

# DIGITAL AFRICA

IN A CONTINENT WITH FEW COMPUTERS AND LITTLE ELECTRICITY, A SMARTPHONE IS NOT JUST A PHONE – IT’S A POTENTIAL REVOLUTION.

The front line in Mogadishu was just beyond the ruined cathedral. You could hear the small-arms fire of the al-Qaeda fighters and the return of heavy machinegun fire from the sandbagged positions of the African Union troops. But the scene on the sun-washed street in the Hamar Weyne district was calm. Women were shopping for fruit and vegetables, and the ciabatta and pasta Mogadishu gained a taste for in its Italian colonial days. A couple of cafés, serving also as electronics shops, were crowded, with people inside making VoIP phone calls and surfing the internet. Outside on the street boys were fiddling with mobile phones, Nokia and Samsung mostly, but also those fantastical Chinese models you find in poorer countries, nameless, with plastic dragon-like construction, heavy on battery-guzzling features like television tuners. I asked my Somali companion what the boys were up to. He wound down the window and summoned his gunmen to go and ask. The answer came back. “They’re updating their Facebook profiles.”

According to a recent intelligence estimate by a defence contractor, 24% of residents in Mogadishu access the internet at least once a week. This in a city in a state of holy war, too dangerous for foreigners to visit freely, where a quarter of the 1.2 million residents live under plastic sheeting, infested, hungry, and reliant on assistance brought in on ships that are liable to be attacked at sea by pirates. Half the population of Mogadishu is under 18. Some of these teenagers end up uploading and downloading ghoulish martyrdom videos and tinkering with websites celebrating the global *jihād*. But far more spend their time searching for love, following English football teams, reading Somali news sites uncensored by the jihadists, and keeping track of money transfers from relatives abroad. It takes more than violent anarchy to extinguish the desire of the young to stay connected, and to keep up with the contemporaries they see on satellite television.

When it comes to electricity, Africa remains the dark continent. There are a billion Africans, and they use only 4% of the world’s electricity. Most of that is round the edges, in Egypt, the Maghreb and South Africa. The rest of Africa is unlit; seen from space, the Congo River basin is as dark as the Southern Ocean. Demand for power is already outpacing economic growth. With its population expected

to double to 2 billion by 2050, Africa will have to build entire new power grids just to stand still. So far, the failure has been systematic: of Nigeria’s 79 power stations, only 17 are working. All of this increases political risk. Some African countries could collapse by 2020 unless they can power an industrial base. Yet Africa’s virtual future is not dependent on its physical future. You don’t need much electricity to run a phone network. You need even less to run a phone itself. Even the scabbiest African village has worked out how to charge mobiles and other devices using car batteries, bicycles and solar panels. Connectivity is a given: it is coming and happening and spreading in Africa whether or not factories get built or young people find jobs. Culture is being formed online as well as on the street: for the foreseeable future, the African voice is going to get louder, while the voice of ageing Europe quietens.

What makes this possible is a series of undersea cables which have finally hooked up Africa to the rest of the internet. EASSY (the East African Submarine Cable System) emerged from the Indian Ocean at Mombasa last July, looking as fine as gossamer and delivering 3.84 terabits per second to 18 countries. It seemed inconceivable that it could carry the weight of so much information and so many hopes. But EASSY and other fibre-optic cables are freeing Africa from the costs and failings of the satellite internet, and for the first time making it affordable for Africans to talk to the outside world and, crucially, to each other. Prices are down, speeds are up: it takes minutes now instead of hours to download a YouTube video. The future is not supposed to feel futuristic – it’s usually far more like the present than the novelists and film-makers imagine – but the present in Africa has been rudimentary for so long that this future really does feel like science fiction.

