

The GLOCEPS

Weekly Influential Brief

Research and Analysis in Development Pillar

Advancing Digital Equity: The Impact of Satellite Internet on East Africa's Connectivity Landscape

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Photo credit: innovation-village.com

Executive Summary

East Africa faces significant challenges in expanding internet connectivity, especially for rural and remote areas where millions lack access to reliable internet. An in-depth analysis of the digital divide in the region reveals that structural challenges such as fragmented regulatory frameworks, high infrastructure costs, and limited digital literacy impede accelerated expansion. This results in restricted opportunities for economic development, social inclusion, and access to essential services such as education and healthcare.

Enhanced internet connectivity is imperative for resolving the unemployment challenge and the

youth bulge phenomena in East Africa. Tech-savvy youth can benefit from improved and reliable internet connectivity as it can accelerate their engagement in digital economy. Likewise, bridging the digital divide can reverse rural-urban migration by decentralizing digital and entrepreneurial opportunities.

The paper highlights key policy discourses in bridging the digital divide in East Africa, while addressing the aforementioned sustainable development goals (SDGs). For an economy that is predominantly agricultural, affordable, and reliable internet is central in catalyzing technological



diversification in other key sectors like healthcare and education.

Moreover, targeted policies and programs are required to address highlighted challenges. This includes prioritizing the harmonization of licensing and spectrum allocation, scaling public-private partnerships for infrastructure expansion, promoting digital literacy programs, and fostering collaborations between global and local telecommunication companies in the internet spaces. These strategic policy actions can aid drive equitable access to digital services and solutions, thus creating the foundation for localized, sustainable, and inclusive digital growth in the region.

Context

The internet has become an indispensable tool for informing and connecting people and services locally and globally. However, some rural and remote areas in East Africa, like the vast majority of sub-Saharan Africa, have a significantly higher disconnected population compared to the urban centers. This perpetuates a digital divide that potentially hinders economic, social, and educational development in rural areas. Moreover, this digital impediment encumbers the region's progress toward achieving relevant Sustainable Development Goals (SDGs).

East Africa faces unique challenges in extending telecommunication services to its underserved rural areas. Mainstream infrastructure solutions like



submarine cables have benefited coastal regions and some urban centers. Fiber-optic networks have similarly favored the urban centers. However, vast inland areas do not have reliable internet connectivity. The high costs of installing, extending and maintaining such infrastructure further impede connectivity. As a result, millions of residents in East Africa remain excluded from reliable digital connectivity, hence limiting equitable access to essential public services and information, and as well as economic opportunities.

Satellite internet offers a promising solution to rural areas internet connectivity. Recent advancements in satellite technology have significantly reduced costs, thus making it a viable option for providing digital connectivity in East Africa's urban and remote regions. Low Earth Orbit (LEO) satellites are transforming the internet landscape by offering high-speed internet access in areas where terrestrial infrastructure is lacking. This is especially appealing in a region where approximately 60% of the population live in rural areas and are often without access to mobile broadband.

International companies like Starlink are increasingly launching thousands of satellites to offer enhanced digital coverage to communities regardless of location. The influx of satellite internet complements efforts by East African governments and regional bodies like the East African Community (EAC). The EAC has recently taken significant steps to improve regional connectivity by agreeing to invest in a dedicated regional satellite collectively. This initiative aims to enhance internet services across the region. This will also address not only the digital divide but also challenges like cyber threats and disaster management. By leveraging both public and private sector investment and rollout in satellite internet technology and infrastructure, access to the digital tools and solutions necessary for socio-economic





development and realization of relevant SDGs becomes increasingly feasible.

Key Issues

The central themes discussed include trends in internet connectivity in the region, the role of internet connectivity in sustainable development, the importance of affordable internet services, and addressing barriers needed to unlock the potential of satellite solutions. These themes collectively inform the challenges and opportunities in expanding I access to digital technology while addressing regulatory barriers, economic disparities, and the strategic integration of satellite platforms to drive socio-economic development across the East African region.



Photo Credit: dig.watch

Trends in Internet Connectivity in East Africa

In recent years, East Africa has experienced notable advancements in internet connectivity through a combination of terrestrial, mobile, and satellite technologies. Despite the progress made, challenges remain, especially concerning the limitations of existing solutions provided by mobile network operators (MNOs).

