Dean&Francis
ISSN 2959-6130

Analysis of SpaceX Starlink Non-Market Issues in Africa

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Abstract:

Satellites have supported us for half a century, and the rapid advancement of technology has led to a massive increase in the use of technological devices worldwide. The use of technology requires fast and high-quality networks to sustain the five trillion gigabytes of data transferred through the internet everyday. SpaceX Starlink started its launching of satellites in the hope of global expansion one day in the satellite telecommunication industry. Yet, Starlink is currently facing two major non-market issues in multiple regions of Africa, which sets a massive barrier between Starlink and its ultimate goal. This paper assembles and analyzes numerous scholarly articles from diverse perspectives to decipher a feasible solution to encourage and promote Starlink in complying with the two non-market issues in Africa. The two non-market issues are security concerns from the African government and the lack of engagement from underdeveloped countries. The solution found to best accommodate the first issue is to negotiate with African governments to find a middle ground, and the resolution for the second issue is to introduce opportunities for underdeveloped countries in Africa to access education, digital economics innovations, and advanced technologies.

Keywords: satellite telecommunication industry, non-market issues, African countries

1. Introduction

Satellites have been around for less than a century, but just within these 50 years of sending signals to Earth from space, our satellite telecommunication industry has developed into a network of signals promoting efficient communication and connection across the globe. From April 13, 1974, when the US launched its first domestic communications satellite, to today, we have reached over 10,000 active satellites orbiting around the Earth [1]. Starting in 2019 when SpaceX first started launching Starlink satellites, it has started gaining a mass amount of attention from people around the world, and it has reached service in half of the world [2]. Though it is still expanding, it is facing obstacles and non-market issues in the other half of the world to prevent it from reaching its goal of global expansion. One large

region that Starlink will tackle in the future is Africa [3]. Although it has already expanded to parts of Africa, Starlink still needs to strategize to fully cover the entire African continent. Full expansion over Africa is not a simple task, as continued expansion into Africa presents several challenges, particularly in navigating complex non-market issues. These non-market challenges refer to factors outside of direct market activities, such as political, social, and regulatory hurdles. In Africa, two of the most prominent obstacles Starlink faces are security concerns raised by various African governments and a lack of engagement from underdeveloped nations that are yet to fully embrace or benefit from digital advancements.

Firstly, African governments have expressed concerns about the security implications of foreign satellite networks operating within their jurisdictions. This issue is particularly sensitive in regions where governments already face instability, cyber threats, or worries about the sovereignty of their communications infrastructure. Without adequately addressing these security concerns, Starlink's entry into these markets may be delayed or even blocked, limiting its ability to provide global internet access.

Secondly, many underdeveloped countries in Africa struggle with a lack of digital infrastructure, economic resources, and educational systems that enable citizens to take full advantage of advanced technologies. This digital divide remains a significant barrier to widespread adoption of Starlink's services. If left unresolved, this gap will prevent a large portion of the population from participating in the digital economy, hindering regional growth and exacerbating existing inequalities.

While the existing body of research highlights Starlink's technological potential and business strategies, there is a distinct lack of analysis focused on these non-market factors, particularly in the African context. This gap is critical because successful expansion into Africa hinges not only on the technical deployment of satellites but also on addressing these broader, non-market challenges.

This research fills this gap by offering a comprehensive analysis of how SpaceX's Starlink can navigate these complex issues. By examining scholarly articles and policy discussions from diverse fields such as international relations, cybersecurity, and economic development, this paper identifies feasible strategies to overcome the specific non-market hurdles in Africa. Furthermore, it proposes actionable solutions that align Starlink's business goals with the developmental needs of underdeveloped African nations, positioning Starlink not only as a provider of internet services but also as a partner in the region's digital transformation.

2. Basic facts analysis

2.1 Current industry conditions

SpaceX Starlink is a global satellite network developed by SpaceX, and it is within the satellite telecommunication industry (SATCOM). Being a global sector, the satellite telecom industry provides services for multiple sectors such as telecommunication, broadcasting, and even military defense for the government. Forms of non terrestrial networks such as providing internet connections through satellites have grown significantly over the past few years. In addition, rapid increases in digital activities, capital investments, and the production rate of satellites have quickly lowered the price for non terrestrial internet globally. With the rise in the use of phones, there follows the emergence of satellite constellations providing internet and connectivity to phones and other communicational technologies [4].

Lead industry analyst Mark Giles states two main drivers for the boom in satellite telecommunications: the reduction in the cost of satellites and the rise in integration of 5G satellite services. The reductions in the cost of sending satellites into space make it more doable for private enterprises to switch to non terrestrial networking methods. With the rise of 5G networks, there is less of the need to advance terrestrial networking methods and more of the need to think outside the box and think of other uncostly ways to provide telecommunication. This led to the seek of satellite telecommunication, which will be accessible anywhere, unlike terrestrial telecommunication [4].

