



# Will Data & AI Cripple or Leapfrog Developing Nations' Growth?

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### **ABOUT THIS REPORT**

This report is part of the Atlantic Council's ongoing endeavor to establish forums, enable discussions about opportunities and challenges of modern technologies, and evaluate their implications for society as well as international relations — efforts that are championed by the newly established *GeoTech Center*. Prior to its formation and to help lay the groundwork for the launch of the Center in March 2020, the Atlantic Council's *Foresight, Strategy, and Risks Initiative* was awarded a *Rockefeller Foundation* grant to evaluate China's role as a global citizen and the country's use of AI as a development tool. The work that the grant commissioned the Atlantic Council to do focused on data and AI efforts by China around the world, included the publication of reports, and the organization of conferences in Europe, China, Africa, and India. At these gatherings, international participants evaluate how AI and the collection of data will influence their societies, and how countries can successfully collaborate on emerging technologies, while putting a special emphasis on the People's Republic in an ever-changing world.

### **THE ATLANTIC COUNCIL GEOTECH CENTER**

Produces events, pioneers efforts, and promotes educational activities on the Future of Work, Data, Trust, Space, and Health to inform leaders across sectors. We do this by:

- Identifying public and private sector choices affecting the use of new technologies and data that explicitly benefit people, prosperity, and peace.
- Recommending positive paths forward to help markets and societies adapt in light of technology- and data-induced changes.
- Determining priorities for future investment and cooperation between public and private sector entities seeking to develop new technologies and data initiatives specifically for global benefit.

**CHAMPIONING POSITIVE PATHS FORWARD THAT NATIONS, ECONOMIES, AND SOCIETIES CAN PURSUE  
TO ENSURE NEW TECHNOLOGIES AND DATA EMPOWER PEOPLE, PROSPERITY, AND PEACE**

## Artificial Intelligence

has the potential to integrate a nexus of technologies enabling digitizing developing nations to leapfrog into a data-centric, knowledge-driven, sustainable growth. But dystopian fears that AI may displace jobs, rob developing economies of the export-growth model key to Asia's economic success, increase industrialized- developing nation inequality, and spur surveillance states have spurred an on-going debate about the impact of AI. Yet early signs show developing nations are rapidly digitizing and thus beginning, on a small scale, to employ AI on disaster relief, precision agriculture, healthcare services, and education. In the decades ahead, one can envision leapfrogging to smart cities, AI-enabled of decentralized development, with villages powered by wind/solar/geothermal renewables with microgrids providing local sources of power to access the internet, use online services, power 3D printed local manufacturing and finding markets around the globe. But this would be a best-case scenario dependent on vastly improved governance, open global data regimes, the right mix of regulatory and investment, environment, transparency, incentivizing local and foreign tech investment, and not least developing the software, the human resources as well to achieve it. This will require the US, leading OECD nations and multilateral development institutions to significantly increase resources in a targeted manner

### DEBATING THE FUTURE

The rise of ever smarter Artificial Intelligence (AI) has sparked a fierce debate about its impact. Tech optimists see AI/Big Data as revolutionizing society -- from creating new jobs to transforming healthcare, education, cybersecurity and transportation. AI pessimists, whose ranks include prominent scientists and technologists such as Stephen Hawking, Elon Musk and Bill Gates fear a dystopia with AI/Big Data displacing jobs, fostering a 1984-like surveillance state, and autonomous robots threatening the very future of humanity. One major concern is that AI will not only foster more inequality in the West, but also may rob developing nations of the investment -driven, export-led growth model that spawned the Asian economic miracle over the past forty years. A fragmenting digital world into distinct, separate regimes (EU, China, US) may exploit and/or deprive data flows on which AI depends.

The fear of a tech-driven, widened Industrialized-developing nation gap, outlined in an Oxford University research project, is that automation will negate developing nations cheap labor advantage. In addition, it is argued, AI will also displace outsourced remote customer call centers that have thrived in places like India and the Philippines for customer services, banking, health, insurance and accounting.<sup>1</sup> Such a tech nightmare is one possible future that may lie over the horizon. But the evidence that the tech revolution will destroy more jobs than it creates is still lacking. For example, the four leading economies that deploy 80% of the world's industrial robots – US, Germany, Japan and China have historically low unemployment, 3.7% in the US, and a 24-year low in Japan of 2.7%.<sup>2</sup> No doubt, automation, artificial intelligence/Big Data is impacting jobs, replacing routine, repetitive, and service jobs such as accounting, legal research, banking and finance. Robots replace specific tasks. Most jobs consist of multiple tasks. In many cases that may mean redefining, rather than eliminating, jobs. But the unprecedented technology revolution now unfolding is still in its early stages.

