central hub for information sharing and coordination among different initiatives and stakeholders, from government to private sector to educational institutions.

[217] Rai (2022) Over and Rise and Development of IT Industry in India. Available here.

Timeline

- **Immediate (0-6 months):** Convene discussions among stakeholders to plan the formation, structure, and governance of the ICT Sector Coordinating Body and secure initial funding commitments.
- **Short-term (6-12 months)**: Formalise the establishment of the body, define its strategic priorities, and commence key activities such as policy advocacy, demand generation, and alignment of skilling programs.
- **Medium-term (12-24 months):** Ensure the body is functioning effectively, with clear successes in sector coordination, policy influence, market linkage strategies, and feedback loops from industry to training providers.

Intervention 1.2: Enhance the KLMIS and other labour market data using an interoperable, infrastructural approach

Challenge

Across sectors, stakeholders have cited concerns with the availability of real-time, granular labour market information about ICT professionals that is reliable, relevant and accessible as outlined in Section 2.1. In particular, real-time and relevant data is needed in three key spheres: (1) the existing landscape of ICT professionals, (2) future demand for ICT professionals and (3) future supply of ICT professionals.

The data deficiency is a challenge for policymakers for policy interventions who have traditionally relied on resource intensive point-in-time studies to map out the landscape of ICT professionals. In addition, because of the rapid evolution of this sector, these point-in-time diagnostic studies rapidly outdated, as shown in Section 3. In addition to policymakers, this data would be valuable for a range of additional audiences, including but not limited to individuals planning careers, businesses looking to hire, skilling institutions planning curriculum changes and intakes, and more.

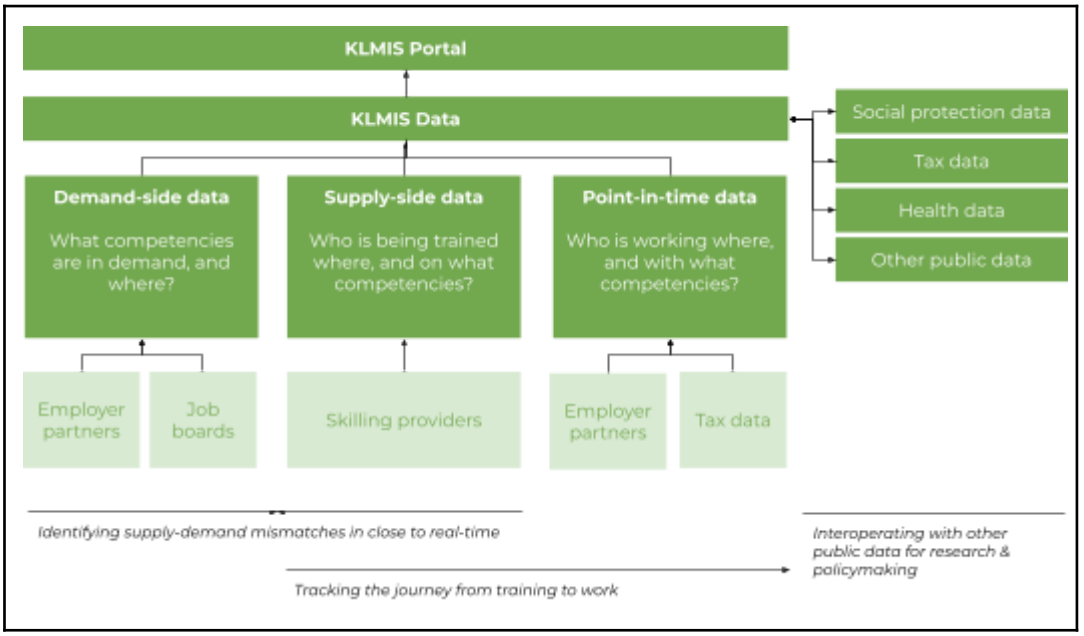
Efforts to mitigate the labour market data gaps have begun with the development of the Kenya Labour Market Information System (KLMIS). However, the portal does not currently have accessible data on the front-end, and is not presently interoperable with other relevant national information systems (for example, social protection databases).