MNOs have been the primary drivers of internet connectivity across East Africa. Their efforts have improved the region's internet connectivity and penetration, rising from 9.6% in 2010 to 33% in 2021.

MNOs have leveraged the surge in submarine cable connections. The number of cables linking Africa to the rest of the world grew from 16 in 2008 to 71 in 2022. These infrastructural improvements have enhanced internet speeds, reduced costs, and fostered greater competition in the telecommunications market.

Despite these investments, significant gaps remain visible. For instance, MNOs primarily focus on urban areas with higher population densities. This strategy excluded lower, rural or sparsely populated. This is because the returns on investment in urban and coastal areas are more favorable. Consequently, vast rural areas where the majority of East Africa's population resides, continue to experience limited or no access to reliable internet services. The high cost of deploying and maintaining the requisite infrastructure in these remote areas further exacerbates this issue.

Satellite technology presents a promising alternative to bridge these gaps. Recent advancements and roll-out in satellite internet, particularly the advent of Low Earth Orbit (LEO) satellites, have made connectivity more affordable and efficient. Companies like Starlink are deploying a constellation of LEO satellites that provide high-speed internet, thus offering a viable solution where mobile networks fall short. However, the initial high cost of satellite internet equipment and services poses affordability challenges to many households in East Africa.

Moreover, a potential reliance on a dominant provider like Starlink raises concerns about potential monopolistic control over internet services. This could lead to dependency and limited competition. Policymakers in the region should recognize these dynamics as they work to ensure equitable and affordable internet access for all. Relevant

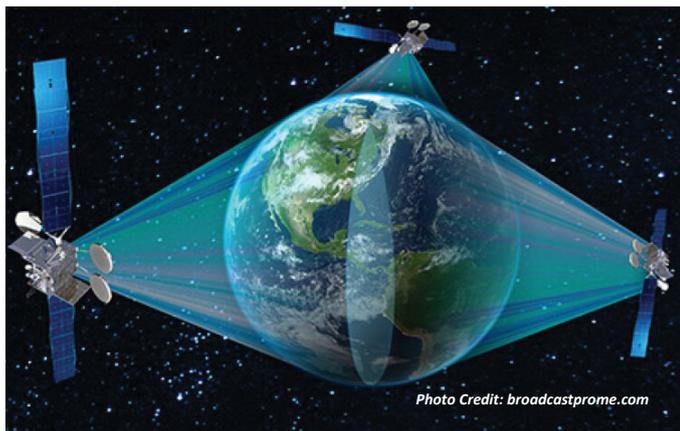




governments create an enabling policy environment, the private sector drives technological innovation and investment. Concurrently, development partners can provide funding and technical assistance, while civil society advocates for inclusive and equitable access to digital services, including net neutrality.

The importance of reliable Internet education cannot be overstated. Many parts of East Africa, especially the rural areas have limited access to quality education. To this end, satellite internet can connect remote schools and enhance access to online educational resources and virtual classrooms. Satellite internet can facilitate e-learning and solutions like remote teacher training programs, which will advance the realization of SDG 4. Accessible internet solutions remain imperative to ensuring inclusive and equitable education and promoting lifelong learning opportunities regardless of location.

Internet connectivity also plays a crucial role in strengthening the region's capacity to identify and adapt to climate stressors. Satellite-based technologies and solutions can monitor and provide real-time information on environmental changes, predict natural disasters, and support early warning systems. This capability is crucial for protecting vulnerable and marginalized communities from climate-related risks, such as



droughts and floods. Reliable internet connectivity, particularly through satellite technologies, is essential for East Africa's sustainable development. Bridging the digital divide is central to enhancing climate adaptation and resilience while supporting key sectors. The inherent advantages of internet connectivity are central to the achievement of SDGs.



Affordable Internet

Satellite internet technology is transforming the region's internet landscape by making data solutions more accessible and affordable. This is particularly crucial for East Africa, where internet costs have traditionally been prohibitively high. The arrival of commercial-scale satellite providers represents a disruptive force to this status quo by offering the promise of cheaper, faster, and more reliable internet access.

