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EVALUATING
THE AFRICAN DEEP-TECH STARTUP ECOSYSTEM

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Contents:

Scope

This report takes a closer look and evaluates the deep-tech ecosystem in Africa, summarising the findings of the mappings of relevant stakeholders, identifies existing gaps, and provides a summary of the identified needs for supporting the deep-tech startups ecosystem in Africa.

Executive Summary

Deep-tech refers to solutions that are based on scientific discoveries and that enable us to solve complex problems. Deep-tech startups are using cutting-edge technology such as Ubiquitous Compute; Pervasive connectivity; Artificial Intelligence; and Cloud to Edge Infrastructure among others; to tackle some of the world's most pressing issues, from climate change to healthcare.

The deep-tech ecosystem in Africa is growing, driven by the development of new applications and the integration with existing products in various sectors notably in agriculture, fintech, e-commerce, mobility, and logistics. However, certain factors have slowed or completely hindered innovation in the industry. These factors range from a lack of adequate support systems for deep-tech, the cost of research and development (R&D) associated with a lot of deep-tech products, and a lack of funding for startups in the industry, among other reasons. Some of the approaches needed to solve these setbacks and enable the industry to grow include increasing access to support structures and funding opportunities for deep-tech startups and businesses, fostering collaboration between different stakeholders in the space, and building up the necessary infrastructure needed for the industry to flourish.

The deep-tech support ecosystem is mostly made up of different players, the core being hubs which typically run from an average of 3 to 12 months, offering training and capital to the cohorts. While this type of support helps companies gain credibility, traction, and the resources to get off the ground, deep-tech companies could arguably reap more benefits from specialised hubs that are targeted at the industry or to specific technologies and aspects that make up the sector.

Although some hubs may offer programmes and host deep-tech communities, there is still a need for more specialised hubs or hub programmes to grow the sector. While sector agnostic hubs may provide more generalised support, specialised hubs may be better positioned to provide expert knowledge and resources catered to deep-tech.

Some of the major gaps identified include a lack of tailored support to deep-tech startups and gaps in training and talent, but the major challenge remains the difficulty in raising funding for these startups. Deep-tech poses a higher risk to investors, and as a result, there are no identified investors with a deep-tech focus operating in the continent. Investments into startups that employ deep-tech products are mostly as a result of the investor's interest in other sectors or verticals e.g., Fintech and agriculture which deep-tech happens to cut across.

There are a few countries across Africa (e.g., Egypt, Ghana, Kenya, Nigeria, South Africa, and Tunisia) that are most suitable for a deep-tech incubation programme, due to their more

mature startup ecosystems. In order to run a successful deep-tech incubation programme, it is also essential to form partnerships and collaborations with already existing players in the sector which include universities, research and academic institutions, events and conferences, investors, hubs, Nonprofits, and corporates.

Stakeholders in the deep-tech startups ecosystem, as well as interested parties and partners; are encouraged to work together in shaping the development of a well-functioning ecosystem by providing technical assistance, training, and enablement to companies, increasing the internal capabilities of ecosystem support organisations, offering more specialised programmes/training. There are also encouraged to foster collaborations between corporates and startups, involving governments and policymakers, providing access to experienced mentors and coaches; and creating synergies with existing players, such as venture capitalists, governments, academia, and regulators.

Introduction

Technology is revolutionising every industry, and deep-tech is at the forefront of this change. Deep-tech refers to solutions that are based on scientific discoveries and that enable us to solve complex problems. Deep-tech startups are using cutting-edge technology such as Ubiquitous Compute; Pervasive connectivity (e.g., 5G/Wi-Fi 6E); Artificial Intelligence; and Cloud to Edge Infrastructure; to tackle some of the world's most pressing issues, from climate change to healthcare. These companies are developing innovative solutions enabling use cases in areas such as healthcare, fintech, agriculture, e-commerce, mobility, and hardware/Internet of Things (IoT).

Despite its early-stage, deep-tech pools across Africa have been experiencing growth over the past decade, especially driven by the development of new applications and the integration with existing products. The traction surrounding the industry can in part be attributed to the widespread adoption of, and advancements in Artificial Intelligence (AI), one of the tech clusters that make up deep-tech. The continent has increasingly seen startups across several sectors leverage AI in their products and systems but, despite the buzz, this space can hardly be compared with other continents.

