Leapfrogging

Conclusion: Unlocking Africa's Leapfrogging Potential

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This report explored Africa's potential to leverage technological adoption for transformative development, beginning with the concept of leapfrogging, bypassing traditional stages of industrial and infrastructural development. Examples range from mobile phone adoption replacing landlines to the use of renewable energy instead of fossil fuels, illustrating both stage-skipping and path-creating opportunities. By embracing these approaches, Africa can address critical development gaps without replicating the incremental trajectories of developed countries.

In interpreting these results, the reader is reminded about the caveat included in the introduction, namely that the modelling in this theme does not do justice to the full impact of new technologies. The impact of advances in health for example, is modelled and included as outcomes there since advances in medical technology, for instance, could substantially reduce the burden of malaria, HIV, tuberculosis and other prevalent diseases. Similarly regarding education, manufacturing, financial flows and even governance. The real effect of leapfrogging is, therefore, dispersed across various themes and only fully captured in the Combined scenario to the degree that we can estimate the extent to which new technologies will effect Africa's future.

Even then, realising its potential requires deliberate policy and strategic action. Leapfrogging is not the mere imitation of high technology; it is a process of sequential learning, capacity-building and innovation. African countries must develop the capability to adapt, improve and ultimately create new technologies, navigating global intellectual property regimes to ensure that growth is locally driven.

Digital technologies offer unprecedented opportunities to accelerate development in energy, health, infrastructure and beyond. Yet the benefits will only materialise if governments combine technological adaptation with effective governance, transparent regulations and open markets. Ironically, restrictive policies, such as internet shutdowns in many African countries during elections, pose a greater threat to leapfrogging than any technological constraint, highlighting the importance of enabling, rather than stifling, innovation.

Leapfrogging requires more than regulatory leniency; it demands flexibility, experimentation and active engagement between policymakers, entrepreneurs and technologists. Strategic industrial and innovation policies must facilitate the development and deployment of frontier technologies, build local capacities and ensure that Africa produces, rather than merely consumes, advanced technologies.

To accelerate technological leapfrogging in Africa, policymakers must adopt a coordinated and inclusive strategy that simultaneously addresses infrastructure gaps, institutional weaknesses and human capital constraints. Evidence from institutions such as the World Bank demonstrates that while digital technologies are already transforming finance, employment and service delivery across the continent, their full potential remains constrained by structural bottlenecks. Effective policy must therefore focus not only on expanding access to technology but also on ensuring that its benefits are widely shared and sustainably embedded in local economies.

A foundational priority is expanding reliable digital and energy infrastructure. Technological leapfrogging depends critically on widespread access to affordable internet and consistent electricity, yet large segments of the population, particularly in rural areas, remain underserved. Governments should prioritise investments in broadband networks and support the scaling of decentralised energy solutions such as minigrids, which have proven effective in reaching off-grid communities. By fostering public-private partnerships and reducing barriers to infrastructure investment, states can create the enabling environment necessary for digital services, mobile finance and AI applications to flourish. Without these foundational systems, higher-level technological innovations cannot scale effectively.

At the same time, strengthening digital financial ecosystems is essential for enabling inclusive economic participation.

Mobile money has already become a cornerstone of financial inclusion in Africa, supporting everything from household resilience to small business operations. However, to move beyond basic transactions, policymakers must promote interoperability across providers, expand access to savings and credit products and integrate digital payments into government services. Leveraging digital finance for social protection programs can further enhance efficiency, reduce corruption and increase trust in digital systems. A mature digital financial ecosystem not only facilitates commerce but also underpins broader digital transformation.

Equally important is the need to support informal digital entrepreneurship. As observed in the widespread use of social media platforms for commerce, small merchants are already leveraging accessible technologies to participate in digital markets without relying on formal e-commerce infrastructure. Rather than attempting to replace these systems, policy should aim to strengthen them by improving access to finance, building trust mechanisms and investing in logistics and delivery networks. Providing targeted training in digital skills and business management can help informal enterprises transition from survival-oriented activities to scalable ventures. Recognising and supporting this form of grassroots innovation is critical for ensuring that leapfrogging is inclusive and grounded in existing economic realities.

Human capital development represents another central pillar of effective policy. The transition to a digital and AI-driven economy requires a workforce equipped with both basic digital literacy and advanced technical skills. Reports from the World Bank highlight the growing demand for such competencies and the risks of exclusion for those without them. Governments must therefore reform education systems to integrate digital skills at all levels, while also investing in vocational training, STEM education and specialised programs in data science and artificial intelligence. Particular attention should be given to closing gender and rural-urban gaps in access to education and technology, as failure to do so could exacerbate existing inequalities.

