



QUBIT HUB

Made in Africa: An African Perspective to the Design, Deployment and Governance of AI

Proposing an African AI governance model focusing on Data Sets, Digital Infrastructure, Talent, and AI Markets as an alternative to premature regulation in the nascent African AI ecosystem.



Introduction

2023 saw a rise in artificial intelligence (AI) regulation. The European Union passed the [AI Act](#) in what has now come to be known as the Brussels effect¹. The USA passed an [executive order on AI](#). China also instituted a number of regulations governing different aspects of AI², such as the [‘draft Measures for Generative Artificial Intelligence Services’](#). These regulatory stances come against a backdrop of numerous concerns regarding AI technology development, such as, transparency, privacy, safety and security, inclusivity, accountability and consumer protection.

Africa and the rest of the global majority did not feature actively in these conversations, unsurprisingly so, given the early stage of AI adoption in these regions³. Nonetheless, the recent trend in regulation among AI powerhouses, has prompted heated conversation about AI regulation in Africa, and left burning questions in its wake. Does AI in Africa need regulation? If yes, what type of regulation? If yes, at what point in the development trajectory is regulation appropriate?

These questions, though important, do not factor in ecosystem heterogeneities and the history of technology advancement. A functioning ecosystem is a prerequisite for the effectiveness of AI regulation. The recent regulatory stances advanced by AI powerhouses are timely, given the level of AI embeddedness and the existence of a functional ecosystem. However, the same cannot be said for AI in Africa. The technology is still nascent and its transformative power is yet to be extensively exploited. By virtue of its nascency, the ecosystem needed to effect regulatory measures is almost non-existent in most African countries. Regarding technology advancement, regulation

¹ run.ai, November 27, 2023: [The Brussels Effect of AI Regulations: How They Impact Your AI Infrastructure](#).

² Nikkei Asia, October 31, 2023: [Biden signs executive order in race with China and EU to govern AI](#).

³ Beverly Alice Townsend, National Library of Medicine, Front Pharmacol, August 24, 2023: [Mapping the regulatory landscape of AI in healthcare in Africa](#)



has often played catch-up to disruptive technologies, given that before their deployment they could not have been anticipated.

Hence, it could be argued that regulatory efforts are premature, given the current state of the AI ecosystem in Africa and the history of disruptive technologies. Regarding the current state of the ecosystem, little is known about it in general, or those of its components in particular. Hence, a holistic understanding of the current state of the ecosystem is crucial in not only guiding the regulation debate but also in setting the AI development agenda. Further, tapping into precedent, with respect to indigenous disruptive technologies, will prove useful in guiding the regulation discourse on timing.

The overall objective of this paper, therefore, is to map the current state of the AI ecosystem in Africa, through its components. The study employs a framework, christened the ‘four horsemen of AI’, to outline the crucial components of the AI ecosystem and to assess the current state of development in each of them. This study will be useful to decision makers in two ways. First, it will provide a current understanding of the state of AI in Africa, thereby contributing to constructive discourse regarding AI regulation. Second, it will serve as a precursor to the development of the continent’s AI regulation readiness framework.

Technology Preceding Regulation – The Case of M-PESA

Technology, regardless of typology, when adopted at scale, has the power to deliver broad-based growth. Numerous factors contribute to widespread adoption, including- albeit what may be considered paradoxical - the absence of regulation. A case in point is the legendary [Safaricom M-PESA](#). Started in 2007, M-PESA is a mobile banking service that allows users to store and transfer money via their mobile phones. M-PESA was introduced in Kenya as an alternative way for the country’s population to access financial services. Rising from obscurity to worldwide recognition, the technology transformed not only the Kenyan financial landscape but also catalysed a formidable



continental and global mobile money economy. In terms of numbers, M-PESA currently (2023) has about [56.7 Million customers](#)⁴. Globally, mobile money transactions, as of 2022, were estimated at USD 1.2 Trillion, of which USD 800 Billion was transacted in sub-Saharan Africa. The corresponding volume transacted in sub-saharan Africa was equivalent to 40% of Africa’s nominal GDP, estimated at USD 3.1 Trillion⁵. One of the main reasons cited for the app’s quick and early success was the fact that regulation had to play ‘catch-up’. For a long time the app was regulated by existing mandates, however, its unprecedented growth eventually necessitated bespoke regulation.

AI adoption, if well executed, can lead to a success story similar to that of digital mobile payments. For example, African startups are already adopting this emerging, disruptive technology to contextualise the continent’s demands in the age of AI. The innovative concepts and skill sets of these startups are apparent; however, resource limitations curtail their growth. Given such constraints, efforts towards addressing bottlenecks within the operational ecosystem are imperative in spurring the growth of the sector. The realisation of impacts at scale, stemming from the growth of AI technology, can then set the scene for context-specific regulation, as exemplified by the M-PESA trajectory.

The Four Horsemen – A proposed framework for assessing the state of the African AI ecosystem

Conceptualising the AI Ecosystem

The effectiveness of AI hinges on the existence of an ecosystem, a fact that is often overlooked in African AI and governance discourses. In most cases, the narrative of AI

⁴ Statista, August 31, 2023: [Number of M-Pesa customers from 2017 to 2023](#).

