



# The Impact of over the Top Service Providers in the Rwandan Telecommunications Market: An Analysis of Business Models

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**Abstract.** The telecommunication industry is facing constant changes in its operations and business environment. One of the major causes of these changes is the rise of Over The Top (OTT) service providers that have developed and implemented innovative new business models that are disrupting the traditional telecommunication industry. In this paper we investigate the impact of OTT business models on Communication Service Providers (CSPs) in the Rwandan telecommunication market. We seek to understand the business models and strategies CSPs and OTTs are employing to stay relevant in the market, the advantages and disadvantages of each model, and to assess whether they are applicable in the Rwandan telecommunications market. The findings and recommendations highlight some of the major trends and business models in the telecommunication markets, and can be used to provide insight for CSPs and regulators to build strong business strategies and relevant regulations.

**Keywords:** Telecommunications · Communication service providers  
CSP · Business models · Over the top · OTT · Rwanda

## 1 Introduction

Companies operating in the global telecommunications market face vast challenges due to the pace of innovation. Companies in this sector traditionally provide data, Internet, and other value-added services, often delivered over mobile networks. However, telecommunications business models are changing as consumers of their products change their behavior. Telecommunications providers are also being challenged by the arrival of over the top service providers (OTTs) that provide similar services in a cheaper, easier and more innovative way. In some cases, new service providers threaten the business models of traditional communications service providers.

The telecommunications industry has long been dominated by communication service providers (CSPs) offering services including voice, data and SMS (short message service). Traditionally, CSPs like AT&T and Verizon relied on voice and short message services (SMS) as a primary source of revenue. Mobile phone development and mobile Internet are at the forefront of an innovation drive that is transforming the market. Market transformation is also accelerated by the decline in smartphone prices, growing access to the Internet, and an explosive increase in user-generated content especially from social media platforms, search engines, and other content service providers [1].

Over The Top (OTTs) players are service providers that offer content such as voice, video, data, instant messaging, and other media to consumers. Providers of OTT services include companies like Google, Netflix, and Facebook. They are referred to as OTTs because they do not possess telecommunications infrastructure to deliver their content to the final consumer and they do not need licenses to operate. OTT service providers rely on the CSPs existing infrastructure, including tangible assets like masts, ducts, and transmission components, and intangible assets like spectrum licenses and rights of way [2]. The emergence of OTTs has triggered a wave of transitions, causing many CSPs to adapt their business models and strategies to remain competitive and profitable in the market, mostly because OTTs offer similar products and services that include voice and instant messaging [3]. In addition, there is a growing demand for OTT services such as video and audio because of the high value placed on effective communication, and improvements in service quality and pricing. However, this kind of competition creates significant pressure on CSPs to provide new and improved value-added services.

The objective of the paper is to analyze the existing models of OTTs and CSPs in the market, then propose a business model that CSPs might adopt in order to design strategies that will help them mitigate competition from similar services being offered by OTTs. In addition, we cover emerging trends in the technology industry and strategies that OTTs are developing that could pose a threat to the stability of the telecommunication industry and CSP services like mobile data and SMS. Further, we analyze the business models that are hybrid (i.e. shared by OTTs and CSPs or by CSPs and other stakeholders) in the telecommunication market and their impact on all stakeholders in the market.

## 2 Background

### 2.1 The Telecommunications Market in Rwanda

The telecommunication market in Rwanda is occupied by three major CSPs: MTN, Airtel, and Tigo. They offer fixed (landline) telephone, mobile telephone (mainly mobile calling and SMS), and Internet data. The market is regulated by the Rwanda Utilities Regulatory Authority (RURA), which is responsible for oversight countrywide [4], and the East Africa Communications Organization (EACO), which is a regional organization that connects ICT stakeholders in countries of the East African Community (EAC) [5].

