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Geopolitics, technology wars and global supply chains: Implications for Africa

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ABSTRACT

Ongoing US–China geopolitical rivalry could harm Africa. As in the case of the Cold War between the United States and the Soviet Union, when African countries were treated like pawns on a global chessboard, African countries risk getting caught in current US–China geopolitical tensions. These are intensifying following the COVID-19 pandemic when many Africa states are facing their worst socio-economic crisis since independence, as well as a sovereign debt crisis not seen since the 1980s. Africa is institutionally underprepared for the combined effects of these developments. Partly, this is due to persistent governance deficiencies, a constrained global trading environment, and economic under-performance continent-wide. And partly, this is accounted for by Africa's marginal position in the global system. This article outlines Africa's potential development pathways against this harsh backdrop, assessing the options for African agency in response to geopolitical rivalries playing out in technology, global supply chains and trade.

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Introduction

This article focuses on African agency in response to three main theatres of engagement that define US–China geopolitical rivalry, namely technology, global supply chains, and trade. How does this superpower friction impact the African continent, especially in the current, post COVID-19 pandemic era? Discussion of the US–China geopolitical rivalries must of course also take into account other factors that have triggered tremors in the global system, for instance the Russia-Ukraine war. Both the pandemic and the conflict in Eurasia have adversely affected the global economy and disrupted global supply chains, with attendant macro-economic shocks. However, the specific events related to the Russia-Ukraine war are beyond the scope of this work, which focuses on the period between 2018 and late 2021. These years include assessment of US policy under the administration of President Donald Trump and in the early years of the administration of President Joe Biden. Historical references are included where relevant to the discussion of African agency and geopolitics.

Since the events around US–China geopolitical rivalry are constantly evolving, long-range analysis is highly speculative at best. US–China tensions are deep-seated and

multifaceted, as they are rooted in contestation over trade and technological supremacy. However, historical references help to contextualise the current frictions. The authors borrow from conceptual frames that consider the uses of structural power in international relations along the three focal areas of technology, global supply chains, and trade, analysing how these geopolitical tensions may possibly affect the African continent and discussing what responses the continent might offer. What agency is exhibited in African actors' actual and potential behaviours along the three focal areas?

As such, this article makes three contributions. First, it outlines the evolution of the geopolitical tensions between China and the US, particularly in the areas of technology, global supply chains and trade. Second, it explores the manifestations of these tensions in those three areas for several different kinds of African actors, especially in the post COVID-19 context. Third, it shows how these African actors have, or could have, exercised agency in their given circumstances. Finally, the authors distil key lessons and conclude. The main observations arising from this analysis are that there is an inevitable shift in the underlying structure of global power, that this shift will induce strain on multilateral institutions and undoubtedly affect the African continent, and that there is a need for African countries to hone and better project their agency to ensure optimal outcomes for Africa from those global power shifts.

Discussion now turns to a review of the literature and an outline of the conceptual framework for the article.

Review of literature and conceptual framing

There is vast and growing literature on various aspects of the US–China geopolitical rivalry. Perhaps most famously – and controversially – Graham Allison characterised the relationship in terms of the 'Thucydides' Trap'.¹ Allison draws his idea of the Thucydides Trap from the work of Thucydides, a thinker in the early 400's whose *History of the Peloponnesian War* details how the rise of a new power, Athens, created conditions that made war with the established power – Sparta – inevitable, and that such a tectonic shift in the coordinates of power instilled fear in Sparta. Allison considers the rise of China as signifying a momentous shift that is analogous to this epic historical event in Ancient Greece. Adapted to the current juncture in international politics, conceptually, China would be Athens reincarnate while Sparta symbolises America.

Allison used this simple framework – or simplistic framework, according to some critics² – to predict whether rising and ruling powers will end up in war due to the structural shift in the balance of power, applying it to China as the rising power and the US as the ruling power, as well as to 16 other historical cases. It is important to point out that although Allison does not posit the inevitability of military confrontation between America and China, he does not rule out such a possibility either. One of the reasons why this tension will continue for the foreseeable future, according to Allison, is that it is based on structural factors and reflects a profound shift in global leadership, with a new challenger (China) determined to test America's mettle.³ Allison does offer some pathways on how a direct confrontation could be avoided. These are based on the need to strengthen cooperation including communication between the two powers, and greater accommodation of China in the liberal internationalist order.