⁵ McKinsey & Company, September 7, 2022: [The future of payments in Africa](#)

governance in Africa tends to focus on the application and use layer, and in recent cases, the labour practices and talent layer, with little attention paid to the ecosystem, or lack of it. We examine the current state of AI in Africa, through the lens of an AI operational system framework; the ‘Four Horsemen of AI’. The framework draws on biblical apocalyptic figures, in the hope that a visual effect of what is needed can be elicited.

Briefly, the ‘Four Horsemen’ components are defined as follows (**Fig 1**):

- **Data Sets and Data Systems:** At the foundation of any AI model is data - this is what enables AI systems to perform as they should.
- **Digital infrastructure:** Data centres, connectivity and chip manufacturing - AI runs on hardware.
- **Talent:** Job creation and productivity - people are the ones who build AI systems as well as the ones who leverage on its productivity enhancing capabilities.
- **AI Markets:** Awareness, use cases, start ups and commercial viability - citizens are the consumers of AI products.

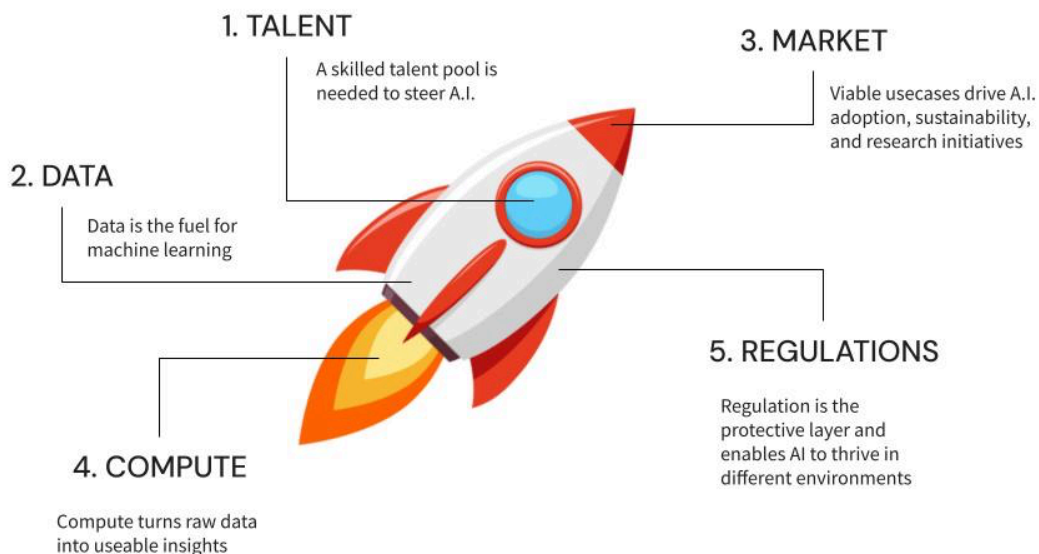


Fig. 1: The Four Horsemen framework



The Four Horsemen Framework

Data Sets and Data Systems

There is a cliché that data is the new oil, and going by this expression, the new deposit yet to be tapped into, is African data. [Africa's population](#) is estimated to be about 1.4 billion⁶, which represents about 17% of the world population.

From a data market perspective, Africa presents perhaps the last untapped market, whose opportunity for growth is curtailed by limited online data sets.

Data set limitations have several implications in use case scenarios, such as AI powered systems being inept at distinguishing people of colour. These controversies are not limited to facial recognition systems. For example, there was an uproar when an AI imaging system could not generate an image of a [black doctor](#) treating a white child, and another that wrongfully identified a heavily pregnant black woman as a criminal. These limitations not only result in biased AI systems, but also hinder the development of bespoke AI products for the African market, given that AI systems perform best when trained on data that is representative of the target user.

That said, [limited data set availability](#) is gradually becoming a surmountable challenge. The recent years have seen the rise of homegrown African companies and initiatives working towards creating and annotating African data, and converting it into a machine-readable format to train AI systems. Initiatives centred around African Natural Language Processing (NLP) - such as collecting data on African indigenous languages and expressions, and converting them into a machine-readable format- provide a case in point. These initiatives, in turn, have enabled the creation of products in indigenous African languages, as well as the preservation of some. Some of the notable NLP

⁶ Worldometer, [Population of Africa](#).



initiatives in this regard are [Masakhane](#)⁷ out of South Africa and the [Kenya Language Corpus \(Kencorpus\)](#)⁸ in Kenya.

There are numerous advantages to Africans spearheading this work, such as the opportunity to shape the narrative around data collection as well as the ability to determine its utilisation in the creation of AI products.

As more effort is put towards the collection of indigenous African data, there needs to be careful thinking around how this data is collected, handled and stored, so as to safeguard its authenticity. Not all data is equal. To illustrate that not all data is equal, consider the case of African language data. In Africa, words, phrases and items derive meaning from both history and context. Data sets, therefore, do not exist in isolation but rather coexist in an ecosystem alongside many other factors, the details of which can be lost when a Western approach to data collection, and processing, is adopted.