Ethan Zuckerman is a leading thinker on the internet based at Harvard University. His blog, entitled My Heart’s in Accra, speaks to his long association with Africa. He arrived in Ghana from New England in 1993, on a Fulbright scholarship, to learn African drumming. Every few weeks he would wander down to the central post office in Accra and place a phone call to his future wife in the United States. The line was indistinct and the call cost \$5 a minute. His Macbook 1000 died after two weeks in the humidity. On the other side of Africa, Joe Mucheru, a Kenyan who now

heads Google’s Africa office, remembers the internet kicking off in Kenya in 1994. Yahoo! and Hotmail e-mail accounts became popular in 1998. The government held onto internet access as a cash cow. Everything was rotten and dormant. “I didn’t know you could make money from air,” said a Kenyan minister, delightedly. But corrupt governments could, simply by withholding access. A 64k modem cost \$16 000 a month, if you could get one. By 2000, the price dropped to \$3 600. Soon after, as a result of legal challenges and pressure from tech enthusiasts and entrepreneurs, the Kenyan government agreed to open up to competition. For those with the money to buy the new modems, the change was instant, both in terms of information and speed. The post in most African countries was expensive and slow. Parcels frequently went missing (they still do), and there was no home delivery, just post-office boxes. Similarly, African governments had never had the money or the inclination to set up libraries; even university libraries were shoddy, so up-to-date printed material was hard to come by. Then, suddenly, there was the internet, with a cornucopia of knowledge on gardening, or cancer, or the stars of “Friends”.

Plugging a PC into the world wide web was only part of the story. Cheap Chinese black-and-white television sets hit the African market around the same time. For \$50, poorer families in towns and cities suddenly had access to what had previously been an elite colonial medium. That stirred up the continent. Then came mobile phones. In 2000 Kenya’s largest mobile-phone operator, Safaricom, had 20 000 customers. Executives at Vodafone, which then owned Safaricom, reckoned that number would grow to 400 000, peaking around now. That was before cheap phones and prepaid airtime. Safaricom now has 12 million customers and is the most profitable business in east Africa. Its biggest achievement has been M-Pesa, a service which allows people to send each other money over their mobiles. M-Pesa will move at least \$1 billion in Kenya alone this year. Michael Joseph, the South African-born executive who masterminded Safaricom’s rise, claims it as “the greatest-ever innovation in the mobile phone industry”.

So far, that is. Computers are merging with mobiles in a way that suggests the innovation is only just beginning. The internet vision for the past decade was internet cafés (or “community data centres” as donors called them) in villages, which were supposed to make money by printing off birth certificates and CVs. That has been replaced by a more potent vision: a supercomputer in the pocket of every African.

There are already 84 million internet-enabled mobiles in Africa. It is predicted that 69% of mobiles in Africa will have internet access by 2014. A week’s worth of data can be had for \$3. That’s still too much for the majority of Africans, who earn less than \$2 a day, but it seems a miracle to those who were shelling out \$1 500 for a sim card in 1998. And the mobile web is a more potent communication tool than anything else in African history, because it is interactive, participatory, and to some degree democratic and anonymous. On the internet you can doubt, you can challenge, you can be openly gay, join the opposition or find fellow believers, and most of all you can be entertained and informed in those long hours in traffic jams or evenings in crowded rooms lit by a single bulb.

Three companies will dominate digital Africa for the next decade. The first is Facebook. This social network, born at Harvard and based in Palo Alto, California, is not just a skin on internet-enabled African mobiles, it is the skin. Pricing is driving its popularity. The site was zero-rated in 2010 – that is, made almost free of data charges in several African markets (the bill is footed by Facebook, the network operators and the phone manufacturers). “The zero-rating of Facebook was the most significant tech story in Africa in 2010,” says Erik Hersman, who has two influential blogs, White African and Afrigadget. So while text messages are cheap, sitting on Facebook is even cheaper. Facebook’s own numbers show growth coming fastest in Egypt, Morocco, Nigeria, Kenya and South Africa.

