Cities as Geopolitical Testbeds of Digital Infrastructure

Cities as Geopolitical Testbeds of Digital Infrastructure: A View from Nairobi, Kenya

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Once overlooked in discussions about the emerging geopolitics of infrastructure, cities in the global south are now recognized as sites where competing great powers materialize their diplomatic and geoeconomic interests through the financing of infrastructure systems such as railway corridors and ports.

Yet these cities—African cities in particular—also play a vital role as testbeds of new technological standards in the scramble for digital infrastructure. From the operating systems of affordable smartphones, to the inaccessible server rooms of national data centers, booming African capitals like Nairobi are the experimental edge of a shift towards China in the geopolitics of digital standards.

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The importance of cities as geopolitical players is now well established. Their role in international relations is attested by several global agendas, from the *Sustainable Development Goals* (Agenda 2030) to the *New Urban Agenda*, both of which recognize that cities, as political actors and as sites of extreme economic and climate inequalities, are crucial in achieving sustainable development.

Although many of these commitments were signed by national governments, subnational powers are increasingly represented in the global political arena, through the leadership of very proactive mayors and a growing number of

initiatives and networks that specifically feature the participation of cities.

Soft power, diplomacy, and foreign policy are also exercised in large metropolitan centers in a variety of other ways. This is particularly true in Africa, and more broadly in the global south, where colonialism, structural adjustment-prescribed austerity, and unprecedented demographic growth have left cities with seemingly unbridgeable infrastructure backlogs.

These gaps are opportunities for linking urban infrastructural needs to international development assistance (foreign aid) and foreign investment regimes. African cities are proxy arenas where different modes of international relations and models of service provision are given effect through the funding, design, and construction of infrastructure systems.

The best example of this is perhaps China's Belt and Road initiative (BRI), which inaugurated a new era of infrastructure-led development, after some twenty years of sluggish commitment by the traditional development partners of global south nations. In the second decade of the 2000s, China married its need to find a spatial fix to domestic overcapacity with the developmental agendas of Asian and African states, for which infrastructure delivery had never stopped being a priority.

Although BRI projects are not exclusively urban, it is in cities that several global corridors of the new Silk Roads have their hubs and terminals, with railway stations, airports, harbors, dry ports, and more capillary systems such as BRTs (bus systems) and LTRs (light rails). Predictably, the response of China's main competitors, the US and the EU, has taken an infrastructural turn too, with the promise of new programs of development finance such as Global Gateway and Build Back Better World.

In this context, digital infrastructure is, and increasingly will be, one of the key geopolitical arenas of the 21st century. From data sovereignty to opposed visions of internet governance, from supply-chain independence to the fight over communication standards, from overt cyberwarfare to the manipulation of social media, information has emerged as one of the frontiers for the deployment of both hard and soft power in international relations. And so, if digital technology is so central to the present and the future of geopolitics, do cities also play a role in the making of this increasingly multipolar technological order?

The Digital Infrastructure Scramble

African cities, in particular, are indeed actors and sites of the geopolitics of digital technology, just as much as they are leaders in global climate agendas, and terrains of other infrastructural alliances across domestic and foreign

powers. Yet, the geopolitics of digital infrastructures are rarely seen as urban matters, despite the widespread currency of smart city programs, and the recognition that cities are cradles of technological innovation.

My suggestion, in this sense, is that urban centers are already beholden to the digital version of what scholars Seth Schindler and Miguel Kanai call "infrastructure scramble", the competition of different state actors and units of capital for international infrastructure networks in the global south.

The notion of "scramble" perhaps overstates rivalry at the expense of alliances of collaborations, but it underscores the fact that cities actively engage with digital infrastructure capital. They do so in different ways, from hosting the bulk of venture capital investments channelled into digital start-ups, to functioning as experimental testbeds for geopolitical transitions.

