SOCIAL TECH ECOSYSTEMS IN SUB-SAHARAN AFRICA

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SOCIAL TECH ECOSYSTEMS IN SUB-SAHARAN AFRICA

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DISCLAIMER

This research was commissioned by Nominet Trust, Comic Relief and Indigo Trust. It is independent research and thus its views do not necessarily always reflect those of the commissioners. They feel, however, that this is a challenging, useful and timely addition to the discussion around social tech in sub-Saharan Africa, with findings that need to be considered.

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INTRODUCTION

Around the world diverse actors are working to develop technology that directly improves social conditions. This report refers to these types of technology as 'social tech'. Examples of social tech include anti-corruption systems for citizens to report bribes; communications platforms for refugees on the move; and systems that allow farmers to plan their next crop. Our investigation focused on projects that were locally ideated; we have generally excluded projects that were solely commercial.

The resulting report surveys how social tech is produced and used across sub-Saharan Africa, and what interventions might enrich and improve this 'ecosystem'. Its primary focus is on information and communication technologies (ICT), though many of its lessons will apply more broadly. It also concentrates on accessible systems, in which the end user is the person who benefits, rather than on specialised systems for professionals.

Commissioned by funders in the social tech sphere, the purpose of this report is to find where intervention might improve the ecosystem. We believe that addressing key weaknesses in the ecosystem can help new social tech initiatives – with powerful base-of-the-pyramid benefits – to succeed. We are not Afro-pessimistic: on the contrary. Intervention, however, is always a challenge, and we outline those areas where we consider improvements would have greatest impact.

A NECESSARY PATH

As a recent report from the United Nations (UN) points out, technology is a double-edged sword. Even as it helps us individually, it seems to be increasing inequality and poverty in many parts of the world:

> 'Dominant innovation trajectories fail to include significant numbers of people from [sic] the benefits of social and technical change, and these are disproportionately poorer and more socially disadvantaged groups, including rural inhabitants and women… [There is a need to] re-orientate and redirect innovation trajectories in ways that enable more inclusive, socially just and environmentally benign patterns of socioeconomic development.'[1]

Seen through this lens, social tech is a form of creative

technical resistance that emphasises justice, equality and inclusivity. Supporting Africans who are finding locally appropriate ways to build more inclusive, just and appropriate alternative technologies is an important and attainable goal.

SOCIAL TECH ECOSYSTEMS

This report uses the concept of an ecosystem to frame the interaction between actors engaged in the creation and use of social tech. An ecosystem is a holistic concept that accommodates complexity and transactions. An ecosystem includes mutual dependencies, flows and exchanges, and patterns of change.

When people think of technology, they often think of an app or an electronic device. This report challenges readers instead to think of technology as a blend of knowledge, intelligence, time, labour, organisation, money and law – a combination that shifts and changes over time. A new social tech initiative needs all these ingredients; the process of mixing the elements might go on for years before a product emerges, and it must continue after.

SUB-SAHARAN AFRICA AND TECHNOLOGY

It is difficult to speak coherently about 900 million people in more than 45 states, with over 1500 languages between them. Nonetheless, both within and without the continent, Africa is perceived and discussed as a market, a trading zone and a union. This study identifies some of the opportunities and challenges for developing social tech in ecosystems across sub-Saharan Africa. It attempts to convey the specificity of individuals in specific locations, while also noting commonalities of context.

Sub-Saharan Africa is more globalised than ever: stroll around any town and you might encounter Chinese construction crews, advertisements for Nestlé products, and people with Samsung phones using WhatsApp to find out if Alex Iwobi scored for Arsenal.

Technology is a global phenomenon that manifests locally; a Congolese teenager loves her mobile phone no less because it was designed in Korea and made in China. The minerals used to make her phone, however,

might be causing resource conflicts in her own country. A UK teenager would not face quite the same predicament. Technologies are enmeshed with global flows of capital, information, opportunities and inequalities.

OUR APPROACH

This report shifts fluidly from local and individual to continental and global levels. It looks both at emerging social tech and at the factors that might either nurture or suppress it. From the individual experience of a social entrepreneur in Togo, it moves out to broad generalisation about West Africa, and a discussion of how North American business practices are affecting that region.

The survey was conducted primarily from Europe and Uganda, interviewing individuals from 25 sub-Saharan African countries.[2] The broad nature of the study means that while it has distilled many important themes, it has also excluded much local information that may be key to the success or failure of an individual project within a single ecosystem.

This is a continental-scale study focusing on globally recognisable technologies; it covers the strata where hundreds of diverse people from dozens of countries intersect with global trends. An umbrella study, it should ideally serve as the starting point for a series of locally-authored reports that aggregate and analyse differences on the ground across sub-Saharan Africa.

A NARROW PATH

For the social entrepreneur in sub-Saharan Africa, the path to success is extremely narrow if their social tech venture is to achieve sustainability and scale.

Many of the obstacles they might face are the same as any other local tech initiative, including:
- Challenges in obtaining funding
- Few consultants or services to help their enterprise navigate the path
- An extremely difficult environment for distribution.

In many parts of this report, the local tech ecosystem was used as a proxy for social tech, mostly because its possibilities and challenges are similar, but also because the two were seen as interchangeable by many interviewees.

In addition to the challenges of running a tech initiative, however, a social mandate entails even more obstacles to overcome. If a team of developers is making an app for urbanites in the top 10% of Nigeria's earners, distribution is challenging but follows an established path. If the same team decides to run a technology hub in Lagos, there are clear models and competitive sources of funding.

If, however, these developers choose to provide a tech service to the majority of Nigerians – who live in rural areas, mostly without power or much disposable income to connect to the internet – they must take a completely different approach. This approach is out of reach for most independent teams. This has resulted in many projects that ostensibly target the bottom of the economic pyramid, but that can, in practice, only be accessed by those at the top of it.

This is not to say that social tech must always be targeted at the poorest. A number of projects reviewed, however, appeared to be income-agnostic but were only really used by the wealthy and urban, something not always obvious to those outside an ecosystem.

Fail fast

It is not surprising that the path to success is narrow. For example, there were at least seven collaborative encyclopedia projects before Wikipedia emerged, and there have been many since. Many observers at the time thought Wikipedia was built upon an inferior technology platform, but Wikipedia took the winning approach of privileging contributions over perfecting the software. The others failed. It wasn't necessarily a waste to have so many failed projects before someone developed a winning approach – ecosystems thrive on diversity.

The U.S. Small Business Administration data since the mid-1990s has shown that the average survival rate for a new business is 50% over five years. Silicon Valley tech startups have a higher failure rate: 'The type of failure we're talking about is like how frogs lay 20,000 eggs so a few wind up as adults sitting on a lily pad'.[3] This is not considered a failure for frogs; it is not considered a failure of the system in Silicon Valley either.

Failure is embraced in the Silicon Valley admonitions to 'fail fast' and to 'pivot'. Failure only means failure to continue one enterprise. The process as a whole is not necessarily a failure: even aborted initiatives often provide some services and returns on investment. They

might train future founders, teach employees to develop future products, or pivot into new approaches.

Although this study cannot give a rate of success or failure for social tech initiatives in sub-Saharan Africa, it draws on many examples of a growing density of projects, some of which seem to be successful. Individuals, organisations and even governments in the ecosystem have learned from failures. More fertile and dense ecosystems, like Kenya, are filled with experts who have seen many initiatives thrive or crash and have a very detailed and nuanced understanding of why. The death of organisms is a hallmark of a thriving ecosystem: it is called food and fertiliser.

A social tech project, however, is supposed to benefit society, so it should ideally be not only successful, but also a good societal investment. A talented young student who spends two years on a social tech initiative that succeeds modestly may otherwise have spent that time improving a government ministry, or building sorely needed infrastructure. There may be an opportunity cost for the individual, or for society.

Our report assumes that social tech has the potential to succeed as a societal investment. Its recommendations are aimed at widening the path to success. If we point out difficulties along the path, it is only to help clear that path and ensure that the costs to individuals or society are decreased.

Which path?

Not all failed tech projects were alike. Some teams had unrealistic ideas that did not match market conditions. We found that this was based, in part at least, on a sort of 'false consciousness': some young African techies model their goals and approaches on those of Silicon Valley, even though they live in a very different place with very different users and opportunities. The Silicon Valley model does not fully translate in a different context.

Other teams with great ideas couldn't access the necessary levers to get their work out to the world. Scaling often requires access to telecommunications infrastructure. Multiple teams interviewed, however, explained that telecommunications companies (telcos) won't provide that access to a startup without making it costly, or asking for very high equity.[4]

Sometimes lessons are hard to extract from a failure. The

failures of other projects, however, may be preventable with further support: these are the lessons that drive many of the recommendations in this report.

Finally, there was no single definition of social tech that was consistent across interviewees. Some were based in non-governmental organisations (NGOs); others saw themselves as a young Steve Jobs; one loved farming and built a social tech product to make it easier. Despite these differences, a role for social tech was clear to almost everyone.

METHOD

We interviewed 116 people from over 30 countries, in English, French or Portuguese. Our sample included African nationals in the diaspora as well as a few European and North American expatriates in Africa. 38 participants were women, 78 were men. For more detail about our research method, please see the Appendix on p. 79.

MAJOR FINDINGS AND RECOMMENDATIONS

FUNDING MODELS

FINDINGS

↘ There are far more social tech ecosystems in sub-Saharan Africa than there are countries. The funding landscape varies greatly across them.

↘ While a few interviewees made arguments for larger amounts of funding, many more called for seed, longer and patient funding. Speed to market is less of an issue than early-stage, flexible and stable funding.

↘ Money is important, but successful projects also cite advice, mentorship and powerful allies as critical to their success. These human resources are not available (or discoverable) in some ecosystems, even if a project has the funding to hire them.

RECOMMENDATIONS

↘ Funders should survey members of ecosystems within individual countries to assess where gaps or opportunities exist for funding.

↘ Funders should devolve the distribution of funding to local people where possible, without pressuring intermediaries to exercise draconian controls on grantees. Alternatively, funders should spend more time on the ground, working with and meeting local people.

↘ Too much funding is inflexible: funders should find ways to embrace the improvisation that is often necessary in these ecosystems.

RACE & FUNDING

FINDING

↘ Funding for tech startups (and social tech) in Africa is significantly tilted towards non-African founders and Africans who have studied abroad. There are many reasons for this, but it is unlikely they are all related to the quality of ideas or chance of success. 'Legibility' of these founders to funders also plays a role[5] – much of the problem may be 'implicit bias'.[6]

RECOMMENDATIONS

↘ Donors should develop techniques to avoid systemic racism, classism or sexism in the grant-making process. Industries where these techniques have been deployed have seen radical transformations.[7]

↘ Tech should be used to counter this trend. New platform-oriented approaches, for example Kiva, GiveDirectly and NGOsource, have shown that software platforms can direct funding in very different ways from traditional approaches. Software systems could be developed to provide better evidence,

faster response times and more flexibility than traditional giving, while explicitly fighting implicit bias through blinding techniques and algorithms. New approaches should be implemented with the caveat that thoughtful on-the-ground funders will still capture important information critical to decision-making.

ACCESS

FINDING

↘ The internet in Africa has low usage rates,[8] and these have been further eroded by the rapid spread of WhatsApp, Twitter and Facebook prepaid social bundles, humorously marketed as as 'WTF'. 'WTF' bundles only provide access to those services and block the rest of the internet. In most countries it is very difficult for small actors to get products out to market using the technology that the majority of people have access to: mobile phones using voice, text messages and text interface USSD (Unstructured Supplementary Service Data, an alternate form of texting common across Africa). Social tech developers are not getting the training they need to identify or assess users and markets at the bottom of the pyramid.

RECOMMENDATIONS

↘ Technology is not just apps. It is not just ICT. Social tech developers need to break out of the urban elite bubble of hubs to confront the 50-60% of their country that has a very different set of needs and capabilities. SMS (texting), USSD, voice and FM radio are less 'sexy' to work on, and much harder to learn or deploy, but they are ultimately a way to reach nearly 100% of the population.

↘ Donors should work with organisations promoting an open and 'neutral' internet. They should also promote the use of radios, especially for information dissemination. Information is costly and hard for most people to access.

↘ Some successful ideas will always be driven by a new technical capability. Nevertheless hub ethos and tech training should pay attention to other ways of ideating, e.g., starting with thoughtful social analysis and only then assessing technologies that might lead to a desired social impact.

↘ Donors should work to collectivise small actors to give them more bargaining power against telcos, or work with third party aggregators or tech service providers who can leverage access for smaller entities. Donors should engage larger development agencies like the UK Department for International Development (DFID) to help them engage with telcos and governments at large.

↘ The first wave of the current African tech scene focused on apps. This may be seen as a misuse of energy and talent. Social tech must get out of the App Store and out of the cities to find its next ideas.

↘ Most donors are putting energy into the tech side of social tech, creating a supply of teams and coders. The demand side, however, is equally important. Which community-based organisations are doing great work? How might tech help them? A percentage of funding models should be 'flipped' to pull technologists towards social teams.

HUBS

FINDING

↘ Tech hubs have been a great model for increasing tech development and nurturing a tech subculture. The model has been so successful

that some hubs are oversubscribed, with too many actors placing too many demands on them.

RECOMMENDATIONS

↘ Hubs should specialise rather than become catch-alls. Western donors should exercise restraint and help hubs to find their niche.

↘ Building new hub infrastructure has been prioritised at the exclusion of existing infra-structure. There are universities, think tanks, NGOs and other organisations that contribute significantly to the ecosystem. These should be grown and incentivised to partner with each other and with hubs.

↘ With hubs, as with anything, early gains can be obvious and dramatic. Longer-term impact can be far less dramatic, but is equally important. Funders need to stick with hubs and other projects, even as low-hanging fruit becomes harder to find, especially by support-ing core expenses. At the same time, some exciting early impacts might not 'stick', so it is equally important to take the time to test a programme or method for staying power.

01.
WHEN SOCIAL TECH WORKS

'This behavior of incoming things in local hands does not necessarily represent the far-reaching tentacles of globalization; in fact it also involves Africans themselves initiating the movements...involved in a process of exchange, emitting their own things in exchange for those of the outside world. The goods are not just coming to them; they are actively constructing transnational networks through their own mobilities in the world—or those of their goods...It is within this global engagement that Africa has provincialized or tamed...the cell phone and, more recently, revolutionized its applications.'

Clapperton Mavhunga, professor, Massachusetts Institute of Technology (MIT)

SUMMARY

Current technology and development initiatives in sub-Saharan Africa are situated within the broader context of globalism and colonial legacies, leading to recommendations for more devolved approaches to funding.

Definitions and interviewees' conceptions of social tech are briefly explored. Four key types of social tech projects are outlined:
• Mission-enterprise
• Secondary-effect
• Programme-oriented
• Infrastructural

Three case studies of social tech initiatives across the continent illustrate varied routes to success.

INTRODUCTION

The report sets out to describe the social tech ecosystem in sub-Saharan Africa. Commissioned by three UK-based foundations, it focuses on a mutually-defined idea of social tech, described and illustrated in the following sections.

The majority of examples cited by interviewees fall within the space of digital ICT (information and communications technology). This might include mobile apps, software platforms, or systems that use telephony features like voice and SMS.

There are many other kinds of technologies, from transportation infrastructure to pharmaceuticals. In general, these require rates of capitalisation and manufacturing infrastructure that go beyond local capacity – though certainly many Africans are contributing to international collaborations on these more involved technologies. This report, however, focuses on technologies that could be developed by smaller teams without high capitalisation, solving local challenges.

The report's primary focus and recommendations are aimed at readers in the West, who wish to engage in promoting and benefiting ecosystems in sub-Saharan Africa. Nevertheless, we hope that readers in sub-Saharan Africa will recognise the picture painted and find the report useful too.

There are many ways to effect social change, from finance and teacher training, to healthcare and research. So why focus on technology? We argue that the central promise of technology is that it offers the potential for scaling, in particular a kind of scaling that does not require a great deal of pre-existing infrastructure. That is, with relatively small investment and little infrastructure, an outsized impact may be achieved. Scaling is discussed several times in this report. This focus may seem reductive, but we argue that most other positive qualities people cite – affordability, ease of access and speed – are generally proxies for the potential to scale in seeming disproportion to the resources invested.

TECHNOLOGY FOR GOOD

Technology is a profound and powerful force in contemporary global culture. Barely used before the 20th century,

by one measure, the word 'technology' has become over 250 times more popular in the past 100 years.[9]

Our capabilities and identities as individuals and nations are deeply intertwined with our relationship to, and mastery of, technology. While Europe has been quick to adopt new technologies, this adoption has also led to new problems. Technology-driven global warming, nuclear devices and anxieties around genetic engineering or restless robots have largely replaced the natural or mystical as the sources of the West's most lurid fears and most pressing threats.

We should approach the idea of any technology for societal good with care. Recent massive increases in global inequalities are, according to some analysts of globalisation, in part driven by new kinds of ICT. The Green Revolution increased caloric output, but at the cost of increased oil dependency, both through mechanisation and the production of nitrogenous fertiliser.[10] Industrialised food production requires between 7 and 10 calories of fossil energy for every calorie generated.[11] Despite our fears, we tend to expect that technology has almost limitless possibilities as a force for positive outcomes and even as a force for liberation and emancipation. This kind of optimism is partly what drives the growth of social tech. It is critical to separate the hopeful from the possible, so that technology's benefits to society can be fully realised.

MOBILE PHONES IN AFRICA: SETTING THE SCENE FOR SCALABLE SOCIAL TECH

Africa has seen rapid rates of adoption of one of the most contemporary technologies: the mobile phone. Since the mid-2000s the growth of mobile devices – the first widely deployed digital ICT on the continent – has tied Africa and mobile phones together in the public imagination.

GSM telephony was developed primarily in Europe for European markets: one of the founders of the GSM specification described its adoption in the Global South as an 'unintended consequence'.[12] Nevertheless, despite the GSM developers' lack of user studies, co-design, a 'bottom-up' process of development, or significant

cultural adaptation of the underlying technology, mobile telephony has been accepted and widely adopted across sub-Saharan Africa.

Many observers have argued that mobile devices allow African countries to 'leapfrog' over earlier generations of technology – landlines, desktop computers and power grids – which have not achieved the same saturation, despite greater investment and much longer introduction efforts.

Moreover, although mobile growth was underwritten by some of the most powerful corporations in Africa (and the world) and ushered in by government-granted tax breaks and monopoly rights, its growth was also 'organic' – driven by demand rather than planning.

Mobile phones have spread considerably. The extent and effect of their spread is more complex than the popular narrative suggests. As outlined in Chapter 4, *Big players*, phones are not nearly as widespread, nor are their impacts as equitable, as a decade of breathless articles have portrayed.

As eloquently described in the World Bank's *World Development 2016: Digital Dividends* report, mobile phone access alone is not enough; a lack of supporting infrastructure dramatically diminishes the positive impact of ICT.[13] Without a doubt, however, mobile telephony has scaled and spread across sub-Saharan Africa in a way that begs the question: what other technologies might scale as organically and effectively?

SCALING SOCIAL TECH

The promise of scale in social tech is often broken. As one recent study noted, 'Despite enthusiasm for small-scale investment in piloting new innovations, there appears to be a broad failure in the Humanitarian Sector's ability to scale up and scale out successful ideas.'[14]

Echoing this view, Kiwanja.net's *Donors Charter* has described the wider sector as 'full of failed pilots' and 'other poorly planned initiatives', which in their profusion only confuse the end user and waste precious resources.[15]

While higher success rates would be optimal, however, replication and 'failed pilots' are not necessarily bad for the ecosystem, or without value. The US Department of Labor shows that by 2016, only two-fifths (41%) of infor-

mation sector businesses founded in 2011 were still in business; by that same year, only a quarter of businesses founded in 2006 had survived.[16]

The issue is not that too many projects fail. They do. But social tech failure rates may not be higher than tech failure rates in Western ecosystems. Should projects in sub-Saharan Africa be held to a higher success rate than those in the UK or France? Some of the systemic and infrastructural reasons why many projects fail to 'lift off' are outlined in Chapter 2, *Lifecycle of a social tech initiative*.

CASE STUDY:
M-PESA: MADE IN THE UK

M-Pesa, a mobile phone-based money transfer, financing and microfinancing service, is often cited as the gold standard in African financial tech (fintech), and an inspiration for governments or funders to invest in tech hubs. Everyone wants to found or fund the next M-Pesa.[17]

The conditions underlying M-Pesa's creation and launch, however, bear no resemblance to the context of an ordinary entrepreneur dreaming big inside a sub-Saharan tech hub. Because M-Pesa is so frequently cited as an example of African-derived tech innovation and the continent's ability to spread homegrown tech innovations elsewhere, it is vital not to conflate M-Pesa's success with what might be possible for entrepreneurs and funders who are working outside of the telcos.

The service was incubated inside British multinational Vodafone, in partnership with the UK's Department for International Development (DFID) and Vodafone's Kenyan subsidiary, Safaricom. These founding partnerships gave Vodafone critical convening power. At the outset, Vodafone gained the support of government regulators, and brought on board a major banking partner, the Commercial Bank of Africa (CBA).

Start-up capital of around £2 million allowed Vodafone to recruit a UK software company to develop the initial platform, and M-Pesa's servers were based in the UK to provide faster internet connectivity. During the pilot, Safaricom staff

handled customer service and managed cash flow.[18]

Most significantly, as an inside project, M-Pesa did not have to negotiate access to Safaricom's users or discounted rates in order to scale. The World Bank report *Digital Dividends* (2016) observes that M-Pesa's early growth and consolidation as a market leader benefited from exclusivity agreements that locked out mobile money competition for seven years, as well as from the hands-off approach of Kenyan banking regulators.