Despite this continued growth, certain factors have slowed or completely hindered innovation in the industry. These factors range from a lack of adequate support systems for deep-tech, the cost of research and development (R&D) associated with a lot of deep-tech products, and a lack of funding for startups in the industry, among other reasons. Some of the approaches needed to solve these setbacks and enable the industry to grow include increasing access to support structures and funding opportunities for deep-tech startups and businesses, fostering collaboration between different stakeholders in the space, and building up the necessary infrastructure needed for the industry to flourish.

Methodology

This study explores startups, corporates, investors, events, and hubs across Africa in the deep-tech ecosystem. More than 200 startups were identified as being deep-tech companies using primary and secondary data collection methods. More than 100 hubs were identified to have either supported one or multiple deep-tech startups in the past or are running programmes that can accommodate doing so in the future. In this study, hubs are defined as support structures that enable entrepreneurs to thrive, offering programmes or incubation and acceleration services. This study does not consider co-working spaces unless they offer hybrid services e.g., programmes. A survey targeted at hubs and interviews with key players was used to collect primary insights from hub managers and startup founders, while Briter's Intelligence platform and desk research were leveraged to identify key stakeholders.

When reading the report, it should be noted that:

1. The research tries to map all deep-tech stakeholders in the continent but does not claim to have captured all existing solutions. It should also be noted that for startups, priority has been assigned to those that have raised prior funding.
2. Categorisation of sectors, products, or tech clusters has been made based on: deep-tech cluster (AI/ML, Computer Vision; Autonomous/Robotics; Hardware & Manufacturing; SW Dev Tools/DevOps; Data, Cloud & Edge; Next Generation Compute; and Security & Privacy); and Sectors (healthcare, fintech, agriculture, e-commerce, mobility, and hardware/Internet of Things (IoT)).
3. Funding analysis takes into account both conventional deep-techs, as well as startups that employ deep-tech tech clusters, for example, AI or IoT in their products and offerings.
4. Not all investments are made public and tracking private companies' financials is subject to respecting confidentiality. Disclosed funding refers to investments that have been announced publicly.
5. 'Undisclosed' in funding values refers to deal values whose amounts have not been disclosed. 'Unspecified' refers to deals whose stages have not been announced.

State of the industry

The research counts 200+ deep-tech startups founded between 2000 and 2022 across the continent, with 79% being founded after 2014. The startups considered span across different sectors including healthtech, fintech, agriculture, e-commerce, and mobility, and are enabled by deep-tech e.g., ubiquitous computing, pervasive connectivity, AI, and Cloud to Edge infrastructure, which have been used as categories of tech clusters within the deep-tech space.
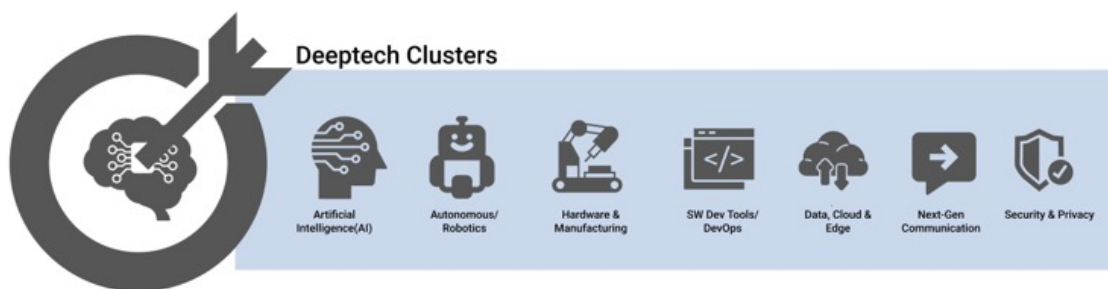
Out of all the startups considered, the majority were located in either South Africa, Kenya, Egypt, or Nigeria, with South Africa taking the lion's share. The figure below shows the concentration of startups across the continent deploying deep-tech. These startups were also concentrated in key cities, i.e., Lagos, Cape Town, and Nairobi. AI/ML, Computer Vision emerged as the tech cluster with the most companies in the continent followed by Data, Cloud & Edge.
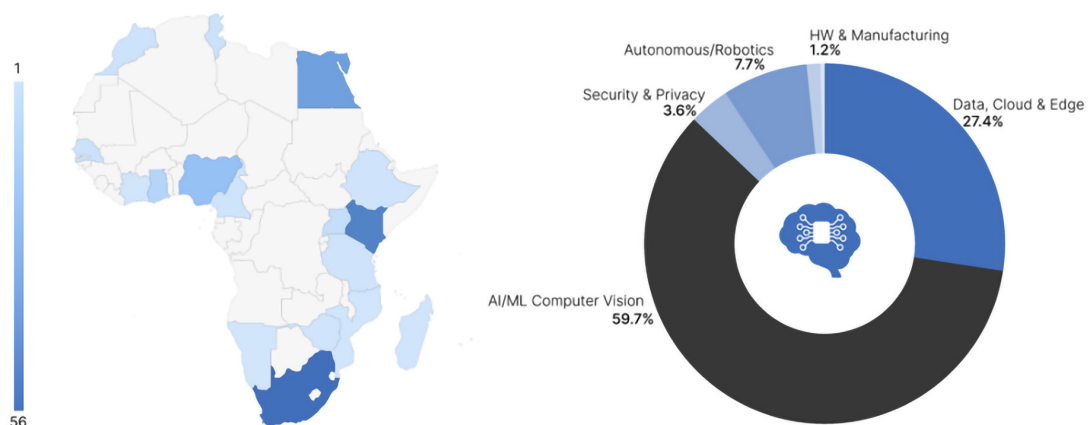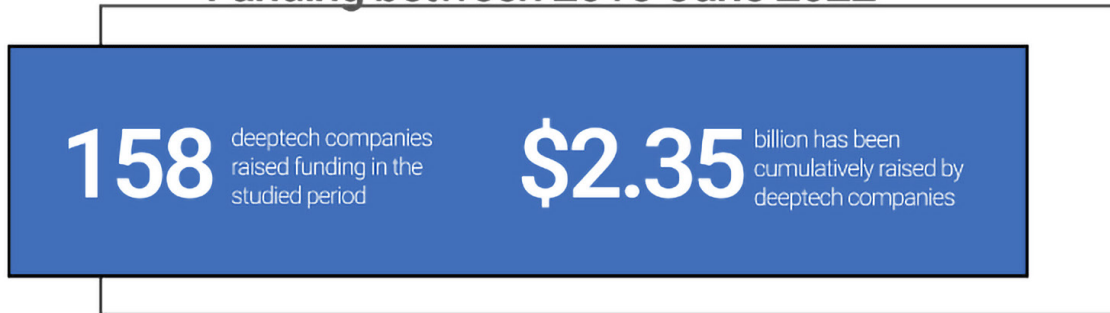