Intervention

Enhance the KLMIS to deliver close-to-real-time data supply-side, demand-side and point-in-time data to multiple user groups. There is already a working concept for an enhanced KLMIS in place, from 2017.[218] This concept should be updated for 2024's security and IT standards, and consider the high-level architecture as outlined in the figure below. Importantly, alignment is needed with ongoing work around government data to ensure the use of common standards for down-the-line interoperability. [219]

Figure 31: Stylised view of an enhanced KLMIS

[218] Genesis Analytics interviews.
[219] This includes a Kenyan interoperability framework under development through collaboration by GIZ, Estdev and Cybernetica, and existing interoperability frameworks like the Kenya Health Information System.



This intervention may be funded by development partners and donors with relevant programmatic interests. The primary government partners would be MoICT-DE, ICTA and MoLSP. An implementation consortium would be required working with technical IT experts, and consulting with international efforts on collaborative labour market information systems, such as the CollectiveX initiative in South Africa. This initiative could include working with job boards like BrighterMonday and LinkedIn for real-time data integration via APIs.

This data would be leveraged by the sector coordinating body to inform a data-driven approach to their activities.

Timeline

- **Immediate (0-6 months):** Establish a project team and secure donor commitments. Finalise and update the KLMIS concept, and develop a detailed project blueprint, including the high-level architectural framework.
- **Short-term (6-12 months):** Begin technical development with a focus on system security and data interoperability. Initiate partnerships with job boards and networking platforms for data integration.
- **Medium-term (12-24 months)**: Implement and test interoperability features with other data systems. Start rolling out KLMIS enhancements with stakeholders for initial feedback and refinement.
- **Long-term (24-36 months):** Complete full-scale implementation across all user groups. Establish ongoing monitoring and updates to the system to accommodate changes in technology and labour market conditions. Ensure that the KLMIS is fully integrated with other national databases and that the system's insights are being actively utilised by stakeholders to inform decision-making.

Intervention 2: Land demand in Kenya that creates inclusive employment at scale

Intervention 2.1: Develop and showcase a shared value proposition for Kenya's IT Outsourcing sector

Challenge

The challenge for Kenya in establishing itself as a desirable IT Outsourcing destination is profound, not only due to misconceptions of Africa but also due to the intense global competition in the ICT sector, as set out in Section 2.3. Other developing nations such as India, the Philippines, Israel and South Africa to an extent, have developed or are developing targeted strategies for advantage in the sector and attracting international interest. Priority is given to active government support, clearly articulated value propositions, and aggressive marketing of ICT capabilities.

Kenyan firms would benefit from shared value propositions in the ICT sector that is a cohesive appraisal of the ICT sector. This value proposition should be available to industry and other stakeholders, including government officials, for consistent communication of the ICT sector's strengths in Kenya.

As a result, Kenya's intrinsic competitive advantages remain underleveraged and is a missed opportunity for growing the sector and its corresponding employment potential. The competitiveness of the sector makes it imperative for Kenya not only to establish clarity on its unique strengths but also to communicate them with vigour and precision in order to differentiate itself and capture a rightful share of the global IT Outsourcing market.

Intervention

To effectively compete on the international stage and overcome the challenges of perception and competition, a multi-faceted intervention strategy is essential. This strategy should establish Kenya's IT Outsourcing sector as a high-quality, competitive, and attractive option for global businesses.

Firstly, enlist a specialised consulting firm with proven expertise in crafting and promoting value propositions for emerging markets. This firm will be responsible for identifying niche areas where Kenyan firms can more easily win out and then to create a compelling narrative that highlights Kenya's unique benefits in IT Outsourcing, such as its cost-quality advantages, robust pool of English-speaking professionals, increasingly sophisticated technical capabilities, and impact sourcing opportunities. This proposition should be informed by the roles with significant opportunity for outsourcing as outlined in Section 3.

The value proposition should then be owned by a prominent and well-equipped champion for it to be properly driven and disseminated. Endorsement from the Federation of African Industry Associations can aid the credibility of the proposition.

Secondly, the BPOAK and, arguably more importantly, government should be trained to effectively market the Kenyan ICT sector leveraging the value proposition. Attaches should be provided with the tools and resources, including updated data, case studies, and testimonials that underline the successes and capabilities of the Kenyan market. International platforms and friends of the sector, like GBS.World, GIZ

and international operators should also be attuned to marketing Kenya's unique offer on a global stage.

Thirdly, BPOAK, potentially in partnership with GBS.World, should look to establish robust feedback loops, anchored in data and market feedback to refine and update the value proposition. This should be structured to accommodate the evolving nature of the sector, ensuring that the messaging aligns with the latest trends, innovations, and needs of potential international clients.