Other scholars have studied the US–China rivalry from the standpoint of technology⁴, global supply chains⁵ and international trade.⁶ There is also a burgeoning literature that considers fragmentation in the monetary system and diversification away from the US dollar.⁷

There are however only a small number of works on the trilateral relationship between the US, China and Africa, including some in the form of multi-issue and multi-stakeholder ‘trilateral dialogues’. These include dialogues convened by the Council on Foreign Relations⁸ and the Brookings Institution.⁹ Other relevant works are a position paper¹⁰ published in the early weeks of the Trump administration identifying several ‘win-win-win’ opportunities for trilateral US–China–Africa relations and an assessment¹¹ of the prospects for bilateral US–China competition or cooperation in Africa. Michelle Gavin of the Council on Foreign Relations recently published a report that reviews major power rivalries, including the US, China, Russia and the European Union, and highlights areas of possible cooperation between the US and China in Africa.¹²

The main weakness of many of these works is the notable absence of any substantive perspectives from African actors or consideration of the implications of these rivalries for the African continent, as well as Africa’s agency. This brings us to the third set of relevant sources, which do include discussion of African agency.

Africa’s agency

William Brown defines African agency in international politics in terms of 1) the agent’s freedom to act, including ‘how much’ and ‘what kind’; 2) the agent’s context, including corresponding enablers and constraints; and 3) the agent’s roles, formal or less formal, which may empower or constrain their choices.¹³ Ronald Chipaike and Matarutse Knowledge explore African agency in a variety of scenarios.¹⁴ They point out that this agency was articulated through the Non-Aligned Movement (NAM), the Organisation of African Unity (later African Union), individual African states, as well as through African civil society and the private sector. Markus Kornprobst presents compelling evidence of African agency in the most constrained of global settings: nuclear arms control agreements.¹⁵ Mzukisi Qobo discusses Africa’s agency as rooted in inclusive institutions, sound governance, and structural transformation that is anchored in digital change.¹⁶

The contention of this article is that Africa’s meaningful participation in shaping the global system can be realised only by reducing reliance on major powers, and by building strong institutions domestically, engendering effective and inclusive governance systems. This will include bolstering dynamic capabilities of the state and having the right kind of leaders in place that are committed to implementing strategies for economic diversification. In the past, African countries sought to exercise agency through participation in structures such as the Non-Aligned Movement and the UNCTAD G77, which called for a ‘New International Economic Order’. These efforts were hampered in part by an absence of transformative governance modes, that is, strong and inclusive institutions and effective governance frameworks.

Pan Africanist thinkers such as Ali Mazrui and Francis Wiafe-Amoako have emphasised that institutions underlie state stability, security and development.¹⁷ Postcolonial leaders such as Tom Mboya placed a premium on capital investment and skilled citizens as critical inputs for development.¹⁸ Former Nigerian Finance Minister, Ngozi Okonjo-Iweala,

stressed the importance of institutional and regulatory reforms as critical success factors.¹⁹ Africa's weak agency is thus here identified as its Achilles Heel.

The nature of today's geopolitical tensions

Tensions between global powers will have implications for the African continent through the channels of technology, global supply chains and trade. During the Cold War years, many African countries found themselves in a position where they had to choose between the US and the Soviet Union. While some African countries expressed fidelity to the Soviet Union, others aligned themselves to the US. Even those African leaders who were participants in the non-aligned movement of the 1960s would often find themselves, because of resource constraints and the need for post-independence recognition, falling within one or the other superpower's 'sphere of influence'.

The Cold War provided a backdrop for drawing African states into the orbit of either of the two superpowers with military assistance and financial support given in surfeit – but primarily directed to elite projects rather than to support economic development. Once the Cold War ended, many African countries found themselves left in the lurch. They had not paid sufficient attention to their own development needs or charted their own development path. As such, their agency had not matured, precisely because domestically they had no sound institutional basis to participate effectively in the global system.

If African countries are to avoid a similar fate in the present day, they must develop better strategies for engaging in the changing global order, and all the more as geopolitical tensions appear to be intensifying once again.

