Leapfrogging

Conclusion: Harnessing technology for the future

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This theme started by examining the notion of leapfrogging and then presented examples of how different technologies offer opportunities for Africa to begin closing the gap with developed countries. It noted that modern technology may even prevent the requirement for traditional infrastructure, such as large electricity grids or roads. It has therefore examined both the notion of stage-skipping, where a country bypasses conventional stages of development, such as using mobile phone connections instead of landlines. It also explored the potential of forging an alternative path of technological development involving emerging technologies with new benefits and new opportunities (path-creating), such as using renewables instead of carbon fuels for energy.

Many areas of leapfrogging were not examined in this theme but in separate themes, such as those dealing with health and education. General improvements in medical science could curb malaria, HIV infections, respiratory infections, tuberculosis and other diseases that currently ravage large populations in Africa, modelled in the Health/WaSH scenario. The manufacturing theme explores the potential to use digital technology as an effective means towards targeted cash transfers to their citizens.

Whichever example we wish to use, technological innovation and leapfrogging will fundamentally shape development on the African continent, particularly if governments decide to pursue those options intentionally. African leaders need to seize the opportunities offered by modern technology and build the productive structures of their economies to unlock rapid growth, alleviate poverty and improve incomes sustainably. Measures to integrate the informal economy into the formal sector are essential, and this theme is enthusiastic about the potential that modern technology offers to simplify and ease the business regulatory framework, design and implement an uncomplicated and progressive tax regime and appropriate labour market regulation that would provide greater employee social security and stability. The emphasis must be on progressive employment programs focusing on occupational health and safety aimed at helping the informal sector transition to formal employment.

Writing for the Center for Strategic and International Studies, Erol Yayboke offers an essential insight in this vein: 'Enthusiasm for taking advantage of leapfrog opportunities,' he cautions, 'should not distract developing nations from what should be their overarching goal: becoming producers in their own right, rather than simply consumers of technologies and services developed elsewhere.' Leapfrogging is not merely copying high technology from others. It is a sequential process of learning by latecomers, building skills in product design and acquiring the capability to create new products — particularly to overcome the extent to which the developed world locks in patent and intellectual property rights to their exclusive use. After all, the real drivers of economic growth are innovation, new knowledge and new technology.

Digitisation and the Fourth Industrial Revolution will allow Africa to leapfrog in crucial areas—for instance, energy supply and some aspects of infrastructure and health, among others—but could also leave the continent trailing further behind. Where technological adaptation is inevitable, its impact will be magnified by efficient and open markets, clear and transparent regulatory frameworks, effective public and private governance, and the ability to leapfrog established systems. Ironically, the threat to leapfrogging may largely come from African governments themselves since countries such as Uganda, Tanzania, Eswatini, Zimbabwe and Ethiopia shut down access, particularly ahead of elections, worried that social media platforms could be used to challenge the party in power.

A strong focus on technology can provide leapfrogging opportunities for low- and middle-income countries. Still, governments must not lose sight of 'traditional' developmental issues, such as governance, infrastructure and skills. According to Saadia Zahidi:

> With opportunities for economic leapfrogging, diffusion of innovative ideas across borders and new forms of value creation, the Fourth Industrial Revolution can level the playing field for all economies. But technology is not a silver bullet on its own. Countries must invest in people and institutions to deliver on the promise of technology.

Therefore, the primary challenge that Africans and international financial institutions face is twofold. First is the ability of African governments to apply innovative business models and flexible regulatory approaches to growth — an agile approach to regulation, perhaps most evident in Rwanda, where the country has provided 4G mobile phone coverage to 95% of its (admittedly small) territory within just four years and established a domestic drone start-up to establish itself as an international supplier of delivery services. The second challenge is for governing elites in poor countries to lever the policy space to carve out space for industrialisation policies that do not run foul of the dictates of the World Trade Organization.

Levering the potential of leapfrogging is therefore not merely asking regulators to get out of the way but about flexibility and a willingness to embrace experimentation, reflecting 'the bottom-up nature of most instances of leapfrog development and the need for policymakers to proactively engage with entrepreneurs and technologists to ensure that growth in new technologies isn't stunted by regulations meant for a different age.' It is developing and applying a deliberate industrial strategy aimed at this exclusive goal, not unfettered free markets or laissez-faire economic policies. Erik Reinert cautions poor countries to learn from the real causes of American and European prosperity instead of taking advice from their forgetful successors. 'Rich countries got rich,' he writes, 'because for decades, often centuries, their states and ruling elites set up subsidised and protected dynamic industries and services … having moved through a stage without free trade, which — when successful — subsequently made free trade desirable.'[1] Eventually, if Africa is to benefit from leapfrogging, it needs to produce new technologies, not merely consume the high technologies of others. The United Nations Conference on Trade and Development warns that strategic innovation policies are required to promote and facilitate the deployment and adaptation of frontier technologies to their production needs and to build capacity for developing them further.

Many areas of leapfrogging are not examined in this theme. Still, they are included in the relevant sectors, including rapid improvements in health and education, as well as the potential to use digital technology to increase the ability of states to undertake targeted cash transfers (or provide social grants) to their citizens. General improvements in medical science could curb malaria, AIDS, COVID-19, tuberculosis and other diseases that currently ravage large populations in Africa. The result would rapidly reduce mortality and morbidity, significantly impacting population trends. It could also improve agriculture yields by, for example, reducing locust infections. Because a manufacturing transition is generally accompanied by an initial increase in inequality before more rapid growth lifts all boats, it is modelled as part of the scenario on manufacturing.

Chart 12: Policy recommendations

Recommendations

1. Growing electricity access and mobile broadband are the key for leapfrogging in Africa
2. Household electricity access can be ramped up through decentralised, off-grid wind and solar breakthroughs in energy storage, hydrogen, and use of biomass will assist
3. Although Africa's urban internet connectivity expanding, mobile broadband must extend across the continent, likely only possible via satellite
4. Digital connectivity provides key enablers like ID's, mobile money, finance and location
5. Electricity and broadband internet access allows leapfrogging in education, health, agriculture, manufacturing, trade, and financial flows, improves accountability and reduces leakage of government revenues
6. Leapfrogging will help formalise Africa's informal sector, boosting government revenues
7. Digital technologies allow the commercialisation of projects in low-income areas
8. To leapfrog, African governments must apply in the digital and energy space:
    a. Innovative business models
    b. Flexible, clear and transparent regulatory frameworks and
    c. Effective governance in the public and private sectors

Endnotes

1. ES Reinert, How Rich Countries Got Rich ... and Why Poor Countries Stay Poor, Constable, London, 2007, xxviii and xxix.

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Dr Jakkie Cilliers is the ISS's founder and former executive director of the ISS. He currently serves as chair of the ISS Board of Trustees and head of the African Futures and Innovation (AFI) programme at the Pretoria oce of the ISS. His 2017 best-seller Fate of the Nation addresses South Africa's futures from political, economic and social perspectives. His three most recent books, Africa First! Igniting a Growth Revolution (March 2020), The Future of Africa: Challenges and Opportunities (April 2021), and Africa Tomorrow: Pathways to Prosperity (June 2022) take a rigorous look at the continent as a whole.

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