To illustrate this latter point, I draw upon an ongoing research project about the presence of Chinese technology companies, start-ups and investors in Nairobi, one of Africa's so-called Silicon Savannahs and one of the continent's most acclaimed digital innovation scenes. Kenya is also an interesting case of China-Africa collaboration more broadly, given that it hosts a few BRI flagships projects, namely the Standard-Gauge Railway and the Port of Mombasa on the East African Northern Corridor, and the Lamu port on the Lapsset Corridor.

At the same time, Kenya has also emerged as a landing pad for Chinese techno-capital, and as an experimental site for its expansion into the rest of the African continent. China's national digital champions such as Huawei and ZTE have been doing business in Kenya for nearly two decades, having diversified their footprints and contributed to the developmental plan for world-class broadband access across the country.

Private Chinese companies such as StarTimes and Transsion dominate the low-cost pay-TV and the affordable mobile phone markets respectively. Several start-ups founded by Chinese expatriates are active in a range of sectors, from e-commerce and last-mile logistics to online gambling and fintech. And a few hefty tickets from China-based VC funds were channelled to Kenyan start-ups in the last three years, including for some of Africa's upcoming unicorns.

In this way, cities like Nairobi are vantage points from which to observe a shift towards China in the geopolitics of digital technology. Sometimes, this is a very visible fact. Walk into a middle-class condo in the wealthier suburbs of Nairobi, and you'll be surrounded by facial recognition and other security equipment branded by Hikvision, a surveillance company owned by the Chinese state.

Stroll along one of the street malls known for selling cheap phones and other tech gadgets, and you'll see thousands of signs, small and big, advertising companies like Tecno, Oraimo, Infinix, Xiaomi, Realmi, Itel, Carlcare, Haier. Some names might be familiar, others are Chinese tech firms that specialize in products and services dedicated to African customers. More often, as with digital technology in general, changes are less symptomatic. Data centers, undersea cables, and 5G base stations rarely meet the eye. And equally opaque is the presence of China in these systems.

The shift towards a multipolar world order is even more subtle in the domain of technical standards for digital technologies. This geopolitical tussle is mostly known to be fought at the level of international agencies and conferences such as the International Telecommunication Union (ITU) and the 3rd Generation Partnership Project (3GPP), where China is seeking to usher in a new internet protocol, and, alongside several other nations, a parcelled approach to internet sovereignty. But standardization battles are also conducted at the urban scale, on the streets and in the future plans of a city like Nairobi.

Transsion: How a Chinese Company Cornered the African Phone Market

A good illustration is in the story of how Transsion became the dominant phone manufacturer and software ecosystem in the African market. Like many other phone makers, Transsion started in the Pearl River Delta as a *shanzhai* manufacturer, a company specialized in making "creative" copies of branded handsets. Having realized that the phone market in China was saturated, Trannsion's enigmatic founder George Zhu decided to pivot to Africa, setting up shop in some of the continent's largest cities. At the time, in the late 2000s, African sales were monopolized by two companies: Finnish manufacturer Nokia and, increasingly so, South Korean Samsung, both of which offered affordable phones.

To win this lower-end market, a manager at Transsion told me, all the company had to do was offer better technical specs at the same price. And so hundreds of students were hired in Nairobi to study what people liked and disliked about their current phones. They were sent to the streets around the university and to popular malls with questionnaires. Smartphone prototypes were given as gifts on the corners of busy streets, in exchange for people's feedback on what Silicon Valley techies call "user experience." Successful managers at Nokia were poached.

All of this ensured that the right manufacturing decisions in mainland China would ensue. Tweaking the perfect balance between battery longevity and computing power, for example, might have looked like a futile endeavour, but in reality it determined what kinds of phones people wanted to buy. A popular

anecdote is that Transsion even used Nairobians to train the AI of their phone cameras to more accurately recognize faces with high levels of melanin.

Albeit cheaper, Transsion handsets were suddenly better than Samsung phones when it came to portraying dark skin in pictures. In the same breath, sales agents were dispatched to electronics stores all around Nairobi, to compete with other brands on the cut-throat ground of face-to-face sales. Carefully curated agreements with fledgling African e-commerce platforms were struck. Eventually, Transsion emerged as the leading brand in the African continent, surpassing Samsung in 2017.