At the core, US–China tensions in the 21st century are about trade and technology supremacy. The contestations straddle the domains of commerce and knowledge. The effects of this rivalry on the rest of the world are potentially dire, and are particularly acute for the African continent, especially because the US and China are the world's two largest economies by far, together accounting for nearly 35% of the global economy, at 15.778% and 18.785%, of global GDP in terms of purchasing-power-parity (PPP), respectively.²⁰ They are also leading global suppliers of critical technologies that are associated with telecommunications, artificial intelligence and digitisation.²¹

In assessing the impact of this geopolitical rivalry, modelling by the Bank of Finland suggests that the trade war between China and the US has already slowed global GDP growth by around 0.7 percentage points.²² This trade rivalry thus introduces a significant degree of uncertainty in global supply chains. The implications are potentially dire for African countries, which could find themselves forced to choose sides in the same way that the US has been nudging Europe to do: in his first international speech as president, Joseph Biden – speaking at a security conference in Munich in February 2021 – implored European leaders to work with the US in dealing with China.²³ Later that year, at the G7 summit, Biden was instrumental in rallying member states to work as a united front against China, including through the Build Back Better World (B3W) Partnership targeted at Africa and other developing regions. That initiative is clearly aimed at countering China's Belt and Road Initiative.²⁴

Origins of US–China tensions in the post-Cold War era

It is worth underlining that US–China tensions did not begin with the Trump administration. During the previous US administrations, under presidents Bill Clinton, George W Bush and Barack Obama (ie, the 24-year period from January 1993 to January 2017), even as relations between the two countries developed with the increased openness of the Chinese economy, the US always regarded China as a competitor and rival. The US was intent, however, on co-opting it into the post-Cold War liberal internationalist order, often imploring China to ‘play by the rules’,²⁵ almost as an article of faith that rules-bound coexistence was not only possible, but likely. This dimension of strategic competition is laid out in Hank Paulson’s account of US–China relations under the Bush administration, during which Paulson was the Secretary of the Treasury. In his book titled *Dealing with China*, he discusses how America sought to tame the giant through a series of strategic economic dialogues.²⁶

The US’s strategic calculation was to incorporate China into a liberal world order and thus manage its rise peacefully. Paulson sought to achieve this through a series of strategic economic dialogues between President Hu Jintao and President George W Bush, beginning in 2006.²⁷ Averting escalation into a fully-fledged trade war was a strategic priority for both countries, as they were aware that this would have a disruptive effect on the global economy and global supply chains, and thus their own economies. China was invested in a stable global economy as it had benefitted from globalisation as a major exporter of manufactured products.²⁸

During the Obama era, the two powers made further inroads in cooperation through their ongoing dialogue, which was now renamed as the Strategic and Economic Dialogue (S&ED). The inaugural S&ED took place in Washington, DC, in July 2009, along two tracks: one focused on strategic issues (bilateral relations, international security, global issues, regional security and stability) and the other focused on economic issues (balanced and sustainable economic growth, a sound financial system, open trade and investment, international financial institutions reform and financing for development and future crises).²⁹

Seven years later, during the eighth S&ED in 2016, the US managed to secure various economic concessions from China.³⁰ China agreed to continue reforming its exchange rate system towards a more market-oriented approach – artificial devaluation of the Chinese currency had been a source of stress for the US as it artificially boosted China’s export competitiveness at America’s expense. The US also insisted on greater economic transparency, especially of financial and energy data on the part of China. This level of transparency would help America to monitor China’s progress in the rebalancing of its economy towards consumption and services, as well as to provide a more accurate view of China’s energy stockpiles. America also extracted concessions with respect to transparency in aspects of the regulation of state-owned enterprises and China’s financial markets.

Despite this apparent progress, the seeds of the destruction of the US–China relationship were sown long before and began to manifest soon after the onset of the 2008–2009 global financial crisis, which was triggered by the near-collapse of the US banking system. At that point, the US was a weakened power and China was in a relatively much stronger position. In addition, a change in leadership in both states had occurred, and Xi Jinping

and Barack Obama lacked the chemistry that had marked the relationship between George W Bush and Hu Jintao. Mistrust between the two countries grew steadily and China became increasingly emboldened about challenging America's traditional supremacy in various areas; it was this set of developments that led scholars such as Allison to point to the Thucydides Trap.³¹

Even though the strategic economic dialogue continued, the talks failed to gain further traction. Over time the tensions between the two would ratchet up over trade and security in Asia. US Secretary of State Hillary Clinton, under the Obama administration, signalled her determination to undermine China in its sphere of influence in Asia by orienting the new US foreign policy priorities towards the Asia Pacific.³² Clinton's approach became known as the Asia Pivot, a term credited to Kurt Campbell, former Assistant Secretary of State for Asia. The strategic outline of this approach is captured in what Hillary Clinton referred to as 'forward-deployed' diplomacy, which entailed dispatching to the region high-ranking officials, development experts, and inter-agency teams.

