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Of Bloatware and Spreadsheets: Nairobi, Chinese Phones, and the Limits of Data Coloniality

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ABSTRACT

This article charts the recent history of affordable Chinese phones in Nairobi, a city heralded by many as one of Africa's digital capitals. Here, cheap handsets manufactured in China are the material commodities that facilitate an increasingly competitive datafication of urban life. From crypto-wallets to distributed logistic platforms, Chinese phones are the enablers of new, datafied economies that seek to transform and incorporate so-called "frontier markets"—informal economies that have thus far escaped the circuits of digital capital. Yet the story of low-cost phones also reveals how these frontiers are sites of trials, negotiations, glitches, agency, and adaptations. In fact, it was urban data about Nairobi that shaped the making of these now ubiquitous devices. Combining oral history and an ethnography of the experts that punctuate the value chains of affordable cell phones, this article ultimately challenges some of the widespread assumptions about (China's) data coloniality in Africa.

Chinku Phones

In the fall of 2021, having recently embarked on a new research project that sought to chart the encounter between Chinese digital capitalism and Nairobi's booming innovation scene, I sat down for an informal conversation with Jerotich, a local business journalist. She worked for the African chapter of CGTN, the controversial Chinese TV channel that covers African news stories and politics. Throughout her career, she had been a long-time observer—and critic—of Kenya's economic ties with China. I was, therefore, interested in her perspective on the research that I had just begun.

"If you want to understand the mobile money revolution and all that's happened in Nairobi since then," Jerotich told me, "you need to look at the moment when phones became ubiquitous. We called them *chinku*. They were cheap copies of established brands like Nokia and Motorola." *Chinku*, as its sound suggests, was the slightly derogatory[1] term for Chinese counterfeited products in *Sheng*, the ever-changing creole spoken by young Nairobians. Chinese fakes were so common, Jerotich explained, that another

vernacular for fake, *imbo*, literally meant "imported." And while *chinku* and *imbo* had initially referred to anything fake, they had come to epitomize cheap handsets.

Jeortich's hint to begin with affordable phones in order to tell the story of Nairobi as a crucible of made-in-Africa innovation is also the starting point of this essay, in which I use Chinese handsets to foreground one of the data materialities of "digital urbanism" (Mouton and Burns, this issue). Phones, as we will see, are in themselves a commodity that circulates and creates circulations (Burrell, 2016; Horst and Miller, 2020). They are the mundane terminals of large ecosystems of data, of computation systems that from our hands operate at an increasingly planetary scale (Bratton, 2022). But what do phones tell us about Nairobi, and what does Nairobi tell us about the making of phones, namely the affordable Chinese handsets that now dominate African markets? To answer these questions, as Jerotich suggested, one needs to go back to the moment when these devices appeared on the streets of Nairobi, at the turn of the first decade of the century.

For Kenya, the late 2000s and early 2010s inaugurated a period of fast technological change (Wahome, 2023). USSD-enabled[2] mobile money, initially a small experiment inspired by informal economic practices and backed by aid grants and corporate interests (Meagher, 2018), soon became through M-Pesa one of the dominant ways of transacting in a country where the majority of its people did not have access to legacy banking systems (Guma, 2022; Guma and Mwaura, 2021). In the aftermath of the 2007 election violence, a made-in-Nairobi crowdsourced platform—*Ushahidi*—offered a new standard for crisis mapping which was later adopted across the world (Okolloh, 2009). A relatively small but incredibly vocal Twittersphere prompted journalists and pundits to ask whether Kenya had leapfrogged from one-party state to "digital democracy" (Nyabola, 2018). The landing of several international undersea cables along the coast of Mombasa, Kenya's main port city, promised at once to increase the country's integration into the global Internet industry and to decrease the cost of access to connectivity (Graham and Mann, 2013). An exceptionally proactive ICT ministry, under the helm of Professor Bitange Ndemo, made digital technology a key agenda of the nation, enshrining it as one of the flagship strategies of its long-term developmental plan—*Kenya Vision 2030* (Ndemo and Weiss, 2017). Soon after, this national plan hatched an ambitious smart city program for Nairobi, linking urban development to the development of ICT as a matter of official policy (Guma and Monstadt, 2021).

In this context, entrepreneurs from the African diaspora with experience in the tech industry, as well as a "creative class" of adventure-seekers from other geographies, started to flock to Nairobi with ideas and capitals (Rosenberg and Brent, 2020). The city became known as Africa's Silicon Savannah,[3] and was celebrated for its burgeoning tech ecosystem, for its successful incubators of innovative startups (Coban, 2016), and for a plethora of purportedly "pro-poor", "smart" digital initiatives (Poggiali, 2016; Mwaura, 2024) sometimes disrupted "from below" through practices of technological bricolage (Guma and Wiig, 2022). And as knowledge of Kenya's propensity for digital innovation soared and spread, the country became the site of many frontier experiments of techno-capitalism (Coban, 2024): experiments large and small, imported and home-grown, practical and speculative, the most idiosyncratic of which was perhaps Google X's failed Loon project (pun intended?)—a fleet of Internet-bearing balloons designed to float over the most remote parts of the country (Mbalalu, 2021).

This period of accelerated technological shifts is far from over. At the outset of the COVID-19 pandemic, while middle-class Kenyans sheltered in place and poorer Kenyans working in the *jua kali*[4] were forced to even more precarious and marginal conditions, a new wave of made-in-Nairobi digital platforms flooded existing urban economies (see Cirolia et al., 2023). So much so that Nairobi is currently one of the fastest growing destinations for global venture capital (Partech Partners, 2022): high-risk equity investments in startups that have the potential to scale quickly. From last-mile logistics to warehouse management, from humanitarian crowdsourcing to crowd-work portals, from pay-go kits to predatory lending wallets, a range of new digital applications are seeking to produce value through data (Kusimba, 2021; Mann and Iazzolino, 2019; Cirolia et al., 2024). In Nairobi, much like in other African cities, data platforms promise to optimize and, therefore, profit from economies that are fragmented and inconsistent: to make urban unknowns known (Odendaal, 2023); to de-risk and expand financial inclusion (Langley and Rodima-Taylor, 2022); and to algorithmically mend the urban "splinters" (Graham and Marvin, 2022) of colonial and postcolonial city building (Pollio et al., 2023).

