

Break Down the Borders: Using Technology to Reunite Africa for Trade, Innovation, Climate Justice and Sustainable Development

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Table of Contents	
Abstract.....	3
1.0 Introduction	3
2.0 Role of Technology in Trade, Innovation, Climate Justice and Sustainable Development	5
3.0 Using Technology to Reunite Africa for Trade, Innovation, Climate Justice and Sustainable Development	8
4.0 Conclusion	12
References	14

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Kariuki Muigua*

Abstract

This paper discusses how Africa can appropriately harness and use technology for Sustainable Development. The paper posits that technology has the capacity to (re)unite Africa by spurring continental progress and innovation across key sectors including trade, environmental governance and climate action in pursuit of Sustainable Development. Despite its ability to accelerate economic, social and environmental development priorities in Africa, the paper observes that Africa faces several challenges in harnessing and utilising technology. It argues that failure to effectively harness technology in Africa undermines Sustainable Development. As a result, the paper argues that it is imperative to enhance Africa's capacity in technology towards achieving the continent's development agenda. The paper suggests how technology can be appropriately developed, adopted and utilised in Africa for trade, innovation, climate justice and Sustainable Development.

1.0 Introduction

The rapid growth of technology provides opportunities to spur human progress and development. It has been observed that when effectively leveraged, technology can accelerate progress at an individual, organizational, national and global level¹. Technology is fuelling innovation and progress across key sectors including healthcare, education, agriculture, energy, finance, environmental governance, trade and

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¹ Institute of Sustainability Studies., 'The Role of Technology in Sustainable Development' Available at <https://instituteofsustainabilitystudies.com/insights/guides/the-role-of-technology-in-sustainable-development/> (Accessed on 30/03/2026)

communications thus fostering progress towards Sustainable Development². Technology is deemed vital to catalyzing innovation; promoting industrial and economic growth; and effecting social changes and human development to improve lives³.

Technology is therefore crucial in unlocking Sustainable Development. It has been argued that access to modern, efficient, reliable and sustainable technology is directly correlated with economic, social, and environmental productivity⁴. The United Nations *2030 Agenda for Sustainable Development*⁵ recognizes the role of technology in realizing the Sustainable Development Goals (SDGs) including achieving food security; promoting good health and well-being; fostering access to affordable and clean energy; building resilient infrastructure, promoting inclusive and sustainable industrialization, fostering innovation and confronting climate change⁶. SDG 17 recognizes that the Sustainable Development agenda can only be realized through strong global partnerships and cooperation on a number of areas including technology development and transfer⁷.

It is therefore evident that technology is a transformative tool that can foster human progress and development. However, it has been observed that inequalities in access and use of technology undermine progress towards Sustainable Development⁸. In particular,

² Technology and Sustainable Development: The Promise and Pitfalls of Techno-Solutionism., Available at https://www.researchgate.net/publication/369730929_Technology_and_Sustainable_Development_The_Promise_and_Pitfalls_of_Techno-Solutionism (Accessed on 30/03/2026)

³ United Nations Economic Commission for Africa., 'Advancing Technology Transfer for Sustainable Development in Africa' Available at https://www.uneca.org/sites/default/files/TCND/STIF2023/Advancing_Technology_Transfer.pdf (Accessed on 30/03/2026)

⁴ African Development Bank Group., 'Technology Transfer for Green Growth in Africa' Available at <https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/African%20Development%20Report%202012%20-%20Technology%20Transfer%20for%20Green%20Growth%20in%20Africa.pdf> (Accessed on 30/03/2026)

⁵ United Nations General Assembly., 'Transforming Our World: the 2030 Agenda for Sustainable Development.' 21 October 2015, A/RES/70/1., Available at <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf> (Accessed on 30/03/2026)

⁶ Ibid

⁷ Ibid

⁸ African Development Bank Group., 'Technology Transfer for Green Growth in Africa' Op Cit

Africa and the Global South face challenges in developing, acquiring and utilising modern technologies undermining their social, economic and environmental development imperatives⁹. Consequently, enhancing access, development, transfer and use of technology in Africa and the Global South is vital towards Sustainable Development¹⁰.

This paper discusses how Africa can appropriately harness and use technology for Sustainable Development. The paper posits that technology has the capacity to (re)unite Africa by spurring continental progress and innovation across key sectors including trade, environmental governance and climate action in pursuit of Sustainable Development. Despite its ability to accelerate economic, social and environmental development priorities in Africa, the paper observes that Africa faces several challenges in harnessing and utilising technology. It argues that failure to effectively harness technology in Africa undermines Sustainable Development. As a result, the paper argues that it is imperative to enhance Africa's capacity in technology towards achieving the continent's development agenda. The paper suggests how technology can be appropriately developed, adopted and utilised in Africa for trade, innovation, climate justice and Sustainable Development.