Principal analyst John Canali explains the reasons behind SATCOM technology getting cheaper. He states that satellites are getting smaller and smaller, but are becoming more and more reliable, decreasing the cost of production. Satellite launches are becoming cheaper and more frequent for companies such as SpaceX, Blue Origin, and the United Launch Alliance. And according to CitiGroup, launch costs are 40 times lower than it was in the eighties. Katie Dowd, Senior Director for Government and Corporate Affairs states that the SATCOM industry has had many useful technological developments and innovations in recent years, especially in the development of Low Earth Orbit (LEO) satellite constellations. The LEO constellations offer global high-speed connections and low latency at a relatively low cost because they are closer to Earth than other satellite constellations. This can assist rural areas in gaining access to faster networks and is a great alternative to terrestrial networks [4].

Principal Network Architect Andy Sutton claims that two high-priced investments along with reusable spacecraft made to SpaceX and Blue Origin have significantly de-

creased the cost of launching satellites into space. Surrey Satellite Technology Ltd, a leading small satellite company, has created small and cubic satellites that enable cheap production. These advancements in satellite technology allow for global coverage [4]. The global satellite communication industry market size was approximately 83.29 billion USD in 2023 and is estimated to have a compound annual growth rate of 10% from 2024 to 2030. With satellite production enterprises adopting Artificial Intelligence in their algorithms, the satellite allows for real-time tracking and information transactions between users [5-6].

2.2 SpaceX current developmental status

In January of 2024, SpaceX launched Starlink's first 60 satellites on Falcon 9. These satellites have direct-to-cell capabilities that allow global seamless access to the network whenever and wherever. This was SpaceX's first launch of 2024. In 2023, Starlink's launches are to expand its mega constellation. And as of January 2024, SpaceX Starlink already has more than 5100 active satellites launched [2]. In a webinar on May 9, 2024, Starlink predicted having $6.6 billion of revenue for the year 2024. Chris Quilty, Founder of Quilty Space, said that the industry was not expected to grow as fast back in 2015, and SpaceX's ambitions for its mega-constellations were laughed at, but its success today surprised industry watchers [7].

Today, Starlink has a constellation of approximately 6,000 satellites and more than 5,200 operational networks, providing internet access to 2.7 million subscribers in 70 countries. Starlink's success in the past three years is amazing, as there is a projection of revenue jump from $1.4 billion in 2022 to $6.6 billion in 2024. For comparison, the total revenue of the other two largest geostationary satellite service providers SES and Intelsat, which have recently merged into one, is only about $4.1 billion. And two dominant GEO satellite internet service providers who have been in the market for over 20 years, had the greatest number of subscribers in 2020 at around 2.2 million people while Starlink outgrew that number just within a few years. This demonstrates the prominent capabilities of SpaceX Starlink. Quilty Space estimates that Starlink's EBITDA to be at least $3.8 billion by the end of 2024, which was a dramatic increase from negative $128 million in 2022. SpaceX Starlink made huge progress in only two years, which was outside of everyone's predictions. Starlink's subscribers include 50,000 mobility, company, and government users, illustrating that the strategy of directly selling to consumers has helped Starlink to grow increasingly [7].

Starlink satellites have also gone through multiple versions with increasing costs. Starlink's V1 satellites were produced at $200,000 each and the V2 mini version was produced at $800,000. This could be caused by the increased size (from 260 kg to 730 kg) and the advanced capabilities of the satellites. The V3 satellites are predicted to weigh around 1,500 kg and cost $1.2 million each. Because of the massive need to produce satellites, more than one-fourth of SpaceX's employees are committed to Starlink. Starlink is currently available in 70 countries globally. It is available in most of the Americas and Eastern Europe, small parts of Africa, Mongolia, Japan, some parts of Southeast Asia, and Australia. To achieve this, it had to gain the approval of every government. This could be complicated in some countries such as China, Russia, and North Korea, yet there is much more space for SpaceX Starlink to expand in the very near future [8].

3. Nonmarket issue debrief

While Starlink has been extremely successful in Western countries as mentioned previously, for it to achieve its goal of global expansion, it still has a long way to go. For instance, Starlink faces various nonmarket issues in most eastern countries, preventing it from reaching its ultimate goal. The advertisement of satellite internet services from Starlink was formerly banned in many African countries, including Côte d'Ivoire, Burkina Faso, the Democratic Republic of Congo, Zimbabwe, South Africa, Senegal, and Mali [3]. Although Starlink has already expanded to 14 countries in Africa, it still cannot provide service for the richest countries in Africa. South Africa, currently the richest African country with a GDP of 373.23 billion USD as of 2024, had formerly restricted Starlink from providing internet to its citizens on August 14, 2023 [9-10]. This could have been the cause of current technical and monetary issues, and regulatory concerns. Fortunately, the relationship between Starlink and South Africa has softened after several months [11]. However, because Starlink constantly faces regulatory restrictions while there are quality internet concerns in Africa, the process of expanding across the entire African continent legally will definitely take time [3].