In his book, *The Pivot*, Campbell noted that the Asia Pivot strategy was 'intended to build upon preceding policy innovations in an evolutionary way, but fundamentally represents a marked elevation of Asia's place in US foreign policy'.³³ This strategy was about repositioning American power in the fastest-growing region in the world, thereby keeping the US relevant as a global power.

In the current period, it is notable that Biden, in a move that underlines his determination to continue a strong hard line with China, brought the hawkish Kurt Campbell out of retirement and appointed him Coordinator for Indo-Pacific Affairs on the National Security Council. Campbell has become one of Biden's key advisers on China policy.³⁴ Further, Biden wasted little time in antagonising China by equating the 'China threat' with that of Russia whenever he meets other global leaders either bilaterally or in the context of the G7 – a tactical miscalculation that, in the view of these authors, draws Russia and China into a closer embrace.³⁵

From the foregoing, it is clear that, although the fractures between the two countries deepened during the Trump administration, the seeds of the hostilities were laid many years before the arrival of Trump in the White House. In the context of the preceding discussion, the article now turns to analyse how the US–China relationship has unfolded from the Trump era onwards. The next section looks at how these tensions played themselves out in the commercial and regulatory domains, and in particular, the 'technology wars'.

The China–US 'technology wars'

The Trump administration framed America's tensions with China as being about a distinction between economic systems, especially the state-commerce relations in the Chinese economic system versus the supposedly free market and democratic regime in the US. This distinction was important for the US as Washington sought to push for a structural redefinition of commercial terms with China, and to extract economic concessions that would help rebalance the scales – on both the technology and trade fronts.

China's domestic regulatory conduct lent justification to America's rationale for undercutting Chinese technology companies by placing restrictions on their trade in the US. The US government has pointed to the lack of strong data privacy laws in China as a

reason for denying market access to digital products and services that originate from China.³⁶ The Chinese authorities countered by expanding a list of technologies that were subjected to export restrictions. This was aimed at restricting exports of Chinese technologies to US companies.³⁷ These technology-directed restrictions on both sides have had the effect of bifurcating global technology systems, making it harder for third parties to collaborate with either, since they could suffer collateral restrictions. The technologies on which the Chinese restricted exports include data-processing technologies such as content-recommendation algorithms, text analysis, speech modelling, and voice-recognition systems.³⁸ These form an essential element of artificial intelligence technologies that are key to the roll out of the Fourth Industrial Revolution, with its enormous potential for the developing world.

Some observers have pointed out that, in China, the Western equivalents of Chinese social media platforms have been banned for years; US technology giants such as Facebook, Twitter and the video streaming platform Netflix are not granted market access in China.³⁹ In addition to filtering by Chinese authorities, China does not have an open Internet. While the Chinese may consider themselves victims when restrictions are imposed on the operation of their social media platforms, they have been practising Internet nationalism for a long time, and from the perspective of the US this creates an asymmetry that needs to be corrected.⁴⁰

Thus, some believe that US actions in blocking China's technology firms are justified.⁴¹ This view does not, however, take into account the behaviour of some of the Western firms, in particular their monopolistic 'winner-takes-all' commercial practices,⁴² nor the adverse effects of algorithm-driven social media platforms on public values and social well-being.⁴³ Western technology firms have not only been aware of these negative aspects of their operations from the outset, but have actively promoted them because they are integral to their business models.⁴⁴

In any case, Beijing, retaliating against Trump administration measures, in early 2019 reportedly ordered all government offices and public institutions to remove foreign computer equipment and software within three years. This policy, dubbed '3-5-2', involved replacing 30% of such equipment in 2020, 50% in 2021, and the remaining 20% in 2022.⁴⁵ The Chinese approach was likely motivated by the need to limit cyberattacks by Western agencies on its computer hardware and software, on the basis that computer hardware and software sourced from the West would be more susceptible to malicious attacks. Such an attack could cripple an entire network if malware or spyware were allowed to infiltrate a government's technology infrastructure through a single point of entry (ie, a foreign-supplied computer). Threats to technology systems are a key part of geopolitical tensions among great powers, and China was exercising an abundance of caution with this move.