There were about 17 million Facebook users in Africa at the start of this year, and there are expected to be 28 million by the end of it. That means Africa is by far the least

Facebooked continent, but the growth patterns indicate that the numbers will surge ahead as mobiles and data become more affordable. Facebook is already making its way in poorer countries. The number of Facebook users in Tanzania quadrupled in 2010, to 200 000. It is expected to quadruple again this year, giving Tanzania more Facebook users than graduates.

This new connectivity has consequences for African politics. About 140 000 Tunisians joined Facebook every month last year. The government censorship was such that the site served as a parallel media. When the protests that toppled the country's strongman, Zine el-Abidine Ben Ali, began in the town of Sidi Bouzid, coverage was coming at first from posts on Facebook and Twitter, then in incendiary footage on Flickr and YouTube. The role of social media in the Tunisian revolution and in the subsequent upheaval in Egypt may have been overstated by an international media less attentive to underlying trends: texting, phone calls on landlines, and meeting in cafés and the mosque were more useful organisational tools. Facebook played a part in helping people keep track of the unrest, but the real force in Tunisia and Egypt was television news. Where the news channel Al Jazeera was seen in some parts of Africa as presenting a distorted view of tribal violence, in Tunisia it was critical in emboldening the protesters. Arguments about the indispensability of Facebook are to some degree a red herring: no authoritarian regime in Africa will make the same mistake of underestimating it. The Mubarak regime shut down not just social media but the entire internet for days during the uprising. Egypt's largest mobile-phone operator said that Egyptian intelligence had demanded that it "turn down the network totally". That is just buying time. Within hours, tech-savvy Egyptians were turning to ham radio and finding ways to access the internet using proxy sites abroad. The new rules were dramatically shown by the actions of a young Egyptian Google executive, Wael Ghonim, whose Facebook blog galvanised the opposition. Ghonim was detained for several days by the security apparatus, which had the sole effect of shedding light on their brutality.

The default view of Facebook is that it will enable African voters to ask more of their politicians. There are already plenty of examples of citizen activism. A colourful one is RSVP in Nigeria. The acronym stands for Register Select Vote Protect, or, as some will tell you, Rice and Stew Very Plenty. The RSVP campaign uses Facebook and Twitter to try and elect credible Nigerian politicians. But, since devils don't talk to angels, the activists often end up talking to like-minded idealists. The politicians themselves are not standing still. Many have created their own fan pages. They push out messages of fund-raisers and splash around pictures of themselves in constituencies. There are signs

that a new generation is outmanoeuvring the old. January Makamba, a youthful Tanzanian politician touted as a presidential hopeful, used Facebook to rally supporters and money when he won a parliamentary seat for the Bumbuli constituency in the hills between Mount Kilimanjaro and the Indian Ocean last year. Makamba brought an aide on the campaign trail whose role was to take pictures and write stories for Makamba's Facebook page. The target audience was not impoverished Bumbuli, but Makamba's peers back in the city: a sophisticated web presence was meant to attract ideas and funds and set Makamba apart from the bruisers, apparatchiks and army officers who also have designs on the presidency.

Where Facebook will have a bigger impact is in the way it changes the behaviour of young Africans with disposable income. Patronage cycles, with the elders instructing the young, are breaking down in favour of verifiable information. "In the past", says Mucheru, "young people relied on teachers and parents for advice. Now they get real experiences, real situations online." Where in the past a career choice would be decided by elders, now it is decided by going online.

Audrey Wabwire is a Kenyan tech worker in her 20s, part of whose job is to update her company's Facebook page. She spends another three hours each day on her own page. "A year ago only a few of my classmates were on Facebook," she says. "Now nearly all of them are." Within a year of getting onto Facebook, Wabwire had 490 friends. The site for her is a tool for talking to friends who have gone abroad, a place to hold family conferences, as well as a way to share photos (taken on the phone), and to follow fashion and politics. Through work she has access to computers, but that is unusual. Most young Africans get to Facebook on their mobiles, using the free browser for mobiles produced by Opera, an Oslo software company (even the competition will tell you that Opera has the best compression technology for mobiles). Screen size does not seem to be an obstruction: when African programmers use laptops, they tend to work with many small windows open, as if in imitation of the mobile.