Though Safaricom resisted the entry of competing service providers, in 2014 the Competition Authority of Kenya (CAK) changed the rules; as competitors entered the market, transaction costs of transfers dropped by a third.[19] New regulations enforcing M-Pesa's interoperability with other mobile platforms are being mooted by the Kenyan government, to curb Safaricom's market dominance and bring down consumer prices.[20]

The motives behind Vodafone's investment in M-Pesa were made clear by the company's CEO at the time, Arun Sarin: 'This is not for altruistic purposes…We have no desire to undertake the role of government or NGOs or embrace an exclusively philanthropic approach to "do good". Rather we recognise that around 20% of the world's mobile phone users are from low to middle income countries and can see that the next billion mobile users are likely to live in markets which have very different needs from those we are used to'.[21]

While much of M-Pesa was built in the UK, the innovation of mobile money transfer did occur in Africa. As Binyavanga Wainaina wrote in 2007, the year of M-Pesa's launch, 'Now there is a pilot project in Kenya, the first in the world, to transfer money, Western Union style, to anybody with a cellphone. It is exciting, yes, but then people have been sending money to each other in Kenya for years. Send minutes to someone, and they can resell them for cash.'[22]

TYPES OF SOCIAL TECH IMPACT

This report uses the term social tech to encompass the broad range of initiatives that fall in the domain where technology is designed or deployed to improve lives and capabilities and to create positive social impact.

This study has concentrated primarily on direct, instrumental projects, which seek to create direct social benefit. It has also focused on projects that seemed to be more locally ideated and smaller, i.e., ICT-oriented digital projects rather than larger infrastructural technologies.

Nonetheless, four types of social benefit associated with technological innovation emerged out of the interview responses:
- Mission-enterprise social tech
- Secondary-effect social tech
- Programme-oriented social tech
- Infrastructural social tech.

MISSION-ENTERPRISE SOCIAL TECH

These are enterprises that exist primarily to develop a specific technology for a particular mission.

To take examples from the for-profit space, the Twitter company runs the Twitter website. While it has experimented with other services, this is the core of its operations. A company like Apple differs in that it sells computers and phones, software and cloud services; its enterprise has many missions. In the social tech space, the Wikimedia Foundation was created to maintain Wikipedia, and this is its main goal.

Most social tech startups follow the Wikipedia kind of approach – the startup is built around one primary product. These enterprises are usually led by an idea for the technology (though sometimes by the mission), and funded by donors or venture capital. They generally look much like any tech startup, except that they add a layer of mission that goes beyond generating revenue.

In this approach, the social tech enterprise is tied very closely, usually exclusively, to the mission and to a product that seeks to promote that mission. The enterprise stakes its success on the popularity and impact of its tech.

SECONDARY-EFFECT SOCIAL TECH

A second model of social tech that many interviewees noted consists of a tech enterprise that is not mission-bound to produce a positive social impact, but does so as a by-product. For example, a commercial financial transfer app might create better access to resources, or generate a much-needed societal benefit such as employment. This is what the president of General Motors meant when he said that 'what was good for our country was good for General Motors, and vice versa.'[23]

Scholars of technology sometimes refer to these by-products as 'secondary effects'.[24] Secondary effects can be as powerful – good or bad – as the primary intended effect of a technology. For example, the most significant aspect of our labour-saving, carbon-fuelled economy may actually be the climate change it is provoking.

Although this study does not focus on technologies that produce social secondary effects, some examples were included, because they were suggested by interviewees as positive examples of social tech. The distinction between this category and the mission-enterprise approach was not especially important to interviewees in Africa, who typically saw any tech company that generated local revenue and employment as social tech.

Secondary effects, both positive and negative, can be controlled, not only through conscious framing, but also through external constraints such as legislation and culture. A startup in Germany, for instance, might produce better working conditions than a startup in a southern state of the USA. In Germany, labour laws are stronger, and sensibilities around workers' rights are generally accepted throughout society. In the southern states of the USA, unions have never been strong and working conditions are poorly regulated. The secondary effects of companies producing the exact same product in different locations, thus, would lead to very different policies on maternal and paternal leave, work week hours, workspace design, or healthcare, etc. One way of encouraging the societal benefits of technology might be to foster legal structures that support positive secondary effects.

PROGRAMME-ORIENTED SOCIAL TECH

NGOs, government ministries and community-based organisations (CBOs) are more likely to engage in social tech that facilitates a particular programmatic goal. Examples include medicine tracking and authenticity systems, anti-corruption systems, or birth registry systems.

Many social tech projects serve a programmatic need of one of these large organisations: this market is so large that it has fed a local class of enterprise, which provides software development, implementation and support services for such initiatives. Examples include tech solutions companies like Praekelt or VotoMobile.

This approach to social tech has demonstrated its capacity to scale and sustain (see U-Report p. 38, and MobileVRS p. 24), as well as to fail. It is not, however, like market-driven approaches, such as the telco mobile networks described earlier, which scaled so effectively.

Although driven by Western organisations, programme-oriented tech is very different from the sorts of consumer-focused technologies or infrastructural investments favoured in the West. A sick person in the UK would be unlikely to rely on an app developed by the Saudi Red Crescent Authority to solve a health issue; they would turn to the National Health Service (NHS), or perhaps go to a Western commercial website like WebMD.

BREAKOUT
BRITTLE SYSTEMS

While programme-oriented and infrastructural social tech initiatives have tremendous advantages, like big budgets and the ear of key government agencies, they can fail. Government projects may suffer from nepotism or siphoned funds. NGO initiatives may fall victim to changing donor priorities or 'waterfall' development approaches that do not touch the earth until the very end of the process. The top-down, donor-funded nature of most of these projects can also sometimes lead to what we call 'brittle systems', i.e., systems that might work within a bureaucracy, but are less robust

when operating within the more complicated ecosystem of the real world. Brittle systems are typified by a mechanistic view of users, who are modelled almost as labour or raw materials.

Brittle systems rarely allow users to exercise their own initiative or creativity. For the system to work, users must act 'rationally' – that is, according to the rationality of the NGO developing the system, usually to meet its own needs. Users cannot apply the technology to other aspects of their lives or needs; it is developed for one programme only. Finally, the system usually relies on inputs (money, labour, information) from the NGO, which might come to an end. The system cannot survive and fails after the inputs are removed.

RemindMi is a UNICEF-led (with government) social tech initiative for post-natal health, currently active in Zambia. RemindMi is widely considered a successful example of a social tech. It also demonstrates many of the qualities of a brittle system: it is defined by a single programme; works with trained staff; beneficiaries are not users. RemindMi uses SMS messaging to remind health workers to follow up with mothers or caretakers to bring their new babies to local clinics for checkups. While it does offer help to mothers and infants, it is single-use and the mother cannot benefit from it except in one very narrow way. The NGO's programme is the 'subject' of the system, and the user is processed by the system. This is a standard approach for development technologies.

REMINDMI PROCESS
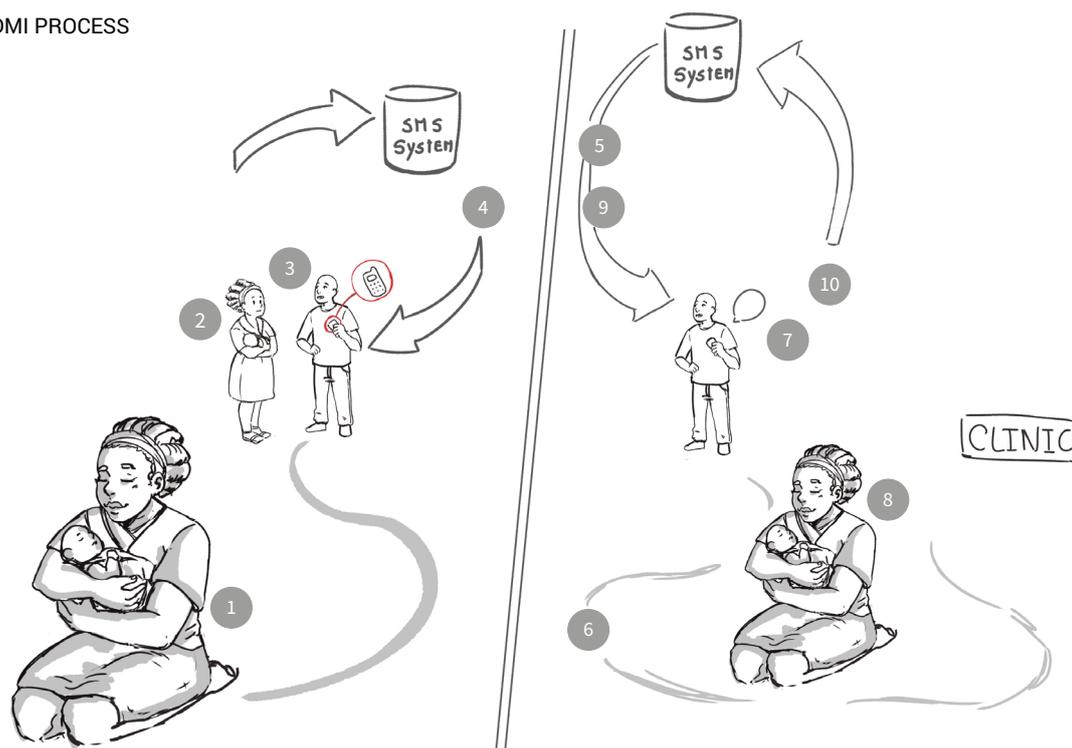
Figure 1. This drawing maps the stages of the RemindMi process, an example of a single-use platform that has many of the characteristics of a 'brittle system'. The drawing and text are adapted from a UNICEF diagram. (Drawing: Helena Barbosa for M-ITI, 2018)

1) Baby is born
2) Community health worker (CHW) informed of birth
3) CHW sends birth registration to system
4) System acknowledges registration
5) System tells CHW to remind mother to go to the clinic
6) CHW contacts mother

7) CHW texts system 'Told'
8) Mother goes to clinic
9) System asks for confirmation
10) CHW checks whether mother has visited clinic and updates system

In contrast, WhatsApp is a corporate messaging service used by families to discuss errant youth; by peri-urban villages to coordinate ridesharing; by activists to organise actions; or by teachers to plan lessons. Its interface is the same for all these groups. Its developers did not analyse the needs of any particular users in Africa. Yet WhatsApp is still very useful to a wide range of people for a wide range of activities. This is partly because users may bring their creativity to bear and use it in different and localised ways. The politics of a commercial platform like WhatsApp are complicated but its users do feel a degree of ownership over their accounts and social networks.

We suspect that NGOs would do well to look at the success of platforms that give their users freedoms and capabilities across the range of their lives, rather than in one particular activity. They should see their beneficiaries as local experts, with the creativity to adapt and enhance the NGO's social tech. This will increase adoption and lead to more sustainable systems.

The clearest example of this might be mobile money systems such as M-Pesa (see case study on p. 14), the now-legendary Safaricom product. M-Pesa and related services, which allow for the electronic saving and transfer of money by the previously unbanked, have transformed finance throughout many regions of Africa and increased financial possibilities, security and access.

Many other similar fintech companies have produced tremendous impact. For example, Sierra Leonean startup SplashMoney was able to distribute funding to health workers during the Ebola outbreak, allowing them to continue their work. The entrepreneurs behind SplashMoney did not intend for the company to be a social tech initiative, yet the impact of the infrastructure they had created doubtless saved and improved many lives.

That said, the *overall* impact of platforms like M-Pesa, which no one doubts has been significant, has yet to be fully understood. The sudden financialisation of much of Africa may open labour up to the sorts of extractive relationships with global capital that have proven so detrimental to regions rich in oil, minerals, timber, diamonds, or ivory – a relationship known by economists as the 'resource curse'.

RECOMMENDATION

↘ NGOs should avoid 'brittle systems', where beneficiaries are cogs in a complex machine. Instead, most social tech products designed by NGOs should increase agency and serve users' lives holistically, so that the system is useful in the broadest way possible. One alternative is to use a system (like SMS) that people already use for everything else. Where possible, add to users' freedoms and capabilities rather than restricting them.

INFRASTRUCTURAL SOCIAL TECH

The fourth type of project encountered acts as a form of infrastructure, since it adds capabilities at such volume that its use in socially beneficial ways might dwarf many mission-specific projects.

BREAKOUT
UNDERSTANDING SOCIAL TECH

During the course of this study, only a handful of interviewees had previously encountered the term 'social tech'. Guesses as to what it encompassed ranged from 'Is it the same as social media?', to a wide range of ideas about technology pressed into service for social good, either through government agencies, NGOs, or the private sector. Interviewees in Anglophone Africa were more likely to link the idea of social tech to entrepreneurship. Those in Lusophone Africa were more likely to describe social tech as powering social transformation driven by community-derived vision. In Francophone Africa, meanwhile, interviewees more often suggested that any social innovation or tech business could be described as a form of social tech.

Here is a sample of responses we received to the question: 'What does social tech mean to you?'

'Tech that is solving social problems at scale (though, could be small-scale interventions too), that were previously core government funded.' - *Social tech entrepreneur, Kenya*

'When people use tech tools to produce results for community.' - *Tech journalist, Ghana*

'[It's] not a field of science, but a sphere of people. People have concerns and produce artefacts that are based on the needs of the community.' - *Government regulator, Mozambique*

'Social tech is a set of methods and tools that allows for social transformation and addressing social needs…methods that bring big groups and society into the process of finding solutions based on social priorities.' - *NGO executive, Angola*

'Addressing the need of the local people using technology.' - *Digital entertainment entrepreneur, Ethiopia*

'It's about the application of appropriate technology by governments, private sector or civil society actors to strengthen existing solutions to social challenges or opportunities.' - *Foundation executive, Kenya*

'[Tech entrepreneurship] is social if it's by a woman: it will mean a happy family whether it is for or not for profit.' - *Startup supporter and gender activist, Benin*

'Any entrepreneurship is necessarily "social" in Senegal. 95% of companies have no legal entity but are part of the informal economy.' - *Impact investor, Senegal*

they frame the project in a very specific way with a clear narrative: 'Corruption? We have an app for that.' They have low overheads, so in theory every pound invested is a pound for the mission. So far, however, they generally have the lowest societal impact. Maximising secondary effects may be less direct, but may impact many other projects for many years to come, leading to a much higher impact.

RECOMMENDATION

↘ European funders and enablers can and should engage in all four types of social tech. Each requires a different set of expectations and approaches, and much more can be done to differentiate and analyse their strengths and weaknesses.

For example, it is easy to justify mission-enterprise social tech organisations, because

SOCIAL TECH IN ACTION: THREE EXAMPLES

CASE STUDY 1: **iCow**

Figure 2. A farmer uses iCow to obtain useful agricultural information on her mobile phone. © iCow (www.icow.co.ke)

iCow is an African-founded, African-led, private sector social tech initiative that has succeeded in scaling and that is 'close to sustainability'. Unusually, iCow was founded by a farmer rather than a developer. It was created to help fellow farmers succeed, by providing them with accurate, helpful and timely agricultural and livestock-related information where and when they need it.

A text-based, mobile phone application, iCow gives farmers access to information, agricultural education and extension services through their phones.

Services offered include 'Farmer Library', an offline agricultural wiki of vital content for farmers without internet access and a variety of 'Kalendas', which remind farmers what to do, e.g., when to milk cows or how to track a cow's oestrus cycle.

Farmers receive information in SMS format in their chosen language. iCow works on every kind of phone. Founder Su Kahumbu's professed goal is 'to secure Africa's food production', and for 'iCow to be the agricultural solution of choice for farmers across Africa'. Kahumbu explains:

'Access to information was my greatest challenge as a farmer. This is why I am adamant in ensuring this is not a problem for farmers today.' She adds: 'I still find it amusing that I am considered a technology entrepreneur. I continually push the tech parameters due to my ignorance of the field, but as long as this ends up with the solutions I want, then it is okay.'

Kahumbu credits many key individuals and organisations for getting iCow to where it is today, including the Indigo Trust, which took the risk of investing in them early on, after they won an Apps4Africa award in 2010. They found an excellent, local business consultant who helped them figure out a business model and manage key negotiations with large and powerful partners. Sources of revenue include their partnerships with:
- Telcos: enabling iCow to reach subscribers to their farming information SMS services
- Universities and research institutes: iCow captures data, which is processed by researchers, and then feeds useful new, research-based information back to farmers. This is going well and has potential to scale globally – Kahumbu is exploring franchising to Peru
- Governments: iCow is charging platform and consulting fees to take iCow into Tanzania and Ethiopia.

There are major advantages to working through governments, particularly in terms of scaling. In Ethiopia there is only one telco, controlled by the government, which gives iCow access to the entire market. In Tanzania, there are four or five telcos. A bigger problem in this context is the expense of SMS aggregation. Licensing costs, even when working through an aggregator, are steep, but partnership with a government can help to bring down those costs.

iCow's current wave of funding has come from a philanthropic investor based in Switzerland that is helping iCow to grow and to expand into other countries, as well as assisting with tech development. Ultimately, Kahumbu credits iCow's ability to beat out competitors

to her team's deep knowledge of, and commitment to, the community it serves: farmers.

Figure 3. iCow sends text messages to subscriber farmers' mobile phones, with useful advice on caring for cattle. © iCow (www.icow.co.ke)

CASE STUDY 2: **MomConnect**

MomConnect is a South African maternal healthcare programme, initiated by the government's Department of Health. It connects pregnant women and new mothers into vital services and timely information via text messages.

Though led by government, MomConnect was developed with over 20 partners from the public and private sectors, including the tech solutions company Praekelt and external donors like the United States Agency for International Development (USAID) and the private ELMA Foundation. Launched in August 2014, MomConnect scaled to reach over 700,000 registrants across South Africa in one year.[25] The platform now connects over a million women to the maternal services they need.

WHAT IT DOES

Through MomConnect, women receive timely text messages on their mobile phones, providing them with key information at different stages of their pregnancy and during their child's first year of life.

MomConnect is free to use. Information is available in all of South Africa's 11 official languages and tailored for women who identify as HIV-positive. An interactive (USSD) text-based helpline that can be used on any mobile phone crucially allows women anonymity, giving them a sense of safety and privacy in what can be a 'stigmatised domain'.[26]

Mothers are also able to provide feedback on the healthcare they have received. MomConnect is integrated directly into South Africa's national health system, so information from mothers cycles directly back to government, where the data is used to improve health services across the country. The government aims to use MomConnect to register all pregnancies nationally.

MOMCONNECT'S SUCCESS

MomConnect is one of the few digital health systems to scale at a national level in a low- and middle-income country. A recent report by the UN Foundation notes government's ability to 'leverage existing programs

Figure 4. © MomConnect (http://www.health.gov.za)

and partners and unite them to work together towards one solution' as a key factor in its success. It describes MomConnect as an example of what can be achieved through 'strong government stewardship and a clear vision.'

The report contrasts such a coordinated approach with contexts where typically 'a pool of innovators are struggling to get the government's attention or…there is no initiative or funding available for disparate programs to collaborate with each other.' [27]

That MomConnect was able to build upon an array of existing programmes, as well as experiences and insights developed during a decade of launching, testing and refining pilots, also contributed to its considerable speed in scaling. The wealth of existing experience and projects that could be connected to one another dramatically reduced the time and financial investment needed for

MomConnect to scale.[28]

The programme also benefited from the government's ability to negotiate significantly discounted rates with the telcos. Most of MomConnect's programme spend, however, is on SMS and USSD data; possible hikes in data costs are cited as a key risk to MomConnect's business model.[29] The programme's reliance on external donors to supplement government funding also makes its 'free to use' model precarious.

CASE STUDY 3: **MobileVRS: Birth registration in Uganda**

Figure 5. A mother displays her child's short birth certificate generated by Mobile Vital Records System (Mobile VRS), at Mulago hospital. At the hospital, birth registration is done using Mobile Vital Records System (Mobile VRS), an innovative technology supported by UNICEF to improve birth registration in Uganda. © UNICEF/UNI149907/Sibiloni

The MobileVRS project in Uganda – whose lead developer is an author on this report – was a project by the United Nations Children's Fund (UNICEF), Uganda Telecom (UTL) and the Uganda Registration Services Bureau (URSB) to build a cheap, easy-to-use system for notifying the government of births. Lack of a birth certificate is significantly correlated with child trafficking. Access to many important services in Uganda, such as going to university, requires a birth certificate. When the project started, however, less than a third (30%) of an estimated 1.4 million annual births were being registered.

The goal of MobileVRS was to provide enough information at birth to obtain a short birth certificate right away, and allow for any information needed for a long birth certificate to be added later.

Under the previous system, a hospital would sequentially fill a 300-page book with new birth registrations; when the book was full it would be sent to the URSB for logging, after which the birth records could be printed.

MobileVRS benefitted from its powerful partners. UNICEF made sure that regulatory issues were taken care of by involving the URSB, which is responsible for birth registration and any laws that govern it. The URSB made sure that the birth registration process worked with and reinforced the existing birth registration structures at the time, rather than replacing them. The same institutions and users were maintained, but given tools that made their work easier and faster.

UTL was brought on board as the developer of the system,

donating time from its highly experienced software development unit. UTL was the former state monopoly, so it had an in-country development team.

The project was primarily seen as corporate social responsibility (CSR) on UTL's part, but it also generated financial benefit. Births are registered on UTL's network, creating revenue inflow for the company. Clauses in the agreement favour UTL over other providers, for the provision of telecoms services in areas where its network is available.

Importantly, the team agreed to use USSD and SMS – two technologies that are widely available and understood in local communities – for community birth notification, rather than a smartphone app. This mix of technologies avoided being smart beyond the access or capabilities of the intended users.

Finally, the MobileVRS team invested time and energy into understanding and accommodating user requirements. For example, the system allowed people to leave out the name of the registered child to begin with, as in many communities children are named at a ceremony long after their birth. Since its launch in 2011, Mobile-VRS has registered around four million new births. Other African countries are considering rolling out the system.

The success of Mobile VRS relied on at least four key factors: government inclusion and ownership; the use of an experienced local team; extraordinary access to resources from a technology partner (UTL); and the willingness to resist the siren call of the latest tech fashion.

DISRUPTION:
THE CHALLENGES OF DOING GOOD WITH TECHNOLOGY IN AFRICA

SUMMARY

This section offers insight to those with less knowledge of Africa and Europe's historical entanglement via colonialism. This relatively recent history strongly informs many Africans' perspectives on current development initiatives or investment coming from Western governments and organisations. In what remains an unequal dynamic with regard to economic power, memories of this past may, for Africans, prompt particular types of questions around Western engagement. For example, Africans might ask: whose interests are being served by your presence in Africa? Are you attempting to define my interests for me? Are you importing your own agenda?

Are you expecting to call the piper's tune? How is encouraging specific technology approaches in Africa different from previous initiatives?