Albeit seemingly immaterial, digital data—scholars of infrastructure remind us—ultimately rest on the deeply corporeal technical systems that make its capture, storage, and flow possible (Amoore, 2018; Furlong, 2021). Whether through a data center or an undersea cable, data are always beholden to an "atlas" of multiple geographical layers (Crawford, 2021). And at their most basic level, data depend on something so unremarkable that it often vanishes from conversations about digital platforms and "smart" urbanism: cell phones. However ordinary and quotidian, I suggest in this article, *chinku* handsets narrate the rise of the Silicon Savannah and its data interfaces with Chinese techno-capital. Specifically, cell phones tell a story of China in Africa, of innovation from below and from above, of copycat and ingenuity, and of the role that African cities play and will play in the mutating geopolitics of digital capitalism (Gagliardone, 2019). As the United States escalates a "tech arms race" with China over microchips and video platforms (Chen et al., 2023), African cities like Nairobi are an alternative vantage point to understand the technopolitics, the trade-offs, and the lived realities of an increasingly turbulent and contested datafication of urban life.

In what follows, I combine an oral history of affordable Chinese cell phones, from when they first landed in Nairobi to when they became a ubiquitous fixture of life in the city, with an ethnography of the experts who punctuate the value chains of this commodity: marketing managers, user-experience designers, sales directors, sales agents, shop owners, phone "fixers" and software developers. I distinguish between the two—oral history and ethnography of experts—because many of the experts I engaged did not bear a historical viewpoint. Predictably, they were focused on the near future rather than the recent past. They would talk of improving *specs*,[5] increasing sales, accelerating repairs, and boosting downloads. On the other hand, my oral history draws on newspaper clippings, corporate materials, and on the tales that were generously shared with me by a few of my interlocutors. Some were, in fact, experts. Others were simply lay observers, and yet acutely aware of how phones had shaped life in the city in the previous two decades.

The arguments of this article are captured by the two materialities of data that give it a title: bloatware and spreadsheets. Bloatware (unwanted, preinstalled software) and

spreadsheets represent both data within and about *chinku* phones, allowing me to think simultaneously about circulations of hardware and circulations of information. A careful examination of these flows ultimately speaks to the centrality of Nairobi as a city caught between the shifting geopolitics of digital capitalism, a city of experiments and recoils amidst increasing competition for markets and standards. In centering Nairobi, this article challenges some of the assumptions about the notions of "frontier" and "frontier markets" that are commonplace both in critical and popular accounts of data economies in the Global South (see Roitman, 2023).

Just like the strides of China in Africa have been sometimes analyzed under the rubric of "coloniality"[6] (see Lumumba-Kasongo, 2011), digital data too has been scrutinized as a (neo-)colonizing force. There have been, in this sense, two intertwined perspectives. On the one hand, a few scholars explicitly speak of "data colonialism" to underscore the "parallels" between the historical patterns of imperial capture and the ways in which data "colonizes" life—manipulating, processing, and commodifying its existence (Couldry and Meijias, 2019a; Thatcher et al., 2016).[7] In this sense, "data colonialism" refers to "an emerging order" for the production of economic value "via data relations" (Couldry and Meijias, 2019b, xiii). More subtly, according to Morgan Mouton and Ryan Burns, "digital neo-colonialism" (2021) operates through all those other forms of extraction that—through data—are adroit, indirect, and often premised on a purported final agency of the individual user. Another perspective focuses instead on the historical continuities rather than the parallels, revealing the important fact that data—their definition, their labelling, their capture, their storage—ultimately reflects the unequal, gendered, and racialized logics of coloniality that still prime the world's economy (Benjamin, 2019; Ricaurte, 2019).

Both perspectives have been vital in the study of data platforms in Africa, where new avenues of profitability are premised on the possibility of capturing information—usually through phones—about urban economies that have thus far escaped what technology critic Evgeny Morozov famously labelled as the "solutionism" of digital capital (2013). This includes the promise to optimize and therefore source value from urban systems that are depicted as in need of a data fix (Fejerskov, 2017; Pollio et al., 2023). In turn, as Abeba Birhane writes, this "algorithmic colonization" of existing social relations, driven by corporate interests, echoes older forms of exploitation, while leaving African digital economies "dependent on Western software and infrastructure" (2020: 389). Through legal loopholes, Big Tech companies have found ways of exerting new forms of imperial power (Coleman, 2019). In the same vein, Michael Kwet argues that novel forms of domination and surveillance are beholden to a "new imperialism" enabled by digital technology (2019). At the same time, other scholars interested in digital financial platforms have shed light on the enduring historical traces of coloniality marking both the uneven diffusion (Bernards, 2022) and the sorting practices (like credit scoring technologies, see Langley and Leyshon, 2022) of these datafied economies.

While coloniality is a powerful and necessary analytical move, this article uses the recent history of Chinese phones in Nairobi to show that data frontiers are also sites of competition and agency, domination and refusal, experimentation and failure. As economic anthropologist Janet Roitman explains (2023), there is a lot missing in "diffusionist" models of technological transfer that portray the majority world as a mere frontier, a terrain of exploitation for technological configurations that emerged elsewhere.

African economies of technicity, writes Clapperton Mavhunga, have long been mischaracterized as incapable of producing innovation on their own terms, and as the borderlands of technical forms defined in the metropolis (2019). Inspired by these insights, I argue that the story of *chinku* phones complicates one-way readings of data coloniality in African cities. Far from being just a frontier, early twenty-first-century Nairobi, where these affordable phones are increasingly interwoven in the flows of data that make urban life what it is—precarious, mutable, at times sordid and exploitative, at other times just ordinary and aspirational[8]—offers us an account of the multiple informational trajectories and experimentations that define digital urbanism. I will return to these reflections at the end of the article.

China in Kenya, through a Touchscreen

The meanings of Chineseness in Kenya, Wangui Kimari has written (2021), hold a polysemic set of references, encompassing preoccupations about the country's economic directions, anxieties about the government's failures in delivering its promises, and the everyday experience of deepening China–Kenya arrangements that escape formal geopolitical and developmental cooperation. From "plastic rice" (Meiu, 2020), to the messy yet awe-inspiring construction of Nairobi's brand-new elevated expressway (Guma et al., 2023), these polysemic references are often embodied by material commodities and by the infrastructures that enable their circulation.[9] Railways, highways and ports have been, in this sense, the visual currency of both academic and popular debates concerning the presence of China in Kenya. As these large-scale investments have been either delivered by Chinese contractors or loan-funded by agencies of the state council in Beijing, much has been written about debt-trap diplomacy (Brautigam, 2011) and China's "market-in-state" capitalism pursuing new frontiers of accumulation in Africa, especially under the Belt and Road Initiative (BRI) (see Han and Webber, 2020).