This ecosystem of factors is what we are terming as ‘data systems’. To reiterate, AI systems are only as good as the data used to train them. While homegrown initiatives with respect to data set creation are laudable, much more remains to be done. Public sector involvement, for example through the crafting of supportive legislation, can significantly ease data set limitations. Regarding data quality, efforts towards minimizing data corruption and maintaining context ought to be prioritised. Such efforts necessitate a coordinated approach in everything; from how the data is collected, sliced and labelled, to how it is stored.

⁷ <https://www.masakhane.io/>

⁸ <https://kencorpus.maseno.ac.ke/#>



Digital infrastructure: Data Centres, Connectivity and Chip Manufacturing

Data centres

Computing is the power that transforms data sets into useful insights. It is an integral component in the training, running and finetuning of AI models. As AI powered technologies become embedded in everyday life, the demand for computing resources will not let up anytime soon. For example, Microsoft is reportedly [planning to spend USD 50 billion a year on data centres](#)⁹ to meet growing demand for AI applications. In comparison, the annual spend of [mega physical-build projects](#)¹⁰ such as nationwide rail networks, roads, or even space programs, do not come close. In Africa, [the data centre market by investment is expected to reach USD 5 billion by 2026](#)¹¹. Knight Frank says that Africa currently boasts 140,000 sqm of data centre space, [and this is set to grow by 50% in the same period due to rapid digitization and the roll-out of 4G and 5G infrastructure across the continent](#)¹². The map below shows the current status **(Fig 2)**.

⁹ Data Center Dynamics, November 24, 2023: [How Microsoft Wins](#)

¹⁰ Wikipedia: [List of megaprojects](#)

¹¹ Semafor Africa, June 22, 2023: [New data centers are supercharging cloud computing in smaller African countries](#)

¹² Knight Frank, April 7, 2021: [Data centers are a growing investment opportunity in Africa](#)

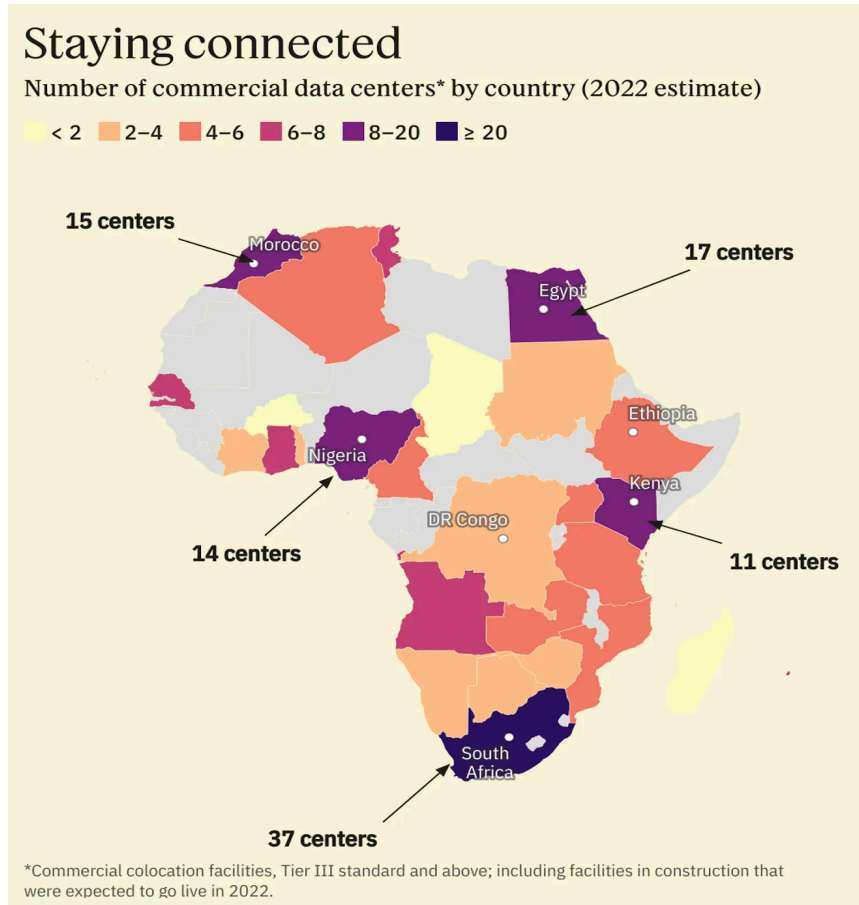


Fig. 2: Current status of Data Centers in Africa

Source: [Semafor](#)

According to the [Data Center Map](#)¹³, Africa has a total of 95 data centres out of 5,065 globally (**Fig 3**). This is 1.8% compared to the population size of 17% of the globe. Additionally, of the [top 500 most powerful commercially available computer systems](#)¹⁴ known to us, only one is located in Africa - in Morocco. This means that without adequate investment, Africa’s data will remain largely stored and processed in other parts of the world. Personal information about Africans – such as health and financial information –

¹³ <https://www.datacentermap.com/>

¹⁴ <https://www.top500.org/>

will be handled in places like Ireland, where big tech has their emerging markets' headquarters located, and where the [jurisdiction and sovereignty of African policy makers may be undermined](#)¹⁵. It also hinders intra-African data flows and goes against the spirit of the African Continental Free Trade Area.