Beijing has grounds for such concern. In her work on cyberwars, Nicole Perlroth has narrated, through the voice of former intelligence operatives or sub-contractors of the US National Security Agency, how technology 'warfare' with foreign adversaries is waged not only through formal government institutions but also outsourced to independent American firms of subcontractors.⁴⁶ These subcontractors that are enlisted into technology warfare hack into computer systems and software of foreign governments and provide America with critical data such as military intelligence or any piece of data that could help American authorities to know what their adversaries are planning. If such

systems and software originate from the US, for example Microsoft software or other operating systems, the possibilities of compromising them are endless since US hackers that scour for system (hardware and software) vulnerabilities could sell such exploits back to agencies associated with the US government.⁴⁷

As noted earlier, under the '3-5-2' policy, the removal and substitution of Western hardware and software by the Chinese authorities was to be implemented in phases, with phase 1 coming into effect in 2020, the first year, with the substitution rate set at 30%; followed by 50% in 2021; and 20% in 2022.⁴⁸ The Chinese government wanted to eventually see 100% local content on hardware and software by the end of 2022.⁴⁹ This would also accelerate the pace of innovation in China, reducing Chinese dependence on Western systems while also countering cyber-attack vulnerabilities from Western agents.

In the course of 2021, China also embarked on an aggressive and wide-ranging crack-down on its own technology giants, including Alibaba and DiDi.⁵⁰ Superficially, the crack-down appeared counterintuitive and detrimental to China's technological ambitions, but the inverse is true when viewed in terms of China's geopolitical rivalry with the US. In this geopolitical context, China's opposition to Alibaba and DiDi's floating of shares in US capital markets and its imposition of draconian data protection rules were designed to shield its national champions from the clutches of US regulators and, crucially, to safeguard the nation's data, which is the most significant factor of production and competitiveness in the digital economy.⁵¹

Global supply chains and Africa: The case of COVID-19 vaccines

A second area in which geopolitical tensions impact Africa is global supply chains. For a concrete, contextually relevant and contemporary example, consider the COVID-19 global supply chains for medical supplies⁵² and vaccines.⁵³ The African continent was clearly adversely affected by abnormal price hikes of medical supplies induced by uncoordinated procurement and artificial shortages in vaccines caused by vaccine hoarding and vaccine nationalism, all of which were exacerbated by the tensions in US-Chinese relations.

As the pandemic was unfolding, researchers at Duke University published an analysis of publicly available data on vaccine procurement and manufacturing.⁵⁴ They observed that advanced industrial economies captured the lion's share of vaccines available, leaving developing countries, especially in Africa, with limited supply. The Duke University researchers pointed out that, by early February 2021, high-income countries were due to have purchased 4.2 billion doses of vaccines and upper-middle income countries just over 1.2 billion doses, with lower middle-income countries at 581 million doses and low-income countries at 610 million doses.⁵⁵

The acrimonious relationship between the Trump administration, China and the World Health Organization (WHO) at the height of the pandemic globally is, again, the clearest example of just how damaging the geopolitical tussle between China and the US can be for vulnerable countries.

As of mid 2021, although Africa had 18% of the world's population, it accounted for less than 2% of globally administered COVID-19 vaccine doses and it produced less than 0.1% of the world's vaccines.⁵⁶ In response to COVID-19 vaccine nationalism and the inequities in the global distribution of COVID-19 vaccines, African countries decided in that year to significantly increase their capacity to manufacture critical

vaccines in the short to medium term.⁵⁷ In the long term, it is imperative that Africa builds home-grown research, development and innovation capabilities in drug discovery and development, including vaccines. In this quest to build manufacturing capacities, African countries need to work collaboratively to establish a base of scientific and technical know-how, shore up regulatory agencies, and create a pipeline of cross-border supply chains.⁵⁸ Developing human capital, sound institutions and investment-friendly policies, and putting in place the right kind of incentives, are vital steps for attracting investment into Africa's nascent drug manufacturing sector. The move toward interregional trade under the African Continental Free Trade Area will also encourage a move away from reliance on global value chains. When African countries work collaboratively to develop their capabilities, this will help to strengthen their agency.

Discussion turns now to the third area of exploration of the impact of geopolitical tensions on Africa: trade.