2.0 Role of Technology in Trade, Innovation, Climate Justice and Sustainable Development

Technology is enhancing global trade by providing numerous benefits including efficiency, cost-reduction, access to global and regional markets and the growth of digital commerce¹¹. The World Trade Organization (WTO) observes that technological

⁹ United Nations Economic Commission for Africa., 'Advancing Technology Transfer for Sustainable Development in Africa' Op Cit

¹⁰ Ibid

¹¹ World Trade Organization., 'The Impact of Digital Technologies on Developing Countries' Trade' Available at https://www.wto.org/english/res_e/booksp_e/05_adtera_chapter_01_e.pdf (Accessed on 30/03/2026)

advancements in the past decades have significantly impacted how goods, services and information are bought, sold and exchanged¹². For instance, modern technologies such as Artificial Intelligence (AI) are being integrated into various trade-related processes in order to reduce logistical barriers, optimize supply chains, save trade-related costs, and enhance access to digital services¹³. In particular, technology has led to the digitalization of global trade enhancing efficiency and inclusivity¹⁴. Technology is enabling digital trade which entails trade in goods and services through the internet, and other Information and Communication Technologies (ICT)¹⁵. It has been observed that digitalisation increases the scale, scope and speed of trade¹⁶. It allows firms to bring new products and services to a larger number of digitally-connected consumers across the globe¹⁷. Harnessing technology is therefore key towards fostering global and regional integration through trade.

In addition technology is enabling innovation through the application of novel and modern solutions across various sectors to improve efficiency, create value and boost competitiveness¹⁸. It has been observed that technology is at the heart of innovation since it leads to the emergence of new methods, products, services, and solutions that have

¹² Ibid

¹³ World Trade Organization., 'Trading with Intelligence: How AI shapes and is shaped by international trade' Available at https://www.wto.org/english/res_e/publications_e/trading_with_intelligence_e.htm (Accessed on 30/06/2026)

¹⁴ World Economic Forum., 'TradeTech is revolutionizing global trade' Available at <https://www.weforum.org/impact/revolutionizing-global-trade-through-technological-transformation/#:~:text=Technology%20is%20playing%20a%20pivotal,solutions%20into%20global%20supply%20chains.> (Accessed on 30/03/2026)

¹⁵ European Commission., 'Digital Trade Agreements' Available at https://policy.trade.ec.europa.eu/help-exporters-and-importers/accessing-markets/goods-and-services/digital-trade/digital-trade-agreements_en#:~:text=What%20are%20Digital%20Trade%20Agreements,safe%20online%20environment%20for%20consumers (Accessed on 30/03/2026)

¹⁶ Organisation for Economic Co-operation and Development., 'Digital Trade' Available at <https://www.oecd.org/trade/topics/digital-trade/> (Accessed on 30/03/2026)

¹⁷ Ibid

¹⁸ United Nations., 'Science, Technology and Innovation' Available at <https://www.un.org/osaa/content/science-technology-and-innovation> (Accessed on 30/03/2026)

positive impacts and value on people and planet¹⁹. Technological innovation has been identified as the engine of human progress and development²⁰. Technological innovation in healthcare, energy, agriculture, transport, industrialization and waste management among other sectors, is providing effective solutions that foster economic productivity and social well-being while reducing negative environmental impacts²¹.

When harnessed appropriately, technology can also foster climate justice. For example, technological advancements such as renewable energy solutions and carbon-capture and storage are strengthening climate mitigation efforts²². In addition, technology has led to the development of early-warning systems and climate-resilient crop varieties thus strengthening climate mitigation efforts²³. Technology therefore plays an important role in the pursuit of climate justice by enabling the world to adequately prepare, respond and recover from climate change and its impacts. It has been observed that climate technology enables humanity to reduce greenhouse gas emissions and adapt to the adverse effects of climate change²⁴. Through this, technology can spearhead climate justice by empowering humanity to optimize resources including energy and monitor environmental changes while also protecting vulnerable communities from the adverse effects of climate change²⁵.