Fourthly, a centralised body should be equipped and promoted as the central liaison and gateway for international investment. Rwanda's Investment Board has proved highly effective in creating a more investor-friendly environment by removing the confusion and cumbersome processes typically associated with dealing with multiple government departments and regulators. Replicating this within the Kenyan context should be considered as a powerful lever for streamlining increased investment in the sector.

Finally, the sector should look to raise its international profile by investing in outbound international marketing activities in key source markets and organising inward investor missions, conferences and awards. Outbound marketing could include sponsoring exhibition booths for BPOAK or Kenyan operators at global events or attendance at buyer and investor roundtables in the UAE (e.g. Gitex) the US (e.g. CxOutsourcers, SSON Outsourcing Week and Customer Contact Week), the UK (e.g. UK Call & Contact Centre Expo) and Europe (e.g. European Contact Centre & Customer Service Awards (ECCCSAs)).

As with intervention 2.2 and 2.3, to draw in political will and support with high-level coordination, this should be included in the work plan of the Kenya-Germany digital dialogue.[220]

Timeline

- **Immediate (0-3 months):** Engage with stakeholders, to secure commitment and funding. Begin the selection process for a suitable consulting firm to craft the value proposition.
- **Short-term (3-6 months):** Commission the consulting firm to develop the value proposition. Start developing training modules for attaches and sector representatives.
- **Medium-term (6-12 months):** Roll out the training for economic attaches and begin the campaign to communicate Kenya's IT Outsourcing value proposition internationally using platforms such as GBS.World.
- **Ongoing over the long term:** Establish regular intervals (e.g., bi-annually) for the review and refresh of the value proposition, incorporating new data and success narratives to keep the messaging current and compelling. Invest in international marketing efforts include outbound marketing and inward investor missions.

[220] Digital Dialogues, 2024.

Intervention 2.2: Conduct review to ensure data regulation adequacy for international ICT outsourcing

Challenge

In the global marketplace, where data protection and cybersecurity are paramount, international ICT outsourcing is heavily influenced by the robustness of a country's data regulations. Companies are increasingly scrutinising the adequacy of data policies of their outsourcing destinations — they need assurances that these align with stringent standards such as the General Data Protection Regulation (GDPR) in the EU. The adequacy of Kenya's data policy and cybersecurity measures is proposed for review, to address concerns set out in Section 2.3.

There is a need for clarity on whether Kenya's frameworks are compliant with or equivalent to international standards such as the GDPR. Without this assurance, Kenya risks being overlooked as a preferred ICT outsourcing destination despite attractiveness otherwise.

Intervention

To address this, a comprehensive review of Kenya's data protection and cybersecurity regulations must be undertaken. This review may consult frameworks such as the GDPR as a comprehensive benchmark as well as model frameworks, data strategies, policies regulations from other critical markets such as the UK and key US states to assess gaps in Kenya's legal frameworks.

Leveraging the established Kenya-Germany digital dialogue can help to draw in political will to advance Kenya's approaches to data policy and cybersecurity. The process should actively seek to integrate any emerging regulatory enhancements into the broader national data strategy, in formulation. Ensuring that Kenya's data protection and cybersecurity laws and data policy is in harmony with international standards pertinent to the ICT outsourcing sub-sector will serve as a key component of Kenya's value proposition. Engagement with ICTA, MoICT-DE and the Office of the Data Protection Commissioner ensures that the review and any resultant policy recommendations have a clear pathway to legislative and executive acceptance and implementation.

With Germany as a key focal market, collaborating with experts and organisations like JobTech Alliance and MercyCorps - who are underway with reviewing regulatory barriers to export - would be important to understand and incorporate the necessary aspects of German data protection standards.

As with intervention 2.1 and 2.3, to draw in political will and support with high-level coordination, this should be included in the work plan of the Kenya-Germany digital dialogue.[221]

Timeline

- **Short-term (0-9 months):** Conduct a thorough review of current Kenyan data policies in reference to GDPR, UK, and US state regulations.
- **Medium-term (9-18 months):** Develop recommendations and a roadmap for aligning Kenya's data protection and cybersecurity regulations with international standards. Begin implementing recommended policy enhancements and integrating these into the national data strategy.
- **Long-term (18-24 months):** Monitor the implementation of the new data policies and measure their effectiveness. Update the value proposition for

[221] Digital Dialogues, 2024.