Still, there are worries here. Globally, there are 94 web domains per 10 000 people. In Africa, it's one per 10 000. So is the internet going to be just a distraction, a clanging vacancy in the large parts of Africa where education, media, civil service and law are lacking? Might venting online by unemployed young Africans lead to new political movements? "Violence is extremely empowering to young people," warns John Githongo, a Kenyan anti-corruption campaigner. The internet could organise it.

Evgeny Morozov, a Belarussian internet expert based at Stanford University, believes the consolidating power of the internet in Africa and other emerging markets is often

overrated. He argues that "cyber-utopianism" and "empty McKinsey-speak" is producing a generation of "slacktivists" who can barely raise themselves from their keyboards and keypads. A characteristic of Facebook in Africa, so far, is the way acquaintances from school or work who belong to different tribes and religions seldom last long as Facebook friends. "It is easier to confirm and then delete," explains a Christian Facebook user in Kenya, talking about the way she deals with Muslims she knows. That bears out the thesis of Zuckerman and others who argue that social networking reinforces what feels comfortable. "What drives me mad about Facebook is that it isn't the world, it's your friends," says Zuckerman.

Most Facebookers in Africa so far are at school or university. This is borne out by the dominance of youth culture, which tends to put government sites in the shade. "Big Brother Africa", a television reality show, for instance, had 100 000 followers in December, compared with 27 (not 27 000: just 27) for the African Union, regarded as the continent's leading political organisation. There is a simple way to correlate age and usage, which is to look at the spike in Facebook traffic at the end of the school day. A well-visited Facebook page, at that hour, is like a pond with a shoal of fish circling. Throw in a question about a Nigerian hip-hop artist or the Man U-Arsenal game and you get your hand bitten off.

Still, no one can deny that Facebook allows for valuable conversations. Take the example of *Shujaaz*, a comic read by about half the children in Kenya. It is among the first comic-strip representations of the daily lives of African children; the slums, the villages, the ramshackle schools and playgrounds. The characters are buoyant, some drawing on the tradition of the classic British comics *Beano* and *Dandy*, others breaking new ground. The hero is Boyie, aka DJB, a boy who has his own ham radio station. When DJB appeals in the comic strip for business ideas, they flood in for real on Facebook. One girl proposes selling homemade popcorn; a boy says money can be made from taking photos of families heading upcountry for the school holidays. Many of *Shujaaz's* storylines take on corruption and tribalism. These too produce a response. "Hey DJB," wrote Judah Ngali, a boy from the country town of Voi, "I'm 14 years old and my dad is a chief. He discriminates and gives only the rich kids bursary funds. I showed him your story [on corruption] and he agreed with it." Together, the comic and the social network created a challenge from son to father that might not otherwise have happened.

*Shujaaz* is run by Rob Burnet, a Scotsman who has run galleries and art foundations in Kenya for two decades. "I hold up the comic to investors and say: this is ICT. It may not look hi-tech to you, but in Africa it is cutting-edge." The difference now is that the comic which is passed from child to child in tenements and farmyards is enhanced by Facebook, as well as by a radio show, text messages and a website. It's like a house with many doors into the virtual world of DJB and his friends.

The second company is Google, the search and advertising colossus, also based in Palo Alto. In Africa, Google looks omniscient. It wants to make the internet a part of everyday life in Africa by eliminating entry barriers of price and language. Even with the drop in prices, Africans still pay many times more for broadband than Europeans do. Google hopes to bring the price down further by establishing data caches in Africa, greatly reducing the time taken to reach popular websites – particularly those with African content. Detractors say Google is buying up swathes of Africa's digital real estate at bargain prices: it seeks transparency of others, but reveals little of itself. How much is it spending on the new infrastructure? "We don't

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discuss numbers," says a Google executive, "but we are committed to Africa."