¹⁹ Jain. N., 'What is Innovation? Definition, Types, Examples and Process' Available at <https://ideascale.com/blog/what-is-innovation/> (Accessed on 30/03/2026)

²⁰ Organisation for Economic Co-operation and Development., 'Technology Policy' Available at <https://www.oecd.org/en/topics/technology-policy.html> (Accessed on 30/03/2026)

²¹ Silvestre. B., & Tirca. D., 'Innovations for Sustainable Development: Moving towards a Sustainable Future.' *Journal of Cleaner Production*, 2018

²² Climate and Technology., Available at <https://ecasiafrica.org/climate-and-technology/> (Accessed on 30/03/2026)

²³ Ibid

²⁴ United Nations Climate Change., 'What is technology development and transfer?' Available at <https://unfccc.int/topics/climate-technology/what-is-technology-development-and-transfer> (Accessed on 30/03/2026)

²⁵ Pan African Climate Justice Alliance., 'Empowering a Sustainable Future: The Role of Information and Communication Technology (ICT) and Innovation in Combating Climate Change' Available at https://pacja.org/david-richard-komu-empowering-a-sustainable-future-the-role-of-information-and-communication-technology-ict-and-innovation-in-combating-climate-change/#:~:text=ICT%20can%20also%20help%20with:%20*%20**Precise,everyone%20has%20equitable%20access%20to%20these%20technologies. (Accessed on 30/03/2026)

Technology therefore plays a key role in unlocking Sustainable Development. Technology unlocks innovation, boosts efficiency, enhances access to goods and services and improves environmental governance by enabling humanity to tackle challenges such as climate change and biodiversity loss²⁶. Due to its vital role for people and planet, it is imperative to use technology for trade, innovation, climate justice and Sustainable Development in Africa.

3.0 Using Technology to Reunite Africa for Trade, Innovation, Climate Justice and Sustainable Development

Due to its potential to spur trade, innovation and climate justice, it has been correctly noted that the pursuit of Sustainable Development in Africa depends on how the continent harnesses and enhances its capacity on technology²⁷. In particular, it has been observed that technology can foster regional integration through trade in Africa²⁸. For instance, digital trade can connect African economies and markets with each other and reduce the physical and administrative barriers that undermine trade in the continent²⁹. Technology provides a platform for marginalized segments of the African population including women, the youth and Micro, Small and Medium enterprises (MSMEs) to actively participate in regional trade through access to online trading platforms, availability of financial platforms that facilitate cross-border payments and ability to market their products and services throughout the continent³⁰.

Technology provides immense opportunities to reunite Africa for trade under the African Continental Free Trade Area (AfCFTA). It has been observed that AfCFTA creates the

²⁶ United Nations Economic Commission for Africa., 'Advancing Technology Transfer for Sustainable Development in Africa' Op Cit

²⁷ Ibid

²⁸ United Nations Economic Commission for Africa., 'Overview of Africa's digital trade performance and trends' Available at https://indico.un.org/event/1020893/attachments/24247/69075/1st%20UNECA_Module%201_Digital%20Trade%20in%20Africa%20Foundations_EN.pdf (Accessed on 30/03/2026)

²⁹ Ibid

³⁰ Ibid

Break Down the Borders: Using Technology to Reunite Africa for Trade, Innovation, Climate Justice and Sustainable Development

world's largest free trade area and a single market for goods and services worth over \$3.4 trillion for more than 1.3 billion Africans³¹. The United Nations observes that the successful implementation of the AfCFTA will lead to the creation of more decent jobs, improved welfare and better quality of life for all citizenry, and Sustainable Development in Africa³². In particular, the *AfCFTA Protocol on Digital Trade*³³ seeks to support the attainment of the objectives of the AfCFTA by establishing harmonized rules and common principles and standards that enable and support digital trade for sustainable and inclusive socio-economic development, regional integration and the digital transformation of Africa³⁴. The Protocol seeks to *inter alia* ensure trusted, safe, ethical, and responsible adoption and regulation of the use of emerging and advanced technologies to support and promote digital trade for regional integration and Sustainable Development in Africa³⁵. In addition, it establishes harmonised digital trade rules and principles which can lower transaction costs, enhance access to regional markets, and stimulate digital entrepreneurship³⁶. It has been pointed out that the AfCFTA Protocol on Digital Trade can enable African countries to harness the transformative power of technology for economic development and regional and international competitiveness³⁷. By creating a harmonised and robust framework, the Protocol reduces barriers to trade,