In Nairobi in particular, it is impossible not to take notice of how the physical landscape of the city has been forever altered by the "marriage of convenience" between the Chinese construction sector and domestic developmental ambitions.[10] The SGR (standard-gauge railway) trains connecting the city to the lake Naivasha,[11] for example, drift over the gazelles, ostriches, and zebras of Nairobi National Park. Along the peripheries of the city, new road bypasses link and sometimes cut through suburbs that, according to colonial planning,[12] were never meant to be well connected (Maina and Cirolia, 2023). The already mentioned expressway now casts its brutalist shadow over the leafy park that Nobel-prize winner Wangarĩ Maathai famously saved from bulldozers in the late 1980s. And throughout the city, the horizon is marked by a swelling number of tall skyscrapers erected at rapid pace by the same companies that have built these city-modernizing infrastructures.

Yet the conspicuous presence of these overseas construction contractors is only one of the corporate forms—or "varieties of capital" (Lee, 2017)—of Global China in Nairobi. Perhaps less visibly, Chinese so-called "digital champions" have been active in Kenya for two decades (Wen, 2020).[13] Network-equipment providers like Huawei and ZTE, for example, have been fundamental partners of the Kenyan government in delivering the widespread Internet access upon which Nairobi's regional advantage as a technology capital rests. Anecdotally, one of the first ever Chinese concessional loans made to Kenya

was earmarked for a digital connectivity project in a rural county. And the latest Chexim loan (to date) went to Huawei for the construction of the national data center and the smart-city grid in Konza, a new satellite town poised to become the country's digital hub (Huang and Pollio, 2023). In many ways, these projects speak to Kenya's "Look East" shift of the mid 2000s, when President Kibaki and his successor Kenyatta kindled a series of developmental and business partnerships with China. It was on the back of these agreements that *chinku* phones appeared on the streets on Nairobi, as another journalist explained to me, in early 2022:

> Kibaki's Look East was not just a beginning, it was also the end of old Kenya. We were the poster child of structural adjustment in Africa. China did not make structural adjustment. But it benefitted from two things that structural adjustment did: [… it] created a huge backlog of infrastructure projects that couldn't be funded by western development money without all the usual conditionalities, and it opened the borders to foreign imports. All of a sudden you could buy a real Nokia and a fake one within the same shop on Luthuli Avenue.

Luthuli Avenue, as I have written elsewhere, is the pulsating heart of China's digital presence in Kenya (Pollio, 2022). Regardless of the large-scale connectivity systems built by Chinese contractors, including the celebrated National Optic-Fiber Network, it is on Luthuli—a street in downtown Nairobi—that many ordinary citizens experienced the realities and repercussions of China's technological ascendancy. Here, along a stretch of a few hundred meters, myriad electronic stores sell, repair, refurbish and experiment with *chinku* phones—the most widespread commodity of digital life in the city.[14] Busy, loud and colorful, Luthuli Avenue is cluttered with the signs of these phones' manufacturers. Some are well known: Xiaomi, Huawei, Oppo … Others are unique to African markets and, to a lesser extent, other Global South countries: Tecno, Realme, Itel, Infinix … Taken together, these cell phone brands attest to the prominence of China as a global maker of affordable handsets for frontier markets. And to their centrality in the harvesting of data about urban life in a city where everything from utility payments to hailing a motorcycle taxi is increasingly digitized (Kusimba, 2021; Cirolia et al., 2023).

Inevitably, China's dominance in Africa's technological present has elicited concerns about Beijing's "neo-colonial" ambitions that materialize in digital systems (Gagliardone, 2019). A recent paper, for example, argues that "Chinese digital neo-colonialism in Africa" involves three phenomena, namely the push to embrace a Chinese model of Internet sovereignty, the export of surveillance technology, and the deployment of AI and data-mining technologies (Gravett, 2020: 126–127). As a consequence, the author concludes, "African governments, policy makers, and technology entrepreneurs must keep in mind considerations of the kind of society they desire in contrast to the kind of society driven by the technology they acquire from China" (Gravett, 2020: 146). In this framing, a somewhat essentialized Chinese model of digital authoritarianism is brought to African nations through illiberal hardware and software. Echoing a broader disquiet about the coloniality of data (Kwet, 2019), as Benjamin Bratton reminds us, "China is now so deeply associated with technology that anxieties about technology are projected into anxieties about China, and to an extent vice versa" (2022:54).

Anxieties, however, only capture a segment of the emotional terrains marked by the travels of Chinese tech in Africa. "I remember the first time I saw a touchscreen," recalled Eric, a marketing manager who'd worked on the launch of a number of cell phone models

in East Africa, "it was a Frankenstein phone. It looked like an iPhone ate a Blackberry. It was terrible, but the touchscreen was something new."[15] "The difference was in the specs," I was told by a shop-owner who ran an electronic store not far from Luthuli. "With the same money you could get either a Nokia with chunky buttons or a smartphone with full touchscreen and a camera,"[16] he explained, when I questioned him about what he remembered of the first *imbo* phones on which he'd laid hands. But surprise and marvel at these aspirational commodities—which by 2015 had become affordable alternatives to more established brands—were also accompanied by frustration and disappointment. After all, some of the first Chinese handsets were suboptimal knockoffs. Cheaper, yes, but also glitchier and less reliable. Even the first cell phones with their own dedicated Chinese brands became known for their stubborn untrustworthiness. I have clipped dozens of hilarious *memes* from those years, in which *chinku* phones are the visual metaphor of bad relationships, dissatisfactory sexual encounters, and online shopping gone wrong, among other regrets.

But things were soon to change, just like Luthuli Avenue. As the signboards of brands like Nokia and Samsung were largely replaced by those of Chinese manufacturers, their phones became more reliable, more sophisticated, and more desirable—while remaining cheaper than their counterparts. This shift was indeed a function of a larger transition happening in the mainland between 2010 and 2015, when "copied in China" became "innovated in China," and the country started to be regarded as a trailblazer of everything digital, from e-commerce to finance.[17] But it was also, as we will see in the pages that follow, a result of a carefully orchestrated set of experiments through which urban life in Nairobi (and probably in other large cities on the continent) functioned as a primer on how to design, make, and sell phones to the masses in Africa.