It is necessary to consider the range of outcomes in this case. There are three possible outcomes, the worst case, the moderate case, and the best case. The worst case is that SpaceX Starlink fails to comply with the regulations that the African countries have imposed on it. This could lead to the loss of a small amount of money that had been used to compromise with the regulations, but as SpaceX Starlink currently is operating well in numerous other regions, the ban from certain African countries will not be able to have a tremendous effect on the development of

the business. The moderate case is that SpaceX Starlink is able to comply with all the regulations but isn't able to provide quality networks to all rural areas as promised. This will create a form of distrust between the African population and Starlink, and could potentially lose consumers in Africa as it intensifies. This could eventually lead to the loss of money. But, from Elon Musk's standpoint, this will still be better than the worst case as Starlink is at least able to provide service to more regions in Africa and become closer to its goal of global expansion. The best case is that SpaceX Starlink can comply with all regulations and provide a quality network to all areas in Africa. This will improve its reputation in the global industry, but it will potentially cost money to improve the technological levels of certain rural areas in Africa. But again, in Elon Musk's point of view, a small amount of monetary loss does not affect the company. However, because Starlink will be one step closer to its goal in the best case, resolving the non-market issues completely will lead to the best outcomes.

As a summary of previously mentioned points, Starlink is facing two main non-market issues in various African countries. The issues are first, regulatory and security concerns, and second, technical concerns in rural areas. These concerns have held Starlink back from enlarging its services in Africa, and the cause could be understood from multiple perspectives. Although the concerns are the reasons for the delays in expansion, they are reasonable. The main actors in both issues are SpaceX and the African government. They are performing within their own best interest and in order to come to an agreement, solutions must be found. The strategies by which these two issues can be resolved will be the topic of discussion in the following section.

4. Discussion

As Starlink is part of SpaceX, which is an American company that sets its roots deeply in Silicon Valley, being able to access digital information of other countries in Africa who are only trade partners will definitely appear slightly concerning at first sight. This led to the earlier proposal of Zimbabwe stating that Starlink has to either apply for a license or build its services in Zimbabwe together with a registered public network within the country to ensure the security of the country and its citizens. Although Starlink is facing regulatory issues in Africa, this issue is not as complicated to solve. The US-African relationship has been harmonious as most African countries are not only trade partners with the US, but also partners in economic development, security, democracy, human rights, and providing potential opportunities for the African youth. As the actors in the issue, SpaceX Starlink and various African governments, both want to ensure an efficient yet secure network across the countries, so resolving the issue is not complicated. When both actors have the same goal for a certain service, they have to work in specific ways to comply with both sides' needs, which is similar to this case. Starlink must consider the reasons that the regulations are imposed on them, seek a way around it while ensuring the security of the network in the African countries, and find a way to affect the decisions of the regulatory agencies of the African countries.

The second non-market issue that Starlink is facing in African countries is the technical side of successfully providing its services. The average percentage of internet users in Africa is 50%, with Morocco at the higher end of the spectrum with 90.7% internet users, and the Central African Republic at the lower end of the spectrum with 10.6% internet users. This creates a huge gap across the African continent in technological developments, meaning that Starlink might not be able to expand its services across Africa as certain countries will not need the service as much. The reason for this issue is that there is a tremendous gap in literacy levels in addition to the potential for innovation across the entire continent. As Africa is a gigantic continent, decreasing the skill gap is not a simple problem, but it is not a hard problem as SpaceX and the African governments are not directly against each other.

Starlink will have to assist Africa in adopting digital economic innovations and providing more access to digital devices and mobile services to the African population, in addition to providing education to improve literacy levels and capacity for innovation. Starlink can assist in that by providing African countries the opportunity to buy digital devices and invest in profit-making organizations that assist in facilitating the implementation of digital devices and education in African countries [12].

5. Conclusion

In conclusion, SpaceX Starlink's ambition of global satellite-based internet access has made impressive strides in recent years, but it faces significant non-market challenges that could hinder its full expansion into Africa. The two primary obstacles—security concerns from African governments and a lack of digital engagement in underdeveloped regions—present complex but solvable issues. Addressing these challenges requires strategic negotiations with governments to ensure security while maintaining operational freedom, as well as investments in digital infrastructure and education to bridge the technological divide across the continent.

This research paper provides critical insight into how

Starlink can navigate these non-market hurdles, filling an important gap in the existing literature by focusing on the non-commercial barriers to satellite telecommunication expansion in Africa. By offering concrete solutions that align with both SpaceX's corporate goals and Africa's developmental needs, this study presents a roadmap for Starlink to not only overcome these barriers but also to contribute meaningfully to Africa's digital transformation. If successful, Starlink's expansion into Africa will set a precedent for future satellite-based internet ventures, demonstrating the necessity of balancing technological innovation with local political, social, and economic considerations.

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