³¹ United Nations., 'Africa's Free Trade on Track, More Efforts Needed.' Available at [https://www.un.org/africarenewal/magazine/january-2023/africa%E2%80%99s-free-trade-track-moreefforts-needed#:~:text=lies%20ahead%2C%20though.-,Presently%2C%20intra%20Africa%20trade%20stands%20low%20at%20just%2014.4%25%20of,day\)%2C%20according%20to%20UNCTAD](https://www.un.org/africarenewal/magazine/january-2023/africa%E2%80%99s-free-trade-track-moreefforts-needed#:~:text=lies%20ahead%2C%20though.-,Presently%2C%20intra%20Africa%20trade%20stands%20low%20at%20just%2014.4%25%20of,day)%2C%20according%20to%20UNCTAD) (Accessed on 30/03/2026)

³² United Nations., 'AU Summit 2023: Powering Trade through AfCFTA' Available at <https://www.un.org/africarenewal/magazine/february-2023/au-summit-2023-powering-trade-through-afcfta> (Accessed on 30/06/2026)

³³ Protocol to the Agreement Establishing the African Continental Free Trade Area on Digital Trade., Available at https://www.bilaterals.org/IMG/pdf/afcfta_digital_trade_protocol_-_9_february_2024_draft.pdf (Accessed on 30/03/2026)

³⁴ Ibid, article 2

³⁵ Ibid, article 2 (2)

³⁶ Stuart. J., 'The Digital Trade Protocol of the AfCFTA and Digitally-Driven Development in Africa' Available at <https://www.tralac.org/blog/article/16306-the-digital-trade-protocol-of-the-afcfta-and-digitally-driven-development-in-africa.html> (Accessed on 30/03/2026)

³⁷ State Department for Industry., 'Brief on Kenya as the AfCFTA Digital Trade Champion' Available at https://www.industrialization.go.ke/sites/default/files/2024-02/BRIEF%20ON%20KENYA%20AS%20THE%20AfCFTA%20DIGITAL%20TRADE%20CHAMPION_0.pdf (Accessed on 30/03/2026)

promoting a more efficient and interconnected continental marketplace³⁸. This in turn promotes digital inclusion, generates sustainable and inclusive economic growth, stimulates economic activity, encourages innovation, supports cross-border trade, generates sustainable and inclusive economic growth, attracts foreign investment, stimulates job creation, reduces inequality, and subsequently eradicates poverty³⁹. Implementing the AfCFTA Protocol on Digital Trade therefore provides numerous opportunities to use technology to reunite Africa for trade.

Technology can also reunite Africa through innovation. For instance, the *Digital Transformation Strategy for Africa*⁴⁰ acknowledges that technology and the digital transformation are a driving force for innovative, inclusive and sustainable growth in Africa⁴¹. The Strategy notes that technology is enabling innovation and digitalization which are stimulating job creation and contributing to addressing poverty, reducing inequality, facilitating the delivery of goods and services, and contributing to the achievement of African Union's Agenda 2063 and the SDGs⁴². According to the Strategy, harnessing technology and innovation can transform African societies and economies towards promoting Africa's integration, generating inclusive economic growth, stimulating job creation, breaking the digital divide, and eradicating poverty for the continent's socio-economic development⁴³. In particular, it has been observed that technology is enabling innovation in Africa and transforming key sectors including healthcare, finance, education, employment and environmental governance⁴⁴.

³⁸ Ibid

³⁹ Ibid

⁴⁰ African Union., 'The Digital Transformation Strategy for Africa (2020-2030)' Available at <https://au.int/sites/default/files/documents/38507-doc-dts-english.pdf> (Accessed on 30/03/2026)

⁴¹ Ibid

⁴² Ibid

⁴³ Ibid

⁴⁴ United Nations Educational, Scientific and Cultural Organization., 'Harnessing emerging technologies for sustainable development in Africa, including through the implementation of the Recommendation on the Ethics of AI' Available at <https://www.unesco.org/en/articles/harnessing-emerging-technologies-sustainable-development-africa-including-through-implementation> (Accessed on 30/03/2026)

Technology therefore provides opportunities to reunite and transform Africa through innovation.