Deep-tech innovators and startups are providing solutions for some of the most pressing challenges in different sectors across the continent. The most prevalent sectors where deep-tech is adopted are agriculture and healthtech.

Funding Snapshot

The startups' funding history has been analysed to provide further insight into the investment into deep-tech in the continent, identifying which countries and sectors the funds typically go to, providing an overview of some of the investors that have invested in the sector, and highlighting the stages and maturity of the sector.

Funding between 2015-June 2022

158 deeptech companies raised funding in the studied period

$2.35 billion has been cumulatively raised by deeptech companies

Funding dedicated to deep technologies has come as a consequence of the progressive awakening around the investment opportunity across Africa, as well as the increase in world-class solutions being developed across the continent, which have gradually attracted international funders. The industry has been growing over the last few years, growing each year as demonstrated in the figure above. Between 2015 and June 2022, deep-tech companies raised a cumulative amount of $2.35 billion in disclosed funding, accounting for 15% of all the funding raised by technology companies in the continent over the same period. It is important to note that these numbers also consider startups that employ the usage of deep-tech tech clusters in their offerings, although they traditionally would not be classified as deep-tech companies. Conventional deep-tech companies raised $139 million in the same period, accounting only for 6% of the total funding raised by all the deep-techs. It is crucial to note, however, that this funding isn't dedicated to boosting the deep-tech components of each company, but rather targeted at the company as a whole itself.
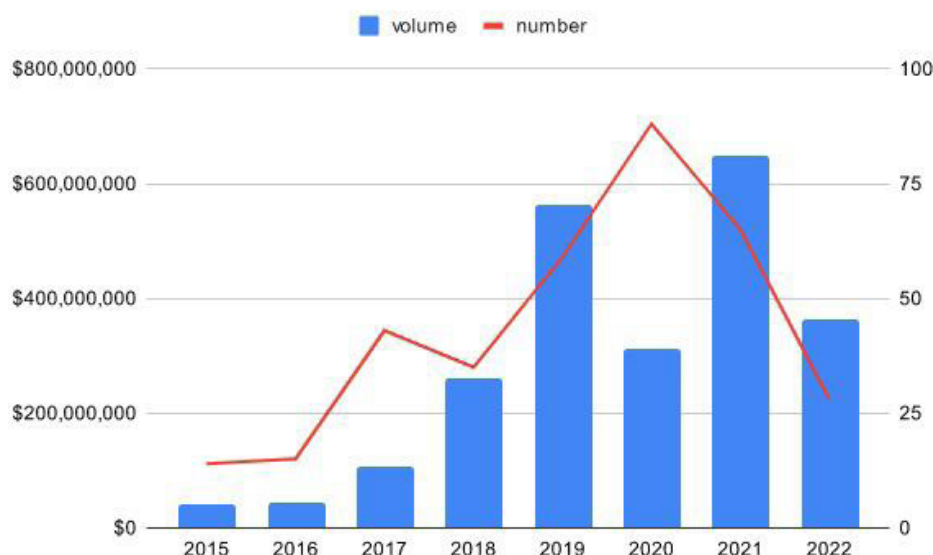
Geographical Breakdown