One of the key dynamics at play is the nascent competition between satellite internet providers and entrenched traditional MNOs. While these entities compete for market share, opportunities abound to collaborate strategically. For instance, partnerships between MNOs and satellite providers are emerging to advance mobile satellite data provision. Planned initiatives by MNOs like Safaricom to collaborate with satellite companies like AST SpaceMobile in launching satellite internet services is essential for extending internet



coverage in remote areas, where terrestrial telecommunication infrastructure is limited or non-existent. Currently, satellite providers are leveraging mobile payment platforms by MNOs to enable users to pay for data plans. This enhances the entrenchment of satellite internet adoption, affordability, and accessibility.

However, the entry of satellites is hampered by high equipment costs that are beyond the reach of marginalized and vulnerable communities in remote regions. Thus, the cost of satellite hardware remains a significant initial barrier that is expected to recede with increased uptake and adoption of satellite internet technology. For instance, satellite service requires an upfront investment in satellite hardware of around \$350, which may be prohibitive for many users. Despite this initial impediment, the growing competition and technological advancement are expected to drive down costs over time. Policymakers should curb the temptation to levy or increase taxation on satellite internet solutions to encourage procurement and usage. This dynamic can make satellite internet a more viable option even for the less affluent communities. Equally, the government is more likely to reap the secondary benefits of increased internet penetration as citizens pursue the popular gig and creative economies and other digital opportunities that are dependent on affordable and reliable internet

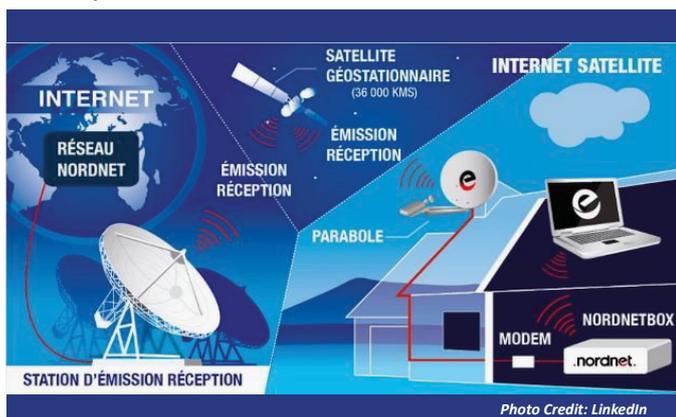
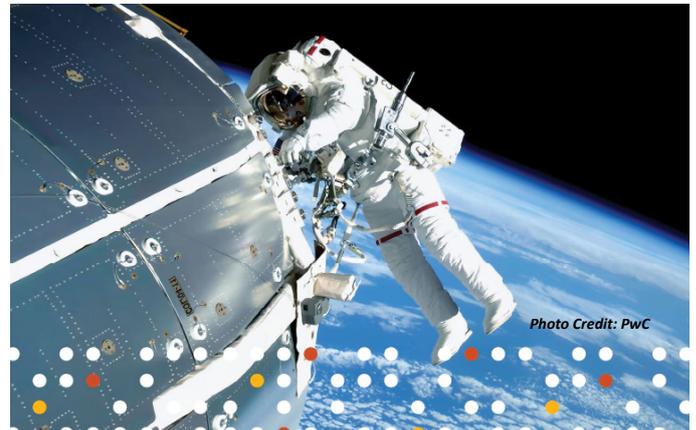


Photo Credit: LinkedIn

connectivity.

It is imperative to note that the satellite internet revolution is not just about providing affordable information access but also about bridging the digital divide in the region. By overcoming geographic barriers and reducing dependency on expensive terrestrial infrastructures, satellite technology is crucial for fostering socio-economic growth, enhancing digital opportunities, and supporting innovations and connectivity across East Africa and beyond.



Unlocking the Potential for Satellite Technology

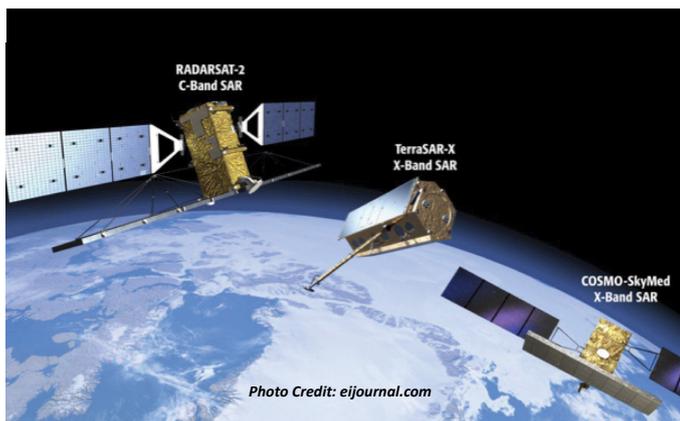
Integrating satellite solutions into the East African digital landscape holds transformative potential. However, several barriers should be addressed to realize the inherent potential. The benefits of satellite communication are immense. However, impediments such as regulatory complexities, high costs, infrastructural limitations, and socio-political processes continue to impede progress.