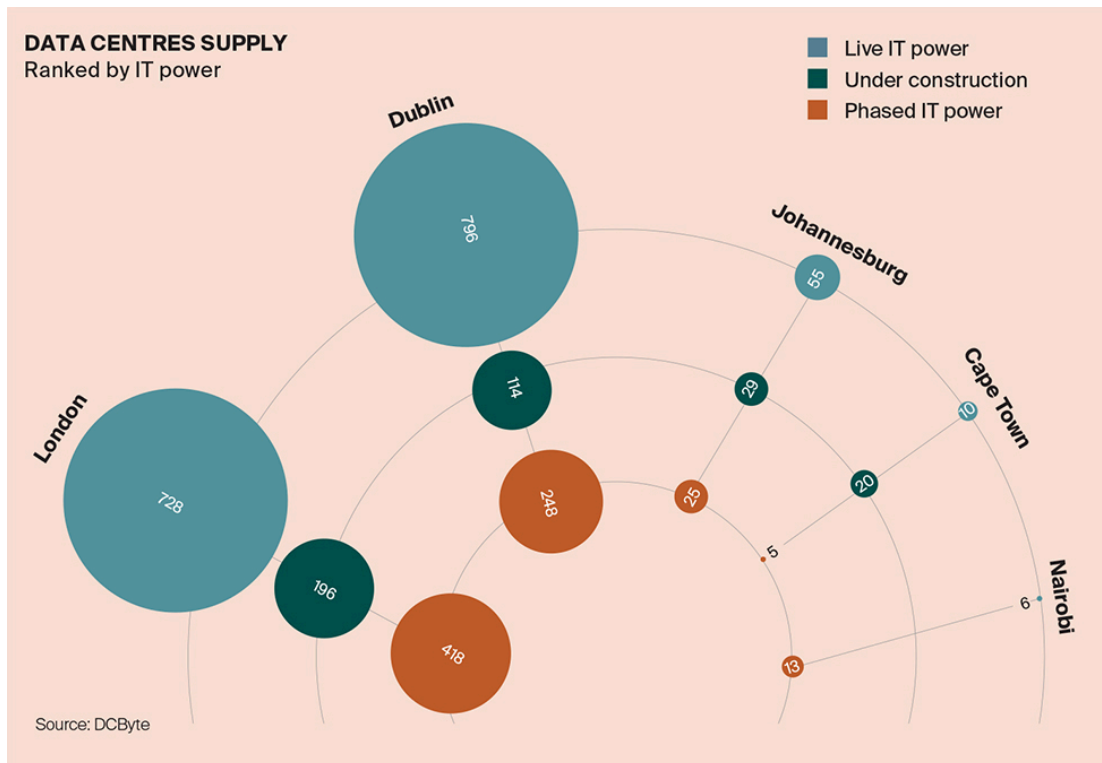


Fig. 3: Map showing the distribution of data centres

In response to the gaps in digital infrastructure, organisations like Africa Data Centres have announced [ambitious plans to bridge the divide](#)¹⁶. Their USD 500 million investment will see 10 hyperscale data centres sprout across 10 African countries within the next two years. This surge in investment isn't isolated; [South Africa alone has witnessed](#)

¹⁵ Alexander von Humboldt, Institute for Internet and Society, March 17, 2022: [Towards an African Narrative on Digital Sovereignty](#)

¹⁶ Africa Data centers, September 3, 2021: [Africa Data centers reveals continent's largest-ever data center expansion plan](#)



[companies like Teraco and Africa Data Centres pouring billions of Rands into developing new facilities](#)¹⁷.

These investments go beyond brick and mortar. [Data centres act as catalysts for economic growth; boosting productivity, competitiveness, and most importantly, employment creation](#)¹⁸.

Take the combined impact of Microsoft Azure, Huawei Cloud, and AWS data-centres in South Africa - [they are projected to generate thousands of new jobs](#)¹⁹, with Microsoft's two facilities alone driving an estimated [100,000+ job opportunities](#)²⁰. This growth extends beyond South Africa's borders. Kenya, for instance, saw [Safaricom's M-PESA mobile money platform spur data centre development and subsequent job creation](#)²¹.

But Africa's potential extends beyond replicating existing compute models. With its lower reliance on fossil fuels compared to many regions, the continent stands poised to [champion next-generation, sustainable compute technologies](#)²². Africa boasts [17 of the top 20 countries in renewable energy consumption](#)²³, showcasing its commitment to clean energy. Companies like Liquid Telecom are already leading the charge, [building solar-powered data centres](#)²⁴ across the continent. These initiatives position Africa not

¹⁷ My Broadband, April 6, 2022: [Data center boom in South Africa – with billions flowing into the country](#)

¹⁸ University of Johannesburg, July 28, 2020: [DATA centerS: HOW DIGITALISATION AND GREEN INVESTMENTS COME TOGETHER](#)

¹⁹ iTWeb, June 6, 2019: [New SA data centers expected to be job creation machines](#)

²⁰ BusinessTech, May 23, 2019: [Microsoft data centers will create 100,000 new jobs in South Africa](#)

²¹ Developing Telecoms, March 23, 2023: [Safaricom opens \\$2m M-Pesa operations center](#)

²² Tony Blair Institute for Global Change, December 7, 2023: [State of Compute Access: How to Bridge the New Digital Divide](#)

²³ World Bank Data: [Renewable energy consumption \(% of final energy consumption\)](#)

²⁴ ESI Africa, November 2, 2023: [Largest data center for East Africa to be sun-powered](#)



just as a recipient of data centre technology, but as a pioneer in developing cleaner, greener computing solutions for the future.