Kenya emerges as the top-funded country, with 119 deals totalling $1.46billion, and accounting for 62% of the total funding into deep-tech startups on the continent. South Africa emerges second with 15%, Nigeria third, and Egypt fourth. This is reflective of the broader funding trends into the tech ecosystem across Africa, where these countries emerge as the top four funding destinations. Tunisia and Egypt can also be seen to have raised significant funding in the industry. It is important to note that this geographical

categorisation is based on African headquarter locations, which are the companies' primary offices or countries of operations on the continent. Looking at the countries of incorporation, however, companies headquartered in the United States emerge the top funded, accounting for 57% of the total funding.
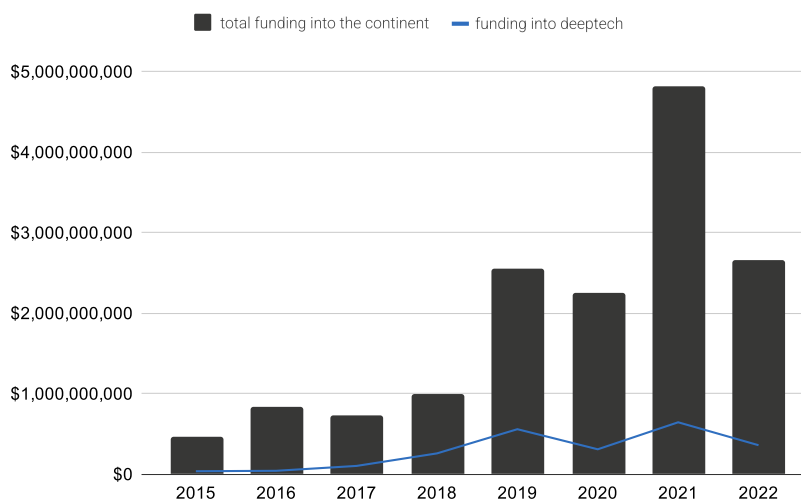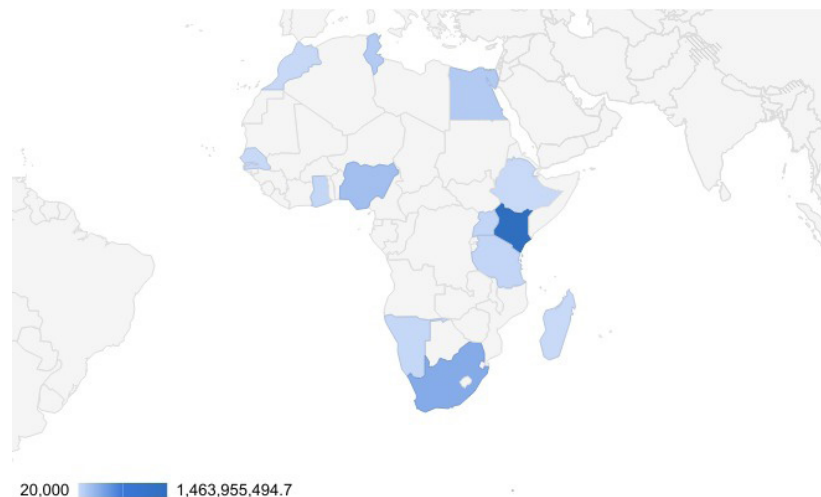
20,000 1,463,955,494.7

■ total funding into the continent — funding into deeptech

Figure : Share of deeptech funding into Africa

Sector Breakdown

Looking at funding trends across all tech-driven sectors reveals that the biggest share of startup funding goes to fintech. This is also true within deep-tech focused solutions, as fintech has also raised the biggest portion of funding at 28%. Logistics emerges second and cleantech third.