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<sup>1</sup> <https://www.bbc.com/news/business-47852589>

<sup>2</sup> For a discussion of the impact of robotics see: [https://www.atlanticcouncil.org/wp-content/uploads/2013/07/rising\\_robotics\\_third\\_industrial\\_revolution.pdf](https://www.atlanticcouncil.org/wp-content/uploads/2013/07/rising_robotics_third_industrial_revolution.pdf)

The debate between techno-optimists and techno-pessimists is on-going. The views vary from those arguing that humans will become obsolete to those who speculate that whole new industries will be generated by the “creative-destruction” of AI/Big Data/robotics/the Internet of Things (IoT) that we don’t yet imagine. The Asian-type export growth model for many less developed economies may be limited, if not foreclosed, by technological change. But it is possible that converging technologies enabled by AI – robotics, Big Data, 3D printing, new energy storage capacity – could create new, decentralized models for growth and new industries as globalization continues to change. That emerging technologies are disruptive is clear, but the jury is still out on the ultimate consequences.<sup>3</sup>

Can AI become a fulcrum for sustainable development and innovation in less-developed nations? If so, what sort of policies, investments, governance, and external help would be required for AI to become a tool driving a new wave of developing economies growth? We have already seen technological leapfrogging in Africa, India and elsewhere as the mobile phone revolution (some 1.2 billion in India; 750 million in Africa) and its multiplicity of apps have improved banking, agriculture, and transport, among other things. As digitization becomes more ubiquitous, think of AI as an enabler/synthesizer, more like electricity than a thing. The future will be everything – agriculture, finance, healthcare -- + AI. There is a growing body of evidence that developing nations are building on the mobile phone revolution, leveraging it into more extensive digitization of their societies. This burgeoning connectiveness and trend toward a more data-centric economy is a key foundation for applying AI and cloud computing. Digitization merges the digital with the physical economy, and enables exponential growth, the story of technology over the past quarter-century. This, in turn, holds the potential to be a driver of more inclusive development, though varying in scope and magnitude in particular cases. There is no question that AI can help address one major impediment to sustainable development: governance.

In the decades ahead, one can envision smart cities, and a model of decentralized development, with villages powered by wind/solar/geothermal renewables with microgrids providing local sources of power to access the internet, use online services, power 3D printed local manufacturing and finding markets around the globe. Farmers could vastly improve productivity and reduce water use with precision agriculture, while farm-to-table could have a new meaning with vertical agriculture providing food to cities.

### **INDIA’S DIGITAL TRANSFORMATION**

The most prominent examples of pioneering digitization in the developing world are India, and in Africa, Kenya, though a number of African nations are not far behind. India, starting from a globally competitive, advanced tech sector, particularly in software, has seen an explosive, transformational digitization and already is a major player in the global knowledge economy. Delhi’s launching of the Aadhaar biometric digital ID program in 2009, has enrolled in 1.2 billion Indians in digital IDs, a twelve-digit number based on biometric, demographic and fingerprint data. For a connected nation, for some 600 million Indians with internet subscriptions and some 700 million smartphones, the Aadhaar program is providing assured, verifiable and relatively secure proof of identification. It set the stage for an almost overnight transformation, widening

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<sup>3</sup> <https://www.wsj.com/articles/will-ai-destroy-more-jobs-than-it-creates-over-the-next-decade-11554156299>

inclusion into the financial system.<sup>4</sup> Suddenly, in the poorest rural villages, social services – pensions, food rations, welfare, farm subsidies were directly transferred to recipients. Tens of millions had previously lacked any official ID; They could now open bank accounts enabled by direct payments, transfer payments -- person to-person, business-to-business, and business-to-government, as a national goods and services tax (superseding unwieldy federal states and unions taxes) led the government to create a common digital platform with 10 million businesses accessing it.<sup>5</sup>

Apart from reducing transaction costs, this digitization reduces opportunities for corruption fraud and theft. An independent survey in 2018, said that 82% of public benefits disbursed were linked to Aadhaar.<sup>6</sup> By February 2018, almost 870 million bank accounts were linked to Aadhaar, according to a government website.<sup>7</sup> While Aadhaar's flaws, vulnerabilities and risks should not be discounted, clearly this catalytic leap in e-governance has opened major economic opportunities for growth.