By seizing this opportunity, Africa can leapfrog traditional models and establish itself as a global leader in the next era of data infrastructure. This will have the combined effect of bringing economic prosperity and digital inclusion to its citizens, as well as solidifying the continent's position as a champion for sustainable development on the world stage.

Connectivity

While some AI models and ML algorithms [can be run on small devices such as personal computers, laptops, and smartphones](#)²⁵, the majority of current use cases are drawn from cloud service use. These include generative AI applications such as ChatGPT, and search functionalities such as those of Google and Bing. Therefore, consideration of internet connection in an African context is vital (Fig 4).

²⁵ Qualcomm, May 15, 2023: [How on-device AI is enabling generative AI to scale \[The future of AI is hybrid\]](#)

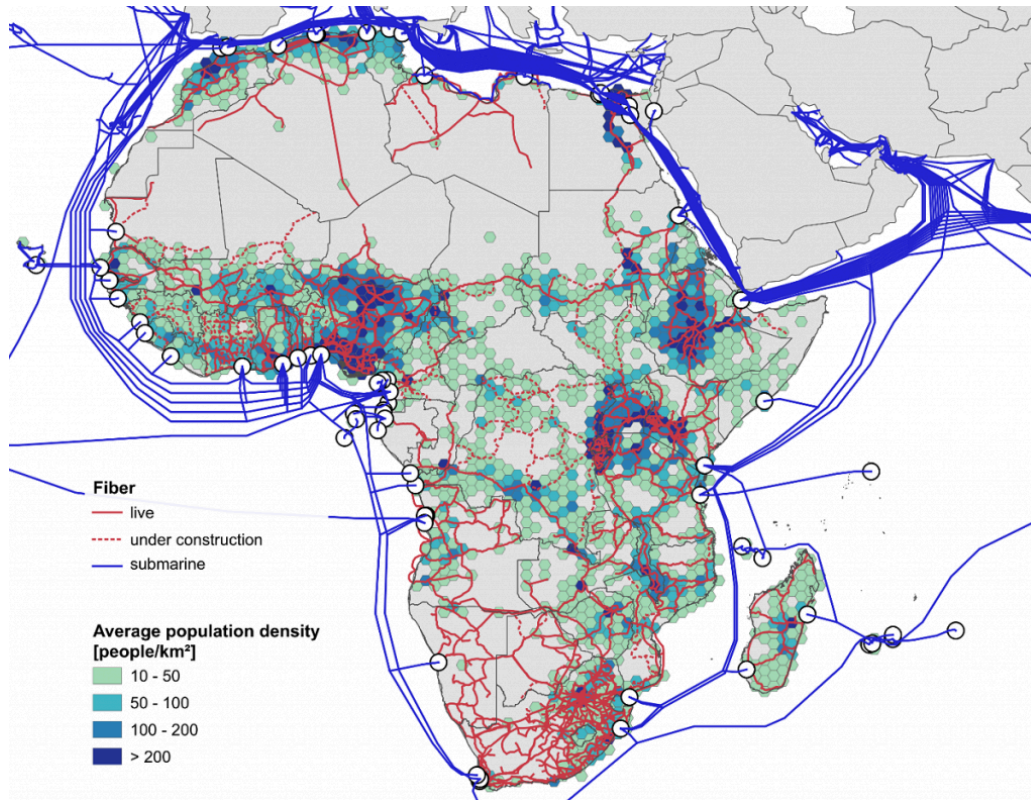


Fig. 4: Visualisation of fiber infrastructure in Africa and population density, showing unserved regions. Total population is estimated for each 10,000 km² hexagon; those with populations below 100,000 are excluded.

Source: Network Startup Resource Center, TeleGeography, and European Commission.

Internet Connectivity: An Overview

1. Terrestrial Internet: [Terrestrial internet in Africa](#) is primarily provided through fiber optic cables. [These cables extend connectivity to landlocked countries or urban centers within countries that have submarine cable access](#)²⁶. However, the

²⁶ Wikipedia, [List of terrestrial fiber optic cable projects in Africa](#)

current telecommunications infrastructure [cannot provide reliable and consistent high-speed internet, which is crucial in some sectors](#)²⁷.

2. Subsea Cable Internet: Subsea cables play a significant role in internet connectivity. The 2Africa cable system, one of the world's largest subsea cable projects, is expected to go live in 2024. [It will deliver more than the total combined capacity of all subsea cables serving Africa today, with a design capacity of up to 180Tbps on key parts of the system](#)²⁸.
3. Satellite Internet: Satellite internet is another key and re-emerging player in Africa's internet connectivity. Companies like [Konnect](#)²⁹ and [Freedomsat](#)³⁰ provide high-speed satellite internet across Africa. As of October 2023, Starlink, developed by SpaceX, [is officially available in seven African countries including Nigeria, Kenya, Mozambique, Rwanda, Malawi, Zambia, and Benin](#)³¹.