Internet & 1.3%
Big Data & 4.1%
Health & Biotech 5.5%
Software 5.8%
E-commerce 9.7%
Agriculture & 12.7%
CleanTech 12.9%
Fintech 27.9%
Logistics & Supply 18.2%
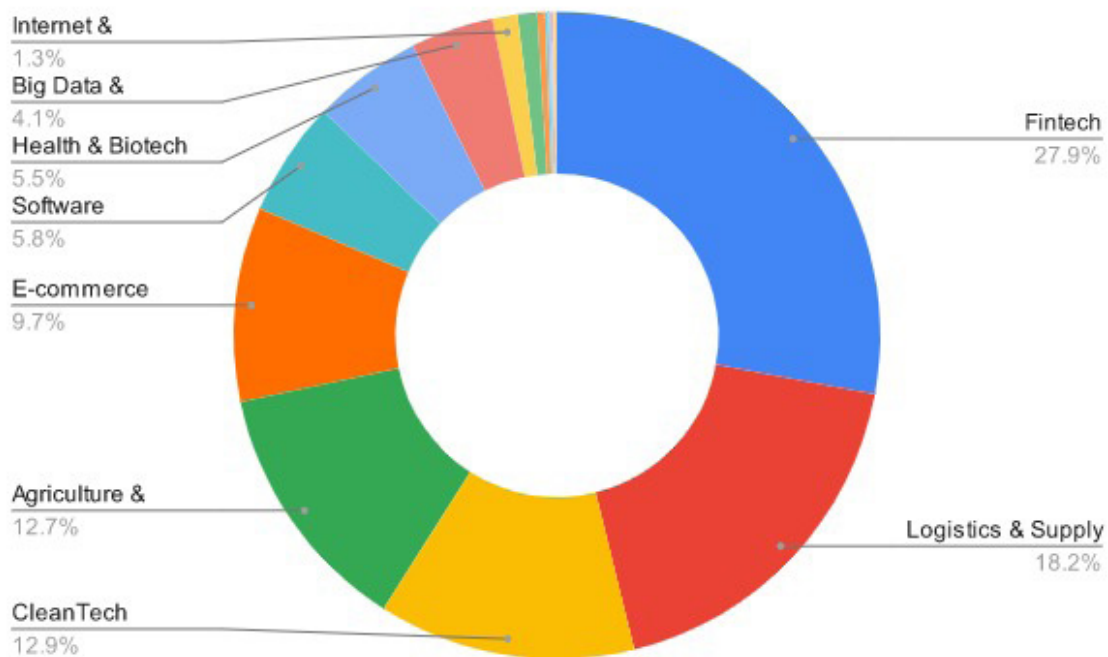
Product Breakdown

Lending emerged as the top-funded product, grossing $605million, which accounts for 26% of the funding into deep-tech startups in the time period studied. B2B Commerce and Vehicle Marketplaces emerged as the second and third most funded products.

Lending
Artificial Intelligence
Supply Chain Management
Solar Home Kit
Data Analytics
Diagnostics
Wearables
Trucking
B2B Commerce
Vehicle Marketplace
Solar Energy
Market Information
Smart metering Systems
Precision Agri
Utilities
WI-FI
PAYGO
Irrigation
Food Delivery
Insurtech
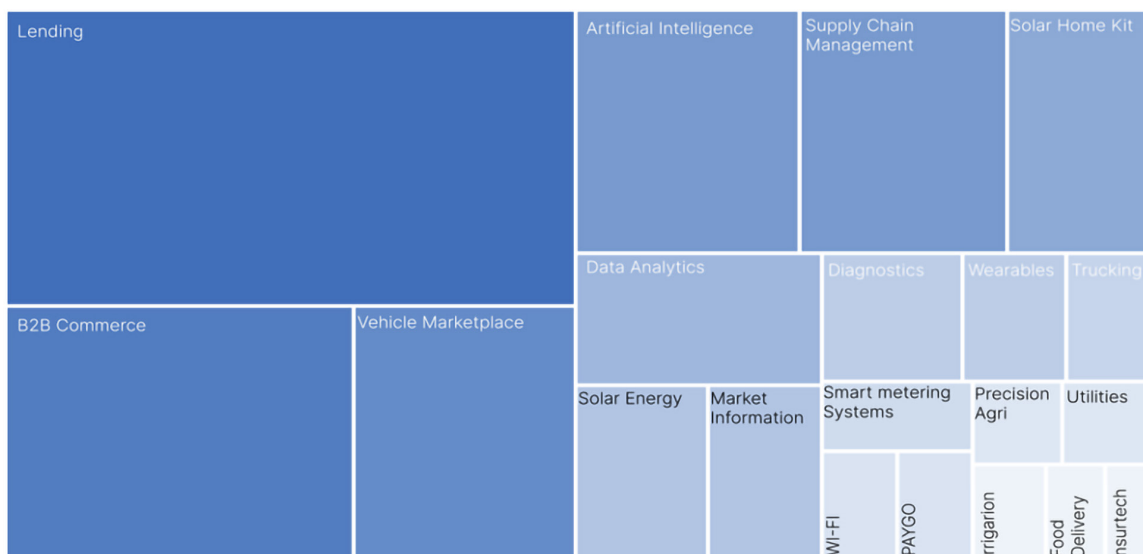
Who is investing in deep-tech?