We believe that Westerners engaging in any development or investment initiatives on the continent need to be mindful of and sensitive towards this dynamic in order to avoid the mistakes of the past. With sustained effort, burgeoning social tech initiatives in sub-Saharan Africa have great potential. But without active work, they are likely to fall into consistent and well-worn patterns of engagement.

Intervention and intention

What does it mean to develop technology for social bene-fit in Africa? What are the social benefits implicit in the term social tech? This is not an academic question: it is fundamental. European interventions on the African continent have always had a technical side, explicit or implicit, and however well-intentioned, these interven-tions and their consequences have had an ambiguous and often troubling history. As we will demonstrate in more depth later, scepticism for social tech initiatives (and foreign assistance for development in general) came up repeatedly in interviews.

For this reason, the report includes this 'disruption' in its text. Rather than qualify every part of the study, this disruption addresses the history of Western/African tech-nical entanglement directly and up front, a history that is far better remembered and more central to discourses on the African continent than it is in Europe. Experts in development may not need to read this synopsis, while those coming from the tech side might find the context helpful. Some readers may wonder if this is more politics than technology; the two, however, are never separate. As the sociologist of technology Bruno Latour has noted, science and technology are politics by other means.[30]

The historical and systemic processes described in this chapter are massive and not the result of actions by any one individual, family, or country, but rather an accu-mulation of countless actions over centuries. Similarly, the current of these processes is so strong that a well-in-tentioned individual or project can hardly help but be affected by them, even if they set out in a different direction.

As disturbing as it may be to confront, ignoring this history would be a mistake. Centuries of interactions have fallen into consistent patterns, though the names and intentions of the actors varied. Anyone from the West attempting to do good through technology in Africa must work mindfully and strenuously to keep this history from repeating itself.

Different experiences of empire and colonialism, diverging views of history

The history and legacies of Europe and Africa's mutual entanglement during the Atlantic slave trade (approxi-mately 1500-1900) and the colonial era (approximately 1880s-1960s) continue to be understood and processed very differently in Europe and Africa.

The recent UK controversy around a statue honouring Cecil Rhodes, the chief architect of Britains's colonial empire in southern Africa, is an example of how much views about the past may diverge along lines of race and continental origin. For the majority of young African students at Oxford University and elsewhere in Africa, the appropriateness of removing the statue from a college courtyard was clear. A YouGov poll conducted in January 2016, however, found that nearly three-fifths (59%) of British people felt the statue should remain in place; the same poll also found that more than two-fifths (44%) of British people thought Britain's history of colonialism was something to be proud of.[31] The statue still stands.

While the reprehensible aspects of European empire and colonial rule in Africa are established as historical fact, the details of this history are little taught in standard school curricula in Europe and North America, and remain relatively unfamiliar to the wider public in the West.[32] Yet understanding how colonial history and its legacies continue to be viewed in many parts of Africa is key for Westerners wishing to engage with African communities, whether in business or non-profit development work.

In different parts of Africa, at different times, this history included the enslaving and killing of millions;[33] violent wars of colonial occupation and the allied, ongoing 'paci-fication' of local populations; forced labour to build roads and railways and extract minerals; land alienation and confiscation of livestock; the dispossession of mineral rights through deceit; the destruction and looting of palaces, cities and villages; brutal tactics of torture and detention during African wars of independence;[34] the (literal) demonisation of African religions; and ongoing, racist disparagement of African intellectual, artistic and philosophical achievements – a basis first for justifying slavery, and subsequently for Europe's colonising pres-ence.[35] Across the continent, African societies and cultural resources were destroyed or disrupted, and ultimately 'all African societies suffered a great blow through the loss of sovereignty'.[36]

Once Europeans had secured their African territories, later phases of colonialism turned their emphasis towards a model of development. The 1920s-1940s were characterised by paternalistic schemes that sent profits to Europe, while the postwar era saw France and Britain instigating multi-year development schemes that benefited from a commodities boom.[37] For colonial administrators, the development project 'implied that

the possessors of knowledge and capital would slowly but generously disperse these critical resources to the less well-endowed.'[38] In the 1960s, France and Britain transformed their colonial development apparatus into a foreign aid system that 'reaffirmed their generous superiority' but 'denied responsibility for the social and political consequences of economic change.'[39] In the words of the eminent Africanist historian Frederick Cooper, 'Africa would become the world's project for uplift'[40] as it maintained a vocation as the world's 'zone of extraction'.[41] The tail end of colonial rule is a history that remains within living memory for many Africans. Indeed, the term 'neo-colonialism' is sometimes used to describe the pervasive ways that these dynamics often persist, despite the absence of formal colonial rule.

Voices from our interviews

European-led development initiatives on the continent will inevitably be viewed by many sub-Saharan Africans in light of earlier European-African relations, in which Africans were denied agency, sovereignty and scope to set their own agendas, or in which profits were reinvested outside the continent. Aspects of investment or development projects that echo any of these features are likely to be perceived as symbolically and structurally similar to colonialism, and while funding may be embraced out of necessity, the initiative may be regarded with ambivalence or cynicism. Examples that may fall into this category are projects that extract data from Africans, digital identification (ID4D) systems that can track Africans, or international labour applications that pay less for equivalent African skills.

For many Africans, foreign aid directed towards Africa is intended to serve the interests of the West (as, in a previous era, did the projects first of empire and then colonialism), by opening up new reserves or resources, or simply providing salaries for Western aid workers. As a Ghanaian investor in the diaspora put it: 'The aid industry is too big to fail, and the biggest benefactors are the grantors and trusts, because for every US$10k granted there is an apparent US$40k lurking in the woodlands. The industry exists for white people to create jobs for themselves and perpetuate the trade.'

Another West African investor saw the emergence of 'social tech' as an investment category as a sign that traditional forms of aid were no longer useful to the West and likely to fall away: 'Social impact has become an issue because we are seeing the end of aid as we know it. As the impact of aid doesn't entirely have visible successes, there has been a certain lexical refashioning. And that is why terms like social tech have come to face [the] light of day.' Yet others see foreign aid as a partial and inadequate form of reparation for damages wrought by slavery and colonialism. As a top Nigerian tech hub co-founder put it: foreign aid is 'our stolen wealth partially returned in the guise of charity.'

A former tech hub professional from Kenya emphasised how power imbalances between Africa and the West make it extremely difficult for Africans to challenge imported tech agendas, and indeed to 'perform' interest in the latest development model:

'It's all about power dynamics; what years of being the experiments and guinea pig of parts of the world has taught us is that you perform for whatever presents itself. So, if the World Bank or whoever else comes singing praises about your potential, you sing a song and adapt and you take whatever you can, and that's become a philosophy. So you know what, whatever it is you want, I will perform for it and at least get something out of it. And that's part of a problem that many [Western] actors are going to have to realise, especially with regard to the language that's being used about tech and the Silicon Savannahs and the Silicon Whatevers. There's a performance aspect to it because there's a power dynamic there that's very difficult to shake up. We'll perform for the money because it's part of survival.'

The same individual laid down the gauntlet to social tech initiatives to value local knowledge and prioritise local agendas in order to avoid replicating the past:

'So this notion of imposing support is quite problematic, whether it's development money, whether it's impact investment. It just changes names, but it does not change an approach. It's quite ridiculous to have a programme where a grant officer sits somewhere in London and comes once every three months and suddenly they are Kenyan experts or Uganda experts. That tack is basically the same model we've seen with traditional development aid – the parachuting into a context. If we're really serious about the business of social tech, and because we are imposing the name of social justice or social impact, or social innovation, we have to do better. What I'm asking for obviously takes longer, is probably more difficult to quantify. But this exporting of the Silicon Valley culture: "I have a solution and I think [it] will change the world." What is that based on? It's setting up a lot of people for failure, because we have different socio-economic contexts, and there are quite a number of assumptions that need to be tested.'

Another East African development professional noted that respecting local agency and listening for local agendas is what *does* work:

'The [funders] who've been successful are those who've been less noisy and are able to go out there and talk to people more and understand better what they are trying to build, what they

imagine or envision as solutions for their society, and then work with those communities to do that.'

A long history of technological engagement

Africa and Europe have a long history of engaging one another through technology.

During the peak of the Atlantic slave trade, as Europeans loaded over 12 million Africans on to high-tech ships (nearly two million would die in transit),[42] cutting-edge technology greatly contributed to the success of Europeans: transport, maps and guns. Similarly, Europe's colonial conquest and exploitation of Africa would not have been possible without the machine gun, industrial steam technology and the printed Bible.

While some Europeans were trying to get rich, most described their mission as also being one of encouraging salvation, improvement, development, or social good. Since before the Enlightenment, Europe exported missionaries seeking (with vast success) to convert Africans to Christianity. Later, the pace grew: 'The colonial expansion of the nineteenth century provoked among the young men and women of Europe a response not only from those who wished to rule, but even more from those who wished to serve', as '[m]issionary societies of every denomination experienced a boom in recruitment and in financial support'.[43]

To the proverbial 'gun in one hand and Bible in the other' with which Europeans colonised Africa, we may also add the role of other forms of what were the contemporary advanced technologies of the time. Europeans believed their technologies would bring Africans towards a more enlightened, European-style future and argued that the benefits of Western science and engineering would help develop Africans. As one Portuguese railway man wrote in 1882:

'In the century of steam engines and electricity Europe does not have to use old methods to civilize Africa…a sophisticated fire engine, a steam machine, a large road, a railway, the whistle and movement of an engine, etc., produce in the inhabitants of Africa a deeper stimulus to their intellectual development than masses and sermons preached by the most eloquent missionary.'[44]

Figure 6. Cecil Rhodes connecting Africa via telegraph, with boots and rifle, as depicted in 'The Rhodes Colossus Striding from Capetown to Cairo'. (Edward Linley Sambourne, Punch magazine, 10 December 1892)

The roads, railways and telegraph lines of yesterday may perhaps be seen as the fibre optic cables, APIs (application programming interfaces), satellites and smartphones of today, each bearing the promise of improving local lives and opening up new markets. And while a new technology might indeed have edified some individuals, it is important to understand their larger systemic effects. Who is benefiting most from their introduction? Are they in fact helping local communities, or simply making them more receptive to outside forces?

Indeed, many of the technologies colonisers deployed were used to dominate, extract and 'under-develop' Africa. Rail and telegraph lines were used to control territories and extract wealth, just as African citizens were actively excluded from accessing and developing these technologies for themselves, on their own terms. Any European arguing for more hubs, open data, or hackathons should actively challenge their assumptions that this sort of tech development will necessarily help Africans as much as it does Europeans, or whether it will ultimately replicate old patterns that disadvantage Africans or accumulate profits outside the continent. The West continues to see its wealth and productivity

as deriving from technical mastery, alongside civil qualities such as respect for human rights, representative government and a free press. Unfortunately, for half a millennium the West did not export human rights or representative government.

Civic tech, open data and similar forms of technology that contain hard-won Western approaches to socio-technical change, however, may be erasing or ignoring various African approaches. Another important feature of the colonial enterprise was to trivialise indigenous knowledge and cast African citizens as passive recipients of other people's social and scientific forms. Yet Africans have an unbroken history of invention, sociotechnical creativity and of innovatively appropriating and engaging with globally circulating knowledge and technologies. As the scholar Clapperton Mavhunga puts it, '[W]hat has been lacking in the development discussion regarding Africa is a view that recasts Africa as a variegated site of innovation (not humanitarian desperation).'[45]

While Africa's nations have now been independent of colonial rule for decades, it is also key to understand in what ways its legacies and power imbalances continue. For instance, most readers will be familiar with the linkages between violence in Africa and the raw materials that power Western technology, such as the coltan and rare earth elements that are critical to the electronics that power social tech. The ongoing mineral-funded conflict in the Democratic Republic of the Congo (DRC), one of the world's most prolific sources of coltan, for example, has cost over five million lives since the mid-1990s.[46] The very tech programmes promoted in Africa's urban centres rely on hardware that contains conflict minerals sourced in their rural areas. Africa also receives disproportionate amounts of the hazardous e-waste generated by Western technology-centric lifestyles and businesses. Both the extraction of raw materials for tech and tech's return as toxic e-waste present perils to African lives.

The digital turn

In the last decade, hundreds of hubs, accelerators, hackathons and other new approaches to tech innovation have been incentivised on the African continent by a range of diverse entities, from the World Bank or UNICEF to the Mastercard Foundation.

These initiatives often follow a familiar process, introducing new ideas while at the same time often overwriting local ones. A recent study of tech entrepreneurship train-

ing in Jamaica, Ghana and China tracked the ways in which ideals of Western technology production – from design thinking to co-working spaces with ping-pong tables – are being actively spread around the world.[47] In hubs and hackathons, including ones covered in this study, it notes that a diverse group of interests teach a singular vision of how to innovate tech, one the authors see as being potentially detrimental to the students:

'In our accounts, we show how the proxy agents that maintain [Silicon] Valley's hegemony might be individual entrepreneurs and venture capitalists, development agencies with or without an explicitly neoliberal agenda, state bodies seeking work for the underemployed, or multinationals looking for new markets. The exact constitution and specific intent of these agents varied across our sites but their work collectively contributed to the narrowing of appropriate design approaches, and the proliferation of increasingly precarious forms of labor…The Valley's templates and exhortations nudge sites at its periphery toward the standardizations needed for the mobility of capital rather than regional specificities needed to support emergent design practices. These moves are often accomplished through ostensibly optimistic and hopeful projects: grand visions of a technologically powered and globally-aligned future that may not ultimately support the very workforce being asked to change.'[48]

This report finds that hubs are more varied than this quote would indicate, and may indeed be a powerful new form of inorganic infrastructure for social tech. But the authors of the quoted study are correctly pointing out a flattening and homogenisation of possible techniques. Hubs are a complex mixture of organic and incentivised, local and globalised, and generally better adapted for teaching global tech/venture culture than leveraging local strengths to invent social tech.

More complex than it seems?

Any European wishing to encourage a particular socio-technical agenda to 'improve' Africa runs the risk of passing for a neocolonialist. They are not completely detached from a long history of technological and economic imbalance, which plays out from the intercontinental to the interpersonal level, with all actors playing well-rehearsed roles. The Nigerian-American writer Teju Cole has called one current configuration of

the European half of this relationship the 'White Savior Industrial Complex', an urge that moves hand-in-hand with systematic exploitation:

'The coltan in [my] phone can probably be traced to the conflict-riven Congo. I don't fool myself that I am not implicated in these transnational networks of oppressive practices…What innocent heroes ["white saviors"] don't always understand is that they play a useful role for people who have much more cynical motives. The White Savior Industrial Complex is a valve for releasing the unbearable pressures that build in a system built on pillage.'[49]

Many in the developing world identify cynical motives in technology for development initiatives, where a Westerner may not. Facebook Free Basics is ostensibly a way to provide limited free ('zero-rated') information to those in the developing world who otherwise couldn't have afforded it. Facebook previously rolled out this service in Burundi without much opposition, but it was contested in India by opponents who literally invoked colonial history.[50] Ultimately, Facebook's attempts to scale in India backfired and precipitated a law that made services like the ones it was lobbying for illegal.

Was corporate America's Facebook being truly altruistic, attempting to connect the world's poor? Or were Indian net neutrality activists right to be suspicious of a neocolonial takeover of the information space? Teju Cole's point is that both of these conflicting perceptions can be true at the same time: a Western initiative can be well-intended but still pose a significant negative threat in the developing world. 'I deeply respect American sentimentality, the way one respects a wounded hippo. You must keep an eye on it, for you know it is deadly.'[51]

This report cannot provide a simple guide for how to contribute responsibly to social tech in Africa without repeating mistakes of the past. Each of its recommendations was developed to minimise the risk of repetition, though only thoughtful programmes in careful dialogue with local ecosystems could do so. But avoiding engagement is not a solution: it would leave the tech field open only to profit motives and unreformed ideas of Africa's potential.

RECOMMENDATIONS

↘ Funders should recognise and support in-
stances where they see African investors,
tech entrepreneurs and development work-
ers taking some of the assertions of Silicon
Valley and – rather than accepting them
wholesale – questioning them and trans-
forming them into something new, shaped
with local conditions, visions and values.

↘ Seek out and embrace the knowledge of peo-
ple who know themselves and their environ-
ments.

↘ Recognise the fatigue of grassroots commu-
nities that have long been told what to do. Try
to integrate yesterday's programmes and the
knowledge that was gained in their local im-
plementation into today's new programmes.

↘ Respect local agency. Recognise that many
people have learned how to interact with
Western donors by 'performing' interest or
belief that a programme is valid in their envi-
ronment. These same people often have ex-
ceptional insights but long ago learned that
this was less valued than ability to help run
a development programme. Try to foster an
atmosphere where local knowledge can be
heard, and local agency promoted.

02.
LIFECYCLE OF A SOCIAL TECH INITIATIVE

'It's not access to funding in that there is no money in the sub-Saharan African ecosystem, it's a lack of user or investor education.'

UK-based Nigerian tech executive

SUMMARY

'Silicon Valley' methods of tech development are a recent introduction. They do not always mesh easily with the existing business, legal, investment or entrepreneurial cultures in sub-Saharan Africa.

The journey of a social tech project from idea to product rarely follows a linear progression and is more like a game of Snakes and Ladders. Interviews from across the continent provide insights into three critical junctures in the lifecycle of a social tech project: conception; assembling a team; and capitalisation. The study did not include a large enough sample to speak conclusively about the scaling stage, but scaling challenges are covered in other parts of this report.

Key recommendations include addressing issues of implicit bias in funding and investment, and, given the high degree of ecosystem variation by country, conducting recurrent gap analyses on the ground, to identify the most pressing local funding needs in a given context.

INTRODUCTION

A TECHNOLOGICAL PRODUCT IS AN AMALGAMATION, NOT A 'THING'

An ecosystem is as much about the transactions and exchanges among organisms as it is about the organisms themselves. A social tech ecosystem is no different.

It takes an ecosystem to create a successful technology product. Throughout its lifecycle, a technology product is an amalgamation of labour, thought, capital, marketing, code and business transactions: only through work does it appear to be a stand-alone entity.

This chapter identifies at which points a technology product connects to different elements in the system. It also identifies watersheds in the lifecycle of a social tech product, emphasising critical moments where social tech initiatives face key challenges.

The primary focus is on bottom-up, entrepreneurial approaches.

THE SILICON VALLEY TEMPLATE IN SUB-SAHARAN AFRICA: SUCCESS OR MISFIT?

The idea that there is a set of universal (usually Silicon Valley) methods that will lead to a successful technology is a narrative that has grown tremendously in the last decade. Many funders, innovators, trainers and consultants have been involved in growing the narrative. Despite the enormous energy invested in promoting this narrative in Africa, the journey of a social tech initiative from ideation to global scaling is rarely straightforward, and Silicon Valley methods may not be optimal.

A recent ethnography of innovation trajectories in Jamaica, Ghana and China points out that 'the global appeal of [Silicon Valley] design methods lies exactly in their promise to upgrade individuals and nations along a trajectory of Western innovation hubs. Yet, none of this happens without contestation, frictions, and awkward misfits.' Its authors note that the newly popular methods of innovation pay great attention to local variability through techniques such as user studies and participatory design, with a focus on 'bottom-up'. Yet ironically, those methods for 'localising' tech are themselves presented as universal.[52]

Hubs, hackathons and lean canvases do generate activity. Global standardisation of methods makes some things easier and produces some gains. Nevertheless, there is often a tension between new initiatives that use 'accepted best practices' codified in the West and the existing business practices, legal regimes and approaches of a host country that predated the introduction of Silicon Valley methods.

Silicon Valley tends to idolise youth, hoodies and drop-outs, mirrored in recent scandals arising from the fraternity culture of Uber. In many African cultures, corporate structures tend to prioritise respect for elders, formality and experience. The Ugandan government recently issued a directive on what is acceptable dress for a public officer,[53] largely outlawing styles that are popular with the youth. Uganda has proposed to raise the retirement age for sections of public servants, in a bid to 'maximise' their contribution. This is despite a labour force growth of 4.9% per annum, where young people account for as much as 83% of the unemployed.[54]

Both the West's youth-centric approach and the elder-centrism familiar in most of Africa have their advantages, but when combined the mismatch is likely to cause friction, as conventional local funders are less likely to see youth and inexperience as an advantage. This partly explains the concentration of youth in social tech startups that easily attract international funding from regions where formality is optional, if not downright undesirable, and youth is celebrated.

Business culture and environment vary hugely across countries, affecting the degree to which a technology or enterprise can succeed. Proselytisers of the latest Western technology or method often assume an absence or lack, rather than difference, of practices. But Africa is not a blank slate; it is home to many rich and diverse languages, cultures and creative and technical practices. Interviews highlight significant variation in macroeconomic structure, business culture, systems of governance, approaches to education and forms of altruism across countries.

In the case of social tech, for example, there are many forms of community support and charity that are very different from the formal social sector in the West. These local forms may be strong models from which new social tech initiatives could emerge, but often teams tacitly borrow models derived from US or UK assumptions about the social fabric.

RECOMMENDATION

↘ Social tech projects in Africa often borrow techniques and values from the Western social sector. Mutual support and communitarianism, however, function differently in most African contexts. More work needs to be done to identify those local practices and use them as a basis for successful social tech systems.

With enough energy and investment, perhaps in ten or 20 years the Silicon Valley approach may replace the rich and variable business and altruist cultures interviewees described. This may not, however, be the most appropriate approach to take. One alternative is to exploit strengths in the local culture.

CASE STUDY:
NOSI: CABO VERDE'S SOCIAL TECH MASSIVE MAINFRAME

In the 1990s, the government of Cabo Verde launched a mission to become an information society. The department they created, now called NOSi (Núcleo Operacional da Sociedade de Informação), has become an ICT powerhouse. The department, which has both a public side and a private side, is rewriting Cabo Verde culture.

According to a review of national innovation strategies in sub-Saharan Africa, 'Reinventing government through e-government was an integral part of the sweeping state modernization reform programs launched in the 1990s. These reforms were deepened and broadened after 2001. The sweeping reforms initially focused on modernizing public financial management through electronic government tools, but have resulted in better governance, more institutional transparency, and improved efficiency in the public sector's delivery of services to citizens and businesses alike.'[55]

The eGoverment system, a significant indigenous innovation (and a public sector one as well), allowed Cabo Verde to keep careful track of donor money at a time when African leadership was under the spotlight for the embezzlement of funds.[56] Within years, Cabo Verde skyrocketed in indicators of good governance: it is currently the highest-ranked country in sub-Saharan Africa for 'control of corruption', scoring far higher than many European countries.