Kenya's ICT outsourcing sector to reflect these strengthened data protection measures.

Intervention 2.3: Scale local operator capacity & matchmaking programmes

Challenge

Limited operator capacity remains a challenge, as outlined in Section 2.3. Local operators often lack internationally recognised certifications such as ISO9000 for cybersecurity, which are crucial for building trust with potential international clients. Furthermore, there are differing views among existing capacity building and trade facilitation entities about which Kenyan employers are ready to scale up and meet the demanding requirements of global markets.

Intervention

To bridge this gap, a two-pronged approach is necessary:

Capacity Building and Certification:

- Establish a Technical Assistance Facility specifically designed to upgrade the capacity of local BPO and ITO operators to service the global market. This facility would provide tailored support to address the unique constraints faced by domestic operators in becoming competitive internationally.
- Offer funding through the Technical Assistance Facility to select BPOs and ITOs that demonstrate potential for scaling. An independent consulting firm would conduct a diagnostic assessment of the operators' current capacities and identify gaps that hinder competitiveness. This should leverage and support ongoing capacity building such as those underway at the German Import Promotion Desk.
- Implement targeted assistance for achieving compliance with global certification standards, such as ISO 9000 and ISO 27000, or SOC2 certifications. Certified trainers could guide domestic BPOs through the certification process, enhancing their international marketability.

Market Linkages and Strategy Development:

- Collaborate with international entities like Stepstone, Bitkom, and the Import Promotion Desk to identify demand and requirements of international buyers, operators and German employers and facilitate connections with Kenyan operators.
- Leveraging the national value proposition, develop tailored go-to-market strategies for domestic operators, focusing on strategic selling points such as commitments to diversity, equity, inclusion (DEI), and environmental, social, and governance (ESG) principles.
- Train operators in developing and implementing these strategies, including social media marketing, positioning them as strategic partners for global demand sources.

As with intervention 2.1 and 2.2, to draw in political will and support with high-level coordination, this should be included in the work plan of the Kenya-Germany digital dialogue.[222]

[222] Digital Dialogues, 2024.

Timeline

- **Short-term (0-9 months):** Set up the Technical Assistance Facility and begin diagnostic assessments on selected local operators for capacity building.
- **Medium-term (0-18 months):** Roll out certification processes and develop go-to-market strategies for operators. Begin matchmaking with international demand through platforms such as IPD and GBS.World.
- **Long-term (18-24 months):** Monitor progress and effectiveness of capacity building and matchmaking programs. Continue to refine and adapt strategies to ensure sustainable growth in operator capacity and international market linkages.

Intervention 3: Align skilling efforts with market needs and scale-up work-ready talent

Intervention 3.1: Advance a common national digital skills framework and updated curricula

Challenge

To address the fragmentation and inconsistency of digital skills training in Kenya, a unified national digital skills framework is essential. This framework aims to standardise the language for skilling providers, allowing for comparability across programs and enabling employers to assess the quality and relevance of training with ease. The framework further serves to set benchmarks that align with international standards, providing a clear structure for domestic institutions to produce globally competitive talent.

Alongside the framework, curricula updates are necessary within tertiary institutions to ensure alignment with current and future industry needs. The curricula for ICT training across Kenyan tertiary institutions does not consistently align with the skills that are used in the current workforce, or what will be required in future, as outlined in Section 2.1. The degree of misalignment varies. Employers note that some institutions - including Strathmore University, Jomo Kenyatta University and University of Nairobi - typically provide more work-ready ICT graduates than other institutions. However, these are pockets of excellence rather than indications of widespread curriculum success. This intervention targets both widespread curriculum success and specific skill gaps at individual institutions.

Moreover, updating curricula is an onerous, time-intensive process involving multiple layers of authorisation. This onerous process can incentivise a lack of curriculum changes and/or short-term "work-arounds", such as the delivery of short courses added on to formal modules.

Intervention

A concept for a national digital skills framework has already been developed and approved by the ICT Authority. This framework should be confirmed for completeness and timeliness, relative to international best practice whilst tailored to the Kenyan context.[223] Approval is then needed from the Permanent Secretaries,

[223] A report outlining the benefits of adopting a national digital skills framework (DSF-ONE) in South Africa is available here. The report is written by industry association BPESA.

followed by national approval by Cabinet. Alignment between ICTA, TVETA, national qualification agencies, the Ministry of Education and the Ministry of Labour & Social Protection is crucial.