Deep-tech poses a higher risk to investors in comparison to other sectors for a variety of reasons including:

1. The intangibility of assets which makes them difficult to value especially in the early stages.
2. Reliance on emerging and cutting-edge technology which may become obsolete very quickly.
3. Limited understanding of technical feasibility by investors.
4. The significant amount of capital required to get off the ground and thus a higher risk of failure.

As earlier noted, the majority of the investors investing in deep-tech do not claim to have a deep-tech focus in their mandate, but rather, see deep-tech as more cross-cutting across the verticals they work in. Therefore, deep-tech is not seen as a vertical but is rather used to gauge the maturity of the solution or startup. This can be seen as one of the challenges deep-tech startups face, especially in the early stages. Excluding some few success stories; most deep-tech startups and innovations, especially in the early stages of ideation and business model development operate with limited revenue and funding. While many Venture Capital firms (VCs), Private Equity firms (PEs), Corporates and DFIs continue to invest in the continent, there is a need for more deep-tech-focused investment.

Support Ecosystem

Deep-tech innovators often require support for a number of reasons, such as long lead times to commercialisation, and like other sectors, the industry has benefited from the existence of a dedicated support ecosystem that works to enable growth, development, and acceleration of innovation. The support is offered in various ways including mentorship, funding, training, networks, partnerships, community, and technical assistance. The deep-tech support ecosystem is mostly made up of private sector players including dedicated hubs, investors, challenges, and hackathons.

Tech Hubs

Hubs provide a wealth of resources and opportunities that may be critical to the success of startups, especially in the very early stages. They offer mentorship, access to capital and networking opportunities with potential customers and investors and provide a community of like-minded entrepreneurs who can offer advice and support to companies

with similar synergies. There are several different types of hubs, including incubators, accelerators, innovation hubs, technology centres, makerspaces, and hackathons.

Most hub programmes take an agnostic approach to support, meaning they offer their services across the board without a special focus on any given technology or industry. These programmes typically run for an average of 3 to 12 months, offering training and capital to the cohorts. While this type of support helps companies gain credibility, traction, and the resources to get off the ground, deep-tech companies could arguably reap more benefits from specialised hubs that are targeted at the industry or to specific technologies and aspects that make up the sector. Although some hubs may offer programmes and host deep-tech communities, there is still a need for more specialised hubs or hub programmes to grow the sector. While sector agnostic hubs may provide more generalised support, specialised hubs may be better positioned to provide expert knowledge and resources catered to deep-tech.

Academia Nexus (University and Academic Institutions)

Academic and research institutions have been at the forefront of promoting new technologies and innovations. Globally, a lot of the deep-tech innovations are born out of academic research across universities. These institutions have played a vital role in fostering the development and commercialisation of these technologies, often through targeted incubation and research programmes. This is also somewhat the case for the continent, where some universities have designed programmes, or partnered with hubs to help students foster deep-tech innovations. Aside from partnerships, universities have also set up offices within them that target the commercialisation of Intellectual Property (IP). An example of this is RUFORUM, a consortium of 148 universities across 38 African countries which partnered with other institutions to implement a climate change AI hub initiative for four years starting in 2022.[1] AI Africa Consortium, led by The University of Witwatersrand and composed of several universities across the continent with the goal of promoting AI is another example of this.

[1]https://ruforum.wordpress.com/2022/04/01/3-african-institutions-partner-to-use-artificial-intelligence-to-tackle-climate-change/

Investors

Investors play a vital role in the growth of ecosystems. They can provide funding and other value adds to startups including mentorship, market access, and even validation of ideas. This study considers investors across all stages of development, from angel networks to seed funds, to venture capital and even corporate venture arms.