A comprehensive McKinsey report projects that by 2025 core digital sectors (IT, digital process and communication services and electronics manufacturing) could double their GDP level to \$355bil-\$435 bil. Moreover, emerging digitized sectors, including healthcare, agriculture and financial services, could create up to \$150 billion in value by 2025.<sup>8</sup> If such potential is realized, the McKinsey study says, the digital economy could create 60-65 million new jobs by 2025. However, at the same time, it projects that retraining will be necessary to assist from 40-45 million workers whose jobs could be lost or altered.<sup>9</sup> This challenge of creative destruction" underscores the downside risk of AI-driven digital transformation and exponential change.

### **KENYA'S DIGITAL TRANSFORMATION**

Kenya appears on the leading edge of a number African states beginning to leverage the mobile phone revolution into a foundation to more broadly digitize society, albeit far less comprehensively than India. In the Kenyan case, since 2007, a partnership between a mobile payment app, M-Pesa, a telco provider and a commercial bank turned cash into e-money stored on SIM cards while recording them into a trust bank

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<sup>4</sup> <https://www.mckinsey.com/~media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/digital%20india%20technology%20to%20transform%20a%20connected%20nation/digital-india-technology-to-transform-a-connected-nation-full-report.ashx>

<sup>5</sup> <https://www.mckinsey.com/~media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/digital%20india%20technology%20to%20transform%20a%20connected%20nation/digital-india-technology-to-transform-a-connected-nation-full-report.ashx>

<sup>6</sup> <https://www.cgdev.org/event/digital-identities-and-state-aadhaar>

<sup>7</sup> <https://stateofaadhaar.in/>

<sup>8</sup> <https://www.mckinsey.com/~media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/Digital%20India%20Technology%20to%20transform%20a%20connected%20nation/MGI-Digital-India-Exec-summary-April-2019.ashx>

<sup>9</sup> <https://www.mckinsey.com/~media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/Digital%20India%20Technology%20to%20transform%20a%20connected%20nation/MGI-Digital-India-Exec-summary-April-2019.ashx>

account. This enabled the funds to be transferred people-to-people or to business, business-to-business, etc, thus providing millions of Kenyans access to and inclusion in the formal financial services system.<sup>10</sup>

While this digitization has been largely limited to the financial services sector, Kenya now has become a world leader in mobile payments. The initial prospect of e-transfers not requiring a bank account (only a phone number required) has developed into networks of agents, integrated with banks and other financial institutions processing cash-to-SIM cards and transactions. This has shrunk cash transfers, lowered costs and provided a safer, transparent way of doing business.

Over the past fourteen years, the total amount of adults participating in formal bank and financial services jumped from 26.4% in 2006 to 83% in 2019, while the amount of those excluded from financial services fell from 38% to 11%. By 2017, 82% of Kenyans were included in the financial system.<sup>11</sup> Digital technology has begun to be employed to delivering social services in Kenya, though less extensively than in India. The Kenyan government has been incrementally pursuing wider e-governance since 2002. Creating an adequate legal, regulatory and accountable institutional framework is a work-in-progress. How to parlay successful digitization beyond the financial sector and foster a dynamic innovation ecosystem that can drive economic growth is a long-term challenge. Digitization is a necessary, but not sufficient underpinning for fostering a successful innovation ecosystem.

One caveat is the risk of growing techno-nationalism and a trend toward digital protectionism. This could result in significant competitive disadvantage for less-developed nations with regard to access to and choice of advanced equipment and infrastructure as well as facing constraints on the flow of data (and therefore, AI) and/or exploitation of their data by a fragmented set of digital regimes.

### AI AT WORK IN DEVELOPING NATIONS

While the breadth and scope of social and economic digital transformation in Kenya stands out, a host of other African nations -- including South Africa, Uganda, Ghana, Nigeria and Rwanda -- appear on a similar course. In all of these countries, digitized financial inclusion has reached 50% or higher.<sup>12</sup>

There are already signs that AI could have a transformational impact on developing countries *writ large*. This can be discerned from Cloud-based current AI applications for disaster relief, healthcare, agriculture, as well as finance/fintech. Moreover, local tech hubs (a workspace with incubators to aid startups) are sprouting up across the developing world – 618 to date across Africa – from Lagos, Dakar, Nairobi, Cairo and Cape Town -- suggesting a foundation and prospective source for AI applications.<sup>13</sup> Ethiopia for example has launched a

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<sup>10</sup> For a comprehensive view of this process and assessment of its impact, see: <https://www.cgdev.org/sites/default/files/digital-technology-and-state-capacity-kenya.pdf>

<sup>11</sup> <https://www.cgdev.org/sites/default/files/digital-technology-and-state-capacity-kenya.pdf>

<sup>12</sup> <https://www.cgdev.org/sites/default/files/digital-technology-and-state-capacity-kenya.pdf>

<sup>13</sup> <https://www.forbes.com/sites/tobyshapshak/2019/07/11/africas-booming-tech-hubs-are-backbone-of-tech-ecosystem-having-grown-40-this-year/#41b562cf24c2>

multi-billion tech initiative, and a leading AI software developer iCog, has produced an array of apps facilitating development.<sup>14</sup> While past performance is no guarantee of future success, there are encouraging signs.