In parallel, the development of inclusive and secure digital identification systems is crucial for improving governance and service delivery. Digital ID can enable more accurate targeting of social programs, reduce fraud and facilitate access to financial services. However, as research underscores, poorly designed systems risk excluding vulnerable populations and undermining trust. Policymakers must therefore ensure universal access, incorporate robust data protection frameworks and provide alternative mechanisms for those unable to enrol digitally.

Looking ahead, enabling the responsible development and deployment of artificial intelligence will be key to sustaining long-term leapfrogging. AI offers significant potential to address sectoral challenges in agriculture, healthcare, finance and climate adaptation. Still, its adoption in Africa is constrained by limited data availability, weak infrastructure and skills shortages. Governments should invest in local data ecosystems, including the development of datasets that reflect African languages and contexts, and support research institutions and innovation hubs. Establishing clear regulatory frameworks that promote ethical AI use without stifling innovation will be essential for fostering trust and encouraging investment. Importantly, AI strategies should prioritise applications that deliver tangible social and economic benefits, rather than replicating models from advanced economies that may not align with local needs.

Finally, improving the overall regulatory and business environment is necessary to unlock private sector participation and innovation. Across sectors, from fintech to energy, complex and inconsistent regulations continue to hinder growth. Policymakers should streamline licensing processes, adopt regulatory sandboxes to test new technologies and harmonise policies across regions to facilitate cross-border digital markets. By creating a predictable and supportive regulatory environment, governments can attract investment, encourage competition and accelerate the scaling of successful innovations.

In sum, Africa's ability to leapfrog hinges on a proactive, integrated and inclusive approach. By aligning technological innovation with development priorities, African countries can not only narrow the gap with developed nations but also

pioneer new models of sustainable and inclusive growth. Leapfrogging presents both a challenge and an opportunity; pursued strategically, it can unlock rapid growth, alleviate poverty and empower the continent to shape its own technological and economic future.

Chart 12 summarises the policy recommendations.

Chart 12: Recommendations

Governments in Africa should:

1. Expand digital and energy infrastructure:

- Scale broadband networks and mobile connectivity, prioritising rural and underserved areas.
- Integrate reliable electricity access through decentralised, renewable energy solutions, including off-grid and mini-grid systems, to ensure digital technologies function effectively.
- Promote infrastructure sharing, spectrum management, and efficient permitting to reduce deployment costs and expand reach.

2. Improve affordability and access to technology:

- Reduce taxes and tariffs on digital devices and internet services.
- Support targeted subsidies, shared internet access points and innovative financing to make connectivity and devices accessible to low-income households.
- Ensure programs prioritise the poorest and most vulnerable populations to prevent the digital divide from deepening poverty.

3. Invest in human capital and digital skills:

- Reform education and vocational programs to strengthen digital literacy, STEM skills and AI competencies.
- Launch community-level digital literacy initiatives to improve adoption among rural and low-income populations.
- Target efforts to reduce gender and rural–urban disparities in digital skills.

4. Strengthen financial inclusion and digital entrepreneurship:

- Promote interoperable mobile money, digital savings, credit and social transfer systems to empower households and small businesses.
- Support informal and small enterprises with access to finance, logistics, digital tools, skills training and trust-building mechanisms to drive grassroots innovation.

5. Develop inclusive digital systems and AI governance:

- Implement secure, privacy-conscious and universally accessible digital ID systems to expand access to financial services and public programs.
- Foster responsible AI adoption through local data ecosystems, innovation hubs and ethical regulatory frameworks, focusing on sectors such as agriculture, health, finance and climate adaptation.

6. Create an enabling regulatory and investment environment:

- Streamline licensing and regulatory processes to reduce barriers to network and service deployment.
- Harmonise policies, maintain regulatory stability and promote fair competition.
- Liberalise foreign investment to attract capital and stimulate private sector innovation.

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Dr Jakkie Cilliers is the founder and former executive director of the ISS. He currently serves as chair of the ISS Board of Trustees, head of the African Futures and Innovation (AFI) programme at the Institute's Pretoria office, and an extraordinary professor at the University of Pretoria. His 2017 best-seller Fate of the Nation addresses South Africa's future 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) offer rigorous analyses of the continent as a whole. From August to December 2025, Cilliers was a Richard von Weizsäcker Fellow at the Robert Bosch Academy in Berlin.

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