In comparison to other regions, Africa has a lower internet penetration rate. As of January 2023, [the internet penetration rate in Africa stood at around 43 percent, well below the global average of 66 percent](#). However, [the rate varies across different regions within Africa, with Southern Africa having the highest internet penetration rate at around 70 percent](#)³². Despite the rising number of users, [Africa is still considered the least](#)

²⁷ Broadband Commission for Sustainable Development, October 2019: [Connecting Africa Through Broadband A strategy for doubling connectivity by 2021 and reaching universal access by 2030](#)

²⁸ Submarine Cable Networks, May 15, 2020: [2Africa: a transformative subsea cable for future internet connectivity in Africa](#)

²⁹ <https://africa.konnect.com/en>

³⁰ <https://www.freedomsatafrica.com/>

³¹ Technext, November 2023: [A list of African countries where Starlink is either available or soon to be launched](#)

³² Statista: <https://www.statista.com/topics/9813/internet-usage-in-africa/#topicOverview>



[connected continent on earth](#)³³. A [2019 report](#)³⁴ calling for urgent action to close the internet access gap, suggests that around USD 100 billion would be needed to achieve universal access to broadband connectivity in Africa by 2030.

Chip manufacturing

The core powering block of [AI systems is silicon chips](#)³⁵. These can be found in almost all modern day electronic devices. With the rise of AI, the world has witnessed an increase in chip diplomacy with countries rushing to have regulations that are designed to incentivize the growth of their chip manufacturing industries. For example the [EU has the EU Chips Act](#)³⁶. Some of its intentions are to set the criteria to recognise and support integrated production facilities and open EU foundries that are first-of-a-kind facilities. It also aims to foster the security of supply and resilience of the Union's semiconductor ecosystem; to set up a coordination mechanism between Member States and the EU Commission for mapping and monitoring the Union's semiconductor sector as well as crisis prevention and response to semiconductor shortages; and, where relevant, consulting stakeholders from the semiconductor sector. The USA meanwhile, has the Creating Helpful Incentives to Produce Semiconductors (CHIPS) [Act of 2022](#)³⁷ whose aim is to incentivize the production of semiconductors in the United States. These are just a few instances of countries now passing legislation geared towards growing their respective chip industries.

In contrast, conversation about Africa being a potential power house of chip manufacturing and design does not feature. Africa's inclusion in this conversation is

³³ Ses, June 27, 2022: [Africa Connectivity Outlook: 2022 and Beyond](#)

³⁴ Broadband Commission for Sustainable Development, October 2019: [Connecting Africa Through Broadband A strategy for doubling connectivity by 2021 and reaching universal access by 2030](#)

³⁵ Center for Security and Emerging Technology, April 2020: [AI Chips: What They Are and Why They Matter](#)

³⁶ Cyber Risk GmbH: [The European Chips Act](#)

³⁷ McKinsey & Company, October 4, 2022: [The CHIPS and Science Act: Here's what's in it](#)



anchored on the existence of a good business and legal framework that, among other things, ensures certainty in taxation. Such robust frameworks serve as important incentives to investors, seeking suitable chip manufacturing opportunities.

Currently, there are initiatives such as Semiconductor Technologies Limited, which is a [Semiconductor and Chips manufacturing company³⁸ in Kenya](#) that is trying to rewrite the chip narrative in Africa. There is also [Gearbox, a Kenyan³⁹ company](#) that specialises in Printed Circuit Boards Assemblies (PCBA), also known as motherboards. These initiatives demonstrate the potential to grow Africa as a chip powerhouse. However, as alluded above, much needs to be done to enable significant investments into these companies.

Talent: Job creation and boost in productivity

Job Creation

Africa, just like other continents, is experiencing a transformative journey at the crossroads of human talent and AI; a convergence that can potentially transform its development trajectory if harnessed effectively. Africa has drawn on its [cultural heritage⁴⁰](#) and diverse talent, which has grown over time in the evolution of technology that has moved us from traditional craftsmanship to contemporary innovation. So where are we currently? Africa, though often overlooked, boasts a burgeoning pool of skilled professionals, including digital marketers, graphic designers, social media influencers, and others in engineering and entrepreneurship. Peer learning has greatly contributed to the growing numbers on the continent. However, formal training is now playing a pivotal role in nurturing these talents, as skilling, reskilling, and upskilling continue. How do we know that this space has potential to grow? African countries are cognisant of the new trend and the majority do not want to miss out in the early adoption stage. This has

³⁸ <https://stlsemiconductor.com/the-company/>

³⁹ <https://www.gearbox-europlacer.com/>

⁴⁰ UNDP, April 21, 2023: [Accelerating Creativity and Innovation in Africa](#)



resulted in a move from peer learning to formal training, which is heavily invested in propagating the AI gospel. AI startups are also sprouting and are in [need of talent](#)⁴¹ to advance the design and development of solutions specific to Africa.

Upskilling initiatives are therefore needed to equip talent with the technical (AI related) skill proficiencies required to harness their full potential. Right now, the AI talent value chain in Africa is at the bottom of the heap, and though this has potential for mass job creation, it poses unique challenges that may call for a rethink of African labour laws and innovative ways of applying existing laws. For example, one of the major issues to come out of Africa, and Kenya in particular, was the horrible working conditions that people hired to [moderate the OpenAI platform and train its AI](#)⁴² models, were subjected to. Cases were filed in Kenyan courts, where mistreated employees demanded better pay and treatment similar to those offered to their counterparts in western countries. What is pertinent is a delicate balance between the opportunity to create mass job employment and ensuring basic human rights, plus adequate labour safeguards.