A fragmented regulatory environment across the region is a significant obstacle. Currently, each country operates under its own set of rules for internet connectivity. This will potentially lead to delays and increased costs for service providers while hampering cross-country deployment and integration of internet systems that are essential for the region's citizens, commercial endeavors,





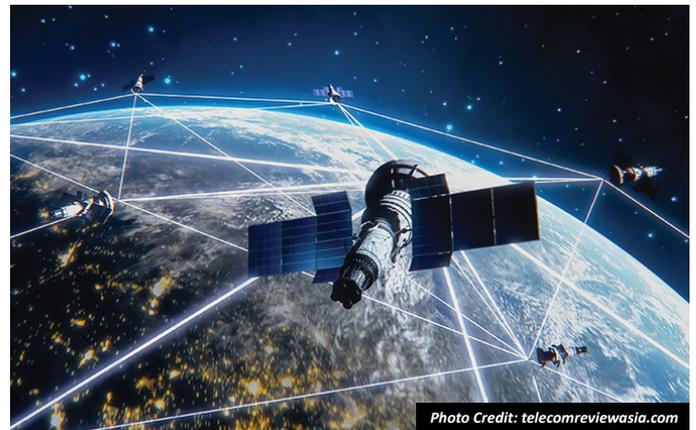
and socio-economic development. Harmonization regulations, particularly in licensing and spectrum allocation, are crucial. For instance, countries could benefit from more synchronized regulatory frameworks. This will potentially facilitate smoother operations for satellite providers and thus expand access to underserved regions. Encouraging collaborative regulatory environments that prioritize partnerships between public and private sector actors could also stimulate innovation and the development of secondary tools and solutions that leverage satellite technologies.



Equally, the high upfront costs of satellite equipment, such as user devices, are prohibitive for many communities. While affluent populations, especially in urban areas are likely to afford these facilities, poor regions have been excluded from even the present terrestrial options by MNOs remain excluded. Targeted policies and investments are required to address these disparities. For example, tax reliefs and partnerships between the government and private companies will go a long way in making satellite solutions more affordable and thus accessible. Technological innovations, including cheaper manufacturing processes or shared infrastructure, will equally reduce the related cost barriers.

The lack of digital literacy and awareness among potential users limits the effective utilization of

satellite services. Educational programs and community engagement initiatives are necessary to raise and build the digital skills needed to benefit from these technologies. Moreover, political instability in some East African countries may pose risks to satellite infrastructure, thus disrupting services and deferring investments. It is imperative to promote political stability and good governance, as these are essential for fostering a conducive ecosystem and addressing structural barriers to satellite growth and uptake.



Conclusion

Expanded internet connectivity in East Africa reveals a complex interplay of synergies, barriers, and opportunities, especially among vulnerable and rural populations. Synergies arise from integrating satellite technology with existing infrastructure, providing a viable solution to the region's connectivity challenges. However, significant barriers persist. These include high initial hardware costs, regulatory fragmentation, and socio-political instability. These factors hinder the widespread adoption of satellite internet services and exacerbate the digital divide. Yet, the opportunities are immense. By leveraging satellite internet capabilities, East Africa can bridge its connectivity gaps, catalyze development opportunities, and enhance digital access, especially for marginalized populations. Achieving this requires concerted efforts from both



the public and private sectors to harmonize regulations, lower costs, and promote digital literacy. Ultimately this will advance the potential of internet connectivity across the region.

Recommendations

- a) East African Community (EAC) to harmonize regulatory frameworks across member states to facilitate smoother satellite internet deployment, integration, and regional connectivity.
- b) EAC to spearhead the introduction of tax incentives and subsidies for satellite internet technology providers and consumers to lower the cost of equipment and services
- c) EAC and relevant ministries by member states to facilitate strategic partnerships between global satellite companies and local MNOs to expand coverage, reduce costs, and enhance the integration of satellite and terrestrial internet solutions.



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