NOSi sells its software to other countries and has recently developed a reputation for its server farms and hosting. It provides free WiFi in public spaces and one branch even makes websites for local businesses.

Cabo Verde's NOSi has pursued a different strategy from that of most countries in sub-Saharan Africa, with little emphasis on tech entrepreneurship. Nevertheless, it is hard to imagine a better investment in sub-Saharan Africa than ensuring government financial accountability. Cabo Verde is a darling for donors; every dollar it receives is far more likely to be spent for the public benefit.

Figure 7. NOSi is installing WebLabs, or 'container laboratories', each equipped to support ICT training for twelve students at a time, in all secondary schools across Cabo Verde. (Photo: Christopher Csíkszentmihályi, 2018)

A GAME OF SNAKES AND LADDERS

Interviewee responses indicate that the path to success for a locally grown social tech initiative is like a game of Snakes and Ladders, with uneven climbs and some retrograde slides. Specific steps vary by city and country. The timeline below outlines the development of a social tech product, drawing on descriptions by interviewees.

STAGE 1: CONCEPTION

Social tech in sub-Saharan Africa is typically conceived in one of several environments, each of which impacts the process of ideation and influences its nature.

Government contracts

One place of conception might be a government ministry which has identified a need, e.g., a land ownership registry. The government might approach an NGO, a tech service provision company, or a contractor to implement the project. Usually well-resourced, projects like this tend to use a 'waterfall' approach of cascading design, with a rigorous requirements assessment period, a formal process of defining the technology, and a straightforward implementation.

As with startups, many of these big projects fail, because of poor user modelling, corruption, or a host of other factors. The notoriety of such large-scale failures has contributed to shifts in funding away from governments and towards NGOs.

Development agency contracts

Another site of origin might be a call to innovate around social issues by 'first order' granting agencies like USAID, DFID, or the Bill and Melinda Gates Foundation (BMGF), or the regranting entities to whom they devolve. The calls are made around critical pain points in a society, such as energy provision, primary healthcare, or sanitation.

'When you're submitting an entry for a call from GIZ [German Corporation for International Cooperation] make sure it meets their socio-economic criteria, and the solution must cover a wide population,' explained a health-oriented social tech founder in Uganda. In many cases these calls cover activities that in Europe would fall within the remit of government.

Techies are not often drawn to these challenges because these sectors are seen as lacking prestige. Support from organisations like GIZ or the United Nations Population Fund (UNFPA), however, creates a demand for social tech innovators.

average hub saw the development of a great number of 'ridesharing'-style apps, while in 2014 there were several social media apps. These tendencies should be moderated by a similar investment in making local issues 'cool'. The Ushahidi project, for example, succeeded in making crisis mapping an international technology genre.

Tech hubs and hackathons

Another site of origin might be individual entrepreneurs in a tech hub or techies responding to a themed hackathon held at a local university or inside a tech hub.

Hackathons provide powerful incentives to address specific issues. They may be funded by corporations, including telcos and tech companies. Hackathons also serve as a recruitment and training ground, where techies are introduced to new proprietary or open systems, APIs and programming languages. In some cases they function as a source of new intellectual property for sponsors.

Common hackathon themes include fintech, edtech, m-health and agriculture. Hackathons are sometimes sponsored by governments or in association with civil society, sector experts and other stakeholders. As a hub manager in Rwanda described: 'Another recent hackathon was focused on solving issues around communication between parents and children about sexual reproductive health – a topic that's not easily discussed in Rwanda. For this, we partnered with the Office of the First Lady.'

These challenges tend to draw a great deal on an individual's personal experience or motivation to create a social tech solution: 'Each person comes in with their own idea…ideas come from experiencing a problem and then coming up with a solution in order to survive,' explained the Rwandan hub manager.

Since individuals are rarely in a position to judge whether their ideas will be generally popular, some of the larger hubs have seen the need to augment individual intuition. Innovators 'need to understand the markets'. An idea 'should go beyond coming from the community. It needs market research,' said a hub manager in Kenya.

RECOMMENDATION

↘ Funders should concentrate on demand, not just supply (coders, hubs). Is there an important community-based organisation (CBO) that is doing good work at scale? What types of tech could they use? Is there a 'wicked problem'[57] that a government ministry or teachers' union is working on? How could a tech product help them to address it? Working with established institutions provides an expanded path to scaling.

Optimal solutions?

The place where an idea is conceived (NGO, hub, ministry, etc.) frames the construction of the challenge. This in turn frames possible responses to the challenge, and predetermines who might be interested in or able to respond. This can be seen as the political economy of an idea, as the different points of conception highlight different problems, and assume different solutions. Sociotechnical configurations often stem from the professional approaches of members of the team that created them, and their professional responsibilities, rather than reflecting the optimal solution from a user or beneficiary perspective.

CASE STUDY:
U-REPORT: HOW A GIANT LISTENS

U-Report, a project initiated by UNICEF's Uganda Tech for Development team, allows people to interact with UNICEF via SMS using any mobile phone. It has over 300,000 voluntary users, most of whom are young people. Subscribers provide selected demographic data when they sign up to this free service, so that UNICEF can send them relevant messages.

Typically, UNICEF sends an SMS questionnaire to a subset of subscribers, enquiring about a development goal, a local condition, or a service that it

provides. Subscribers send a response, and can view the results online. The system often sends an abbreviated analysis of the findings via SMS. Response rates are relatively high, partly thanks to this interactivity.

U-Report has recently been launched in 35 more countries including Liberia, Burundi, Swaziland and Ukraine. There are over 3.5 million users globally.

U-Report has allowed UNICEF to move from pushing out paper reports to engaging in substantive, instant conversations with its constituents.

RECOMMENDATION

↘ In most countries in Africa, it is hard to scale a social tech product unless the government, a telco, or a major NGO is involved. Funders should identify realistic scaling models in sub-Saharan Africa; question models that work well in the West; and pay special attention to which existing local institutions a proposed project leverages.

STAGE 2: ASSEMBLING A TEAM

In many hubs and accelerators, tech start-up teams contain a cadre of computer science graduates, often from the same cohort, who together make use of a hub and participate in hackathons and competitions. Hubs are largely based on the idea of giving inexperienced teams the opportunity to hone their software engineering skills; gain access to startup capital; polish their marketing and customer retention skills; and develop and iterate business models to scale ideas to larger markets.

The largely technical composition of these teams often results in products that are technically ingenious but socially, politically and economically lacking. In many cases the business, design, or community side of the team is composed of programmers who are also willing to take on non-technical roles. Of course, such teams

can often iterate, revise and find collaborators in a later stage. Hubs can and do assist in the growth of such teams.

Although these teams are mostly technical, their skills are not often at a professional level. One ex-telecommunications engineer running a financial technology startup in Uganda admitted, 'We need talent. I cannot do it all by myself. And it is not easy to find [tech] talent.' Some hubs have taken on the role of tech training as well. Many issues that face a project in scaling, however, are specialised and usually learned on the job. Telcos, media houses and NGOs often provide such specialised knowledge.

STAGE 3: CAPITALISING

Across the board – from Dakar to Accra to Nairobi – the most common hurdle to prototyping and scaling a tech innovation was access to appropriate financial support. Existing social tech initiatives in the region have followed many diverse routes to pilot and success (or failure). Opinions on the suitability of different types and amounts of funding at different points in the lifecycle varied widely. In addition, perceptions of the greatest lack of one particular type or stage of funding over another differed in each ecosystem.

RECOMMENDATION

↘ Each country has a different ratio of funding at different stages. A brief gap analysis in each country would yield information on specific imbalances or absences.

Early stage funding: bringing a prototype to market

Most tech entrepreneurs in sub-Saharan Africa muddle through the early stages by bootstrapping their projects with personal savings or gifts from family and friends – a model that, as one social tech entrepreneur from South Africa pointed out, disproportionately favours those from more privileged backgrounds and disadvantages those with less. Economic disparities may also have a racial or ethnic dimension to them.

In many countries, even relatively small sums of money (US$500–$2,000) were seen as having potential for enormous impact, as not much money is needed to allow entrepreneurs to create a working prototype and bring it to market. A Kenyan academic and former regulator reported, 'Funding at the idea stage is a problem locally.'

Several hub managers echoed this view: 'Now I would say our most pressing need is money for basic seed funding for startups – a few years ago I would have said it was for skills in tech and business,' explained a tech hub co-founder in Ghana. Another hub co-founder, also in Ghana, agreed: 'So far it's been possible to cover programmes with grant funding but harder to find investment for the startups.'

Another critical path to success in early-stage work is through awards and prizes. Prize money from corporate hackathons and competitions is typically US$1,500–$3,000. These are often described as a double-edged sword.

On the one hand, prizes can develop an environment that can be exploited by 'tenderpreneurs' who are constantly moving from one small grant to another, never actually bringing a project to the point of impact.

On the other hand, prizes awarded through competitions and hackathons are seen as important points of validation. Projects from several countries that have achieved success cited winning an award as critical to attracting venture capital or facilitating partnerships later on. Several interviewees cited the need for awards targeted at each step of the project development process.

Moreover, several interviewees, mostly in Anglophone countries, were concerned about telcos using hackathons to 'steal' ideas. This occurred either directly, when telcos appropriated intellectual property in winning entries; or more indirectly, as they later copied business ideas. Such practices, however, appear to have recently pivoted towards promoting revenue-sharing models between entrepreneurs and telcos, with varying degrees of favourableness towards entrepreneurs.

A social tech entrepreneur in Kenya pointed out the danger to a team of taking venture capital too early in a company's lifecycle, explaining, 'Founders can feel too much pressure, and it is damaging to their passion for the project…They think: "It was my idea, and here we are working for these other guys!" '

BREAKOUT
THE EFFECTS OF RACE AND AND IMPLICIT BIAS IN FUNDING

Seed funding amounts varied from a few thousand pounds to £150,000 and above. The race and nationality of co-founders and board members were cited by entrepreneurs and other ecosystem members as significant variables correlating with the amounts of money disbursed.

Silicon Valley's name for a tech company that has an initial public offering (IPO) over a billion dollars – like Facebook or YouTube – is a 'unicorn'. The jesting name for a unicorn-style success in Africa is a 'rhino'. The lion's share of rhinos in sub-Saharan Africa have white founders.

As one of our East African researchers put it: '10k for all black African teams. 100k or a million plus [US dollars] for a team with a white guy.' There are certainly exceptions, but for African entrepreneurs, the effects of race and perceptions of racism pervade the funding cycle, from how much seed funding a project can attract, to raising later-stage capital, to the kinds of questions investors ask.

The latest investment report from Disrupt Africa, which offers an overview of funding patterns across Africa, supports this general view. It reveals how the largest investments in 2016 all went to companies with one or more expatriate, non-African, or white founder/s.[58] Of tech startups receiving the most investment in South Africa in 2016, the top three companies had only white founders: Zoona, a fintech company, received US$15 million; Hepstar, also in fintech, received US$2 million; and Where Is My Transport received US$1.5 million. In Nigeria, the top investment recipient of 2016, the coding startup Andela, has one African co-founder out of four. Andela received US$24 million. In Ghana, the top investment recipient in 2016, the pay-as-you-go solar provider PEG, has two expatriate founders. PEG secured US$9 million.

Drawing on a larger pool of financial data for

the period 2015-16, Village Capital's new report, *Breaking the Pattern*, comes to a similar conclusion for the East African region, stating that '90% of disclosed investments over the past two years went to startups with one or more European or North American founder.'

This asymmetry is mirrored on the investment side: the Village Capital report also tells us that for 2015-16, 80% of disclosed investors in East Africa came from outside the continent. A former Kenyan tech hub researcher gives a more fine-grained understanding of this dynamic within Kenya, observing that the vast majority of angels and venture capital investors in Nairobi have thus far been non-Kenyan, and only 26% of investments have been made to start-ups founded by Kenyans.[59]

These reports suggest that foreign funders and investors are often relatively unfamiliar with African business environments and norms; such investors disproportionately support entrepreneurs who look like them, think like them, talk like them, or have followed comparable educational or career trajectories. This is called 'implicit bias'. As the Village Capital report explains, investment patterns the world over exhibit such bias as they tend to track the 'demographic makeup of the investors themselves'. In the US, for example, less than 10% of investment capital (disproportionately held by white men) goes to women and less than 5% goes to black or Latino entrepreneurs.[60] In Africa's current investment environment, implicit bias favours expatriates, whites and men, as well as, to a lesser degree, 'repats' or returnees from the diaspora. Village Capital concludes that US and European investors in Africa are overlooking a great deal of local talent, knowledge and insight and, as a result, are 'leaving too many great deals on the table.'[61]

There is nothing wrong with international, multiracial teams. Indeed, diversity of knowledge and backgrounds in a team can be a powerful asset. What is corrosive is when implicit bias leads funding to overlook local talent or consistently reward entrepreneurs unequally by race and ethnicity.

RECOMMENDATION

⬐ Injustice currently permeates the ways that race correlates with tech funding and investment in sub-Saharan Africa. The goal of equal opportunity should be pursued vigorously and via multiple strategies, which may include:
 • Adopting peer nomination and review systems
 • Using double blind reviews
 • Using quotas
 • Devolving decision-making to local experts
 • Hiring in-country programme staff
 • Increasing time spent by programme staff in local contexts
 • Offering flexible contracts
 • Offering coaching and writing assistance.

FIGURING OUT THE BUSINESS MODEL

Grants and fellowships

Many interviewees cited the usefulness of grant support while finding a suitable business model and getting paying customers on board. A hub co-founder in Ghana emphasised the benefit of time to iterate without the pressure of repaying loans.

Grant money early on was perceived by many as especially key for tech entrepreneurs working in the social tech space, where the focus on broader social goals can mean entrepreneurs need more time to demonstrate commercial viability. 'Anyone in social tech should use non-concessional sources of funding from grants (from governments or foundations) before they reach market validation,' the Kenyan founder of a financial services company advised.

The few founders who received a generous fellowship to cover their salary saw it as critical to their path. A social tech entrepreneur in Nigeria, whose salary as a CEO was guaranteed for three years by Ashoka, explained, 'You need time to be able to reach sustainability. You need

funding that supports people as well as ideas.' Financial security is seen as low in social tech entrepreneurship; he needed a way to survive the transition from his previous employment.

An inflexible economy

Some interviewees, however, were wary or very critical of the donor economy. They thought that it warped markets, put people on the wrong path to scale, or was too inflexible. 'Inflexible grant structures in the tech world are a killer,' said the Ugandan co-founder of a fintech enterprise.

The product cycles for tech projects are characterised by rapid iterations and pivots whenever the need arises, but many grants are structured in ways that do not allow agility. Failure to adhere to the pre-agreed terms of a grant can mean that subsequent tranches of money, needed to enable further product development, are not released.

Floundering with finance

A loan fund manager at an incubator in Rwanda added, 'When companies receive grants early on, they don't get the chance to develop hands-on knowledge of how to manage their company's finances, how to schedule payments, and so on', disadvantaging them by not adequately preparing them to take on investments later.

> RECOMMENDATION
>
> ↘ Structure grants so that they are better able to accommodate the pivots and iterations needed for tech success. Encourage grantees to include local consultants and accounting services (e.g., for budget forecasts, modelling, etc.) as budget line items.

Loans

Local banks are not geared towards supporting entrepreneurs of any type in any of the countries where interviews were conducted. High interest rates, inflexible repayment schedules, demands for rapid repayment and demands for 150-200% collateral are typical.

As a loan fund manager at an incubator in Rwanda said, 'Time and again I've seen good SMEs [small and medium-sized enterprises] being given terrible terms by the banks, terms that required payment too soon, and then the banks just came and took all their collateral. I've seen very good business ideas fail in this way.'

In addition, young social tech entrepreneurs are generally not in a position to put forward collateral, let alone at such high rates. As a tech hub co-founder in Ghana highlighted, 'No banks will give loans to startups, because you can't get a loan without collateral.'

> RECOMMENDATION
>
> ↘ Support the creation of small, low interest rate, flexible repayment, collateral-free loans that are coupled with business mentorship.

Incubation and acceleration

Much energy is focused on hubs and ideation, but incubators and accelerators are harder to find. A social tech founder from Nigeria said, 'I feel like we need more incubation spaces (with a lot of mentorship) to truly make Africa great.'

Others pointed to the increasing need for incubators – in many places there is no way up and out of the hub to the next stage. 'Funding is a ladder,' explained a venture fund manager in Kenya.

A European staff member at an incubator in Rwanda said, 'Lots of outsiders (from Europe, the US) are willing to invest in Rwanda, because the country is seen as stable and open, but few deals happen.' He said that this is because 'too many entrepreneurs are making decisions that are not based on their company's financials. Outside investors get afraid when they see that.'

He added, 'Without business development support services, SMEs will not be investor ready. We need funders to subsidise the support costs so that SMEs get the technical assistance that they truly need. Investors hesitate to support initiatives like ours, but it's the only way of preparing companies to take on investments.'

A UK-based Nigerian tech executive echoed that there is 'an increasing demand internationally…[foreign investors] are beginning to take Africa very seriously, but then they don't have a process to do due diligence on the startups they want to invest in. People are struggling to find who to collaborate with locally to make these things happen.'

A Ugandan tech and innovation specialist, also in the UK, offered the same view: 'There is more money looking to go in than there are ready startups and projects ready to receive it,' she explained.

In Francophone Africa, a France-based impact investment fund found similar conditions. Their policy is to support only African-led business. As an investment fund, they must be able to evaluate risk, therefore they fund stable local SMEs that are not usually from the tech sector. They too see a strong need for more incubators to get tech startups ready for investors.

startups is still new. It's not access to funding in terms of that there is no money in the ecosystem, it's [a question of] a lack of user (or investor) education.'

Of course, this apparent 'lack of education' is partly a manifestation of the importation of foreign finance techniques. There might not be such an educational mismatch if funding were based on more locally familiar models, like savings and credit cooperative organisations (SACCOs), or Sharia-compliant finance.

RECOMMENDATION

↘ Each country in sub-Saharan Africa has a different mix of private and public funding available. Funders might hire local consultants to survey the terrain every year or two to assess where gaps or gluts occur.

RECOMMENDATION

↘ In many cases a perceived lack of investment stems from mismatches of expectation more than a lack of financial capacity. There is an opportunity for entrepreneur education about how to approach finance, and investor education about how to evaluate African entrepreneurs. This resonates with our findings about race, 'legibility' and implicit bias. It may be a place where a small amount of investment could unlock significant capacity.

An impact investor based in Senegal stressed the need for continuous funding throughout the lifecycle: 'Support the whole cycle, from student encouragement, towards entrepreneurship, to those already active [in incubators], to seed funding through competitions, to scaling through support to establish themselves and network internationally.'

A UK-based Nigerian tech executive added, 'Access to finance: this is something you hear in every ecosystem. The root causes of those bottlenecks are different in Africa…There is also a lack of structure in financing startups. People are not used to crowdfunding. People are not used to angel investing. The whole concept of investing in

03.
HUBS UNDER PRESSURE

'Come learn how to make apps and go ye forth and throw them out there!'

Nanjira Sambuli, ICT policy analyst, Kenya

SUMMARY

The last ten years of tech culture in sub-Saharan Africa might well be called 'the decade of the hub'. No other entity has so successfully captured the imagination, both locally and of the international press, nor seen such a concerted push from powerful entities like the World Bank. By 2016, there were 155 hubs in sub-Saharan Africa, according to the Bank.[62]

While their successes are mixed, hubs have proven to be promising institutions. So successfully promoted and nurtured, hubs now form a kind of infrastructure for the tech industry.

This chapter introduces hubs, and charts their growing popularity across sub-Saharan Africa. We are primarily concerned with how hubs nurture social tech projects, rather than their broader role in promoting any kind of tech enterprise. Evidence from interviews provides insights into hubs and the local ecosystem, how hubs relate to social good, and finally the key issues of pressure and sustainability.

TECH HUBS PER COUNTRY

TECH HUBS PER CAPITA

>30
>10
>5
=1

>1/.5M
>1/2M
>1/4M
>1/8M
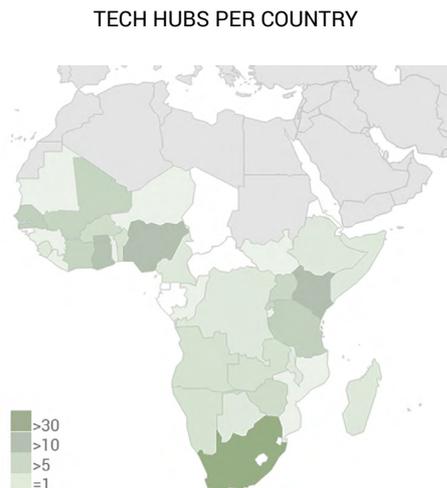
Map 1. This map shows the distribution of tech hubs per country in sub-Saharan Africa, based on the World Bank's list of hubs from 2016. (M-ITI, 2018)
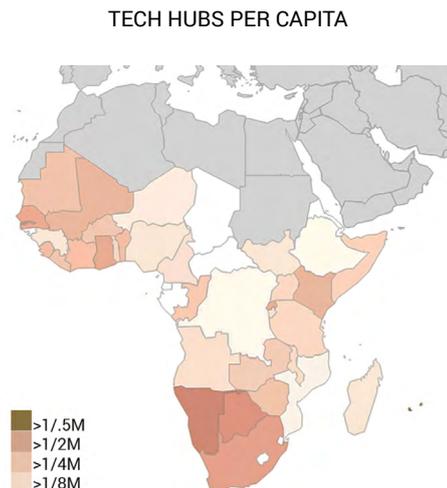
Map 2. This map shows the distribution of tech hubs per capita in sub-Saharan African countries, based on the World Bank's list of hubs from 2016. The map key shows population size in millions per single tech hub. (M-ITI, 2018)

WHAT IS A HUB?

A hub is an enterprise that offers a collaborative workspace, where new ideas and enterprises are created and supported. At a minimum, hubs provide glacially-paced wifi and a desk. Others may provide business resources and tech training; house hackathons and lectures; matchmake with investors and donors; conduct research; or any other number of activities and services.