A Decade of Competition

"At first, it was Nokia",[18] remembered Samuel, the co-owner of a computer business on Moi Avenue, a few blocks away from Luthuli. With a degree in IT, he'd initially worked as a sales middleman for another electronics store, while moonlighting as a computer factotum:

> Nokia used to be a big thing in Kenya. Then it was Samsung. But Samsung did not fully embrace the lower-tier market. Let me draw something [See Figure 1]. The market is divided into four parts. There's the—let me say—zero cash to [Ksh] 10,000. This is the most basic phone you can have. It doesn't have Internet capability. And then from 10,000 to Ksh 25,000, now this is the middle-range phone. Basic Internet connectivity, touchscreen. Right now, it's touchscreen, camera, GPS, and everything. Then we have the 25,000 to

Ksh 0–10,000	Ksh 10,000–25,000	Ksh 25,000–70,000	Ksh 70,000 +
Featurephones	Middle-range smartphones	Upper-range smartphones	Business/executive smartphones

Figure 1. A reproduction of the diagram drawn by Samuel on his notebook

70,000, they call it the "upper range." From Ksh 70,000, we have the business or executive phones, Apple, Samsung … flagship phones.

In the late 2000s, Samuel went on to explain, Finnish manufacturer Nokia had dominated the lower-tier markets, with models such as the 1110. Sturdy, easy to use and long lasting, 1100s had been uniquely designed for developing contexts—and, as such, they were incredibly successful. Whether you had a "real" Nokia 1100, or a Chinese replica (though both would have been made in the Pearl River Delta), this model was perfect for the needs of a growing urban population that desired connectivity. It was with these phones—often bought on Luthuli—that urban Kenyans first experienced sending mobile money to their families in rural counties, I was told by another informant, himself a digital entrepreneur.[19] He still had a vivid, emotional memory of his first M-Pesa remittance to his mother in Kitui.

By the early 2010s, however, smartphones had appeared on the market, and the technological aspirations of urban consumers had extended much beyond mere mobile connectivity. Nairobians wanted touchscreens, cameras, 3G Internet access, and GPS. President Kibaki's free-trade policies, including a lift of import duties on handsets, had opened the gates to Apple and Samsung smartphones. These expensive gadgets were out of reach of most Kenyans, and yet those few that appeared in the hands of businesspeople and tourists multiplied the technical affordances that *wananchi*—ordinary citizens—expected from their handsets. "Nokia did not understand this," a former design consultant explained to me.[20] She'd worked in Kenya for several years, delivering user-experience trials for cell phone companies and network providers. Over a long and insightful Zoom call, she elaborated that Nokia managers had become obsessed with competing with Apple, and forgot to innovate what they were doing best. In 2013, they launched a color update of the 1100 model, the 105 series, which did turn out as one of the best-selling phones of all time, but didn't have any of the features that had become aspirational: no 3G, no touchscreen, no camera. Barely a flashlight.

In the meantime, as we have seen, a new set of mobile commodities had begun to appear in the streets of Nairobi. These were not just *imbo* copies anymore, but Chinese phones with their own dedicated brands: Tecno, Itel, and later on Infinix. They all belonged to the same Shenzhen-based manufacturer, an elusive company called Transsion, which had indeed started as a *shanzhai* factory—a maker of knockoffs[21]—but had then pivoted to African consumer markets (Avle, 2022). With a long experience of serving the needs of the urban poor in China (Qiu, 2009), Shenzhen phone makers were perfectly placed to understand that selling handsets to the African masses—to the proverbial bottom of the economic pyramid (Lu, 2020)— was not a race to the bottom at all, recalled the former Nokia consultant. It was, in fact, a competition to see which company would get market segmentation right.

"Tecno appeared," Samuel the shop-owner narrated, while sipping black tea in a cafeteria on a narrow laneway near his shop, "and they targeted *this* market." He pointed to the middle-range box he'd drawn on a black page of his notebook (See Figure 1). While Nokia kept offering featurephones for the bottom tier of the market, "Tecno would give you a 3G smartphone with maybe 2GB RAM, 3GB RAM, 32GB ROM, 64GB ROM. Whatever features Samsung was giving you here," Samuel pointed to the top two

boxes in his drawing, "Tecno would give you here," he went on, moving his finger back to the middle-range segment.

> The screen might have not been of good quality but these guys [were] not interested in screens. They were interested in RAM. They [were] interested in performance and storage. And was it 3G? So they got a hold of this middle-range market. And of course with time technology improved. They started making better screens at a cheaper cost. Storage increased. You now get 128GB at a low cost. You could get 4GB, 6GB. So they started producing different combinations of, say, a good screen with better RAM, a good camera and better ROM, but at the cost of 25,000, 30,000. So that's how Transsion ended up with a 60 percent share of total sales. Nokia didn't embrace that strategy, so they were eliminated from the market.

This was, obviously, just the initial snapshot of a decade of explosive competition, even between Chinese brands themselves. Transsion launched Itel, which targeted the entry-level featurephone markets with new specs, including Whatsapp. After a successful campaign in India, Realme arrived in Kenya as an alternative to Tecno. Samsung too diversified its offering to compete on the lower-tier markets, with its *A series*. Oppo entered the battle at its upper echelon, with high-standards and still relatively affordable phones. Infinix, another Transsion line dedicated to younger consumers, was challenged in its dominance by Xiaomi, which, at the time of my conversation with Samuel, was the true up-and-coming brand in Nairobi. Even Huawei, a company otherwise focused on network equipment, had briefly been a contender for the mid-upper range smartphone market, before its ambitions were quelled by the United States' ban.[22]

One of the interesting facets of this fierce competition was the outlining of very detailed sociological contours for elusive sociological categories, those of the African urban middle and lower-middle classes. As Claire Mercer argues (2020), while these social formations are not coherent economic and political groups, they nonetheless shape the material expansion of cities in very distinct ways. Similarly, they also shape the algorithmic practices of platform companies, for which highly price-sensitive consumers are an imagined target and a driver of new logistical configurations (Pollio et al., 2023). In competing for very specific market segments, phone makers had contributed to delineate the meanings of both social mobility and social stagnation, even in the absence of deeper, broader changes in Kenyan society (Cheeseman, 2015). While these processes were obviously shaped by much more than commodities (James, 2019), Chinese handsets too had performed "boundary work" (Mercer, 2020). And while there remained suspicions and "xenophobic" biases against Chinese handsets—Samuel noted, drawing on his experience as a retailer—Chinese phones were not just *chinku* anymore, but embodied tangible aspirations of mobility, social and otherwise.

