



# Leapfrogging

## Other Frontier Technologies and Leapfrogging Potential in Africa

Jakkie Cilliers

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There are also many other leapfrogging opportunities arising from technologies that provide alternatives to the costly infrastructure required by traditional development pathways. For instance, drones offer a powerful opportunity to advance precision agriculture in developing countries by enabling farmers to better monitor and respond to variations in crop and livestock production. Compared with conventional remote-sensing systems, drones provide more affordable, accessible agronomic data.

An example is the [Third Eye project](#) in Mozambique, where low-cost drones helped smallholder farmers increase crop yields by 41% while reducing water use by 9%. These outcomes highlight the systemic nature of innovation, combining not just the technology itself but also the training of local drone operators, effective communication of agronomic insights and the widespread use of mobile phones.

Beyond agriculture, drones [can also](#) transform logistics and service delivery in hard-to-reach areas. In Rwanda, the government partnered with the company Zipline to use drones to deliver blood to medical facilities, cutting delivery times from 4 hours to just 15 minutes and helping address maternal mortality.

In Bangladesh, the [Internet of Things](#) is being used to assess groundwater chemistry and protect people in the Ganges Delta from drinking water that is contaminated with arsenic. This lessens the need for investments in the implementation and maintenance of traditional monitoring networks. Small-scale satellites are used in communication networks and applications that rely on high-resolution imagery for land-use monitoring and urban planning. These satellites will soon be affordable for more developing countries, businesses and universities, diminishing the need for investment in more costly and traditional satellite technologies. These examples highlight the potential for leapfrogging by adopting technologies developed elsewhere.

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## About the authors

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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