In 2014, researcher Nicolas Friederici reported from a working group that tried to define some of the common characteristics of hubs they had studied in Africa, Asia and Europe.[63] According to Friederici, hubs are:

- **Communal**, providing a shared working environment
- **Self-organising and adaptive**, driven bottom-up by the needs of innovators and entrepreneurs
- **Innovating**, **enabling innovators**, offering a service entity that enables the creation of other enterprises
- **Melting pots for heterogeneous knowledge**, welcoming practitioners from tech, business, design, etc.
- **Local outposts of a higher cause** – promoting Silicon Valley (or other international) techniques.

Business approaches and techniques, however, vary significantly between hubs and around the continent. Interviews revealed that the greatest similarity between hubs is in their core aspiration: all sought to promote business and enterprise formation.

From this starting point, many paths diverge: hubs vary significantly in how they choose their mandate and seek to achieve their goals. Some of this divergence is based on alternate strategies or specialisation, whether by types of intended output or by reference to local conditions.

Great expectations, little support

Much of this divergence, however, is because many hub administrators are 'winging it', tactically responding to demand from local actors or funding from international donors, and often operating without adequate training or support.

This combination of high expectations and sometimes poor implementation led to some of the darkest moments of humour in interviews, expressed equally by harried proprietors and dismissive critics.

At the same time, many of the successful social tech projects researched were started in hubs; a number of the researchers who contributed to this report worked in hubs during this study, and for many years before. Hubs are undeniably an important new cultural form.

BREAKOUT
IHUB: PAVING THE WAY FOR SUCCESS

Hubs in sub-Saharan Africa first entered the global media because of a single extraordinary institution based in Nairobi, Kenya, named iHub.

iHub arose from a project called Ushahidi, a system to crowdmap political violence in Kenya's contentious 2007 election. The Ushahidi team formed the hub to build upon their initial success. Former Ushahidi and iHub employees now make up a *Who's Who* of social tech in East Africa, including Ory Okolloh, Jessica Colaço, Juliana Rotich, Eric Hersman and Nanjira Sambuli.

iHub soon became important far beyond Nairobi, producing successful projects and growing a research branch, which sought to provide timely and accurate information on ICT and tech use, especially at the bottom of the socioeconomic pyramid, that wasn't really being gathered elsewhere.

Perhaps most importantly, Ushahidi and iHub created a model of the successful sub-Saharan Africa social tech entrepreneur, addressing societal challenges by authoring tech developed in Africa and reused around the world. iHub's influence was further extended as it became a resource for the East African region and the entire continent, hosting visitors and providing a template for aspiring hub managers.

iHub has recently undergone a change in management and mission. The headline of a *Wall Street Journal* article from 2017 described the change: *'Kenya's Tech Hub Gets a Makeover: "Silicon Savannah" is refocusing on profit and revenues, going beyond social activism'*.[64] From the perspective of social tech, this framing of 'beyond' social activism is troubling, and perhaps reveals the precariousness of social mission-driven tech entrepreneurship.

No hub is an island

As important as hubs have become, it is critical to recognise that no single type of institution can provide an ecosystem. This study found that where hubs have led to the creation of successful projects, it was generally because other aspects of the ecosystem were working well.

Where enterprises generated by hubs have been less successful, this is often because their progress was obstructed by the weakness of a key ecosystem enabler, e.g., regulation, trained labour, or technical infrastructure. This echoes the thesis of the excellent World Bank *Digital Dividends* report, which concluded that 'the full benefits of the information and communications transformation will not be realized unless countries continue to improve their business environment, invest in people's education and health, and promote good governance.'[65]

Self-sufficiency and its limits

In many cases, when the rest of the ecosystem is unable to support it, a hub and its funders try to solve the problem through the hub. Not enough trained labour? Use the hub for teaching. Not enough early capitalisation? Use the hub to set up investments. Not enough bottom-up ideation? Use the hub to create rural satellites.

As a hub founder in Ghana described it: 'It's like we're the bank, school, parent, brother, and psychologist. We've had a couple of [staff] people suffer from mental health issues because of the stress.' Hubs are suffering from 'everything looks like a nail' syndrome, where they are expected to solve problems that are actually located far outside their walls.

The early success of hubs has been rewarded by the creation of more hubs in more places. Indeed helping to set up new hubs is a revenue stream for existing ones. Each new hub has access to low-hanging fruit. As the work of supporting startups all the way through to scaling and sustainability moves further along, the urge is to build up the capacity of the hub. Hubs are becoming overloaded with expectations.

BREAKOUT
SILICON VALLEY'S PUBLIC SECRET

Ecosystems that hubs most frequently refer to, like Silicon Valley, work rather differently. Indeed, in the USA, 'tech hub' typically refers to an entire region with a strong ecosystem, not a single institution.

For example, Silicon Valley's name was coined in 1971. The region's prominence, however, had its roots in early US Navy research, dating back to the Spanish-American colonial war over 100 years earlier, when the military was experimenting with telegraph communications.

Stanford University (founded in 1885) and University of California, Berkeley (founded in 1868), two of the top research universities in the world, were training expert technicians for regional military communications research, and later commercial radio enterprises.

By the time the inventor of the silicon transistor moved to the area, the region already supported a dense ecosystem nurtured by more than a century of constant and coordinated public funding by the wealthiest government in the world.

Since then, the region has become a magnet for successful scientists, engineers and businesspeople from every country in the world. Leveraging the latest Silicon Valley technique to produce successful tech institutions elsewhere ignores how that technique was crafted for a specific and unique position atop one hundred years of infrastructure investment in education, labour, capital, manufacturing, legislation, transit networks and other key aspects of a tech innovation ecosystem.

RECOMMENDATIONS

↘ Hubs cannot replace the rest of the ecosys-

tem or compensate for every ecosystem weakness. Equal donor attention must be focused on other parts, like education and training, lobbying for better regulation, more investment during the 'messy middle' phase 'between the conclusion of a pilot program and the ultimate wide scale operation and optimization' of an innovation, and improved tech access for the scaling process.[66]

↘ Alternatives to Silicon Valley methods must be better developed and refined, preferably by increasing South-South communications and sharing lessons learned.

As much as tech hubs in sub-Saharan Africa are being overwhelmed with demands to replace the missing parts of what should be an ecosystem, innovators are similarly being trained to model their professional approach on the example of a Sergey Brin (Google co-founder) or Mark Zuckerberg (Facebook co-founder).

It is key to note that Brin's father and grandfather were mathematicians. Zuckerberg's father taught him programming and hired him a software developer tutor. Zuckerberg then attended a top-ranked high school and Harvard: his risk in forming a startup was negligible. In terms of family capitalisation, institutional support and work environment, there is no comparison between these famous founders' resources and those of most hub graduates who are trying to create tech enterprises in sub-Saharan Africa. Indeed, many, if not most, students in African universities did not previously have access to a computer.

Hubs appear to be at a critical point of inflection. Their early successes have led to a gradual process of raised expectations and an overloading of responsibilities. Their impact, however, can only match the support of the rest of the ecosystem in which they and their innovators work. In places that are widely understood to be extremely friendly to social tech innovation (e.g., Kenya, Rwanda, South Africa), hubs will have stronger impact than in others (e.g., Zimbabwe, Chad), where the ecosystem sets strong limits to growth.

This report's primary recommendation is not to abandon hubs, but rather to help them to succeed by having a reasonable expectation of their role, and investing

attention and resources into other key aspects of the ecosystem, including education, investment and regulation.

HUBS ON THE GROUND

One of the key characteristics of hubs in sub-Saharan Africa is that they have generally been very consciously introduced as embassies of Silicon Valley entrepreneurial culture. A hub might offer training in 'lean startup' and 'lean platform' approaches to business and tech enthusiasts; their design often seeks to imitate the fun and designerly offices of tech 'unicorns' like Facebook and Google, with bright colours, foosball tables and bean bag chairs.

The combination of technique, aesthetics and worldview most hubs seek to promote is, to put it simply, an ideology. For proponents like the World Bank, the hope is that this enculturation will create a more mobile and internationalised workforce that can better interface with global trends.

Learning the wrong lesson

Two obvious problems arise from this approach. First, the right way to innovate technology in Silicon Valley is not necessarily the right way to do so in the Rift Valley. Teams working in hubs often learn the wrong lesson; perhaps the most significant waste of innovation energy has been the concentration on smartphone apps since the introduction of the iPhone a decade ago. Hubs have spawned successive waves of poorly-adapted pitches for smartphones in countries where habits and access to smartphones and data are completely different from American or European markets. These waves have crashed against the rocks of market realities. This disjuncture between Silicon Valley and the various local contexts means that work in hubs has often conflated the aspirational with the unfeasible, for example, by training young people for the wrong ecosystem and opportunities. A local external business culture may be quite different from the one inside the hub.

As one Nigerian tech executive now in the UK put it: 'Hubs are making promises they can't keep.' A scholar of hubs in Zambia described her concern that 'the hubs are giving young people too much hope, and maybe the wrong kind of hope…but the truth is there is a dearth of other opportunities.' These observers worry that the structural impediments to succeeding are not being highlighted nearly as much as success stories from other ecosystems, which may not be replicable.

Hope aside, there is an opportunity cost as well. The young innovators in hubs are choosing this path over ones that might have more probable benefits for themselves and society, such as working in the government census bureau or contributing to agricultural sciences. From an ecosystem perspective, enthusiasm for hubs is appropriate – they are doing good work, but they are not an end in themselves.

within which many of Africa's leaders in politics, business, academia, sport, music, and many other endeavors are raised. The valley where children herd cattle, the pools where they fish, the forests in which they hunt and pick fruit, the dusty streets where they play with their self-made plastic football – all these are sites in which the African child is taught critical life skills through showing and doing, but not the exam or the pen. Out of them arises a spirit of experiment, adventure, risk-taking, and ambition, inspired by a desire to escape grinding realities of being born poor through sheer hard work and seeking answers in novelty even while one's feet are firmly planted in the elastic cultural traditions of one's ancestors.'[67]

The African continent has a larger rural population than an urban one; understanding this as a point of strength is key. That said, different forms of innovation are taught in its very different urban areas as well.

Unsuitable role models

The second obvious problem is that concentrating on the Silicon Valley approach ignores – or even erases – the opportunity to cultivate local approaches that might work better. As described in Chapter 1, *When social tech works*, a hallmark of colonial-era education was the attempt to rewrite African minds, rejecting and erasing local knowledge in favour of ostensibly more rational, effectual and proper ways of thinking and behaving – a process some have called 'epistemicide'.[68] Hubs may be seen as introducing new knowledge from the West, but in many cases they do so at the expense of developing local knowledge, or codifying it into new technologies.

One computer scientist in Zimbabwe put it this way: 'Sometimes I worry that the software industry in Africa is just stuck in eternal mimicry. Which I don't think works.' For him, imitation fails in two ways: First, imitation is a losing game if you're slow to it. Inundated with examples of successful apps from other parts of the world, hub innovators often reproduce local versions of products (e.g., AliBaba, Uber) that fail to gain traction. 'It works technically, but the guys are doing it 10 years too late,'

he adds.

Second, he says, imitation fails because one can imitate the product, but not necessarily the user: 'When you are diffusing and transferring technologies, you are also diffusing different cultural practices, because the technologies are not value neutral or ideologically neutral. And the people who write software tend to be the people who do not appreciate the social side of technology.'

One hub veteran from Kenya thinks it is time for hubs to start defining themselves better, with more reference to the specifics of their country:

'It's going to be very interesting to see with all these hubs, how much is it that the local community gets agency to explore, experiment, and figure out the place of technology to help solve their problems. Or is it going to be: "Come learn how to make apps and go ye forth!"? So each hub is going to have to figure out its philosophy in going there.'

Some hubs are also started from the 'bottom-up', either by 're-pats' (diaspora returnees), like Ice Addis (Ethiopia), the Co-Creation Hub (Nigeria), or iSpace (Ghana); by local individuals or local private enterprise like EtriLabs (Benin); or local governments – such as kLab (Rwanda). These are all examples of Africans engaging with globally circulating knowledge and taking the lead in turning those insights into action.

HUBS AND SOCIAL GOOD

The Silicon Valley culture that hubs seek to replicate is not known for its concern with social good. Stories of extreme corporate greed have recently swamped the Valley, from the activities of anti-heroes like Martin Shkreli,[69] to the 'shady' practices of companies like Uber, which led to significant protests within the company, and lawsuits from without.[70]

Gender discrimination and overt sexism are rife in the Valley.[71] For hubs to serve the social tech ecosystem, they must reject or augment this dominant innovation culture.

As a recent UN report puts it:

> 'Dominant innovation trajectories fail to include significant numbers of people from [sic] the benefits of social and technical change, and these are disproportionately poorer and more socially disadvantaged groups, including rural inhabitants and women… [These factors] point not only to the longstanding need to continue to develop innovation capabilities in developing countries – across a wide range of firms and other actors – but also to re-orientate and redirect innovation trajectories in ways that enable more inclusive, socially just, and environmentally benign patterns of socioeconomic development.'[72]

The recent transformation of iHub to, as the *Wall Street Journal* put it, refocus 'on profit and revenues, going beyond social activism' is thus not heartening.[73]

Inside an urban bubble

Africa's tech hubs generally draw from middle-class, urban techies, whose experience is remote from that of the vulnerable communities below the poverty line whom donors most typically seek to assist. This gap poses significant challenges to designing social tech that serves marginalised or 'base of the pyramid' communities well. 'We are guilty!' admitted one tech hub co-founder, 'The hub does exist inside the Accra bubble.'

The predominant concentration on apps over the last decade is one example of that relatively urban, prosperous bubble, as described further in Chapter 4, *Big Players*. 'We have to liberate the idea of technology being apps,' said one tech hub veteran. 'What we tried to do when I was at the iHub was really push our members as much as possible to go to the field, and we'd even organise field trips…And I'm not saying that a one-time interaction does it, but let's cultivate that habit of going back and ideating *together*…I think that's different from if I just say, "You know what, I'm Kenyan, so that's enough."'

Hubs encourage and house a range of economic activity, not only social tech. Some teams design games, others create applications for tourists. As economic activity this makes sense, and resembles common Silicon Valley strategy, but the urban, affluent bubble of most tech hubs sometimes has a negative effect on social tech projects. These projects are marketed (or confused by media or donors) as social tech projects, but are actually serving only the best off, sometimes to the unintended detriment

of others. Over the course of this research, the authors began to refer to social tech products developed in an affluent hub bubble as 'bourgeoiapps'. Hallmarks of a bourgeoiapp include:
- An app for the rural or poor, when smartphone app usage is tied to urbanites with surplus income
- Appealing to values or situations that are primarily urban, like food delivery or taking motorcycle taxis whose driver a user doesn't know
- Simply replaying a recent trend in Silicon Valley
- Appealing to values more common among aid workers or recently returned expats.

None of these are problems in and of themselves, unless they are mistaken for, or mismarketed as, social tech.

RECOMMENDATIONS

↘ Much of the work over the last ten years has concentrated on 'quick win' mobile apps. It is time for a broader idea of what is possible with social tech, and better research and funding for innovations that don't simply leverage Western techniques against African conditions, but reward local techniques to solve local problems. While we don't encourage every hub to accept these recommendations – they are overloaded as it is – there may be spaces for hubs to embrace different forms of innovation:

- Though digital ICT is key, broadening the social tech remit to include hardware, and hardware and software combinations, has the potential to usher in a wealth of locally relevant new tech. Some new hubs might specialise in this area, with the caveat that this sort of work has different timelines and capital needs from software. Gearbox in Kenya and Kumasi Hive in Ghana are examples of this strategy.
- Encourage more collaboration between hardware people (makerspaces, fab labs, local university engineering departments) and software people (tech hubs, local computer science departments).
- Encourage hubs to connect to sub-Saharan Africa's deeply rooted local cultures of fabrication, repair and skilled artisanship.

> ↘ Funders should encourage not only a 'push' from hubs − training and creating technologies − but also a 'pull' from CBOs, civil society and local sector experts. This will ensure a local context, with mission and support, and incentivise technologists to match their work to that context.

A more grounded approach

Some hubs in sub-Saharan Africa are actively finding ways to develop more grounded social technologies. As one of the report commissioners explained, 'People who own the problem need to own the disruption.' This is not the approach typically espoused in Silicon Valley, or in the user-facing sides of computer science and software engineering, where user-centred design (UCD), participatory design (PD) and other methods are taught to allow a generic engineer access to a user's needs and requirements. The entity conducting the UCD has typically already determined the project or product's goals, and expects to produce the product. Although the techniques are often inclusive, ultimately the product is not owned from within the community.

James Ferguson, an anthropologist who specialises in development, has made the argument that no technique will allow outside experts to understand the needs of rural people in the developing world better than the people themselves:

> Ordinary people actually know a lot about their own lives. They are often better positioned than experts from on high to make decisions that affect their own lives. The point is: where does the information lie? Who has enough information to actually know what social good is?'[74]

Looking at local opportunities

One example of a hub that is moving beyond apps and looking at the needs and capabilities of local communities is Kumasi Hive in Ghana. It was founded in Kumasi in part because of that city's strong artisan culture – home to a long, locally-rooted tradition of skilled fabrication and a culture of DIY and repair.

Kumasi Hive is a hardware incubator, with the ultimate goal of generating better-paying manufacturing jobs in Ghana. Their primary focus is around agriculture, and they have held 'agricultural hackathons' in the rural north of the country. Integrating end users into the innovation process is key, not as subjects of user studies but as co-creators. As one former Kenyan hub executive says:

'Now innovation from the bottom of the pyramid, another thing you'll always find is people in that sort of definition or box, if you will, know what they need. It's all about who listens to that and invites them to help devise a new technology…So that's for me what the missing link is. Listening to people and being able to reach the space in the way that they open up to you because… from the traditional NGO approach… you know, people parachuting in, deploy solutions, or say they will listen to you one time and they never come back, and you don't create a culture of equality.'

As the number of hubs increases, they have also differentiated. We believe these differentiations need to go further, and link with local conditions, as in the case of Kumasi Hive.

Inclusive spaces

Several interviewees spoke about proactive programmes in hubs to welcome women 'techies': one positive aspect of the sheer newness of hubs is that they haven't (yet) become limited based on traditional factors of exclusion. They were described as far more inclusive by gender or class than universities.

Jjiguene Tech Hub in Senegal and Women In Technology Uganda are positive examples of hubs that have been specifically crafted to increase women's participation.

HUBS AND SUSTAINABILITY

Perhaps the most significant factor we found, across many hubs in many countries, was that hubs are under a great deal of pressure to provide all services. 'Hubs have the job of not only working with the startup but also educating the ecosystem. They talk policy with government and with embassies,' explained one hub manager in Zambia.

Added to this are perennial issues of sustainability. As one UK-based hub funder expressed it, 'The issue for hubs is that they sit across many fault lines, not making enough money to be interesting to big investors, not having enough money to do social impact research and work to impress NGOs on a consistent and long-term basis.'

This research revealed that many of the most active and productive hubs have core costs covered. 'Unrestricted funding for core costs like salaries and rent are most needed,' says the director of an Ethiopian social enterprise incubator. The CEO of a startup space in Ghana explains, 'We have to pay US$35,000 rent annually! We have no government backing. If, say, I had a space from government, or even reduced rental at US$15,000, that would give me US$20,000 to invest in startups.'

A diversified mix of income was also important. Income streams might include in-kind support (e.g., internet); no-strings attached corporate social responsibility sponsorship, grants and revenue from hosting hackathons for companies; providing business development services;

or consulting.

Yet a diversified revenue stream can bring its own challenges in African contexts, distracting from the core mission, or blurring the needs of hub innovators with those of outside interests. Moreover, there is no legal framework in any of the countries surveyed for organisations to mix non-profit with commercial work.

A hub co-founder in Ghana explained:

'We were forced to set up a subsidiary in order to charge for services. You can't survive on grants forever. We pay full tax rates on those services and charge sales tax. At [our hub], grant funding is not taxed because we receive it through our foundation. Grants are taxed as income unless you set up an NGO. Things get very muddy, moving between two entities. You shouldn't have to set up subsidiaries.'

Chasing after diverse income streams which divert a hub from its core mission also seems to be a significant distraction.

CONCLUSION

Hubs are at an inflection point: their importance is becoming indisputable, but at the same time their challenges are coming into sharper relief. Their success is causing them to be overloaded with expectations. A handful of hubs are doing exemplary work and achieving institutional stability. Many others, however, are struggling to find an identity and a path to sustainability.

Nevertheless, despite the many concerns expressed by interviewees, no other type of institution has done so much to infuse a sense of dynamism and possibility into the tech scene in sub-Saharan Africa. Hubs will never be perfect, but they have established themselves as important pillars of the tech ecosystem. The good ones should be supported.

04.

BIG PLAYERS: TELCOS, SOCIAL BUNDLES & GOVERNMENT

'Telcos will eat you up!'

Social tech founder, Kenya

SUMMARY

Even in sub-Saharan African countries covered by fibre optic networks, data-enabled smartphones remain prohibitively expensive for all but a small minority of people. A majority of those who access the internet do so through their mobile phones via low-priced 'social bundles' – a form of internet access limited to WhatsApp, Twitter and Facebook ('WTF'). A lack of affordable access to the full internet has significant implications for how projects can be deployed.

While 'WTF' social bundles, USSD and SMS systems are accessible to more people than the full internet, using these makes social tech entrepreneurs, governments and tech solutions companies dependent upon powerful bottom-line focused telecommunications companies (telcos) and social media giants. Low literacy rates among women and the elderly in many regions also impact the efficacy of social tech.

Recommendations centre around new strategies for negotiating with the 'big players' and the development of alternative, grassroots-driven ICT infrastructure.

TELECOMMUNICATIONS COMPANIES

CAN YOU HEAR ME NOW? UNDERSTANDING THE ECOSYSTEM'S ICT INFRASTRUCTURE

The power of telecommunications companies (telcos) within the ICT ecosystem of sub-Saharan Africa is immense. There is no analogue or true point of comparison in Europe. Around a quarter of the 800 million citizens of sub-Saharan Africa are using the internet;[75] for most of them telcos are their only way onto it, via mobile phone internet packages.