How did this happen? One explanation, as I have mentioned earlier and explained elsewhere (Pollio, 2022), was that African markets resembled those of China a decade earlier. And so Chinese hardware companies had the right experience to understand what kind of phones people wanted, as well as the marketing and sales strategies necessary to capture mass frontier markets. Rumor had it that Transsion had even poached former Nokia strategists, both in Nairobi and in Shenzhen, to inform its bottom-of-the-pyramid innovation drive.[23] But more importantly, I would argue, Transsion and other companies like Xiaomi had made Nairobi into a real-life testbed of new phones,

new features, new specs. And in turn, Nairobi's urban life had shaped the technological affordances of these new commodities.

Experimented in Nairobi; Made in China

Two of my interlocutors, Mike and Osama, had worked for Transsion in the early days of the company in Kenya. Both recruited when they were students, Osama's stint had only lasted for a few months, while Mike had climbed the managerial ladder and stayed for several years. Through the stories of their time at Transsion, which they generously shared with me between the winter of 2021 and the fall of 2022, I was able to capture a glimpse of how the company had come to dominate cell phone sales in Kenya (and in Africa more broadly).

Mike recalled that a friend had informed him about a new cell phone company whose research department was recruiting people "interested in statistics." He was about to complete his degree in economics at the University of Nairobi, so he immediately jumped on the opportunity. It was Mike's first job, and it came with decent pay. On his part, Osama remembered he'd heard about Transsion from other students who were working for the company part time, to make some money on the side. "All they wanted was people who could handle a spreadsheet," he told me, when I questioned him about the job requirements. In fact, at the entry level, there was little statistics, but a lot of manual data work.

Over the years, Transsion had recruited hundreds of graduates to conduct in-depth market research and inform sound manufacturing decisions. The most basic kind of research involved customer-satisfaction surveys. Each new employee would be provided with a call log of people who'd bought a particular phone model and gave their number to the sales agent:

> What we used to do is to call them, and there was a survey. Generally, it was about getting feedback about the model. What they liked about the model and what they didn't like about the model. And getting suggestions about what they would want for the next model in the same series.

Mike speculated that Transsion had perfectly understood the aspirations of social mobility that were embodied by smartphones in the early 2010s. Customer loyalty was built on the promise of offering bigger and better at a fraction of the price of an iPhone. He'd observed how each successive model would incorporate the desires and the critiques he had listened to over hundreds of phone calls. In the meantime, the management at Transsion Kenya had taken notice of Mike's keen eye for research and promoted him to a managerial position. For almost a decade, right before our conversation, Mike had directed hundreds of trials.

Customer satisfaction, Osama further explained, was just one of the data points in a much wider experimental system. Another type of test, the so-called CLTs (central-location tests), involved sending small teams of surveyors to find customers of competing brands in the streets of Nairobi. Luthuli Avenue, obviously, was a favorite location, but so were the streets around the University. During a CLT, testers would administer question-naires about certain functionalities of certain phones. Questions were so specific, Mike told me, that he could often gauge the direction that the mothership was taking with

their following models. Similarly detailed were also what Osama called "in-depth surveys." These involved paying users of a particular Transsion phone model to track them for a period of time: at what time did they wake up, how often did they listen to music, how much battery did they use on a web browser, how many photos did they take in a day? For Mike, the years spent at Transsion's R&D department had made him realize the importance of not treating the lower end of the phone market as a single segment. Students wanted good cameras and good speakers. Their parents wanted a long battery life. Street vendors wanted multiple sim-slots. Instead of satisfying each of these demands in a single phone, each model sought to strike a unique balance of different specs.

Experimental practices did not end with users, however. Mike recalled, for example, the time when Transsion sought to improve the AI of the phone cameras. One of his colleagues "was tasked with [labelling] ten thousand photographs each month."

> At the beginning, we didn't have any idea. We were sending data to Guangzhou.[24] You know, all the data collection is done here; but most of the designing, development is done there. We didn't even have Chinese bosses here; they would come for one or two weeks only when we had some sensitive event, but most of the jobs, we would just send material back … What used to happen, you were given a specific task, probably to take a thousand or 500 photos of people eating, another two hundred photos of people in a class setting, photos of people in a Matatu [minibus taxi].

The first cheap, camera-enabled smartphones, according to the recollection of another informant, were terrible when it came to portraying faces with high-melanin levels. Cameras would not even focus on dark-skinned people, she told me.[25] You couldn't tell facial features. Then, all of a sudden, Transsion cameras were doing a better job. "Selfies [became] glowy and snatched," she recalled, "better than other more expensive brands." When asked about the ethics of taking photos of ordinary Kenyans without consent, Mike explained that local teams had developed ways around it.

> They also wanted photos of … uhm, mixed race photos. So what we did, we just went around the office, and captured Chinese [people] with a bunch of friends. So most of the photos we sent back were actually Transsion employees. And in that way we solved the consent issue.

These small acts of ethical adaptation, obviously, did not address the bigger questions raised by facial recognition practices that essentialize ethnicity and race as matters of skin pigmentation. Neither did they really challenge the issue of what facial data is ultimately used for, including the global overpolicing of black bodies (Benjamin, 2019). In their compelling study of Transsion's patents, for example, Miao Lu and Jack Qiu have noted how the company partnered with the Shanghai municipal government to build an AI database containing "billions of dark-skinned images" (Lu and Qiu, 2022b: 778). Essentially, the "empowerment narrative" of a more inclusive camera AI was about sales and, potentially, surveillance (Lu and Qiu, 2022b: 778).