In addition, technology is also at the heart of climate justice in Africa. It has been observed that despite having the least greenhouse gas emissions when compared to other regions, Africa stands out disproportionately as the most vulnerable region in the world to climate change and its impacts⁴⁵. Climate change is impacting food and water security, ecosystems and economies, fueling displacement and migration and worsening the threat of conflict over dwindling natural resources in Africa⁴⁶. Confronting climate change in Africa is therefore a matter of justice, equity and fairness. It has been argued that optimizing the benefits of technology is an increasing priority for the governments and the people of Africa in order to achieve sound environmental governance by tackling environmental threats including climate change, biodiversity loss and pollution towards Sustainable Development⁴⁷. In particular, technology provides Africa with an opportunity to strengthen climate action by de-coupling economic growth from greenhouse gas emissions and environmental pollution⁴⁸. By developing, deploying and utilising green technologies, it is possible to foster climate justice in Africa through mitigating and adapting to the worst effects of climate change and building resilient and sustainable societies⁴⁹. By using technology, it is possible to strengthen climate mitigation and adaptation through clean energy solutions, energy-efficient practices, carbon capture

⁴⁵ United Nations Environment Programme., 'Responding to Climate Change' Available at <https://www.unep.org/regions/africa/regional-initiatives/responding-climate-change> (Accessed on 30/03/2026)

⁴⁶ World Meteorological Organization., 'Africa suffers disproportionately from climate change' Available at <https://wmo.int/media/news/africa-suffers-disproportionately-from-climate-change> (Accessed on 30/03/2026)

⁴⁷ The African Manifesto for Science, Technology and Innovation., Available at <https://atpsnet.org/wp-content/uploads/2017/05/the-african-manifesto-for-sti.pdf> (Accessed on 30/03/2026)

⁴⁸ Ibid

⁴⁹ African entrepreneurs lead the way in climate change adaptation., Available at <https://www.wipo.int/en/web/wipo-magazine/articles/african-entrepreneurs-lead-the-way-in-climate-change-adaptation-39782#:~:text=Aspirations%20to%20go%20nationwide,Nabunya%20says.> (Accessed on 30/03/2026)

and storage, early warning systems and drought-resistant crops towards climate justice⁵⁰. It is therefore imperative to embrace technology in order to foster climate justice in Africa.

Technology therefore provides opportunities to reunite Africa for trade, innovation, climate justice and Sustainable Development. However, it has been observed that challenges such as inadequate human and institutional capacity, social factors that inhibit change, inadequate financial resources to purchase, operate, and maintain new technologies, and higher initial capital costs in the case of some technology options undermine the ability and capacity of Africa to effectively harness technology for Sustainable Development⁵¹. It is imperative to address these challenges in order to effectively harness technology towards reuniting Africa for trade, innovation, climate justice and Sustainable Development.

4.0 Conclusion

Technology is an effective solution towards reuniting Africa for trade, innovation, climate justice and Sustainable Development. However, barriers in developing, accessing and utilising technology undermines the capacity of Africa to pursue Sustainable Development. In light of these challenges, the 2030 Agenda for Sustainable Development encourages states to enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation for Sustainable Development⁵². In addition, SDG 17 urges developed countries to promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed in order to bolster their capacity to achieve

⁵⁰ Climate and Technology., Op Cit

⁵¹ Intergovernmental Panel on Climate Change., 'The International Dimension in Technology Development and Deployment: Technology Transfer' Available at https://archive.ipcc.ch/publications_and_data/ar4/wg3/en/ch2s2-7-3.html (Accessed on 30/03/2026)

⁵² United Nations General Assembly., 'Transforming Our World: the 2030 Agenda for Sustainable Development.' 21 October 2015, A/RES/70/1., Op Cit

Sustainable Development⁵³. It is therefore imperative to strengthen technology development and transfer in Africa for trade, innovation, climate justice, and Sustainable Development. It has been observed that funding, research and development is crucial towards bolstering the capacity of Africa to harness modern technologies for Sustainable Development⁵⁴. Further, in light of greater emphasis on regional integration as envisaged under African Union's Agenda 2063, there is need for collaboration among states and the private sector in Africa towards developing, acquiring and utilising technologies that align with the continent's economic, social and environmental development priorities⁵⁵.

Harnessing and utilising technology is therefore a key prerogative towards reuniting Africa for trade, innovation, climate justice and Sustainable Development. It is imperative to pursue this ideal for people and planet.

⁵³ Ibid

⁵⁴ United Nations Economic Commission for Africa., 'Mechanisms to Promote Development and Dissemination of Clean and Environmentally Sound Technologies in Africa' Available at <https://sustainabledevelopment.un.org/content/documents/1247eca.pdf> (Accessed on 30/03/2026)

⁵⁵ African Union., 'The Digital Transformation Strategy for Africa (2020-2030)' Op Cit

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[innovation-in-combating-climate-change/#:~:text=ICT%20can%20also%20help%20with:%20*%20**Precise,everyone%20has%20equitable%20access%20to%20these%20technologies](#)

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Break Down the Borders: Using Technology to Reunite Africa for Trade, Innovation, Climate Justice and Sustainable Development

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