In the quest to propel Africa into a prominent position on the AI landscape, it is also imperative to rethink our approach to talent development. Africa needs to cultivate expertise across various dimensions of AI. For instance, in the continent's educational systems – are we providing students with the requisite skills for the future of AI? Drawing inspiration from successful gig economy models, as exemplified by [previous research](#)⁴³, we can explore unconventional yet promising avenues like [data labelling](#)⁴⁴. Much like

⁴¹ Ade-Ibijola, A., Okonkwo, C., January 1, 2023: [Artificial Intelligence in Africa: Emerging Challenges](#). In: Eke, D.O., Wakunuma, K., Akintoye, S. (eds) Responsible AI in Africa. Social and Cultural Studies of Robots and AI. Palgrave Macmillan, Cham.

⁴² The Guardian, August 2, 2023: [‘It’s destroyed me completely’: Kenyan moderators decry toll of training of AI models](#)

⁴³ Qhala Limited, 2022: [Platform Livelihoods Report](#)

⁴⁴ <https://zindi.africa/>



India's growth through call centres, basic data labelling could offer unprecedented earning opportunities, potentially reaching up to USD [700](#)⁴⁵ a month per worker. Aligning with the expanding global industry of supervised learning and "Humans in the Loop," such initiatives could not only [reshape](#)⁴⁶ our educational landscape but also position Africa as a significant player in the evolving AI market. After we navigate this transformation, crafting supportive regulations and policies becomes paramount to balance innovation and compliance.

Efficiency and increased productivity

The transformative impact of AI on productivity and workflow efficiencies is increasingly evident. For example, creatives who have embraced AI technologies report significant improvements in workflow processes and overall [output](#)⁴⁷. The same can be said in other domains like farming. The correlation between AI adoption and increased [productivity](#)⁴⁸ is a catalyst for a broader exploration of AI trends that is fueling curiosity and moving beyond mere interest, to active engagement and investment.

⁴⁵ Abdessalam Jaldi, Policy Center for the New South, July 2023: [Artificial Intelligence Revolution in Africa: Economic Opportunities and Legal Challenges](#)

⁴⁶ OECD, February 9, 2021: [Developing an Artificial Intelligence for Africa strategy](#)

⁴⁷ JSTOR Daily, October 24, 2023: [AI and the Creative Process: Part One](#)

⁴⁸ Harvard Business Review, September 27, 2021: [AI Adoption Skyrocketed Over the Last 18 Months](#)



AI Markets and Use cases: Awareness, Usefulness, Start-Ups and Commercial Viability

Awareness

Across the African continent, a quiet revolution is [brewing](#)⁴⁹. While the world marvels at Africa's ubiquitous mobile money ecosystem, a new frontier beckons: AI. For the ecosystem to move in the same direction, the question is whether the population is cognizant of how AI-related interventions meet their needs. Pan-African initiatives such as [She Hacks Africa](#)⁵⁰, AI4D Africa and other country-based communities — such as AI Kenya, iHub, and NairobiAI in Kenya, [wit.ai.cairo](#)⁵¹ in Egypt, AI community Africa in Nigeria, and Algeria AI community etc. — are vibrant AI communities that are sowing the seeds of understanding. As these efforts bear fruit, market awareness will blossom, attracting investment and talent to propel the ecosystem forward.

Usefulness

Once awareness is well established, tailoring AI for African realities will be achieved, thereby demonstrating its usefulness. The one-size-fits-all approach to AI will not fly in Africa's diverse landscape, as the solutions have to be contextually relevant, addressing real-world challenges such as rural development, low literacy levels, and financial inclusion, among others. These solutions, if carefully designed and developed, can leapfrog traditional barriers and have a transformative impact on the lives of African and other populations in the global south.

By leveraging its leapfrogging potential, Africa can reshape its trajectory with tailored AI solutions. For instance, disease-prediction models can improve healthcare access, while

⁴⁹ Access Partnership, September 2023: [AI in Africa: Unlocking Potential, Igniting Progress; A working paper](#)

⁵⁰ <https://shehacksafrica.org/>

⁵¹ <https://wit.ai/>



personalised learning platforms like [Ubongo's AI-powered](#)⁵² games can revolutionise education where resources are limited.

Commercial viability

The challenge of bringing this to fruition hangs heavy in the air. Can AI solutions in Africa, with limited data pools and nascent infrastructure, actually turn a profit? The answer lies in striking a balance. Firstly, frugal design innovation should be encouraged to factor in the socio-economic constraints of users. Secondly, focusing on niche markets with specific pain points will offer opportunities for early success.

The one indicator of an ecosystem's commercial viability is investment into the startup ecosystem. The entire African startup ecosystem received about USD [3 billion](#)⁵³ of VC funding in 2023, while Anthropic alone received [USD 4](#)⁵⁴ billion in 2023 and OpenAI in its history has raised USD [11+ Billion](#)⁵⁵. As efforts are put around regulation, similar efforts should be directed towards catalysing funding into the innovation ecosystem. Finally, collaborations can pool resources, expertise, and data to create commercially viable solutions that scale.