But the forms of strategic refusal described by Mike, however small, do show the oft-forsaken agency of those who collect data and, more importantly, experimentalize data collection practices. And that, as Seyram Avle has argued (also writing about Transsion), Africa is not just a passive frontier of Global China's technological expansion (Avle, 2022). My informants had ambivalent feelings about their time at the company, but

they were adamant about the negotiations and frictions that they had injected into the betterment of *chinku* phones. In their final analysis, they had not been the pawns but, at least in part, the architects of affordable handsets that perfectly suited the communication needs of ordinary Kenyans.[26] Having navigated constraints and corporate hierarchies, Osama and Mike wanted me to know how Nairobi life had shaped a story that many told as one of dominance and extraction.

Similar feelings were shared by shop-owners like Samuel. He explained to me how merchants would band together to understand and create coalitions against the motley supply chains of Chinese phones. On WhatsApp groups, they would discuss if a particular brand was trying to force down the throat of their customers a suboptimal handset, if an agent was unreliable, and what strategies they could deploy as an informal collective. Then again, sales too were an incredibly datafied practice. Early in August 2021, I had the fortune to interview Eric, the animated and fast-spoken marketing consultant who'd recently engineered the boom of Xiaomi sales in Kenya. He'd worked for other Chinese brands before, and had been exposed to their agent-based sales model:

> Salespeople used to submit a report. Online, they have a platform to put in the IMEI[27] of the phone they sold and at what price, but also a physical spreadsheet in which they indicate the number of phones they sold, and the number of phones sold by their competitors in the same shop. At the end of the day, they send the report via Whatsapp [a photo of the physical report], to their manager … And so the managers can ask you, how are these people selling more than you when you're selling devices that are probably better? It's all about maximizing sales to customers. You have to be very good to people and very aggressive. But these [sales agents] are friends. They work together. They collaborate. But when a customer comes in, it looks like cutthroat competition.

For space, I cannot dive further into the ins and outs of these sophisticated and sensitive sales data machines, whose final goal is to gauge the exact pricing point of a phone (Pollio, 2022). Suffice it to say that marketing and sales are just as experimental as the customer satisfaction tests that Mike used to handle: measured, monitored, and benchmarked. Between competition and collaboration, as in the words of my informant, a vast ecosystem of data had—from the street corners of Nairobi—nudged, improved, perfected and ultimately shaped one of Global China's technological "transfers" and "translations" in Africa, and in the Global South more broadly (Lu and Qiu, 2022a). But cell phones are, as we will see in the next and final section, also producers and holders of data.

From Hardware to Software and Back

Many rumors surrounded George Zhu—or Zhu Zhaojiang—the enigmatic founder of Transsion. According to some, he'd started his venture as a maker of phones with a small *shanzhai* factory in Shenzhen. Others narrated that he'd made his money at Ningbo Bird, a company that used to make affordable handsets for Chinese consumers, and had modelled Transsion on the vision to export Ningbo Bird's domestic successes to developing markets. Some would say, instead, that a secretive deal with a Taiwanese manufacturer of microchips had been behind Zhu's ascendancy. Whichever the case, all these rumors seemed to agree that it was a trip to Nairobi that had sparked his decision to make phones for African consumers.

Eventually, in late March 2023, I met with somebody who actually knew George Zhu, a senior manager in a local bank. He recalled the first time that they had bumped into each other, in the early 2010s, on a flight from Kampala to Nairobi. Ming, my contact, had heard about Tecno's founder from colleagues and collaborators. At the time, Zhu was the talk of the town: an unknown entrepreneur who'd stamped out Nokia's dominance in less than three years, and was now rubbing shoulders with important Kenyan politicians and businesspeople. And so Ming was surprised not only to find out that Zhu was travelling alone, but that he was himself hands-on involved in the trials and fine-tuning of the design, sales, and marketing experiments that I've described previously in this article. But things changed, Ming told me, between 2018 and 2019. Zhu became more elusive. He had shifted his focus to the listing of Transsion on the newly launched Shanghai STAR, the technology-focused equity stock market that Xi Jinping had wanted, in order to nudge the return of Chinese big tech listed abroad, and to create Yuan liquidity for domestic companies.

The listing of Transsion on the financial market, a business analyst told me,[28] had coincided with a strategy to expand from hardware—the sale of phones—to software. The IPO documents[29] I came across could not be clearer about this shift: Transsion was raising liquidity to launch a fully fledged attack on a market monopolized by Western software companies, from social media to financial services. To keep the cost of cell phones affordable, the profit margins on their sales had to be minimal. But with millions of handsets already on the market, Transsion had incidentally built a distribution channel for value-added services. Data-driven platforms could be preinstalled or delivered to millions of phones that were hitherto part of the daily lives of their African users. Even before the listing, Transsion had been experimenting with messaging, music streaming, news, and other applications, having created a small startup called Afmobi. I spoke to one of the early Kenyan employees of Afmobi, David. As a product manager, he remembered how from the very beginning his team had worked on matching a Transsion-dedicated marketplace with local software developers working on innovative applications.[30]

After the IPO, and following a partnership with another Chinese software giant (NetEase), Transsion's software efforts were consolidated into three main operations. The in-house software unit would continue to work on the native operating ecosystem of its phones. A venture capital arm, Future Hub, would invest in Africa-based fledgling startups, offering them early-stage capital and an incredibly capillary distribution channel.[31] And a software company owned by both Transsion and Netease—Transnet—would work on a number of flagship platforms, replacing Afmobi. Transnet, for example, incorporated platforms that had already existed for some time, such as the Nigerian music streaming service Boomplay, which was initially pre-installed as a music player on Tecno phones and had evolved into "the largest online African music catalogue" (Avle, 2022: 1479). Combining freemium with advertising-led business model, today Transnet platforms range from short video streaming ("Vskit, the African version of Tiktok," told me David) to financial services (though these were exclusively developed for West-African markets, given the prominence of other mobile money companies in East Africa). Transnet, David further explained, was pushing its developers to pepper all these apps with increasingly sophisticated AI systems. From phones, Transsion had turned to data.

In fact, as Seyram Avle has written (2022):

> Transsion's gradual shifts toward [software] emphasize how hardware [is] the entry point … for new forms of data collection and use. Hardware is the site of platform power … Under the rubric of innovation, design, and continual upgrade, increasingly affordable smart devices enroll populations that hitherto were left out of the logics of surveillance/ techno-capitalism through the placement of devices on bodies and both private and public spaces, continually abstracting facets of life into calculable data for profit. (2022: 1485)

This analysis could not be more on point. However "empowering" and convenient to end users, the making of a hardware-software nexus for African consumers is, ultimately, about expanding the data frontiers of technological profit (Lu and Qiu, 2022b). But in the remainder of this article, I want to focus on a different story of data, one that brings our attention back to the ordinary hardware cultures of Nairobi.