Such practices of experimentation and consolidation continue today. When Transsion raised capital through an IPO on the prestigious Shanghai STAR in 2019, part of the funding was channelled to boost its software arm. The company incorporated some early-day start-ups and began to pre-install their software onto the dedicated operating ecosystems of its smartphones.

Africa's most used music streaming platform, Boomplay, is a case in point. Whether or not this and other apps will become true alternatives to Spotify, Zoom, Stripe, and others remains to be seen. Nonetheless, Transsion already showcases how mobile phones, their operating systems, and application suites matter too in the geopolitics of standards. They shape and are shaped by the scramble between different corporations seeking to outdo each other on frontier markets. Sometimes, these fights come down to the street corners and the malls of an African metropolis like Nairobi.

Konza Technopolis: 'Smart City' or Failed Promise?

Konza Technopolis provides an additional urban example of the geopolitics of technical standardization. Conceived as a satellite to Nairobi, Konza is a greenfield "smart city" designed to boost the country's high-tech sectors. It was first introduced in the national development plan of 2008 (Kenya Vision 2030), and later gazetted in Kenyan law as a 2000-hectare special economic zone for the enhancement of the BPO (business process offshoring) and ICT sectors.

Despite the initial fanfare, the gestation period of the project was long and thorny, prompting commentators and critics to describe Konza Technopolis as a fantasy city, or a failed promise. Adding to the ridicule, the first building of the new city stood empty for many years, like a white elephant in clear sight from the busy highway that connects Nairobi and Kenya's main port city Mombasa.

And yet, whether or not it will deliver on its promises, today Konza is a bustling construction site and a privileged observation point to chart how the

geopolitics of digital infrastructure unfold. When I visited in June 2022, Kenya's National Data Centre was about to be commissioned.

Financed with a concessional loan from China's export-import bank, and built by Huawei with its own equipment, the data center will centralize and standardize a number of datasets and cloud services for various government departments and ministries. It will also host private servers as a colocation facility. It goes without saying that Huawei is the first tenant, with its cloud going live in East Africa long before its western competitors Amazon and Microsoft.

The data center, however, is only a small piece in a larger infrastructural puzzle. The construction of the smart grid upon which the entire city relies was awarded to an Italian contractor, with a loan by a public investment bank from the same country to the Kenyan treasury, and with a bond issued by Standard Bank Kenya.

The latter is the subsidiary of a group partly owned by a state-owned Chinese bank, thanks to a takeover that has been one of China's largest investments into Africa to date. Meanwhile, the dam that will provide the electricity necessary to the new high-tech city was financed by the African Development Bank, and an upgrading of the section of the highway connecting Konza and Nairobi's southern end was partially supported by the World Bank.

Not far from the data center, the Kenya Advanced Institute of Science and Technology (KAIST) was at the time of my visit almost ready to open its doors to the first batch of graduate students. Funded by the South Korean government, KAIST is modelled upon the Korea Advanced Institute of Science and Technology, an institution initiated by USAID in the early 70s to boost the South Korean developmental state project.

Since then, KAIST itself has exported its own model, offering standardized technical curricula for institutions in countries that seek to address skill shortages and accelerate their industrial development. In Konza, the specific promise of KAIST is to produce the software engineers that the new city will need to become a crucible of made-in-Africa innovation. Taken together, all these investments speak to how city plans—in this case a plan for a whole new satellite city—function as testbeds for the alliance between domestic developmental ambitions and the geopolitics of foreign aid and investment.

Conclusion

The ongoing construction of Konza and the corporate story of Transsion in Kenya are just two of many examples of how battles of standards in technology, and more broadly in the composition of digital infrastructure, take place in cities. African cities in particular have emerged as the testbeds

of shifts in the geopolitics of information towards multipolar magnets of power. Some of these shifts, as the relentless competition of Chinese phone makers against their rivals shows, are indeed infrastructural scrambles. In other cases, as the financing of Konza highlights, it is less a case of battling and more the coming together of many facets of transnational capital, development finance, and the priorities of a domestic developmental agenda into a single city fragment.

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