Trade tensions and Africa

For African countries that are economically dependent on external trading relations, geopolitical tensions disrupting trade relationships can constitute a major challenge. Both the US and China are major export destinations for many African countries, as well as sources of foreign direct investment and development aid. China is sub-Saharan Africa's leading trading partner with the total value of trade worth \$192 billion in 2019, up from \$185 billion in 2018, according to the dataset compiled by Johns Hopkins University's School of Advanced International Studies China Africa Research Initiative (SAIS-CARI).⁵⁹ US–Africa two-way trade, on the other hand, had a total value of \$56 billion in 2019, suggesting that on the commercial stakes, China excels the US in Africa. However, much of the China–Africa two-way trade favours China, with Africa importing from China goods worth \$113 billion compared to its exports to China to the value of \$79 billion, according to SAIS-CARI.⁶⁰ Apart from South Africa, it is resource-rich countries such as Angola, the Republic of Congo, the Democratic Republic of Congo, Zambia, and Equatorial Guinea that enjoy current account surpluses in their trade with China.⁶¹

The bulk of Africa's imports from China and the US comprise capital equipment and machinery, textiles and clothing and other manufactured products.⁶² It would seem the US and China have their eyes set on gaining more market access for their goods and services, especially targeting Africa's growing consumer market and supplying their equipment to African businesses.

The bulk of Africa's exports to China, on the other hand, remains in commodities. Both the US and China are important for Africa's integration into the global economy on a competitive basis. In view of these factors, and in the post-COVID-19 global trading environment, there are strong arguments that turning inwards – via protectionist measures like tariffs, export restrictions and vaccine hoarding – would ultimately be counterproductive.⁶³

As such, African countries could be in a vulnerable position if the tensions between the US and China escalate further, as they might be forced to choose to associate with one of the two superpowers. This is especially so as the US looks to gradually move away from the African Growth and Opportunity Act (AGOA) trade preference scheme towards negotiating bilateral free trade agreements with African countries. Such negotiations have already started with Kenya, with a view to extending them to other countries. The

Kenya-US Trade and Investment Partnership signals this direction.⁶⁴ It is here proposed that African countries do not have to find themselves in the same position they were in during the Cold War; however, to avoid that fate, they will need to realise and utilise their own agency. Principally, African countries should approach relationships with external partners from the point of view of promoting their own state interests.

Implications of China-US tensions for Africa, and the imperative of agency

Geopolitical confrontations between major economies shape the patterns of trade and global value chains. Such is the importance and impact of these confrontations that the hostile interactions of key players have been described as ‘weaponized interdependence’.⁶⁵ Weaponised interdependence is defined as ‘a condition under which an actor can exploit its position in an embedded network to gain a bargaining advantage over others in a contained system’.⁶⁶ The trade and technological conflict between the US and China certainly fits this definition.

As argued throughout the foregoing sections, the tussle of these two global giants presents potential dilemmas for Africa in the areas of technology, global supply chains and trade. Many African countries could find themselves being urged to choose sides in these areas of conflict. For example, the US ban on Huawei – or any technology restrictions by either side – could scupper Africa’s acceleration to digital transformation.

African leaders will need to be aware of the role of geopolitics in constraining or advancing their developmental goals and should calibrate their diplomatic strategies to minimise the adverse effects accordingly. Importantly, Africans should seek to avoid over-reliance on either Western or Chinese technologies but choose from a diverse menu of options while gradually developing their own platforms. Western powers such as the US and the EU will likely accelerate the trend of supply chain relocation as US-China rivalry intensifies. As evident in the case of Huawei, the US will deploy trade diplomacy and other foreign policy tools to force countries to abandon Chinese technologies; in the case of African states, these pressures could be better resisted on a regional level, applying the leverage of market share to counter these initiatives, for instance.⁶⁷

The first area of impact for Africa is clearly that of technology since technology is a key enabler of Africa’s socioeconomic development and transition to an innovation-led, knowledge-based economy.⁶⁸ Mobile technology, for example, has been deployed to provide modern communications services to the continent’s growing population, with penetration in Sub-Saharan Africa in terms of unique mobile subscribers as a percentage of the region’s population having grown to 46% in 2020 and projected to reach 50% in 2025.⁶⁹ In relation to its overall needs, and compared to other regions of the world, Africa’s deficits in information, communication and technology (ICT) infrastructure and services are a serious impediment to Africa’s development and need to be accelerated.⁷⁰

In addition, the roll out of 5G technology has the potential to ameliorate some of the socio-economic ills that afflict African countries through the provision of affordable broadband Internet connectivity for low income remote and rural communities.⁷¹ However, there are various institutional, policy and regulatory interventions that are needed for technology to work in the service of industrial development. Technology on its own will not make much of a difference if there is inadequate institutional support, policy signalling or regulatory structures, as shown by the low levels of

technology transfer experienced in previous generations of mobile technology – for example in South Africa in relation to the Chinese mobile network equipment companies Huawei and ZTE.⁷² Clearly, throttling Africa's participation in new technologies would slow the realisation of the continent's potential.