Google's most interesting initiative is with languages. The person in charge is Denis Gikunda, a Kenyan whose interest in technology goes back to the 1990s, when he was the computer-room monitor at Starehe Boys School in Nairobi. He went on to work for a computer-games company in Canada, where his job was to tailor games for different language markets – different scripts and voice-overs. His job with Google is to think of ways to localise the internet in Africa. There are over 100 African languages with 1m or more speakers, and Google wants to offer knowledge, transaction services, and entertainment in all of them. Already, on his HTC phone, Gikunda can speak a sentence in one language and have it simultaneously spoken back in another. When he was running late for our interview, because rain had turned the road to mud, he didn't type a text, he spoke an e-mail.

The challenge looks impossible, given that some of the languages exist in written form only in missionary dictionaries, which may have missed some of the finer points. "This will be the first time for these 100 or so languages to be written at scale," says Gikunda, a Meru. The opportunities for enhancing local cultures are innumerable. Meru is a language with 1.3m speakers centred on Mount Kenya. Gikunda argues that websites in Meru will deepen the understanding of Meru culture: how to take care of cattle and goats, how to look at the night sky, how to get married, or buried, the Meru way. A new technology will turn into a recovery of a world that existed before.

and the iPhone. Nokia executives admit the company has "lost the thought leadership" in some markets, but not in Africa.

Nokia is more clear-eyed about the economics of digital Africa than Facebook and Google are: how much technology can the average African realistically afford and what does he or she really want to do with it? That is partly because it actually makes stuff, but also because it understands the bottom of the pyramid, the bop, where customers eke out the life of a handset for years in the harshest conditions. Nokia knows that Africa is still mostly a sachet economy, where people, many of them illiterate, buy tiny amounts of soap, milk, or airtime where they can. The media talk is about smartphones, because African coverage of technology is pitched at the rich, but 90% of the phones Nokia sells in Africa are at the low end.

These are the models that people in richer countries happily used a decade ago. You made calls, you texted a lot, you fiddled with ringtones, and you played simple games. The steady earner remains the Nokia 1100. This is the AK-47 of communication, the most popular mobile phone ever made, already established as a design classic. There are over 50m Nokia 1100s in use in Africa. Only when these are upgraded to internet-enabled phones can the mass of Africans be said to have gone online. A souped-up version of the 1100 will have to be cheap, and offer sophisticated speech-recognition software, with translation features similar to those Google is touting, and it will have to retain the durability and add-ons like flashlights that have made the 1100 so popular (fishermen in West Africa like the 1100

Apple is nowhere in Africa and shows little interest in democratisation, but Nokia is facing stiff competition at the top of the market from BlackBerry, the smartphone made by Research in Motion, based in Waterloo, Canada. The head of BlackBerry's Africa office, Deon Liebenberg, says his company's sales defy logic. BlackBerry had seen itself as providing a secure platform for businessmen and government officials. Now it is selling models with consumer appeal: rounded phones in shades of tangerine and strawberry lipgloss. To the young African professional, the smartphone is highly aspirational: it is the house and car you can't afford. In a culture where so much is shared, the smartphone is a space which is all yours – your music, your plans, your tomorrow.

This year electronic tablets will start to make an impact on the African market. A cheaper and more robust version of Samsung's Galaxy should have wide appeal if the price can be brought down below \$100. "That's a given," says Brockhaug of Nokia, though he won't be drawn on whether Nokia is interested in developing a tablet. A library in the hands of 100m Africans sounds fanciful, but no more so than the idea, back in 1995, that the poorest African cattleherder would have a mobile phone of his own.