Following approval of the framework, a fast-track curriculum update process should be initiated by universities, skilling institutes and even secondary schools. Prioritisation of curricula updates can be determined by two criteria: (1) extent to which the institute's course(s) teach competencies that will rapidly evolve due to the pace of technological innovation and (2) extent to which the competencies or skills are in high industry demand.

The fast track procedure should include a public-private review board, to ensure industry participation alongside public interest. An option is for an expert at the Commission for University Education to steer this process. Key stakeholders should include the ICT Authority and the Ministry of Education alongside industry bodies and industry representation by, for instance, KEPSA, FKE or Safaricom.

Technical assistance should be made available for institutes needing to update their curricula. This could be carried out on an institution-by-institution curriculum gap assessment, such as one undertaken by the World Bank in 2019. [224]

Timeline

- **Short-term (0-9 months):** Confirm and endorse the national digital skills framework at various government levels. Begin institution-by-institution assessment of curricula.
- **Medium-term (9-18 months):** Roll out the endorsement of the framework with a broad campaign. Implement the curriculum updates, and introduce work-bridging programs.
- **Long-term (18-24 months):** Establish and operationalise a fast-track process for updating curricula. Review and iterate on the curriculum updates and the framework's effectiveness in meeting market demands.

Intervention 3.2: Scale demand-driven skilling programmes & pathways through targeted co-funding and capacity building

Challenge

As outlined in Section 2.1, in general, Kenyan ICT skilling should be more attentive to sector demands. Demand-driven skilling programmes ensure that candidates acquire skills and knowledge that directly align with employer needs, and can allow industry to gain a competitive advantage by accessing a scalable pipeline of talent with relevant skills and specialisations. Fostering closer connections between industry demand and skilling is all the more critical in the age of AI, as demands for talent shift rapidly and in dynamic ways, as outlined in Section 2.2. In Kenya, examples of demand-driven skilling programmes include Generation, CareerBox, Moringa, Tana and ALX.

Closing the skills gap in Kenya's ICT sector not only involves aligning training with market demands but also ensuring equitable access to these opportunities for underrepresented groups, such as women, people with disabilities, and refugees.

[224] World Bank, 2019. Labor market analysis and curriculum gap assessment using big data in Kenya. Available here.

Current skilling programs inadvertently perpetuate existing disparities by not actively addressing the unique barriers faced by these populations. For one, developing, delivering and partaking in these programmes is expensive. Curriculum development and delivery requires a high-touch approach between skiller and employer, with significant time and development costs. These programmes can also be unaffordable for candidates, in terms of programme fees as well as transport, food, data and device costs. Online or hybrid courses are constrained by data costs and poor quality of internet connection in rural areas.

Intervention

Provide outcomes-based subsidies to Kenyan demand-driven skilling initiatives that demonstrate successful demand-driven training. Success may be demonstrated by an increase in percentage of placements made, an increase in absolute placements made, an increase in placements made among particular marginalised populations, or a combination. These KPIs should be determined on a case-by-case basis. The specific roles to be focused on are outlined in Section 3.

This intervention should follow a co-funded approach across donor, industry and government funding.[225] Donor funding could come through GIZ, MasterCard Foundation or other entities, industry funding through significant absorbers of IT talent like Safaricom or Airtel, and government contributions through the ICT Authority, the Ministry of ICT and Digital Economy and/or the Ministry of Labour and Social Protection. Appropriate training providers could be identified through a call for applications and/or a more targeted approach based on providers mentioned in this study and other landscaping exercises: see Section 2.1 for a view of demand-driven skilling institutions active in Kenya.

Timeline

- **Immediate (0-3 months):** Conduct a needs assessment to identify specific barriers and opportunities for targeted groups. Engage skilling institutes and define commitments for inclusive skilling initiatives.
- **Short-term (3-6 months):** Launch a call for applications and select skilling initiatives for expansion. Establish funding mechanisms and partnerships.
- **Medium-term (9-12 months):** Begin deployment of targeted funds to incentivize the scaling of successful skilling programs and establish clear, measurable KPIs for program efficacy.
- **Long-term (12-24 months):** Evaluate the impact of the scaled skilling initiatives and refine programs based on success metrics and industry feedback.