Investment into the continent has risen over the past few years, with startups that leverage deep-tech products raising a cumulative of $648 million just in 2021 alone. Despite this, there are very few investors that have a targeted deep-tech focus in the region. Most investors operate agnostically or target specific sectors, such as agriculture, fintech or e-commerce and as a result may have invested in some of these startups that leverage deep-tech for their products

Corporates

Corporates have been important partners for startups. Given the long R&D phase and the general lack of specialised programmes that cater to deep-tech startups, corporates active in the industry are well suited to provide expertise. There are also catalysts of co-creation programmes between startups and corporates including conferences.

Key Findings

State of the industry

a. The number of startups developing or integrating deep-tech across Africa is growing. Despite the growing number, however, there exist few to no innovations around some of the core deep-tech clusters. Using our categorisation, we see little to no presence in the Next-Gen Compute, SW Dev Tools/DevOps, and HW & Manufacturing clusters.

b. Overly across the years, AI/ML and computer vision has seen the most growth and adoption in comparison to the other tech clusters.

c. Fintech, e-commerce, Health, and Agriculture were found to be the key sectors intersecting with deep-tech in the continent.

d. Looking at the geographical distribution of the deep-tech companies, we see a large concentration in a few select countries in the continent, i.e., Egypt, Kenya, Nigeria, South Africa, and Tunisia.

Support Ecosystem

a. Most hub programmes are sector-agnostic, with very few having programmes that are catered to deep-tech-specific needs.

b. There are some efforts by governments, and we encourage them to do more to facilitate the growth of the industry.

c. There are few deep-tech-focused investors or investment vehicles.

Hurdles and limitations

a. There are barriers to entry due to the large R&D costs, time, and a lack of adequate tailored support programmes for deep-tech.

b. There is little funding available to conventional deep-tech startups in the early stages. The companies that have raised the most funding typically also operate across other industries.

c. There are limited networking opportunities and events between players in the deep-tech scene across the continent.

Gaps and Identified needs

While the major challenges and gaps that exist in deep-tech startups continue to be around funding opportunities, there are other gaps present. Here is what we've learnt.

1. There is a lack of adequate tailored support to deep-tech startups

Deep-tech startups would benefit from specialised programmes that are targeted at the industry. Out of 400+ hubs we investigated, only 14% had programmes that were catered towards deep-tech. Generally, a lot of incubators/accelerators took an agnostic approach while selecting their cohorts. While this approach can be useful for broad coverage of support, categorising cohorts based on the specific industries or verticals would be more beneficial to deep-tech startups as it would allow for their needs to be met more efficiently. Through the desk research and seminars carried out[2], it was also found that there was a lack of investors with deep-tech expertise, signaling a skill gap on the investors' end.

2. More support from governments is needed

A quick scan into the government and their initiatives towards deep-tech in their various countries showed limited activity. While there are initiatives in some countries across the continent that target the tech ecosystem as a whole, e.g., the Startup Act in Tunisia; deep-tech startups would benefit more from tailored initiatives and policies. Governments could, for example, prioritise the ease of doing business for these companies, introduce tax breaks, or reform education systems focusing on the various tech clusters.

3. Supporting deep-tech startups at scale is challenging

There are several challenges associated with supporting deep-tech startups at scale. Firstly, deep-tech companies have long development timelines. They typically spend a significant amount of time and resources on R&D in order to bring innovative products to the market. This requires R&D facilities which are costly, especially considering the difficulty in achieving profitability and sustainability by the companies in the early stages. Secondly, it is difficult to identify and assess the technical feasibility of the companies' proposed solutions as they often operate in niche areas. Even if the solution is technically feasible, it is difficult to commercialise at scale.

Thirdly, supporting stakeholders need to be able to keep up with developments in order to effectively deliver market and technical support as it's an industry driven by technical advancements. We found that R&D facilities were not a common offering by hubs in the continent.

[2]Intel Workshops on Intel Ignite & oneAPI for Startups held in Abuja, Nigeria (May 2022) and Nairobi, Kenya (July 2022); Intel Early-Stage Deep-Tech Investor Roundtable, Nairobi, Kenya (July 2022)

4. Minimal cross-industry collaborations and networking forums

While there exist deep-tech events and networking opportunities, we found there weren't as many compared to other sectors' events. These events and networking forums were also concentrated in a few select countries with the majority of the countries in the continent only having access to virtual ones. We also found that there were very few industry-focused corporate partnerships with relevant startup engagement programmes.