Addressing local challenges not only accelerates progress but also acts as a catalyst for positive social and economic impact. The emergence of AI startups within the [entrepreneurial ecosystem](#)⁵⁶, further fostered by platforms like AfriCAN Code's online forums and hackathons, promises both innovation and job creation, injecting dynamism into Africa's economy and positioning the continent as a leader in the global AI landscape.

⁵² <https://www.ubongo.org/>

⁵³ Techcrunch, January 23, 2023: [How African startups raised funding in 2023](#)

⁵⁴ Fortune, September 26, 2023: [What is Anthropic? The buzzy AI startup just got up to \\$4 billion in funding from Amazon as part of a colossal tech alliance](#)

⁵⁵ Vox, September 25, 2023: [The \\$1 billion gamble to ensure AI doesn't destroy humanity](#)

⁵⁶ Quartz, November 25, 2021: [Why AI needs input from Africans](#)



This strategic approach and Africa's rich values and investments in infrastructure, talent, and responsible AI development, can bring about this delicate dance. It holds the potential to empower people and serve as a beacon of inclusive AI development for the world.

Conclusion

This study assessed the current state of the AI ecosystem in Africa using the proposed 'four horsemen' operational system framework. Four broad components were considered in the framework: data sets and data systems, digital infrastructure, talent and AI markets. Overall, progress, although slow and varied, has been made in each of the components. Laudable advancements include: African language data collection spearheaded by homegrown communities and initiatives, investments in AI infrastructure-data centres, internet connectivity and a computing facility; emergence of chip investment companies; emergence of start-ups; and increased investments into the startup ecosystem. That said, much remains to be done. Specifically, policy initiatives should be geared towards expanding computing facilities and internet connectivity, funding data centres, advancing the capabilities of Africa's talent and instituting policies that ameliorate data sets constraints. To conclude, although AI regulation in Africa is important, our findings indicate that it is not a priority, given the current state of the ecosystem. Legislative initiatives ought to be directed towards alleviating ecosystem bottlenecks, to transform the continent into an AI powerhouse, after which regulation can be prioritised.

In contemplating the relevance of our paper at this time, we recognize that Africa stands at a pivotal moment when it comes to AI. We hope this paper will serve as a beacon, pointing toward a future where Africa not only participates in, but eventually leads in the global AI landscape. The timing is crucial as we witness global shifts in AI governance



models and the undeniable impact of AI as it moves towards the realisation of the 4th industrial revolution⁵⁷.

Future work

Subsequent articles will expand on the concept of the four horsemen of AI, in the process facilitating collective rethinking of AI and AI Governance in Africa. We will offer a deep dive into each of the components:

Data Sets and Data Systems: The series will look at what is currently happening when it comes to the collection, creation and annotation of African data; why there is a lack of African data when it comes to training of AI systems; what regulations are currently in place to regulate data; and balancing between copyright and training of data sets. Lastly, it will provide suggestions on the best way to ensure that data benefits the growth of Africa as an AI powerhouse.

Digital infrastructure: Data Centres, Connectivity and Chip Manufacturing: In a subsequent article we will explore Digital infrastructure. We will critically analyse what is currently in place in terms of initiatives to enable all three. What policies and regulations are there that are either hindering or enabling the development of these sectors?

Talent: Job creation and boost in productivity: This series will look into optimising different skill sets using AI. We shall show that we can move towards operationalization of the needed labour in this sector, given the market opportunities and the need to skill, reskill and upskill while ensuring that the youth and the larger population in Africa can live off their talent and support others in their community, as they grow the continent's digital economy.

⁵⁷ UNESCO, [The Fourth Revolution: big data & artificial intelligence | The UNESCO Courier](#).



AI Markets: Awareness, usefulness, startups and commercial viability: The series will take a deep dive on the market aspects of AI, including what an ideal AI Market looks like for Africa. How do we create awareness and accelerate adoption of AI tools? How do we create tools that effectively assist Africa in resolving some of its most perennial economic challenges? Who is currently creating these AI products for the African continent, and what are they?

The expected outcome of this series is to provide a concrete argument as to why Africa is still not ready for AI regulations. What's needed more are strategies enabling AI ecosystem growth and the subsequent introduction of rules that balance human rights and innovation. It will be used as a base study for anyone looking to understand the current state of AI in Africa. It will also be the precursor for developing Africa's AI regulation readiness framework. The series will further inform policy leaders on why Africa is unprepared for AI regulations and how to change that.

About the Authors

Incubated by Qhala, Qubit Hub is an African-based AI research, innovation and development lab, a commune of African Researchers in Data Analysis, ML, Physics and Policy, whose goal is to ideate and incubate, conceptualise, design, develop and deploy AI Initiatives, while actively engaging with policymakers in creating relevant and practical regulatory directions.

We are grateful to Tevin Mwenda, Joshua Baru, Babra Chege, Kavengi Kitonga, David Lemayian, William Powers, Wanjiru Mburu (PhD), Njeri Ngaruiya (PhD), and Shikoh Gitau (PhD) for their contributions to this paper.

For more information concerning this topic and upcoming publications and convenings reach us at info@qbit.africa

For press inquiries contact pr@qhala.com