Those users are most likely to be urban and wealthier, so for projects that want to include the other 75%, it is common to use systems like SMS text messages, USSD or voice, all of which require working with telcos. For a full appreciation of the outsized role of telcos in the ecosystem, however, it is essential first to understand *how* access works and for *whom*.

MOBILE PHONE PENETRATION

Unfortunately, ten years of sensationalist headlines about mobile growth in Africa have done little to clarify actual, on-the-ground experience for most people on the continent. The institutions that compile statistics for the authoritative International Telecommunication Union's reports on usage – government ministries and publicly and privately owned telcos – appear to have overestimated use and availability for decades. Case in point: most statistics have, until quite recently, primarily focused on mobile phone 'penetration'.

This term has only recently started to fall out of favour because of an embarrassing inflection point: mobile penetration rates were starting to exceed 100%. For years, penetration rates had been used as a rough proxy for how many people in a country were connected; more recently, the oversaturation rates began to look suspect for some markets.

INTERNET USAGE BY PERCENT OF POPULATION
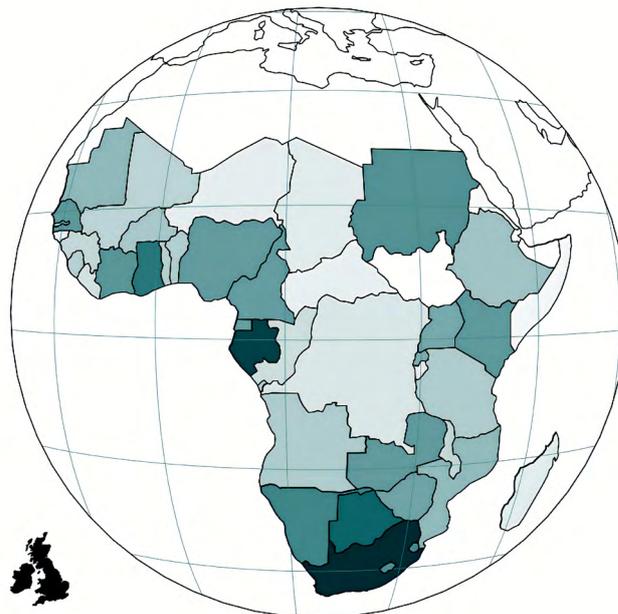
Map 3. This map shows distribution of internet usage, by percentage of population, in sub-Saharan Africa based on 2016 data from the ITU. Darker areas indicate more users, and the British Isles are shown in the lower left corner for comparison. Note that a significant portion of users in sub-Saharan Africa only access the internet via social bundle accounts. (M-ITI, 2018)

Let's take a moment to look at how national access is calculated; individual access and use; and finally, why these matter for social tech.

Penetration rates were historically calculated based on a country's population divided by the number of SIM cards in use in that country. In the mid-2000s, this formula indicated very rapid gains in sub-Saharan Africa – some of the highest rates of growth in the world – though obviously this was partly because the starting point was relatively low.

The form of service that has become ubiquitous throughout the continent is prepaid SIM cards. Over 95% of service in sub-Saharan Africa is prepaid[76] – a subscriber buys a SIM card, adds credit to it, uses the credit and reloads, etc.

Penetration rates are calculated by SIM card per capita, but some people use multiple SIM cards. There are many reasons for this, perhaps the most important of which is that telcos offer less expensive calls and texts 'in network'. A taxi driver who wants customers to call her might have four or five SIM cards across several mobile phones networks; a farmer might have one SIM card for

MOBILE PHONE PENETRATION AND USE – PROGRESSIVE FILTERS OF INTERNET ACCESS
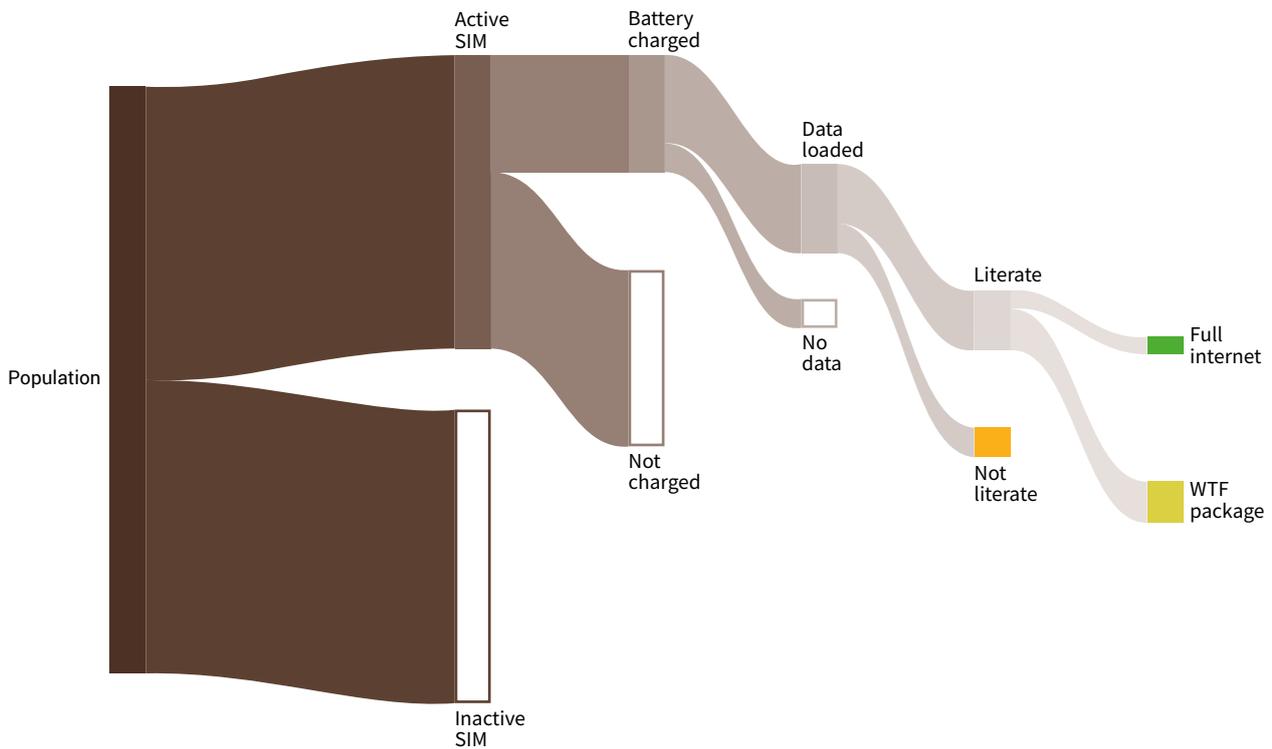
Figure 8. While 'mobile phone penetration' is counted by the number of SIM cards/population, there are progressive filters that reduce the number of actual users significantly. These include:
1) Does the user have multiple sim cards?
2) Is their phone charged?
3) Do they have credit to use it? (Illustration: Duarte Sousa for M-ITI, 2018)

local use and another to reach their family in the capital. As the GSMA indicated in a recent study, in many 'developing' economies the average subscriber has two SIM cards, which halves the penetration rate.[77]

But that's just the beginning, because that farmer might also have an old inactive SIM card from a year ago, when they switched services. With prepaid accounts there is little motivation for a user or their telco to deactivate an old account: it might be useful later, and there is no surcharge for possession of an inactive SIM. In many of the countries included in this study, the number of inactive subscriptions might be close to the number of active ones. According to the ITU, 'in the Central African Republic, there were 1.2 million active mobile-cellular subscriptions in 2014, as against 2.1 million registered subscriptions in the same year.'[78] This potentially lowers the penetration rate even more.

MOBILE PHONE USE

Four more points have major repercussions for actual use: first, much of Africa is 'off the grid'. While solar panels dot the countryside, powering mobile phone charging points, in many cases a charging point may be a ten kilometre walk away. Those phones that are charged will be switched off most of the time; when on, they are only used minimally for voice calls or text.

Second, many batteries are grey market, off-brand and hold little charge. Third, between inflation, the possibility of theft and concerns about liquidity, it is often unwise for anyone without much wealth to carry credit on their SIM card.[79] Finally, poor literacy rates make it hard for many people to use the myriad of apps – mostly internet-driven – that come with smartphones and feature phones. For example, almost 40% of women in rural Uganda would not be able to use a text interface requiring literacy.[80]

MOBILE BASKET ACTUAL COST VS. EQUIVALENT COST IN THE UK, BY GNI PER CAPITA
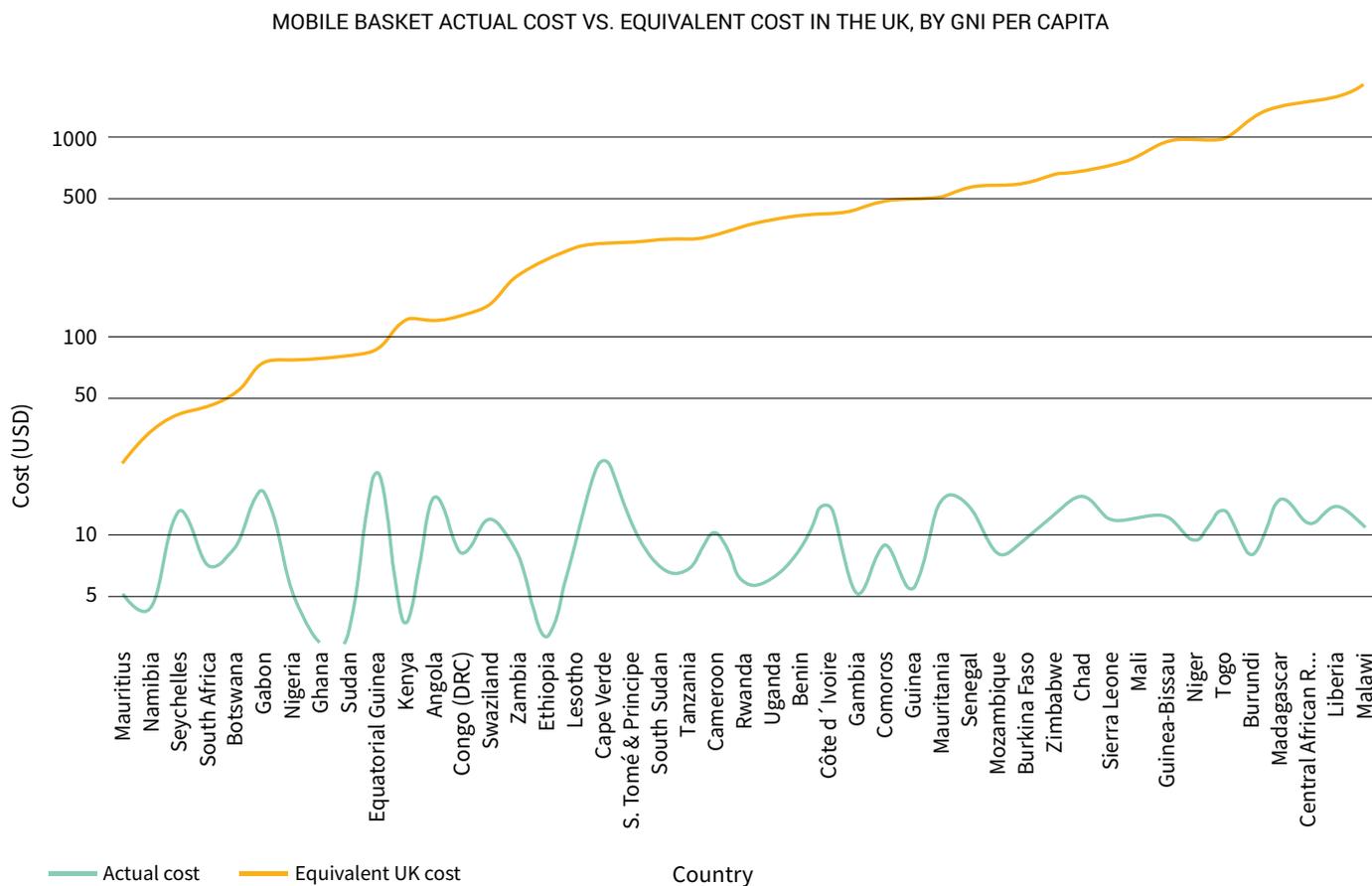
Figure 9. This graph indicates the relative cost of mobile phone use to a subscriber in sub-Saharan Africa compared with the cost to an equivalent mobile phone user in the UK, when calculated as a percentage of Gross National Income (GNI) per capita. For example, the cost to a mobile phone subscriber in Malawi who pays US$10 per month is equivalent to a UK subscriber paying over US$1,000 per month for the same access, when adjusted for GNI per capita. Across sub-Saharan Africa, mobile phone use remains extremely expensive relative to income. (M-ITI, 2018).[81]

This is not to say that phones aren't useful or in demand even in rural areas. Indeed, studies have found that mothers trade phone access for food security; others have found that the need for phones has created new forms of poverty.[82] It is also important to point out that in rural areas there is a culture of phone-sharing. And illiterate users often memorise important aspects of a user interface.

Moreover, the self-organising and communitarian aspects of rural African societies mitigate the costs of illiteracy: an illiterate grandmother can always stop a passer-by on the road and ask them to read an incoming text message. Nearly everyone can borrow a phone in an emergency. That said, these use patterns are rarely incorporated into the design and structure of tech projects, only used to counter concerns about access.

Mobile phones are still useful for non-owners and those in rural areas without access to data. Hubs' focus on developing apps over the past decade, however, looks like energy and creativity misdirected, in terms of building inclusive products for the majority of people, most of whom live on low incomes or outside urban areas. For years, hub employees and entrepreneurs justified this focus with arguments like, 'everyone you see has a smartphone these days', or, 'growth rates mean that soon everyone will be online'.

Within a hubpreneur's urban bubble this might have seemed plausible, but in many cases these were more justifications than rationales: the real reason apps were the rage in sub-Saharan African hubs was because they were the rage in the global tech scene. Also, they are relatively easy to create. The truth, a decade on, is that the growth rates were never what people thought they were, smartphones are still only used by a fraction of the population, and data costs are too high for most people. As one entrepreneur in Ghana put it: 'Data is the devil's blood here, it's poison.'

Social bundles, covered in detail below, do not allow apps that are not based on WhatsApp, Twitter or Facebook to access the internet. This means that apps are used less and less, even by those with smartphones.

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RECOMMENDATIONS

↘ Understand the mistakes that led to misdirected energy in app development. Fund research into where global trends are at odds with what can work in sub-Saharan Africa. Fund projects that are accessible to more than a small elite.

↘ SMS, USSD and IVR (interactive voice response) are critical tools that can reach all phone owners, as long as their handsets are charged. These tools should be integrated into the core of hub activity.

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WORKING WITH TELCOS

THE TELCOS' PERSPECTIVE

Partnering with telcos isn't easy, as their central role means opportunity costs and market positioning are strong drivers of their approach. Big and powerful, they are at the top of the ecosystem and they fear disruption.

Recent GSMA research on business engagement in emerging economies indicates that 'digital disruption has made it difficult for mobile operators to keep up with the accelerating pace of innovation.'[84]

As one external observer based in Kenya remarked: 'When you have a monopoly, it's an opportunity for someone else. I used to tell telcos that. In the next five years, even the monopolies will be disrupted because of the new technologies. Telcos are not going to control infrastructure anymore. Why? Many of them are mature and are facing a downward spiral.'

In order for the telcos to maintain their position, the GSMA recommends that they create corporate venture capital wings to invest in local digital startups, and thus accelerate innovation within the company and bring potentially disruptive external competition into the fold.[83]

THE VIEW FROM THE GROUND

Telco activities stemming from this line of thinking, however, have in general not been well-received by hubs, entrepreneurs, innovators, or those working within the social tech space in sub-Saharan Africa. Only two or three of the dozens of interviewees who touched on the subject reported positive stories about the relationship between telcos and social tech.

The study found examples where hubs have been taken over by telcos, and telcos have offered them free internet in exchange for *all IP generated in the hub*. One interviewee gave an example of a telco-sponsored hackathon where the telco launched an identical project to the prize winners a few months later. As one tech hub executive based in Ghana put it:

'The telcos are a bit like charlatans. They do their own competitions, and if you win, you cede all intellectual property rights in your idea over to them. Also, the app can only be made available on their platform. Another example: I had to walk away from a £180,000 deal with [telco name] to provide [hub name] with free internet because they wanted subsequent rights to everything that came out of the hub.'

Most of the people we spoke to think the telcos are more or less able to run roughshod over entrepreneurs and create their own terms of engagement. As one social tech innovator put it: 'No telco wants an outside company or partners to be big; they want to own everything.' And because of their power, telcos can and do consistently try to own everything.

One venture capitalist in Kenya explained that partnering with a telco – which may be necessary to scale – means sharing revenue with them at ratios of 70/30 or 80/20 in the telco's favour: 'This doesn't make for a very sustainable financial ecosystem, especially for services aimed at those with little or no money.'

In a tech solutions company in South Africa, an employee explained, 'We don't partner with telcos. The telcos are driven by bottom-line indicators…We always approach new markets through local partners, for example UNICEF, the government, etc.' Another CEO was more blunt: 'Safaricom, M-Pesa and crew are smart. They're milking unregulated territory to its bare bones.'

One entrepreneur described a complicated relationship with a telco to us in more detail: 'There are three main networks in [my country], and at first we wanted to be "network agnostic". But no one wanted to partner with us. In the end, we entered into an exclusive partnership with [the largest telco], who took on marketing for us.' Thanks to a relationship with a major international donor the enterprise was able to hire a top consultant who helped negotiate more favourable terms with the telco, and the social tech enterprise is going very well.

Nevertheless, the successful partnership hasn't been enough for the telco. In a move similar to others that have been described by many sources in other situations and countries, the telco recently launched a nearly identical service. The innovator isn't too concerned: 'They don't have the subject matter expertise and will most likely fail.'

And it seems that many of these services do fail. One Kenyan innovator notes, 'The operators launch services with external parties. And everybody focuses maybe for a month or two, you see some interesting numbers. Then somehow the services are abandoned.'

Several interviewees pointed to how telcos are looking to grow into more sophisticated information services: 'In five to ten years, telcos will be data platforms for content and services. Some mobile operators are already trying hard around health, education, agriculture.' This helps to account for the telcos' interest in sponsoring hubs and competitions as a way of identifying and harvesting promising new services.

So long as telcos are focused solely on maximising their bottom line rather than seeking also to nurture a broader ecosystem for 'double bottom line' social tech, a telco's sponsorship or partnership risks creating conflicts of interest. 'When a startup is in direct competition with Safaricom's hubs/funds, and needs to work on top of Safaricom infrastructure, who gets the fairer interest? Past history seems to suggest it is not a level playing field. The issue hasn't risen in a sharp enough form. At the moment everyone is too small,' says a UK telco, internet and media consultant. A recent study of the fintech landscape in East Africa echoes the views of our interviewees. The study concludes that while partnering with a telco opens up a clear path for reaching a significant number of customers, and thus offers significant opportunities for scaling, partnering with telcos can also 'be detrimentally expensive [and] time-consuming'.[85] Indeed, the challenges are so well known and difficult to address that they found they 'lead investors in East Africa to think twice before investing in companies that rely on MNOs (Mobile Network Operators) to scale.'[86]

RECOMMENDATIONS

↘ Telcos are critical to scaling. However, in the words of our interviewees, 'they are focused on their bottom lines', which can make them difficult or challenging for social tech actors to work with. Funders should explore ways to act as intermediaries: through tech solutions companies or aggregators that allow social tech projects access to infrastructure; by aggregating the needs of startup projects; or through consultants or negotiators.

↘ Funders should work with organisations like the World Wide Web Foundation's Alliance for Affordable Internet to influence telcos with European offices to review and adopt more innovation-friendly business practices in sub-Saharan Africa. Orange, Vodafone and MTN are all susceptible to pressure through their European offices, which have an eye on corporate social responsibility. In addition to lowering data costs and advocating for an open internet, they should be encouraged to provide better services for local African entrepreneurs.

WHATSAPP, TWITTER, FACEBOOK (WTF) SOCIAL BUNDLES

The global net neutrality movement is about ensuring a common carrier – i.e., information on the internet is delivered equally, no matter what it is, or between whom

it travels. Telcos in sub-Saharan Africa, however, are anything but neutral.

Over the past few years, deals between the telcos and social media companies have seen the rise of the 'WTF' social bundle. As one digital activist in Zimbabwe estimated, '70% of internet usage is WhatsApp. A lot of people think WhatsApp is the internet.'

This means that users cannot download or use many of the social tech apps being developed in the hubs; developing for Facebook and WhatsApp is difficult, not standardised, vendor-specific, and increases the number of lopsided corporate agreements an enterprise has to strike in order to scale.

An entrepreneur from Uganda was more direct: 'You're competing inside a system that has been gamed! Everybody is being forced, pushed to build bots and services for the Facebook messenger platform. It's like being forced to abet corruption. What happens when Facebook decides that Uganda is no longer a market that is interesting to them? What products and services will Ugandans use then, in this unfortunate event?'

While it is unlikely that Facebook will leave Uganda any time soon, the company might make arbitrary changes to the interface, or remove an app that a community-based organisation uses in its work.

We saw at least one activist organisation in Zimbabwe jumping through hoops to run a politically sensitive mailing list over WhatsApp. Previously, this group communicated via a large SMS subscriber list. Sending text messages was one of their biggest expenses, but the group could send them out in one go through a bulk delivery service. Since the advent of WhatsApp, however, SMS has dropped in popularity. The activists have thus had to start from scratch and build up a new WhatsApp list, with around 20,000 subscribers.

WhatsApp, however, does not allow the use of bots to automate the sending of messages. Nor does WhatsApp allow groups larger than 256 users (although the activists do not use large groups for fear of 'outing' some subscribers). So now the organisation has to spend nearly a day copying and pasting addresses into the WhatsApp interface to send a single message to its mailing list.

As one scholar of African media has described it: 'Social media bundles…are a key instrument that both enables and disables mobile internet access. While much critical debate has so far focused on Free Basics, data bundles may be the bigger key to Facebook's growing expansion on the African continent.' Or as an informatics professor from Cabo Verde put it more directly: 'A right to the internet has to be secured for all people.'