Richard Seymour, a British industrial and technology designer, points to the demographic shift to youth in poor countries. "Understand the young," he says. "Emergent behaviour starts with them." It could be that social networking is the emergent behaviour in Africa. Or it could be that everyone is looking in the wrong place and

the real innovation is in the hacking that goes on in Africa's informal sector. Hersman's Afrigadget blog celebrates African inventors who have hacked into their mobiles and got them remotely opening and closing doors, setting up 400-volt electric shocks on their doorknobs to lie in wait for burglars, and even make pots of tea – on their way home, they send a text message to their home phone, which sets the tea-maker to work.

Not everything will be about uploading and downloading. As prices for memory cards drop, there will be a shift from hawkers selling pirated DVDs to drivers stalled in traffic jams, to hawkers loading entertainment bundles onto memory cards for a flat fee. Games for mobiles will become more important. There needs to be a move by game-makers to embed literacy, numeracy and logic skills into games pre-installed on mobiles: a kind of mass education by stealth. YouTube will take off. "We are a social species. We spark off each other," says Chris Anderson, the curator of the TED conferences. He expects video to spread virally through Africa in the course of this year. That will produce dance crazes and superstar Pentecostal mobi-evangelists, but also circulate knowledge.

Finally, digital Africa will become a spoken tradition. African cultures are among the most oral in the world. Storytelling under the tree is still commonplace. Speaking is still preferred to writing and Africa happens to have timed its digital age to coincide with new voice-activated technologies. The generation gap between those who were trained to guide a fountain pen with their fingers, those whose kinetic memory is dominated by their thumbs, and those even younger who are used to the sweeping movements of the touchscreen, will give way to the return of voice – Africa's voice.

## THE MEDIA TALK IS ABOUT SMARTPHONES, BECAUSE AFRICAN COVERAGE OF TECHNOLOGY IS PITCHED AT THE RICH, BUT 90% OF THE PHONES NOKIA SELLS IN AFRICA ARE AT THE LOW END.

Meru will have to wait its turn. For now, Google is concentrating on Africa's so-called Tier One languages: Swahili, Amharic, Wolof, Hausa, Afrikaans, Zulu, and possibly Setswana and Somali (in addition to English, Arabic, French and Portuguese). This is Google as an anti-Babel, with the utopian goal of a future in which all information is available in anyone's language. The tragedy for many African languages is that there is not nearly enough written down: millions of words of text are needed to create a database for statistical-based translation. The hope is that as the global is pulled down, the indigenous is pulled up. "At the moment, indigenous knowledge is trapped," says Gikunda.

The third big player in Africa's digital revolution is Nokia, the mobile-phone maker from Tampere in Finland, which has history and substance in African eyes. It claims a 58% market share in Africa and vies with Coca-Cola as the continent's most recognised brand. It was Nokia's ability to distribute phones through subsidies in rich countries that allowed it to sell basic models at low prices in Africa. Nokia has lost ground at the high end in rich countries to Android

because it floats, and can be taken apart and dried in the sun and still work). Price won't be a problem. The cheapest internet-enabled phone from Nokia is expected to cost \$25 by 2015.

The question for Nokia is how to bring some of the features of the internet to the bop. "The first part of the mobile revolution was about communication. The next is about value-added services," says Jussi Hinkkanen, Nokia's head of government relations for Africa. Nokia is betting on its own add-ons such as Ovi Life Tools and on a software shop aping the revenue-sharing model pioneered by Apple's App Store. Life Tools aims to enhance AK-47 phones by providing pricing and tips for farmers, lessons for teachers, and books and games for children. So far the African peasant farmer is reluctant to part with pennies for any service. "That will come if it offers real value," says Brad Brockhaug, Nokia's head of sales in Africa. Next up are accountancy and supply-chain tools for small businesses: practical rather than sexy. But Nokia's market share is so big that if Life Tools does take off, and boost income and learning, it could add a point to Africa's GDP.