In the month following the initial ban imposed by the Trump Administration on Huawei, the CEOs of four major South African telecommunications operators (Telkom, Vodacom, MTN and Cell C) wrote a joint letter⁷³ to the South African President Cyril Ramaphosa requesting his urgent intervention on the US action against Huawei. These CEOs were gravely concerned about the US move because Huawei was a critical supplier of 5G and other technologies for all four firms.

In a speech on 5 July 2019, President Ramaphosa publicly expressed his support for the four operators as well as for Huawei, stating that the ban was 'an example of protectionism that will affect our own telecommunications sector, particularly the efforts to roll out the 5G network, causing a setback on other networks as well.'⁷⁴

African policymakers would be well advised to strenuously safeguard their right to choose from the widest possible range of technology options that suit their countries' development needs, and should insist on acquiring and developing new technologies like 5G based on objective criteria that serve their development needs rather than those of the foreigners. In this context, the need for asserting Africa's agency has never been more urgent. Crucially, if the African continent is to take full advantage of the technological shifts, it will need to shore up its capacities, including through public investment in building digital infrastructure (including through partnerships with the private sector), developing digital skills, and enhancing public policy tools and regulation to promote a digital economy that is growth-enhancing and equitable.

For Africa to capture the full benefits of potentially transformative technologies like 5G, African participation in the development of the associated technology standards is essential. However, despite the evident rewards of such participation, it is much easier said than done because as noted by Brad Biddle: 'There is no standard for standards. Technology standards are created, maintained and propagated in a bewildering variety of ways, by a diverse set of actors.'⁷⁵ It is essential that African countries participate actively in ICT global standard processes at the International Telecommunications Union (ITU), World Intellectual Property Organisation (WIPO), International Electrotechnical Commission (IEC), and International Organization for Standardization (ISO), among others.

In the view of the authors, even if the continent was relatively self-sufficient technologically, interdependence generates greater public value than technology nationalism. To further illustrate the point on how innovations that are driven through narrow national or regional paradigms can create problems for others, consider the ongoing competition between the US and the European Union over investments in green technologies. Under the Joe Biden administration America is undertaking a large-scale green energy transition through the Inflation Reduction Act signed into law in August 2022. This act entails tax credits for clean energy projects and local content requirements that will force beneficiary companies to procure locally.⁷⁶ Such incentives will likely draw investments away from Europe to the US.

The European Union's answer is the proposed EU Sovereign Fund to promote upstream research, innovation, and strategic industrial projects, which it hopes to support through the revised emissions trading system that will raise about \$750 billion (700 billion Euros) by 2030.⁷⁷ Both schemes could introduce new protectionism,

leaning on emissions standards or local content requirements to discipline imports. They also seek to catch up with China's lead on clean technology.

Pushing for multilateralism and participating in standard-setting processes internationally can yield better outcomes for shared innovation, especially for the African continent. On the technology front, the more immediate challenge for the continent, however, is to enrich the digital ecosystem, including building the digital infrastructure, upgrading digital skills, and broadening its citizens' participation in the digital economy. For technologies related to industries of the future that may rely on the ubiquity of 5G, it is vital that the standard-setting platforms are consensus-driven, and that the African continent, which has over 1.2 billion people, is active in such key standard-setting processes.

President Xi Jinping has said that 'a new round of technological and industrial revolution with information technology at its core is emerging' and has stated his ambition to build China 'from a network big power to a network great power', where 'network great power' can also be translated as 'cyber great power'.⁷⁸ This repositioning of China is understandably concerning to the leading network-cyber power, the US.

One of China's main strategies for building its technological capabilities has been by participating very actively in the development of important emerging technology standards such as 5G. Indeed, as of February 2021, Huawei owned 15.4% of global 5G technology patents – defined as granted and active patent families, ie, 5G standard-essential patent (SEP) families with at least one granted patent counted – a percentage higher than any other company in the world.⁷⁹ Between them, Huawei and ZTE own 21% of all such patents.⁸⁰ Little wonder then that ICT standards development is an area of fierce contestation between the US and China.⁸¹ African countries will be better served by making their own voices and agendas heard in these crucial fora.

US-China rivalry in ICT standards development opens up opportunities for more African participation, since each of these powerful players will have to build alliances with participants from other parts of the world. For instance, Fisseha Mekuria has put forward several workable proposals for making African contributions to 5G standardisation, aimed at increasing affordable broadband Internet access to low-income rural and urban communities in Africa.⁸²

Given the critical development role of digital technologies and other new technologies, it is important that these technologies should not be politicised or instrumentalised for geopolitical ends. African leaders will need to be aware of the role that geopolitics can play in constraining or advancing developmental ends and calibrate their diplomatic strategies to minimise the adverse effects.