RECOMMENDATION

↘ Some social tech projects may need to use Free Basics, Facebook's Messenger bots, WhatsApp, or other proprietary systems to reach their audiences. These systems dramatically limit the possibilities for innovation, and leave teams dependent on the whims of a corporation with one employee for every quarter of a million users. Ironically, when it comes to creating a supportive environment for small social tech enterprises, lobbying government may be less important than lobbying Facebook to open up its systems.

REGULATION

MAKING NETWORKS, EXPLOITING NETWORKS

The rapid growth of mobile telephony is one of the reasons why people have faith in social tech's ability to scale in sub-Saharan Africa (see p. 13). In most countries, however, governments provided huge incentives to promote the development of the basic GSM (Global System for Mobile Communications) network.

Governments may have offered significant tax incentives to telcos, or monopoly or duopoly control of the market. Several countries still have a monopoly, like Ethiopia, and many have more than 60% of the market held by a single company.[87] West Africa has much less diversity than other regions.

In South Africa (and in most other countries), powerhouse telco MTN and several other companies receive continued tax incentives to provide mobile phone coverage in rural areas, where the profit margins are generally

slim. Providing service and providing quality of service, however, are not the same thing. Rural areas often have much poorer data speed, voice quality and bandwidth than urban areas.

What is important to note is that the rapid spread of mobile telephony in sub-Saharan Africa happened through partnerships between governments and some of the largest corporations in the world, e.g., Vodacom, Orange and MTN. A central caveat of this report is that scaling social tech may require just as much investment and energy – and it may be necessary to work with both governments and telcos.

Some observers see sub-Saharan Africa as a vision of a possible future for the West: smaller government, less regulation, fewer social safety nets and no neutrality of the internet.[88] Yet, uniformly, all interviewees cited and emphasised the critical role that governments and legislation either did play, or ought to play, in strengthening and balancing the ecosystem for social tech initiatives.

Proposals and recommendations for the role of government varied by country and region. Kenyans gave some credit to the government for its laissez-faire approach, which interviewees cited as clearing the way for innovation. The Rwandan government was lauded as an active enabler of the ecosystem.

Everyone, however, cited the need for smarter regulation and called for government to redistribute the power of telcos. An interviewee from the Kenyan finance sector, keen to see a more level playing field, described the regulator and government as 'spineless'. In West Africa, no one suggested government get out of the way, only that it do a better job.

WHAT IS GOVERNMENT GOOD FOR?

Many respondents spoke about the government and its impact on the possibilities and practices of social tech. Their opinions were diverse but some key themes emerged:
- Government should regulate the small less and regulate the large more, especially telcos
- In parts of West Africa, government was seen as necessary, but unfortunately also as an impenetrable monolith that could only be approached through family contacts or the right school friends

- Government was seen as the only actor capable of bringing zero-cost services, wide-scale to the most vulnerable
- Projects that survive for the long-haul very often had government involvement
- Government is key to an infrastructural approach, especially for health, education, energy and ICT infrastructure.

RECOMMENDATION

↘ Funders should work to find channels into the government – to 'the ones who get it' – and provide venues and channels for interaction with others in the ecosystem.

AGGRESSIVE GOVERNMENTS

This study has mostly assumed that governments are necessary enablers for social tech, but in some cases governments are actively trying to oppose civil society. In Zimbabwe, interviewees suggested that government is such a significant impediment to any other activity, and so fundamentally dysfunctional, that there is no clear path to a successful social tech project. Cameroon recently cut off the internet to the Anglophone part of the country for 93 days.

For Europeans funding in Africa, or developers of social tech products, there should be questions addressed at each point of decision: Am I helping the mission of government? Or am I creating a parallel system that is orthogonal to it? Does my system increase government accountability as well as the government's ability to conduct its operations? Relationships to other institutions should be similarly investigated.

Funders should ask themselves: 'This social tech product: is this how I would prefer a service to be delivered in the UK?' Some who chafe in long lines at the UK's NHS might indeed enjoy an SMS diagnosis service to occupy themselves. Few, however, would be happy to substitute an app for single payer healthcare.

In much the same way that Uber is engaged in a political campaign to rewrite cities and labour,[89] and Airbnb's product is enabling aggressive new forms of gentrification,[90]

the design of a highly scaled and successful social tech service in sub-Saharan Africa might create similar shifts – either towards regulated, accountable governance or towards unregulated, unaccountable systems.

05.
SCRAMBLED AFRICA

'There is no part of the world other than Africa where, constrained by brutal circumstances, people are so constantly forced to innovate both in ways of being, ways of thinking and in ways of making things. Putting together again and repairing what has been broken up – bodies, tools, institutions and symbolic systems – have become the very condition for survival.'

Achille Mbembe, Cameroonian philosopher

SUMMARY

Following four centuries of slavery, Africa has experienced the loss of sovereignty associated with colonialism; hot proxy conflicts of the Cold War; and, more recently, violent resource extraction. It has borne the brunt of the HIV/AIDS crisis.

Attempts by Europe to support initiatives in Africa often follow the old colonial patterns, because of language, cultural familiarity and other factors. This may serve to reinforce colonial legacies, and continue to fracture the continent, preventing the development of larger markets and trans-continental social tech collaboration.

This chapter looks at some of the legacies of these violent histories, which continue to impact the promise and possibilities of social tech. First it covers language – both the dense tapestry of local languages and the colonial languages that exist alongside them. Next it looks at global migrations to and from the continent; and finally at the diaspora, as both an engine and resource for social tech.

COLONIALISM'S LINGUISTIC LEGACY

Africa's linguistic diversity is remarkable. Nigeria alone has 520 living languages. In addition to the many local languages, large swathes of the continent are overwritten with those of former colonial powers.

One of the most significant findings of this study was the degree to which Africa remains divided into very different colonial linguistic blocks, with corresponding approaches to government, business and civil society, all of which have an impact on social tech.

Interviews were conducted in French, English and Portuguese. Some Francophone interviewees were conversant in English; no Anglophone or Francophone interviewees spoke Portuguese; few Anglophones spoke French. Arabic is spoken in some sub-Saharan countries but was not covered in this study.

These languages, bestowed upon African communities according to arbitrary colonial borders, have divided Africa into continuing spheres of mutual influence and interconnection. While there are some exceptions, interactions across linguistic boundaries are limited.

In contrast, it is worth looking at India. Although India may only be a subcontinent, it has a larger population than sub-Saharan Africa and only slightly less linguistic diversity. Before independence, members of the Indian Congress travelled throughout the country on the British-built rail system, forging a subcontinental identity. Hindi was promoted (though not without opposition) as a bridge language.[91] A widespread knowledge of both English and Hindi has fostered interconnection and communication, not to mention a massive national film industry.

When one speaks about language in Africa, one is also speaking about 150 years of direct and indirect social and cultural influence; those effects are significant. 150 million West and Central Africans still use a currency that was a direct replacement of the French franc (and which benefits France substantially). France and Belgium represent about half of all trade from the European Union to Senegal. Germany is still the largest exporter to Tanzania. For Francophone interviewees, the importance and central role of government was unquestionable,

seemingly a holdover of French values. Anglophone interviewees generally had a far more market-oriented understanding of the ecosystem.

Interviewees from all over the continent agreed that the Anglosphere had the closest to a Silicon Valley, hub-centric approach to tech. Lusophone and Francophone interviews showed that many entrepreneurs and tech hubs felt they had to 'catch up' with their Anglophone neighbours. They also felt excluded from the opportunities and advantages Anglophones appeared to enjoy.

South Africa, Nigeria and Kenya's ecosystems are seen as founts of innovation and by far the most fertile in terms of productivity and infrastructure. Anglophone approaches to social tech were widely seen as a good thing: interviewees did not, for example, cite Chinese, Brazilian or Indian approaches as something to emulate. The compass generally pointed West.

TECH AND LOCAL LANGUAGES

Thousands of local languages are spoken throughout Africa, encapsulating rich cultural heritages. UNESCO and other organisations argue for the preservation of that culture in a world that has been increasingly homogenised since the advent of the printing press and other mass media.

Interestingly, while the broadcast era has been one of standardisation and minority language extinction, Facebook's platform model is creating large text repositories of many local languages in comments, where previously relatively few had much of a printed canon.

Most local languages, however, are not taught in written form in schools. Swahili, a widely spoken lingua franca in East Africa, is more commonly used on text-based social media than most local languages. The Nigerian minister of science and technology recently announced plans to teach STEM (science, technology, engineering and mathematics) subjects in local languages. South Africa's Rhodes University recently awarded the first PhD to a student whose thesis was written in isiXhosa. Nevertheless in

Africa, as on much of the globe, the software and interfaces default to English. As the CEO of a youth NGO active in Gabon explained, English is 'the language that tech speaks.'

The founder of an NGO in Benin dedicated to supporting startups among African women described apps for market women in rural Mali: 'Content needs to be developed in local languages as many women in rural areas will not understand French or English, and they need to know when they get up early in the morning to pick up their salad: what's the cost of the salad for that day, is it worth travelling for three hours to sell their salads that day? And they can't understand that information if it's not in [a local language].'

Fragmentation by language is a major constraint for a social tech project. Some social tech developers go to great lengths to make sure that text content is translated into local languages.

Allowing for this tremendous linguistic diversity may be difficult for centrally produced information, but is well facilitated by a platform approach that collects user-contributed content. But as literacy is not taught in local languages, textual communication using an app or SMS is often of less use.

Moreover, many potential users of a social tech product have low or no literacy. UNESCO estimates that in 2015, three-fifths (63%) of adults in sub-Saharan Africa were literate. This figure, however, conceals a significant gender divide: while 7 in 10 men can read, only half of women can. Literacy increases with wealth and in urban areas, but any interface that requires literacy may be of little use for a poor rural woman. What may seem to a developer to be a technical question is actually a question about fundamental human rights and capabilities.

RECOMMENDATION

↘ While it seems difficult to develop for local languages, software libraries that allow for multiple languages (in programmer jargon: internationalisation [i18n] and localisation [l10n]), have come a long way. Hubs should work to make sure that software projects start with a multilingual boilerplate as best practice.

FINDING

↘ While some attention has been paid to SMS and USSD, and too much attention to smartphone apps, voice interfaces have not received much attention. This is partly because it is relatively difficult and expensive to do voice, and few telcos offer access to voice services (compared to how companies like Twilio and Tropo work in markets like the USA). The Zimbabwean Freedom Fone project is an example of an initiative that sought to make these types of interfaces easier to develop and administer.

RECOMMENDATION

↘ Affordable and simple voice interfaces should be explored, as they would double or triple the number of users social tech could reach. Enabling technologies and enterprises should be developed to make this process easier. Radio is the king of media in Africa, the most widely accessed source of information, more equally accessed by gender, income, or location than any other medium. Yet radio is generally neglected in hubs, when in fact it can be combined with other forms of ICT in ways that might have far greater reach and impact than apps.[93]

COLONIAL LANGUAGES

About 80 million Africans speak French below the Sahara, and some 35 million speak Portuguese. These numbers are low compared to the populations of Francophone and Lusophone countries, reflecting the fact that many people speak indigenous languages, especially in rural areas.

For example, the DRC is one of 24 Francophone countries in sub-Saharan Africa; it alone has a population of over 80 million. Roughly half its population speaks French, while 70% of urbanites in the capital do. Much of the dominant local language, Lingala, is interwoven with French.

Although there are four other official bridge languages in the DRC and 242 local languages, only French is taught

in school after the second grade. The urban elites, governors and others who run the country are Francophone, and the structure of society is a legacy of French governance and sensibilities. The entire population, whether or not they speak French, is living in a Francophone sphere of cultural, monetary and institutional influence.

RECOMMENDATION

↘ It is critical that funders understand that most Africans are speaking their colonial language as a second or third language. A North American or British expatriate will always have a smoother pitch and sound more comfortable when interacting in English. It is crucial to find ways to evaluate a proposal or pitch that actively avoid implicit bias.

SPHERES OF INFLUENCE

A range of factors differentiate these linguistic spheres from each other, in fundamental ways.

THE FRANCOPHONE VIEW

Francophone interviewees, even in bustling cities like Dakar, described an ecosystem that was far less dense and diverse than the average Anglophone one. They described the tech scene in Francophone sub-Saharan Africa as less energetic, with less available information and fewer resources than their counterparts to the east.

The chief Francophone researcher for this study found that members of the ecosystem were more opaque about their work, more wary of spontaneous approaches and less interested in building bridges beyond those that already existed, compared with their counterparts in the Anglosphere.

There are a number of hubs in Francophone Africa, but they do not have the cultural valence they do in Anglophone areas.

Interviews from Gabon and Cameroon indicated that in Francophone culture, being an entrepreneur and studying business is often seen as a sign of poor intellect and

failing school studies: entrepreneurship is 'made for the losers'. Indeed, some young people in Gabon hide from their parents the fact that they are attending events like entrepreneurship skills workshops. This was somewhat true for Anglophone respondents, but far less so.

For Francophone Africa, approaches based in universities or the civil service may have added traction. When asked how to increase access to finance for entrepreneurs in Senegal, an executive from Orange said without hesitation, 'It should be the government…it needs to engage with [the] private sector and startups.' In Francophone countries, government was inevitably seen as the most critical agent in supporting and facilitating any initiative.

Most institutional social tech funding in Francophone Africa is said to come from French government agencies, including Agence Française de Développement (AFD). A major commercial player in corporate financing, Investisseurs & Partenaires (I&P), is currently run by the former head of AFD. An I&P director based in France said that their mission is to provide funding to the 'missing middle' of enterprises too large for microcredit, but too small for international finance. They only fund enterprises 'made in Africa', who they feel can 'respond to local unmet needs.'

I&P does not, thus, fund many technical innovators, as they have found that 'innovation companies involving tech usually don't originate from locals but from Westerners or from diaspora people.'

The primacy of government also extends to education, which sticks closely to the French model. Coding is not taught in most schools, so the Organisation internationale de la Francophonie is funding tech hubs to run coding schools and programmes for children and teenagers.

Indeed education and training appeared to be a major mandate for hubs. As one tech hub director in Cameroon put it, 'Our work starts before: outreach programmes, going into schools, helping students to become entrepreneurs, [hosting] events, training sessions.'

Obviously, some linguistic and cultural differences may not affect a programme introduced by WHO or UNICEF: one UK-based charity worker said that she found little difference working between Anglophone and Francophone environments. This may be partly to do with the international nature of large aid organisations, which have been mandating standard practices since the mid-20th century. It was the opposite of what

was reported by local members of the respective ecosystems, or local interviewees that had experience in both environments.

Indeed, sometimes it is the very appearance of similarity across African contexts that acts as a clue signalling the often very radical differences that can exist between ecosystems. The jury of one national award for innovation in Gabon, for example, gave its top prize to an app with an English interface. This means that in every step of the lifecycle – ideation, development, pitching and finally recognition through the national Grand Prix de l'Excellence – different actors in the tech ecosystem in Gabon validated a new app with an English interface for a Francophone market. It is difficult to imagine that a French app would win such a prize in an Anglophone country.

RECOMMENDATION

↘ West Africa has a great number of Anglophone/Francophone borders with many multilingual citizens. One possible regional specialisation strategy might focus on multilingual apps and opportunities. GiftedMom[92] is a good example of a successful bilingual app from this region.

THE LUSOPHONE VIEW

Portuguese-speaking interviewees felt even more isolated than their Francophone counterparts. That said, there is a linguistically-based common sphere that spans the continent.

'Here the language is a huge barrier, our entrepreneurs are looking to engage with Lusophone countries, so our company tries to expand towards Mozambique and Cabo Verde. Also, from Mozambique they engage in Angola's market,' said a tech hub co-founder in Angola.

An Angolan social tech entrepreneur with a focus on technical and business education added:

'We are trying to get more connected with Lusophone countries including the PALOP [Lusophone Africa] and Brazil…We want also to engage more in the African ecosystem. The challenge is language, many people do not speak English and do not understand the importance of speaking English…Anglophone countries are more developed and also they have easy access to content in English. We do not have connection with Francophone countries, despite Congo being a big neighbour. Language is an obstacle and nobody is doing substantial work to connect. Even with Lusophone countries there are not many connections. We do not know much about Cabo Verde, São Tomé or Guinea Bissau.'

The Lusophone social tech scene was described as taking its first steps. The Angolan social tech entrepreneur explained, 'We are in a very early state. Many people are just awaking [sic] about social tech. Some organisations are working on this, including mine. The community is still very small; there is a lot of work to do in terms of education, inspiration.'

Both Lusophone and Francophone interviewees spoke about the importance and centrality of government. They had a strong sense that government was the primary engine of their respective countries. Some interviewees seemed reluctant to speak negatively on the record about government: 'We see government as [a] partner, not as an enemy. We consider this is a role to play together,' explained an Angolan tech hub co-founder.

The same hub co-founder indicated that government legislation was not lacking either in quantity or quality. They suggested, however, that existing legislation was not well implemented, and that the government was too proactive, passing legislation on new technologies that still had no market: 'We believe that we have to do our part and the government will follow. Government [should] enter into play when things are happening, and then they start regulating…We don't think that government should regulate things that nobody is paying attention to.'

Like the tech innovation space in general, social tech initiatives are largely restricted to the capital cities. In the words of an Angolan entrepreneur who runs a 'startup studio':

'Let me underline that I talk about Angola with a focus on Luanda. That is unfair for the country. The reality in the capital is very different with respect to the rest of the country. In Luanda, you have some opportunities, but in other provinces the reality is worse and the landscape is different. When we talked about those initiatives, they are all focusing in Luanda, that is a shame…we do not work in rural areas yet, but we look forward to do that as a next step. There are some constraints. To work there you need to work with local authorities, you need to inform the local authorities and explain what your aims are. This takes time, it is a long process. Hopefully next year we will start going beyond Luanda.'

This analysis tallies with other experiences in rural areas in Anglophone Africa: working at a local level is dependent upon relations with local government officials. In some cases relations must be maintained, not only with the official government, but also with an ethnic shadow government, and also with religious leaders.

RECOMMENDATION

↘ As described elsewhere, more work needs to be done to get rural issues in front of developers. Moreover, each team should not have to start from scratch to build the necessary connections with rural authorities. Hubs or other entities that specialise in facilitating rural project opportunities for small local

teams would go a long way towards popping the urban elite bubble.

One central difference between the Lusophone and Francophone realms is that while in the latter the French government is seen as very important, in Lusophone contexts the Portuguese government is not a player in the ecosystem.

This may be because France's GDP and population is much larger than those of its former colonies. Portugal's population is less than half that of Angola or Mozambique; its GDP is only about double Angola's. Indeed the Angolan bank BIC has branches on Portuguese high streets. USAID and the Dutch and Swedish governments were seen as far more significant than contributions from Portugal.

As described in the case study in Chapter 2, *Lifecycle of a social tech initiative*, Cabo Verde is unique in Africa and perhaps the world, as its ecosystem is dominated by NOSi (Núcleo Operacional para a Sociedade de Informação), a government agency that has grown to handle all aspects of technology through the islands. Part of the NOSi mission is bringing connection between islands and institutions, and it has been very proactive in building free social access to wifi in public squares and schools.

RECOMMENDATION

↘ Funders should work to extend their regional networks and build transnational markets. Although it may be easier for funders to work within their linguistic and cultural comfort zones, this runs the risk of unintentionally furthering the fracture of the continent and extending colonial legacies.

DIASPORA

The topic of diaspora and Africa could merit a report in itself, and indeed the diaspora figured prominently in this research. People leave a country for many reasons, from mortal necessity to the pursuit of career or economic opportunity. The status and expectations for those who

leave are culturally determined.

This report focuses on two aspects of Africa's diaspora: the role returnees can play inside Africa and the role diasporans can play from outside the continent.

First, many of the diasporans interviewed or highlighted through this study play an outsized role in the ecosystem as 'bridge figures', 'translators' and 'go-betweens'. Whether because of resources that allow them to study abroad, or because of skills and practices they were exposed to while away, diasporans accounted for a large number of the founders of social tech initiatives. From a negative point of view, returnees may be successful because they are already comparatively well-resourced; their ability to 'code-switch' and fluency in Western cultural norms makes them 'legible' to funders irrespective of their ability; and their foreign training is seen as elite.

Viewed positively, it may be that better education abroad; an enhanced ability to see beyond the present to the possible; and the ease of a returnee to move past gender and class barriers all empower a diasporan to do great things. 'The diaspora gives Africans an outward facing perspective on stark contrasts between a fledgling ecosystem in sub-Saharan Africa to more mature ones in Europe and America,' explained a Nigerian working for a tech service company in Dublin. Both of these perspectives contain truths. Diasporans inject new ideas and energies into local communities. Nevertheless, focusing funding and efforts on diasporans will increase and codify some aspects of social inequality.

Second, Africa's diaspora has the potential to contribute to the social tech ecosystem from outside the continent. The diaspora is already a major source of income for many countries: in Liberia and the Gambia remittances account for a fifth (20%) of GDP, and in Zimbabwe and Ghana around 15%. Members of the diaspora often wish to help from abroad rather than return. 'Most of them are actually [so] comfortable with life [abroad] that the prospect of moving back, or the deliberate effort in building businesses back home, is only a distant idea they love to flirt with,' explained a Ghanaian private equity investor in London.

But remittances, the most common way of helping from abroad, are fraught with problems. They rarely support economic production or infrastructure. They are often channelled towards an individual's family rather than the wider community. The same investor describes remit-

tances as 'a gateway for supporting the consumption trends and covering subsistence costs back in Africa' that have 'conditioned recipients the same way grants have conditioned social tech innovators.'

Indeed, remittances can be as detrimental to local economies as they are a boon to individual families: they are known to cause local inflation and other troublesome economic trends that may in fact detract from financial sustainability goals.[94]

RECOMMENDATIONS

↘ Remittance tech is a promising area for social tech, exploring more productive and equitable ways of leveraging remittances as public investments rather than per-family subsidies.

↘ If diaspora returnees are highly empowered to contribute to social tech ecosystems back home, then mobility grants, 'camps' and other forms of travel and immersion could be an important investment. Such expeditions could target promising businesspeople or social entrepreneurs and take them on tours of top European institutions engaging in social tech.

↘ The diaspora has much more to offer than just money – including language, expertise and spare time. Software platforms that leverage distributed labour and creative contributions have changed the nature of how things can be made, from GitHub to Google Docs to YouTube. There is a tremendous space for platforms where the diaspora could 'crowd build' information and services.

06.