One example is enabling predictive models for disaster relief, which are likely to soon also apply to hurricanes and floods. Using drones, Big Data and geospatial mapping, first responders can analyze and prioritize where to distribute supplies, and governments can better scope out reconstruction needs. This is what occurred in Nepal in the aftermath of a 2015 earthquake, as drones assessed in real time the location and the magnitude and locale of destruction, and mapped the distribution of emergency supplies. Similarly, AI is also aiding relief agencies and NGOs to better manage and prioritize the delivery of supplies to refugees fleeing conflict zones.

AI is also proving to be a powerful tool for rural areas in less developed countries to overcome the disadvantages of distance in accessing services. One case in point is Rwanda where a Silicon Valley start partnering with its health ministry allows drones to deliver medical supplies and blood on short notice to isolated rural areas. Combined with mobile phones, AI can process large amounts of data to digitize health data, aid physicians with diagnosis, and predict and model the spread of disease. Telemedicine can be a force multiplier, extending the reach of doctors and medical services to remote areas.

Together with energy services, education is a key enabler of development. AI can have a multiplier effect by providing online tutoring and educational services to isolated areas lacking in teachers and books. Online classes and e-textbooks at the secondary level can be offered from teachers in Lagos, Dakar or Dar es Salaam, increasing exponentially the reach of education services.

And not least, AI has begun to make a big difference for farmers in India and elsewhere. AI has begun to enable 'smart' agriculture from AI, connecting farmers with markets and allowing farmers in real time to monitor, soil conditions, fertilizer needs and to optimize planting and harvesting. Better information has helped farmers in India to increase crop yields and more efficiently market their produce. The deployment of 5G cellular networks, which will enable inexpensive sensors to operate an Internet of Things (IoT) will facilitate the use of smart farming still more.

Moreover, with 60% of the world's population living in cities, vertical farming -- growing produce in hundreds of vertically stacked layers in indoor facilities hydroponically -- could provide be a source of sustainable, local food, create jobs and reduce GHG emissions in African and Asian megacities. This farming technology has already made the tiny Netherlands a leading global food exporter.

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<sup>14</sup> [https://www.huffpost.com/entry/artificial-intelligence-c\\_b\\_8043974?](https://www.huffpost.com/entry/artificial-intelligence-c_b_8043974?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS91cmw_c2E9dCZyY3Q9aiZxPSZlc3JjPXMmc291cmNIPXdlYiZjZD0xJnZlZD0yYWhVS0V3aUwwNjNOcm9Ya0FoV3dtdUFLSfc3VkeXa1FGakFBZWdRSUFsQUlmdXJsPWWhOdHBzJTnBJTJGd3d3Lmh1ZmZwb3N0LmNvbSUYRmVudHJ5JTJGYXJ0aWZpY2lhbC1pbmRlbGxpZ2VuY2UtY19iXzgwNDM5NzQmdXNnPUFPdlZhdzJCSm11emMxX0JoU1Rp eURaaGozYzc&guce_referrer_sig=AQAAABMoFpO3wTOTmHchumHvXpNF6UsJEP3PpFJJu1JBuWhbdo_QR1UghMB2_GuRR6RuEr33QP Jbqi5QjPUSGviPT9bdFGXj8Pln5_5t_nrwjJaaWcY0KOGHOzsng7MbxtFttJwhO_cS_NhHCLIQrbYqh19nWntRrtFVzP9950ZonoD)

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However, such a best-case scenario is unlikely under current circumstances, regardless of available technologies. Realizing such potential is a generational project that requires good governance, the right mix of policies, regulatory and investment, environment, transparency, incentivizing local and foreign tech investment, and broadening connectivity. In Ethiopia today, for example, despite its emphasis on a Hitech future, as of 2019, less than 5% of its 105 million citizens have access to the internet.

Key impediments to a future realizing tech potential are connectivity, fragmented data regimes, reliable energy, and not least, a persistent shortage of talent, developed human resources to deploy and advance AI. The fragmenting of data into three distinct digital regimes – EU (GDPR), China, and the US) may pose a structural impediment restricting or exploiting less-developed nations data. Better governance is only part of the solution. Obtaining the resources to achieve such goals requires help. Achieving the desired outcome of sustainable development harnessing the opportunities of the tech revolution now unfolding will necessarily be a protracted, incremental process, with nations responding to these challenges based on their own circumstances and capabilities.