[225] This co-funded model draws inspiration from, inter alia, the skilling component of a three-way partnership between the Rwanda Development Board (RDB), Harambee and GIZ, with funding from the Mastercard Foundation and GIZ, was established to attract global BPO operators to set up delivery operations in Rwanda through a combination of bespoke incentives and skilling subsidies.

Intervention 4: Ensure opportunities are accessible, inclusive and dignified for all

Intervention 4.1: Develop a sector labour charter

Challenge

Kenya's ICT sector is burgeoning but grapples with labour issues that could impede its expansion and detract from its international standing, as outlined in Section 2.3. The potential for unethical labour practices, such as substandard working conditions, inadequate compensation, and the presence of harmful content, are not only harmful to workers but also compromise industry integrity and deter potential investments. Addressing these labour issues promptly is critical to ensure that the sector's growth offers accessible, inclusive, and dignified opportunities for everyone involved.

Intervention

To address these challenges, it is proposed that a multi-stakeholder initiative be launched to co-create a Kenyan ICT Sector Labour Charter. This charter will serve as a voluntary set of principles and standards to which companies can commit, ensuring that the growth of the sector is both equitable and ethical.

The charter development should be a collaborative effort, involving key players such as:

- The Kenya Private Sector Alliance (KEPSA): To drive engagement and support from the broader private sector.
- The Federation of Kenya Employers (FKE) and Business Processing Outsourcing Association of Kenya (BPOAK): To represent the interests and realities of employers within the sector.
- Organised labour groups in Kenya: To ensure that the perspectives and needs of the workforce are accurately represented and advocated for.
- The Information and Communication Technology Authority (ICTA), Kenyan Investment Authority, and Ministry of Labour and Social Protection (MoLSP): To align the charter with national policies and regulations, ensuring governmental endorsement and support.

Involving a reputable third-party organisation in the facilitation and drafting, such as the Fair Work Foundation, will aid in ensuring that the charter is comprehensive and holds companies to objective international standards.

Timeline

- **Immediate (0-3 months):** Start stakeholder discussions, form a principal working group, and engage Fair Work Foundation or other facilitators.
- **Short-term (3-6 months):** Hold stakeholder consultations and draft the charter with collective contributions.
- **Medium-term (6-12 months):** Finalise and endorse the charter, set up compliance mechanisms that encourage adherence while facilitating sector growth.
- **Long-term (12-24 months):** Implement the charter, encourage widespread commitment, and analyse adherence impacts. Regularly review and update the charter to reflect industry changes and maintain relevance.

Intervention 4.2: Strategically improve internet connectivity & hardware access

Challenge

One of Kenya's most significant barriers to maximising its ICT potential is the persisting digital divide, as set out in Section 2.1. High costs of devices and inadequate internet access, particularly in rural areas, are substantial obstacles. Slow internet speeds compound these issues, leading to exclusion of underserved populations and escalating the cost of conducting business. This digital divide not only prevents individuals from participating in the ICT-driven economy but also impedes the ICT sector's expansion by limiting the market and talent pool.

Intervention

Firstly, the government should negotiate with hardware providers to secure discounted rates for bulk purchases. These devices can be distributed through various programs targeting students, entrepreneurs, and ICT professionals, especially in underserved regions.

Secondly, to ensure the relevance and sustainability of ICT infrastructure development, it is crucial to advance the construction of rural ICT hubs based on a demand-driven model. This approach would involve:

- Detailed consultations with community members and businesses at a county level to identify specific needs and preferences.
- Aligning these developments with existing national digital strategies to ensure coherence and maximise resource utilisation.
- Mitigating the risk of creating underused facilities ("white elephants") by grounding projects in actual demand and usage projections.

Exploration and expansion of innovative financing models, such as the interest-free loan programs currently piloted by Shortlist[226], can facilitate greater access to necessary hardware and services for those who might not afford them. Such financial models could be coupled with digital literacy programs to ensure that the beneficiaries have the skills required to make the most of the technology provided.

Timeline

- **Short-term (0-9 months):** Open negotiations with hardware suppliers and conduct a preliminary assessment of regional needs for internet connectivity and device access. Deliver a feasibility study on the scaling of ICT hubs.
- **Medium-term (9-18 months):** Finalise agreements for procuring hardware and begin piloting interest-free loan programmes for targeted beneficiaries.
- **Long-term (12-24 months):** Scale the establishment of demand-driven ICT hubs, with ongoing refinement based on stakeholder feedback. Evaluate the impact of the interventions on closing the digital divide. Look to scale up successful models based on demand and cost-effectiveness.