Transsion phones are known, and sometimes ridiculed, for their bloatware—a plethora of native applications that users would find on their phones "bloating" the memory of devices. Some of these applications are simply *dupes*[32] of Android's standard services: a browser, a marketplace, a news reader, a few games, etc. Others, some journalists have speculated, are invisible spyware, trojans that leave a data door open to surveillance (Osamuyi, 2018). One of my informants simply believed that after the Huawei–US affair, Chinese companies like Transsion were preparing themselves for a post-Android time.[33] He was a popular Kenyan "YouTuber" filming reviews of tech gadgets, and he told me that bloatware was, in his opinion, a way to keep Transsion's in-house marketplace ready in case of an escalation of US–China trade wars. Yet one of these bloatware apps, Carlcare, had a different origin story.

Carlcare is the after-sales service for all Transsion brands. In Nairobi, it operates a few shops and a light-assembly plant that are dedicated to the repair of the company's handsets. For Samuel the shop-owner, Carlcare had been one of the crucial reasons for the loyalty that Transsion's customers had developed. Cheap phones, by nature of their affordability, were prone to malfunctions. Carlcare offered fast and reliable servicing for both manufacturing glitches and damage caused by users. According to Samuel's perspective, this aligned with a technological culture by virtue of which Kenyans saw value in the repairability of devices. Even the success of Nokia years before, I was told, had been a function of how easy it was to fix and refurbish a 1100.

Mike, the former R&D manager at Transsion, recalled that Carlcare had evolved organically from the same user-experience research that he had conducted. Initially, after-sales services were a contextual solution to what Nairobians wanted in response to the paltry reliability of their handsets, and their desire for a long-lasting technological investment. Unlike *chinku* copies, Tecno and Itel handsets thus came with warranties. But then Carlcare had grown into something bigger, a whole ecosystem of repair. The preinstalled app, among other functions, would allow users to book an appointment at a service center, monitor the repair order, or even get a loan to pay for the service—had the warranty lapsed. At the same time, the app would be the interface for Carlcare's own data-driven business model and for Transsion at large.

I got a sense of how datafied this repair system was when I visited a couple of Carlcare centers in downtown Nairobi, in the fall of 2022. With a research collaborator, I ended up

speaking to the manager of one of these centers, which had the functional aesthetics of a hospital waiting room. The manager told us how the app was not just a data interface for users, but also a trove of metadata for Carlcare itself. Each phone ending in the repair pipeline was treated as a data point and as a data source. Information about glitches and bugs, for example, would be sent back to the mothership, and compounded into a quality-monitoring platform. Information about common causes of damages, on the other hand, would inform how many and what kinds of spare parts the Shenzhen factory had to ship to Kenya. And so forth.

Whether by chance or by design, Carlcare had created a data-driven after-sales system which aligned to what Nairobians, and Kenyans at large, understood as valuable. As in the words of the Xiaomi marketing consultant Eric, whom I mentioned earlier:

> This applies … to any technology in Kenya. It actually started with vehicles. That's why almost everyone has a Toyota … because the maintenance and spare parts are cheap and, most importantly, easily accessible. The same now applies to tech and phones. It is very easy to maintain these phones, because the panels and every other component are also very cheap, and you don't need crazy expertise. Young people fix their phones by themselves, through YouTube, because the spare parts are easy to get. What [Transsion] also invested in, are these service centers. In Luthuli, they have a huge service center … So yes, in Kenya, guys think about repair. It's [about] accessibility —you don't want to wait a week to get a screen replacement— and pricing, which also needs to be low. This fits the culture of repair that exists in Nairobi beyond the smartphones themselves.

Despite Eric's observations, I do not want to reify some kind of uniquely "Kenyan" or "African" culture of repair (even though other informants did so too). My argument is rather different: among the many technological affordances that a hardware device begets, disparate actors and users value each of them in a different order. Prioritizing repairability over, say, the allure of a brand-new model is a function of many technocultural, economic, and personal circumstances. It would be a mistake to pinpoint one. Yet these hierarchies of valuation do shape through data, as the Carlcare case shows, the material commodities that, in turn, inform life in Nairobi. In other words, the datafied circulations of spare parts and repair ingenuity are another moment of both the ordinary and the aspirational acts of valuation that delineate and negotiate the so-called "market frontiers" of (Chinese) techno-capitalism in urban Africa.

China-Africa, Nairobi, and the Limits of Data Coloniality

In these final lines, I return to the two arguments that I wish to make in this article. The first one is, essentially, empirical. Nairobi, one of Africa's most celebrated hubs of innovation, is a vantage point to observe the shifting geopolitics of transnational digital capitalism. Affordable Chinese phones, obviously, only represent a sliver of this tech race. But they do capture how the datafication of urban life, which largely depends on the capillary ubiquity of handsets, is an arena of competition and experimentation in which Chinese manufacturers are the current, if only temporary, victors. Therefore, the recent history of *chinku* phones in Kenya foregrounds a less discussed and yet vital facet of Global China in Africa: the fact that cities like Nairobi are the testbed of a mutating techno-capitalism that emerges from trials, negotiations, glitches, and adaptations. And through affordable Chinese phones, Kenya's capital city appears not as a marginal periphery, but as the

center of ingenious speculations about new data economies rooted at the junction of hardware and software platforms (Avle, 2022).