The US has exerted pressure on allies such as Britain, Australia, New Zealand and Japan to dissociate from Huawei's 5G technology. Australia and New Zealand subsequently blocked Huawei from rolling out its 5G network infrastructure in those two countries. The EU has not followed suit, despite the fact that there are two European telecoms equipment companies that have the capacity to develop 5G technology: Finland's Nokia and Sweden's Ericsson.

Reversing globalisation vs moving ahead: Three lessons informing Africa's choices

In the post-COVID-19 world, the greatest temptation for policymakers in Africa and other developing regions, is to forget the hard-won lessons of previous years and decades, and

attempt to reverse globalisation.⁸³ That, the authors here contend, would be a profound mistake. Certainly, there are many important lessons to be learned from the post-pandemic experience, but three stand out based on the subject matter in this article.

The first lesson is with respect to Innovation. The main takeaway from this study's exploration of technology is the vital importance of innovation and in particular technological innovation. It is clear from recent and much longer history that technological innovation is the key driver of long-term, sustainable growth in modern economies.⁸⁴

The second lesson is the importance of building resilience. The main takeaway from this study of African actors and global supply chains is the need to develop institutional capabilities that reinforce resilience. For manufacturing and local manufacturing of vaccines in Africa specifically, several resilience 'levers' – ie, sourcing (the supplier ecosystem), making (the manufacturing network) and delivering (via established channels to a network of customers), as well as supply chain adaptation (revising, migrating and regionalising) – can be applied.⁸⁵

Although digital transformation has introduced efficiencies into the global supply chains, it has also made them a lot more complex and vulnerable.⁸⁶ African countries need to take seriously the need for integration efforts through regionalisation that will reduce heavy reliance on external partners. More broadly, a regionalisation strategy⁸⁷ can be applied at continental level with the African Continental Free Trade Area and at sub-regional level with regional economic communities like the Southern African Development Community.

The third lesson is about the centrality of agency. Irrespective of structural or processual conditions, African actors should always strive to retain a good measure of agency which they can choose to exercise. For example, the years prior to the COVID-19 pandemic witnessed a seemingly endless succession of 'Africa + 1' summits between African states and global powers which, despite apparent asymmetry, served several self-determined or at least co-determined purposes for the African actors.⁸⁸ Of course, the precise quality and quantity of agency will vary from context to context.

Elijah Munyi, David Mwambari and Aleks Ylönen, in their edited volume published in 2020, present a rich set of studies of both state and non-state actors in Africa intended to show that 'agency is a two-way street' and to 'expand and refine the definition of agency to the three main criteria used: agency as influence, agency as exertion of actorness, and agency as innovation of norms in the international system'.⁸⁹ African actors can also draw inspiration from the continent's precolonial history; archaeological investigations indicate that precolonial African states were not merely the product of external influences, but demonstrated 'the agency of indigenous political entrepreneurs in driving state formation across the continent'.⁹⁰

Conclusion

In light of the ongoing US–China geopolitical rivalry in the areas of technology and trade, it is imperative that African countries diversify their critical technology infrastructure sources to avoid being locked into one system. Based on a study of the current geopolitical tensions and of the historical record during the Cold War, it is the recommendation of this article that African countries be more pragmatic and assertive in their foreign economic relations rather than lock themselves into exclusive trade relationships and

technology partnerships. It is also crucial that they tighten regulation and security conditions to minimise cybersecurity risks associated with 5G technologies.

Further, African actors should embrace global supply chains, but adapt them to their own needs through regionalisation strategies. Post-pandemic global medical supply chains have highlighted glaring and intolerable inequities which must be addressed. There are also risks related to cyber-attacks that have become increased with the digitisation of supply chains. In general, the key response to the COVID-19 shocks has been to design resilience into global supply chains. Reconfiguring these supply chains and making them resilient requires reintegration and adaptation.

Finally, African decision-makers have an opportunity to use their agency more effectively during this current post-pandemic socio-economic crisis, especially if they deepen collaborative relationships among themselves through processes such as the African Continental Free Trade Area, shore up their domestic institutional capabilities, improve their production profiles, invest in innovation, and negotiate with external partners on a much sounder institutional and economic footing.

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