[226] Shortlist, 2024.

Annex

1. Quantification of ICT jobs

There is limited nationally representative and timely data that outlines the number of ICT jobs in Kenya and delineates the number of professionals by job family, gender, location, age and other relevant categories. Some collections are informative but not complete. For instance, the Kenyan National Bureau of Statistics collects a continuous household survey that collects information on occupations. However, the most recent data reported is for 2021 and the delineation of occupations does not provide granular, organised detail on different ICT job families according to a particular job framework. In particular, the relevant IT job categories outlined in this survey are “Computing Professionals”, “Information Clerks” and “Electronics and Telecommunications”. The Kenya Labour Market Information System also intends to provide reliable, up to date information on the landscape of working professionals, but data was inaccessible on the portal at the time of writing.

Aside from official statistics, various previous studies provide an indication of the level of employment in Kenya. In 2019, MercyCorps and Moringa School estimated that by 2022, the IT sector would employ 95 000 people. In 2020, the International Trade Administration estimated that the sector employed 250 000 people. By 2025, WEF noted the potential for BPO jobs (including IT outsourcing) to create over 500 000 jobs in the IT sector in Kenya. On a role-by-role basis, there are also mixed results. In 2017, WEF found 7000 people working in BPO (including IT outsourcing). A 2021 Africa Developer Report from Google estimated a total of around 58 000 software developers in the country.

In this study, we took the following approach to estimating the figures. We received the estimated proportion of ICT professionals per job family among our survey respondents. These proportions are indexed against the estimated 58 000 software developers in Kenya from Google’s Africa Developer Report; the most recently completed report from a reliable source. For example, software developers comprised 16.8% of ICT professionals in our sample and data science & analytics comprised 7.7%. Under the assumption that 16.8% reflects 58 000 people (software developers), 7.7% would reflect ±26 000 people (data scientists & analysts). When this is complete, we triangulate upward or downward based on reliable industry reports, where available. For example, we correct the cybersecurity estimation to approximately 4000 professionals, reflecting figures from Kaibiru et al (2023) scaled upward to the current year. Rounded to the nearest thousand, this approach results in 330 000 ICT professionals.

As a robustness check, we then triangulate the bottom-up role-by-role approach outlined above with a top-down approach. More particularly, we take the estimation of 250 000 ICT professionals in 2022, as outlined by the International Trade Association, and scale it up to 2024 using the sector CAGR of 10.8%, also estimated by the ITA. This approach results in a figure of 307 000 professionals, well within a 10% error margin of the bottom-up figure. These figures are best estimates underpinned by a variety of sources, and they are not derived from a truly nationally representative survey sample, which was out of the scope of this assignment.

2. Stakeholder participation

Organisation	Name(s)	Bilateral Consultations	Kenya-Germany Connections Workshop	Impact of AI Roundtable	Validation Workshop
Brighter Monday	Sylvia Mbaabu	✔			
Shortlist	Austin Stranahan	✔		✔	

KEPSA	Ehud Gachugu	✔	✔	✔	✔
Stepstone	Lizelle Pretorius	✔	✔		
JCSE-IITPSA	Adrian Schofield	✔			
Import Promotion Desk	Thomas Wilde	✔	✔		✔
	Stefan Schütze Tobar		✔		✔
Tana	Ava Zhang	✔	✔		✔
Propel	Sunkanmi Ola	✔	✔		
	Seun Owolabi		✔	✔	✔
	Yassine Jalal		✔	✔	✔
Generation	Corrine Ngurukie	✔		✔	✔
Next Step Foundation	Chris Harrison	✔		✔	
Moringa School	Audrey Cheng	✔			
	Nikki Germany	✔			
Africa Digital Media Institute (ADMI)	Lucy Gitau	✔			
Gebeya	Menna Taffesse Garedew	✔			
Liquid Telecoms	Oswald Jumira	✔			
Cloudfactory	Craig Somers	✔			
	Simon Davies	✔			
Sama	Ken Njunge	✔			
	Annepeace Alwala	✔			
Standard Chartered	Sanelisiwe Baloyi	✔			
Stanbic Bank	Sylvia Kamene	✔			
Techno Brain	Manoj Shanker	✔			
	Agnes Itote				✔
Banda Health	Wesley Brown	✔			
ICTA	Stanley Kamanguya	✔			
	Dir Zilpher Owiti		✔	✔	✔
	Kelvin Njeru		✔	✔	✔
	Patrick Kwanya		✔	✔	✔
	Emmanuel Amurugat		✔	✔	✔