Another important factor shaping developing nations efforts to harness emerging technologies to advance development is the international environment in which they must operate. Present trends suggest a problematic future for the international policies and institutions that enabled the generations of prosperity in the post WW2 world. It is an economic and political system that is fragmenting in the face of growing nationalism and major power competition. For example, the fate of the World Trade Organization is uncertain, with nationalism and protectionism threatening an open, rules-based economic system. The reality of Big Tech, particularly US and Chinese also may be a negative factor complicating the efforts of developing nations to create viable innovation ecosystems. Whether from brain drains, siphoning off top scientists and engineers, acquiring promising startups, or being magnets for venture capital, Big Tech may well complicate developing nations innovation efforts. In the case of China, evidence suggests that the distortions from its mercantilist trade and industrial policies can shrink markets, and stifle innovation in developing countries, as subsidized Chinese firms flood local markets with IT.<sup>15</sup>

The Bretton Woods (World Bank, IFC, IMF, WTO, ADB, Inter-American Development Bank) institutions continue to be a critical source of knowledge, training, resource flows, and the software of development for less developed economies. Yet it is at best, unclear whether the global leadership and commitment to sustain, adequately resource and adapt these institutions to current challenges will be sufficient. To foster an economic environment conducive to developing nations succeeding in ascending from current stages of digitization to have the wherewithal to successfully adapt emerging tech and develop tech hubs and innovation ecosystems will require a coordinated global effort. A top priority should be a sustained, coordinated effort from all the above-mentioned economic actors to help to help create the software, specifically, the human capital, for sustainable growth and knowledge economies. Educating and training developing nation technologists, engineers and scientists, facilitating connectivity to lay the basis for success is a *sine qua non*. The other side of the bargain is developing nations adopting the enabling policies and accountable governance to absorb assistance. Clearly it will be a marathon, not a sprint, but the technology revolution offers an opportunity to catapult developing economies forward.

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<sup>15</sup> <https://itif.org/publications/2020/01/06/innovation-drag-chinas-economic-impact-developed-nations>

**ACTION POINTS**

- The BUILD Act, integrating US aid and development finance agencies, focused on incentivizing private sector investment, **positions the US to lead**, working with OECD nations, multilateral banks and the Tech and Venture Capital industry to advance the deployment of AI for sustainable development;
- The G-20 should mandate fostering the conditions for AI accelerating sustainable development as a priority for multilateral institutions and public/private partnerships to facilitate less developed nations in creating the capacity to move ahead;
- These efforts should be bottom-up, not top down, drawing on the tenets and procedures of the Millennium Challenge Corporation (MCC), with plans drawn up by recipient nations, strict, graded criteria for disbursing funds, emphasis on grants, to limit debt problems;
- G-7 nations (and China, if possible) should promote public-private partnerships with the tech and VC sectors to train talent and provide seed capital for startups on less-developed nations.



### ABOUT THE AUTHOR

Robert A. Manning is a senior fellow with the Scowcroft Center for Strategy and Security and its Strategic Foresight Initiative at the Atlantic Council. Previously, he served as a senior Strategist at the National Counterproliferation Center in the Office of the Director of National Intelligence (ODNI) from 2010 to 2012, and as the director of long-range energy and regional/global affairs at the US National Intelligence Council's Strategic Futures Group from 2008 to 2010. From 2005 to 2008, Manning served as a member of the US Secretary of State's Policy Planning Staff, and from 2001 to 2005, he was senior counsellor for energy, technology, and science policy at the US Department of State, where he advised the Under Secretary of State for Global Affairs and other senior officials on a range of issues including energy and climate change policy and new energy technologies. From 1997 to 2001, he was director of Asian studies and a senior fellow at the Council on Foreign Relations (CFR). He led several CFR task forces, including the Korea Task Force and the Southeast Asia Task Force among others. Manning was previously an adviser for policy and public diplomacy to the assistant secretary of State for East Asian and Pacific affairs at the State Department and served as an adviser to the Office of the Secretary of Defense from 1988 to 1989.

His publications include *The Asian Energy Factor* (Palgrave/St. Martins 2000) and *China, Nuclear Weapons and Arms Control*. He has published essays on nuclear weapons; numerous journal articles on international energy and Asian security issues; and roughly half a dozen book chapters in edited volumes on China, Korea, Japan, regional security architecture, energy, and energy security. He has published widely in *Foreign Affairs*, *Foreign Policy*, *the National Interest*, *the New York Times*, *the Washington Post*, *the Los Angeles Times*, *Chosun Ilbo*, and other publications.

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