The second argument of this article is more conceptual and seeks to challenge a rather common reading of these phenomena. Interestingly, both Global China and global techno-capitalism in the African continent have been critically analyzed under the categories of coloniality. Accordingly, while China uses its capital-export regime to neo-colonial ends—creating new forms of dependence via sovereign debt and unequal trade relations, data platforms extend their power to all forms of life (Couldry and Meijas, 2019b). Combining both concerns, anxieties about "Chinese digital neo-coloni-alism in Africa" abound (Gravett, 2020). Often, as Yuchen Chen and her colleagues have observed, these readings unhelpfully lump disparate things and practices together into the same "black box" (Chen et al., 2023). But the bigger point about coloniality remains valid, as digital data follows the traces of previous colonial relations and is ridden with new forms of enclosure and predatory inclusion that mirror the past (Langley and Leyshon, 2022). The ruthless layoff of the Nairobi data workers who contributed to the labelling of violent content for OpenAI's ChatGPT platform (through a subcontractor) is a recent case in point. Extractive data economies rely on labor made cheap and disposable along the enduring inequalities that have their origins in the imperial project of Africa's economic subjugation (Bayart, 2000). Similarly, the troves of data captured and mobilized by increasingly ubiquitous affordable Chinese handsets, their lock-ins and dexterous capacity for market-making, could be easily framed as one of the neo-colonial frontiers of techno-capital in the cities of the continent. Not only do phones produce the data that make urban life extractable, they are also made from extracting minerals in the earthly deposits that once were the frontiers of colonial expansion (Smith, 2021).

But frontiers are, at once, an apt and a problematic analytical category (Downey and Fisher, 2006), one that is in itself primed by colonial notions of exploration and by what may stand beyond these metaphorical lines: a *terra nullius*? A "virgin market"—as one of my informants put it?[34] Conversely, what I have narrated in this article, albeit anecdotal, showcases the contested, tentative, aspirational and ingenious experiments through which frontiers are marked—in this case the "market frontiers" of digital data and the phones that enable its circulation in urban Africa. While I do not disagree that the story of *chinku* phones is one of techno-capital (and of Global China) finding new terrains of profit, this article also illustrates how these economies are palimpsests of, yes, colonial traces but also forms of techno-cultural imagination that escape it. And so we should perhaps consider another meaning of frontier: *limit, edge*.[35] Limits, physical and conceptual, define the ethnographic and historical account of how Nairobi's urban life was enrolled into the experimentation and marketization of affordable phones for mass consumers in Africa. And these limits, I argue, also apply to the analytical concepts—data coloniality and the likes—through which we may make sense of these shifts in the ambivalent politics of digital technology and "digital urbanism."

In turn, recognizing the limits of (China's) data coloniality, whether a metaphor for the parallels between historical colonialism and contemporary techno-capitalism, or a description of its imperial continuities, means acknowledging, and not 'brushing off' (Cooper, 2005) the multiple form of ingenuity and the entanglements that define technological presents and futures in urban Africa. After all, and I paraphrase Clapperton

Mavhunga here (2014: 11–17), focusing exclusively on how innovations of others reach the African shores, or on how technology victimizes seemingly hapless African users, risks reproducing the same tropes that portrayed Africa (and, at some point, China too, Yuk Hui has argued) as a pre-technological world. It also fails to account for how incoming things, in this case cell phones and their data economies, are in fact prosthetics that emerge from multiple and contingent engagements of technicity, as the ones I sketched in previous pages (Hui, 2019). Ultimately, for the study of digital urbanism in Africa and beyond, this article suggests that a careful attention to the ambivalent materialities of data reveals the plural designs and uses that are always beholden to technological configurations. Moving beyond frontier-thinking (Cirolia et al., 2024), this entry point shifts our attention to the other mathematics of value that, together with colonial remains, define, or may potentially define, the economies of data in our cities.

Notes

1. Chinku can also have a sinophobic tone if addressed to people as an alternative to the neutral Mchina/Wachina.
2. Unstructured Supplementary Service Data (USSD), also called "quick codes," is a communications protocol used by cell phones to communicate with the network operator. USSD can be used for mobile money, but also for much simpler services, such as recharging a SIM card.
3. I am currently working on an archival genealogy of the phrase "Silicon Savannah," which seems to have appeared in Kenyan policy documents circa 2007/2008 to describe one of the *Vision 2030* plans, and then shifted its meaning around 2015 to capture Nairobi's innovation scene.
4. The informal economy; literally, "fierce sun" (See King, 1996).
5. Spec is a tech jargon meaning "technical specifications", that is, the measurable qualities of a device.
6. I use "coloniality" not in its strict conceptual (and political) meaning, which owes its debt to Anibal Quijano and others, but as a more generic descriptor of a wide analytical vocabulary that centers the endurance of colonial relations in the present. For an impassionate analysis of coloniality in Africa, see Ndlovu-Gatsheni (2013).
7. Interestingly, Couldry and Meijas indicate the US and China as the two "pole[s] of colonial power" (2019b: 337).
8. I paraphrased this description from Kenda Mutongi's *Matatu* (2017).
9. There is a vast literature in infrastructure studies charting the technopolitics that roads, dams, and railways encapsulate. For Kenya, see for example Kimari and Ernstson (2020), Lesutis (2022) and Manji (2015).
10. I borrowed this phrase from Power and Alves (2012). This argument is made in more detail in Huang and Pollio (2023).
11. And potentially, in the future, to Lake Victoria, just like the original "lunatic express" in colonial times (Taylor, 2020).
12. See Murunga, 2012.
13. And globally (See Shen, 2018).
14. There are other streets in other African cities that specialize in the sales of electronics. Thank you Seyram Avle for pointing this out.
15. Interview, May 2022.
16. Interview, June 2021.
17. Much has been written about this transition, and from different perspectives. See, among others, Qiu (2009), Hong (2017), Wen (2020) and Zhang (2023). For China's digital influence in the Global South, see Heeks et al. (2024).
18. Interview, June 2021.
19. Interview, May 2022.

20. Interview, June 2021.
21. This is an oversimplification of the *shanzhai* phenomenon, but it reflects the way it was perceived in the West as an industry of copycats and knockoffs (Yang, 2016). See also See Section 2 of de Kloet et al. (2019).
22. In May 2019, the Trump administration included Huawei in the Export Administration Regulations "entity list," a move which de facto banned Google-owned Android operating system on Huawei phones.
23. This was confidentially reported to me by more than one informant.
24. He probably meant Shenzhen.
25. Interview, April 2022.
26. For a broader argument about this, see Odumosu (2017).
27. International Mobile Equipment Identity.
28. Interview, May 2022.
29. 中信证券, 2019.
30. Interview, June 2021.
31. Interview, April 2022.
32. Duplicates.
33. Interview, June 2021.
34. Interview, April 2022.
35. On the polysemy of frontier/edge as a space of continuity, as a relation and as a form of uncertainty, see Saguin (2022). Thank you, Morgan Mouton, for the suggestion.

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Disclosure Statement

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