LOOKING BACK AT SOCIAL
TECH IN THE YEAR 2022

'I just told the world the truth. And if my truth then becomes political, I can't do anything about that.'

Miriam Makeba, South African singer

SUMMARY

Many aspects of this report have focused on barriers to creating social tech with impact in sub-Saharan Africa. There is no question, however, that people and institutions are motivated to create social tech that can scale across countries and the continent.

What would the ideal ecosystem look like over the next five years? It is hard to predict the future or provide definitive solutions for dozens of countries across a wide and varied continent. Nevertheless, it is worth imagining a five-year plan for social tech in Africa. It is also essential for European discourses around Africa to incorporate grounded but aspirational visions of what is possible.

This section imagines a retrospective gaze at the year 2022, when fundamental changes made after 2018 have set in motion positive and powerful social transformation.

A NEW RELATIONSHIP WITH THE AFRICAN DIASPORA

Global mobility had long played an important role in economics and development, from an individual to a regional level. There were many everyday examples of the benefits of mobility – from remittances that enabled individual families to survive and thrive, to overseas education that enabled a returning diasporan to pitch to foreign funders in a language and style they understood. Often these benefits remained within the family.

In 2022, however, diasporans had more opportunities to engage in ways that better promoted equality, and supported broader development beyond the family unit.

There were now simple social tech platforms to send remittances in support of infrastructure, by purchasing a road or a charging station for a village, or funding a district health centre. Other examples included 'crowd building' information services from abroad, facilitating voluntary analysis of statistics for a government department, or analysing medical images for hospitals.

INCREMENTAL INFRASTRUCTURE

There was clear need for investment in infrastructure across sub-Saharan Africa, from roads and power, to sanitation and education. The prevalent model – a largely state-purchased, corporate-built approach that had served the West well since the 18th century – did not work as well in Africa.

In 2019, a range of initiatives were launched to consider how infrastructure might emulate the success of motorcycle taxis, mobile phones and other forms of more ad-hoc infrastructure that had demonstrated wide success.

Were there forms of infrastructure that could spread similarly, through smaller investments, but that could aggregate better? Indeed there were. By 2021, governments and citizens were investing in incremental improvements that together began to form a coherent, safe and equitable infrastructure, including data, electrical power and other enabling fundamentals.

EQUITABLE INVESTMENTS

By 2022, a mixture of donor policy and progressive financial legislation across many countries in Africa had curtailed a destructive trend – the lopsided investment preference for expatriates and foreign-trained Africans. By exploring 'colour blind' approaches to investment, donors were better able to make grants free from unconscious biases, focusing on performance rather than comfort, cultural similarity or legibility.

Expatriates continued to receive funding in cases where they brought skills and experiences that gave them an advantage in ideating and implementing programmes or innovations. But it was easier to discover local social entrepreneurs who brought their own advantages, such as superior understanding of users and markets.

Government legislation developed in Kenya was later modelled by other countries, making it slightly more difficult for private sector capital to reward only expats. This legislation gave investors the incentive to identify and fund local talent.

BASIC RESEARCH

At a major conference on Africa and technology organised in 2018, a group of governments, donors and researchers agreed that many of the structural problems being discussed stemmed from the importation of technologies developed for other markets and locales.

They agreed upon a mandate for locally developed hardware (communication, transportation, power systems, etc.), and channelled funding towards developing solutions suited to the local context.

These included a strategic partnership with Huawei to develop a phone for rural areas, a collaboration with Ericsson on a village telco base station, and another with Subaru on next-generation commuter buses. In all cases, basic research was conducted at African hubs and universities. Late-stage manufacturing and assembly of products happened on the continent.

A PLACE AT THE TABLE

In 2020 advocacy by local activists and donors led to the creation of social enterprise legal status in Nigeria: the Lowprofit LLC (LP). LPs were similar to Low Profit LLC status in the USA, or Community Interest Companies and social investment tax relief in the UK. LP standing allowed low-profit enterprises to take funding from private donors for social good programmes or operations without incurring tax burdens, and guaranteed that such enterprises would reinvest any profits back into their programmes.

The social enterprise standing streamlined running a social tech initiative, widening the path to success. Soon telcos began to offer discounted services to LPs, and in turn received tax write-offs themselves. By 2022 several other countries had modelled the Nigerian approach with their own legislation.

OPEN INTERNET

In 2019 the Open Internet campaign, led by the WWW Foundation and a consortium of African organisations, finally yielded success. An agreement was signed by the African Union and implemented by the major economic and regional blocks to ensure a neutral, 'common carrier' internet, thus ending subsidised 'social bundles'. At the same time the #datamustfall movement pressured governments to set caps for data costs based on income levels. For the first time in years, local innovators were able to compete.

WOMEN TAKE THE LEAD

In 2018-20, a tech hub in Ghana, led by a founder of noted Akan matrilineal heritage, became a tremendous success, as it honed methods for developing successful projects centred on female, rural users.

Several of the projects from this hub rocketed to international success, and the hub successfully franchised to both Anglophone and Francophone countries, through Akan evangelists from both Côte d'Ivoire and Ghana.

Comparisons were made to famous franchises like Khan Academy, but the Akan hubs had a more significant value proposition: unlocking the potential of half the continent. The hubs rejected Silicon Valley 'brogrammer' models

and replaced them with ones that promoted gender equity in the workplace. What is more, they promoted a local approach to business value propositions more in line with rural economics than the app-and-Uber experiments of hubs in the 2010s.

COLLECTIVE INFRASTRUCTURE

Following the work of Rhizomatica in Oaxaca and others, in 2018 researchers in Uganda began to develop several types of collective communications infrastructure. Drawing from the organisational success of SACCOs (collective savings organisations run by rural farmers), the 'telcollective' models allowed for village-scale investments in small cellular base stations, mesh networked internet and low-power FM technology.[95] It proved less expensive than commercial services and allowed for free intra-community communications.

In 2021, after several years of tense negotiations with the Uganda Communications Commission and significant lobbying by UNESCO, Uganda legalised village-level telco services, which were soon emulated around the world. Commercial telcos subsidised the community ownership model so that they would no longer have to provide basic service in rural areas, a responsibility that had previously formed part of their licensing requirements from government.

A NEW GENERATION OF SOCIAL TECH FUND MANAGERS

Private capital investment had been dominated by expatriates in 2017, but over the next five years there was a significant increase in Afrocentric fund managers. The immense success of development finance institution (DFI) products such as microfinance over the last three decades attracted more traditional investors, sovereign wealth funds, pension funds and insurers.

This rise of corporate venture capital could be traced back as far as 2015, when traditional telcos and other entities invested in and nurtured social tech, as a way of going beyond corporate social responsibility and tapping into economic and social prospects promised by new ventures.

Later some international donors began to create funds

that allowed them to spread risk in developing markets, 'throttle' investment in more or less successful projects and create incentives for cooperation within the funds.

Finally, a new crop of social tech fund managers replicated these successful techniques, securing capital from a diverse range of investors – private and charitable, local and international. Social investment in Africa became less risky and more 'legible' to outsiders.

SPEAK AND CARRY A STICK

In a 2013 TED talk, South African commentator Toby Shapshak drew a neat vignette around a Maasai moran in the grasslands with a grazing stick in one hand, and a Nokia 1100 mobile phone in the other. The basic phone enabled real-time communication with loved ones, receiving money from rich relatives in the city, and sending money to agricultural suppliers. Shapshak's key quote, 'You don't need an app for that!' was the direct opposite to Silicon Valley's 'There's an app for that!'

Previously, millions of people were excluded from the benefits of mobile technology because they lacked the literacy or colonial language skills required to navigate text interfaces. Many Africans used their own languages, but only orally. Although there were deep oral traditions, local languages were rarely reflected in written culture or education.

For a long time, it seemed to everyone that the hegemony of English was necessary for tech. By 2020, however, advancements in Natural Language Processing, matched with concerted research efforts between universities and telcos, allowed for sophisticated African voice technologies to be widely deployed by the largest telcos and radio stations. Intelligent and intuitive communication now flowed, without being filtered by literacy in colonial languages.

RAISING THE (ACADEMY) BAR

The World Bank's 20th century 'structural adjustment' programme of liberalisation in Africa had degraded the quality of higher learning across the continent. Several institutions mushroomed in size but underwhelmed in delivery.

In the 2020s, however, efforts were put in place to revive an ailing public education system. Centres of excellence like the African Institute of Mathematical Sciences (AIMS), Africa Leadership Institute, the Centre for Intellectual Property and Information Technology law at Strathmore University, and Carnegie Mellon Africa had graduated a diverse range of socially conscious researchers, makers, emerging leaders and policy experts.

This new wave reinvested in basic research and development, helped develop interdisciplinary programmes and drove curricular reforms, which further created stronger research and education institutions. This alleviated some of the pressure on hubs and training programmes, while ensuring that locally specific knowledge was amplified and preserved.

SOCIAL TECH MOVES TO CIVIC TECH

Building on the successful Cabo Verde model, many African techies realised that approaches that ameliorate symptoms will have less impact if larger powers continue to make problems. Accountability and good governance had to come first.

In 2018, an influential 'Donors' Pact' was created that advocated for adjusting the funding of programmes to cover basic needs in countries where the government was a major impediment to fulfilling those needs.

The pact called for funding to move towards civic tech for civil reform, spanning the range from active resistance to patient accountability. Techniques like tying funding to a blockchain for fiscal accountability; developing positive review and transparency systems to ensure service accountability; and agonistic social network analysis to pre-empt corruption all had significantly higher returns than rectifying the effects of corruption and mismanagement.

GLOSSARY

AGGREGATOR. A company that strikes deals with all the carriers in a country to provide a single short code, or three digit number, for SMS interactions and marketing; it then aggregates SMS messages from the various carriers through a single interface, and pushes bulk SMSs sent from that interface to all the carriers.

API (APPLICATION PROGRAMMING INTERFACE). An API allows developers or applications to manipulate data on another computer. They may be 'open' (public) or 'closed' (private). Google Maps has an open API that allows businesses to show a map of their facility from their own website; Twitter has an open API to like a tweet from a Tumblr page. Open APIs enable and encourage 'mashups' that involve other enterprises' data or services. If a tech platform keeps its API closed (or private), small-scale innovators are unlikely to be able to interface with it.

BLOCKCHAIN. A cryptographically secure distributed ledger which can be used to store records, virtual currency, or contracts. Perhaps best known for its support of the cryptocurrency Bitcoin, the blockchain nonetheless has many other potential uses for public but distributed accounting.

BROGRAMMER. An informal term for a stereotypically masculine programmer, sometimes used pejoratively. 'Brogrammer' workplace cultures have been discussed in the media as an impediment to women's advancement in tech.

DFID (DEPARTMENT FOR INTERNATIONAL DEVELOPMENT). A government department leading the UK's work to end extreme poverty. DFID funds a range of programmes across sub-Saharan Africa.

EDTECH. The application of digital technologies for education and learning.

FAB LAB. A network of public fabrication facilities, initially conceived and operated by the Massachusetts Institute of Technology (MIT), for fabricating with contemporary technologies like 3D printers and computer-assisted design.

FINTECH. Any tech that provides a financial service, of growing importance on a continent where most of the population is 'unbanked'.

FREE BASICS. A service from Facebook that offers people free access to a limited selection of websites through their mobile phones.

GSM (GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS). Also known as 2G, this is the standard communication protocol for mobile telephony since the early 1990s. If a phone has a SIM card, it uses GSM.

GSMA. An industry trade group representing the interests of mobile network operators around the world.

HUBREPRENEUR. A tongue-in-cheek term for someone who has made a career out of interacting with tech hubs, either in management or as a frequent beneficiary of project funding.

IMPLICIT BIAS. Biases or attitudes attitudes, based on stereotypes, that may be unconsciously held towards people, ideas or things.

ICT (INFORMATION AND COMMUNICATIONS TECHNOLOGY). This umbrella term describes a cluster of continually evolving and converging information technologies, including computers, software, networking, the internet, programming and telecommunications.

IVR (INTERACTIVE VOICE RESPONSE). An interface that allows for interaction between a human and technology with voice, e.g., Amazon Echo, or the interactive prompts when calling a credit card company.

LEGIBILITY. In this report, legibility refers to the relative ease with which a person is understood by others, often enhanced by common language and/or cultural reference points.

MAKERSPACE. Similar to Fab Labs, makerspaces are workshops where technology enthusiasts can get together to share tools and knowledge.

MHEALTH. Public health initiatives and the practice of medicine supported by mobile phone.

I18N & L10N (INTERNATIONALISATION AND LOCALISATION). Software libraries that allow for the relatively easy process of making an application work in multiple languages and locations. This is what allows, for example, Wikipedia or a browser to be used easily in different countries.

PALOP (PAÍSES AFRICANOS DE LÍNGUA OFICIAL PORTUGUESA). The group of Portuguese-speaking African countries.

PARTICIPATORY DESIGN. A design approach that actively attempts to involve all stakeholders in the design process.

RHINO. A tongue-in-cheek term for a majorly African company derived from the Silicon valley term for a billion dollar initial public offering: 'unicorn'.

SMS (SHORT MESSAGE SERVICE). The original 160 character messaging/texting built into the GSM standard, used since 1992. Available to 80% of the world's mobile phone users.

SOCIAL TECH. A heterogenous term used to describe, among other things, the application of technology for societal issues. Interviewees for this study did not generally use the term.

SOUTH-SOUTH. A term used to describe the exchange of resources, ideas, or know-how between countries, communities, or institutions in the Global South. Most knowledge exchange, travel and economics still travel South-North-South primarily.

TECHIE. An informal term for technology enthusiasts and workers.

TELCO. A telecommunications company. A telco's services may include telephony (fixed and mobile), internet access and data communications.

TENDERPRENEUR. A joking term for someone who lives off of successive grants and awards, often without completing projects or building a business with actual sales.

USAID (UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT). The United States Government agency primarily responsible for administering international civilian aid.

USER-CENTRED DESIGN. One of a set of related techniques, including participatory design and co-design, which to greater or lesser degrees include end-users in the process of design.

UNICORN. A startup company valued at US$1 billion or more.

USSD (UNSTRUCTURED SUPPLEMENTARY SERVICE DATA). An important service for telcos and a necessary one for users with 'feature' (as opposed to 'smart') phones. To 'top up' credit on a phone, a user might have to type *151#, at which point their phone might display a list of options. USSD can encompass more sophisticated, menu-based, two-way dialogues than SMS.

WEST, THE. In this report, the West refers to Europe and North America combined, especially in the context of their respective influence on narratives of progress and development in Africa.

WHATSAPP. A popular messaging app owned by Facebook.

WHITE RHINO. See Rhino. A White Rhino is a similarly humorous term for tech teams in Africa with white partners, apparently allowing them to receive significantly more funding.

WHITE SAVIOR INDUSTRIAL COMPLEX. A term coined by writer Teju Cole in a 2012 article in The Atlantic, to describe how aid works as much to justify privilege as to improve others' lives.[49]

WICKED PROBLEM. A social problem that is very difficult or impossible to solve, due to incomplete or contradictory requirements, expense and the interconnectedness of the problem to other problems.

WTF (WHATSAPP, TWITTER, FACEBOOK). The acronym commonly used to market mobile phone 'social bundles,' which give subscribers daily internet access limited to WhatsApp, Twitter and Facebook. Social bundles do not give subscribers access to the full internet. Recently introduced **SWIFT** gives users daily internet access limited to Snapchat, WhatsApp, Instagram, Facebook and Twitter.

APPENDIX

Research method

Our study drew upon a combination of desk research, participant observation and semi-structured interviews. Our eight interviewers and researchers, brought together by an interdisciplinary human-computer interaction (HCI) research centre in Portugal, included social tech founders, academics, a telecommunications engineer and a technology journalist. The team was equal by gender, with three of the team from Africa, two from North America and the remaining three from Europe. Interviews were conducted both in person in East Africa and via telecommunications, and took place from December 2016 to May 2017. The team spent three months in active writing and further analysis. The analysis was predominantly qualitative and features a high proportion of direct reportage.

Through initial desk research, we built lists of dozens of potential interview subjects involved in social tech ecosystems in sub-Saharan Africa. We referenced recent journalism about startups, hubs, funding and projects, and contacted individuals mentioned in those stories; found personnel in relevant government ministries; and read reports and academic texts studying social and technical innovation to identify key institutions. The initial subjects discovered through this research were contacted via email, LinkedIn, or phone, and asked to nominate peers. There were far higher response rates in some (mostly Anglophone) countries than others, and in some sectors (such as hubs) than others (for example, venture capital). During initial interviews, we solicited further nominations and proactively sought interviews with members of the ecosystems who proved harder to reach, such as investors and regulators. There may therefore be some selection bias in our study, as countries with lower tech profiles among colleagues and in the media were less likely to make our sample; nonetheless, we felt that 25 sub-Saharan African countries was a broad enough sample for the purposes of this report.

Sample questions we asked every interviewee included: What does social tech mean to you? What in the ecosystem helps or hinders the success of a social tech initiative? Who and what other types of people should we be be talking to? The answers to these questions led us to include sectors we hadn't initially considered, such as tech solutions service providers and consultants. Altogether, we interviewed 116 people in 32 countries, including 25 countries in sub-Saharan Africa. Interviews were conducted in English, French or Portuguese. Around a third of participants were women (38), and two-thirds were men (78).

Many interviews were complicated, or made impossible,

due to poor connectivity. More interviews were generally conducted in countries with strong tech ecosystems, like Kenya and Nigeria. Countries like the Democratic Republic of the Congo (DRC), with less robust ecosystems, had lower response rates. In Angola, however, we were able to conduct multiple interviews around the topic of social tech, by also speaking to individuals in development, investment and academia; many of those we spoke with looked towards the tech scenes in countries like Ghana and Kenya as models to be emulated. Lusophone and Francophone interviewees generally described lower activity in their ecosystems and looked towards Anglophone countries for inspiration.

INTERVIEWEES BY SECTOR

Figure 10. This chart shows the distribution of the study's interviewees across various sectors, broadly defined.

DISTRIBUTION OF INTERVIEWEES

Map 4. This map shows the distribution of the study's interviewees in sub-Saharan Africa, by country of residence

We do not identify interviewees in this report except by role and country, because maintaining anonymity allowed us to elicit more frank conversations. Role and country were not always easy to define. Is a hub founder who also financially backs projects an entrepreneur or a funder? Is a Ghanaian working in London for a UK hedge fund on an African portfolio identified as from the UK or from Africa? We did our best to be consistent and have highlighted the professional identities we felt best described the subjects in the context of this report.

As well as African nationals residing in Africa, our study included African nationals living in North America and Europe ('diasporans'), as well as European, North American and South American nationals living in Africa ('expatriates') or in their region of origin. By far the majority of our interviews (80.2%) were with African nationals residing in Africa.

INTERVIEWEES BY NATIONALITY
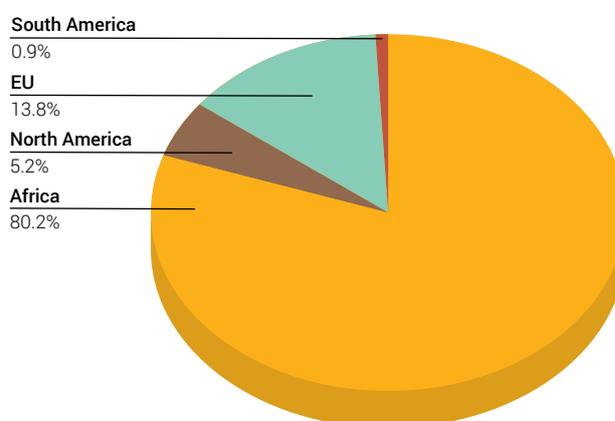
Figure 11. This chart shows the distribution of all the study's interviewees by nationality.

From the beginning of the interview process, our research team held weekly meetings to share what we were hearing and discuss who and what we might be missing. Throughout, we attempted to maintain a focus on smaller, locally-initiated social tech projects. While this focus was central to the report, it introduced some selection bias as well. For example, while we heard much about difficulties in funding enterprises, our concentration was

always on local innovators, so it was not until very close to the end of the process that we understood the impact of race on raising capital. Some later interviews – and the publication of two other reports – strongly suggested that the vast majority of tech money was going to European and American innovators working in Africa. We had been interviewing Africans who were being passed over for major funding; if we had been interviewing more Western expatriates, we might have heard a different story.

We asked an expert in the field, Nanjira Sambuli, to review our first full draft. Sambuli has worked across many sectors – including in hubs – as a researcher and commentator, and as an advisor to development agencies.

She now directs digital access equality for the World Wide Web Foundation. She suggested minor changes but 'signed off' on the report with no major concerns.

In conclusion, we wish to reiterate that Africa is a rich and diverse continent too often mistaken for a country. Each of its regions or nations deserves a focused study that could lead to more specific recommendations and a more detailed picture of how business, capital, tech and social good interact locally. We also believe more studies should be commissioned to explore and report on African business cultures and technologies that differ from dominant tech trends and investment strategies that flow from the West.

COUNTRIES IN WHICH INTERVIEWEES WERE BASED

Sub-Saharan Africa			Europe	North America
Anglophone	**Francophone**	**Lusophone**	France Germany Ireland Italy United Kingdom	Canada United States
Ethiopia Ghana Kenya Malawi Nigeria Rwanda Sierra Leone South Africa South Sudan Tanzania Uganda Zambia Zimbabwe	Benin Cameroon Gabon Ivory Coast Madagascar Senegal Togo	Angola Cape Verde Guinea Bissau Mozambique São Tomé and Príncipe		

Figure 12. This table shows the spread of countries where our our interviewees were based when we interviewed them. Not all interviewees were nationals of the countries in which they were based. Our sample included African nationals in the diaspora as well as European and other expatriates in Africa.

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The green line tracks the International Telecommunication Union's (ITU) mobile-cellular sub-basket for monitoring mobile-cellular prices. ITU's basket includes 30 outgoing calls per month (on-net/off-net to a fixed line and for peak and off-peak times, in predetermined ratios), plus 100 SMS messages, and is calculated as a percentage of a country's average monthly GNI per capita.
The yellow line shows what the same mobile sub-basket would cost in the UK, if it represented the same percentage of GNI per capita as in each of the sub-Saharan African countries listed. We calculated this value by substituting the UK's percentage of GNI per capita with those of each of the countries listed.

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