5. Gap between university/training and market

There is a discrepancy between university curricula and the market requirements in terms of the skills and knowledge needed to be successful in the industry. University training often does not provide students with the specific training needed to be successful in the market as programmes are not up to date with the latest market requirements. Academic and research institutions tend to focus on more theoretical aspects of technology, while in the industry, deep-tech is more likely to be applied and focused on development for practical purposes. In the seminars carried out (and referenced above), it was also found that students who had ideas related to space did not have access to the right networks in their various institutions as most of the networks were around theory, which limited them in terms of capacity to build prototypes.

6. Minimal academic documentation.

There are many reasons why academic documentation is important in innovation, especially in the industry.
First, it provides a record of the research that has been conducted and can be used to track the overall progress and growth of the industry.
Second, it can be used to communicate results to other researchers and stakeholders, which in turn enables prior mistakes by other researchers and entrepreneurs to not be repeated.
Third, it can help secure funding and can be used to promote and commercialise new technologies.
Documentation provides valuable information that can be used to improve technologies and build credibility for the technology by showing that it's supported by experts. While there is overall documentation in the sector globally, there isn't much originating in the continent, which would greatly aid the implementation and localisation of deep-tech in the continent.

7. Talent

Because of the speed at which technology advances, deep-tech startups need specific talent that may not be readily available or may be possessed by only a few individuals. Not all early-stage companies have the time and budget to absorb and sustain a consuming R&D process.

Conclusion

This report provides an overview of the landscape corporations are set to encounter as they begin to scope the opportunities for deep-tech across Africa. The continent remains underexplored and under-resourced when it comes to meeting the demand for financial and technical inputs to deep-tech ventures, and the high costs associated with the development of robust and cutting-edge technologies represent a significant obstacle to the development of a thriving ecosystem.

Stakeholders in the deep-tech startups ecosystem, as well as interested parties and partners; are encouraged to work together in shaping the development of a well-functioning ecosystem by providing technical assistance, training, and enablement to companies, increasing the internal capabilities of ecosystem support organisations, offering more specialised programmes/training. There are also encouraged to foster collaborations between corporates and startups, involving governments and policymakers, providing access to experienced mentors and coaches; and creating synergies with existing players, such as venture capitalists, governments, academia, and regulators.

About Intel

Intel Corporation ("Intel") is a company whose purpose is to create world-changing technology that improves the life of every person on the planet; designs and manufactures advanced integrated digital technology platforms that power an increasingly connected world. The platform consists of a microprocessor and chipset, and may be enhanced by additional hardware, software, and services. The platforms are used in a wide range of applications, such as PCs, laptops, servers, tablets, smartphones, automobiles, automated factory systems, and medical devices.

Intel Ignite

Intel Ignite is a startup growth program targeting early-stage companies that aim to be bold and innovative in order to disrupt their industries. The selection of participant companies is unique, with all startups needing to have secured initial funding (post-seed / pre-A stage). The goal of the 12-week program is to strengthen each company's performance in all relevant areas through highly tailored content for each portfolio company. Upon entering the program, the participating startups receive hands-on mentorship from Intel and industry experts in all relevant domains such as: product, technology, business, management, HR, finance etc. In addition, Ignite provides a preferred path to the best investors and all the knowledge, resources and association that comes from being accepted in one of the most challenging and competitive accelerator programs in the world.

Intel oneAPI for Startups

Intel's virtual global acceleration program that enables and nurtures cutting-edge startups in accelerated computing: AI, Machine Learning, Analytics, HPC, Graphics and Rendering. The program provides early-stage startups with stellar technical resources, including training, consulting, expertise, mentoring, access to compute platforms and SDKs, as well as go-to-market support with co-marketing, customer opportunities and ecosystem partnerships. It's a free membership program without cohorts or time limits and takes no equity.

About Briter Bridges

Briter Bridges is a fast-growing market intelligence and research firm focused on emerging economies. Briter has built the largest collection of visual publications on Africa and underserved markets and regularly provides data and insights to corporates, development finance institutions, governments, and investors. Briter's proprietary business data platform, Intelligence, is regularly used by thousands of public and private organisations ranging from the World Bank to Amazon and governments.

About AfriLabs

AfriLabs is a network organisation that supports 370 Innovation Centers across 52 African countries, founded in 2011 to build a community around Africa's rapidly emerging technology hubs. These hubs serve as centres that provide support to African entrepreneurs, innovators, developers, and youths, by providing physical co-working and dedicated office space, training, business, legal and financial support, helping to raise successful entrepreneurs that will create jobs and develop innovative solutions to African problems.

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