	Norman Ndeleko		✔	✔	✔
	Lynette Ringeera		✔	✔	✔
	Jeremiah Wakamu		✔	✔	✔
	Charles Lomonyang		✔	✔	✔
	Gwen Waswa		✔	✔	✔
	Joseph Wangila		✔	✔	✔
	John Muigai		✔	✔	✔
	Florence Olweny		✔	✔	✔
	Norman Ndeleko		✔	✔	✔
Carnegie Mellon	Patrick McSharry			✔	
Jobtech Alliance	Chris Maclay		✔	✔	
Adanian Labs	Kenneth Agina			✔	
Teleperformance	Sven Decauter		✔		
Mercy Corps	Chris Maclay		✔	✔	
Independent Consultant	Max Schulz		✔		
Adept Technologies	Mercy Mugure		✔		
FCDO	Charles Juma		✔		
CareerBox	Kevin Michaels		✔		
	Lizelle Strydom		✔		

3. Channels of connecting Kenyan talent to global demand

Mode of employment	Description
Remote direct employment	Remote employment presents an increasingly attractive option for ICT professionals, signifying a shift in the traditional employment model. It refers to a job where tasks are completed remotely, often for an organisation located internationally. In Africa, enterprises are revising their hiring criteria to accommodate remote workers who may not reside near the physical workplace.[227] This trend is made feasible by the growing adoption of technology, which makes remote work more accessible. As technology continues to advance, the norms around ways of working are evolving, with a greater emphasis on flexibility and location independence. Despite the attractiveness of remote employment, there can be challenges that hinder its widespread adoption. Identifying, onboarding, supporting, and

[227] Kenya Digital Masterpan. 2022-2032

	paying international remote workers present significant impediments to the scalability of remote work. Employers may face search costs and difficulties in finding the right candidates, further complicated by cultural and linguistic barriers. There are also concerns regarding data security and the risk of alienating those without digital access. Moreover, perceptions of Kenyan talent are often outdated, affecting employment opportunities. Furthermore, there are discrepancies in skill expectations across different countries. These barriers notwithstanding, remote work continues to offer potential for expanding global opportunities, improving individuals' earnings and quality of life, and enabling organisations to access a diverse pool of talent while reducing costs.
Freelancing & gig work	Freelancing includes part-time, independent work with multiple clients, delivered remotely and often connected through a platform. It allows for a flexible approach to employment, where global employers can tap into a pool of talent without the enduring commitments that come with a full-time hire. Particularly within the IT sphere, where work can be delivered from anywhere, freelancers thrive as independent agents, often working remotely on a project-to-project basis. This flexibility can allow for autonomy to select which projects a freelancer would choose to venture into. Freelancing offers opportunities to build connections between a dispersed talent pool and a diverse array of global work opportunities. In the pursuit of flexible engagements and diverse project work, freelancers can encounter various obstacles that can impede the full realisation of the freelance economy's promise. New entrants to the freelance market may face preconceived notions about the quality of their work or find themselves at odds with the existing skills demanded by the field. While freelancing offers companies the benefit of hiring skill-specific talent on-demand, versus permanent staffing, the difficulty can be limitations on structured support for freelancers and incentives that traditional employment paths tend to provide.
Outsourcing work	Outsourcing entails employment in a third-party service provider handling outsourced tasks, where the tasks are typically delivered for international organisations. As outsourcing gains momentum, companies are increasingly turning to third party service providers who source staff for the company's specific needs. The outsourcing model extends beyond the convenience of cost savings for organisations. For young professionals, outsourcing could signify avenues to global exposure and career development. Nevertheless, the trajectory toward widespread adoption of outsourcing is not without its challenges. Perceptions about the competency of outsourced talent to meet specialised skill requirements, the scarcity of incentives from governments and corporations and costs of IT infrastructure all act as gatekeepers to industry expansion or penetration. Additionally, there is a need to stimulate demand within companies for outsourcing services, which remains a substantial hurdle. As the industry continues to evolve, addressing these challenges will be crucial to harnessing the potential of outsourcing for global marketplaces to organisations and individuals alike.