In the Rwandan telecommunication market, CSPs face pressure to provide high quality services because of the increase in demand for data and broadband. This rapid increase in demand is due to the growing penetration of mobile devices and increasing demand for multimedia content and applications [3]. According to a report by RURA, mobile telephone subscriptions increased from 7.7 million in the fourth quarter 2014 to about 7.9 million in the first quarter of 2015 [4]. Growth in subscribers and demand is causing major shifts in the industry.

## 2.2 Over the Top Players (OTTs)

OTT growth is facilitated by advancements in technology, especially smartphones, fast Internet that can reach speeds up to 1 Gbps, new services like WhatsApp, and consumer affinity for services like online gaming and video streaming [6]. Services offered by OTTs are often free, or at least less expensive compared to similar services from CSPs. OTTs have flexible business models that have made them successful players in the industry. For example, OTTs like Facebook, Google and Skype have managed to create successful business models without having to build their own infrastructure; instead, they are able to take advantage of existing CSP infrastructure. By riding on the existing infrastructure, OTTs are decreasing the capital expenditures (CAPEX) necessary to profitably offer new services. For example, in 2014, WhatsApp reached over 600 million global subscribers and generated over \$1,289,000 in revenue. In the same year, Netflix had 50 million subscribers with \$5.5 billion in revenue [5].

## 2.3 Zero-Rating

There are currently more than one billion people who cannot afford access to the Internet [7]. In many developing countries, CSPs work in partnership with OTTs to provide their subscribers with free access to select websites or applications. Zero-rating occurs when communication service providers waive data charges to these select services [7]. Consumers typically have access to a Free Basics plan that allows them access to websites such as Facebook Zero, Google, and Wikipedia alongside localized content and information ranging from Ebola health advisories to women’s rights applications and job postings [7]. Proponents of zero-rating argue that the practice of zero-rating increases innovation and development and gives Internet access to people that would otherwise find it unaffordable. Customers gain access to a number of free services including health, education, communication, sports, travel, jobs and local information [8]. Zero-rating is offered under different plans; for example, under the “free website plan,” users can access one website with limited access, e.g. Facebook Zero users only access Facebook, but with no images [9].

In Africa, zero-rating is widespread. For example, MTN South Africa zero-rates Twitter, in Kenya, Airtel zero-rates Facebook Free Basics, Safaricom zero-rates Wikipedia, and MTN Nigeria partnered with Opera Mini and [naij.com](http://naij.com) for “1 million days of free Internet” [10]. In 2015, during the Transform Africa

Summit in Kigali, Facebook launched [internet.org](http://internet.org), a free basic platform in Kinyarwanda that offers free health care information, educational content, and information about jobs and government [10]. Facebook has also partnered with some cellphone operators like Airtel in Rwanda to offer zero-rated services to areas that are hard to reach or underserved [8].

### 3 Analysis of Business Models

We adopted a qualitative approach wherein we analyzed secondary data from academic papers, online articles, and journals in order to understand the existing OTT and CSP business models, their importance, and the advantages and disadvantages in order to give an in-depth recommendation concerning adoption in the Rwandan Telecom market.

After reviewing the gathered information, we formed conclusions on the relevance of recommendations in the telecommunications market. Procedurally, we first determined which of the data collected to associate with the project. Second, we interpreted the relevant data to better understand the business models of both OTTs and CSPs and the possible impact on the market. Third, we cross-analyzed the data to evaluate the impact of OTTs on affordability and adoption of telecommunication services, and to determine if the existing model is positive or negative in relation to the competition. Lastly, we provide recommendations and ideas for the evolution of OTT models in the Rwandan market.

OTTs and CSPs have traditionally been linked to different kinds of business models. CSPs in Africa are well known for their “pay as you go” business model, while most OTTs are known for their “freemium” and “advertising” business models. The business models covered in this paper are grouped into two categories: OTT business models, and business models between CSPs, users, and OTTs (hybrid business models).

#### 3.1 Over the Top Service Provider Business Models

These are some of the business models that were traditionally exclusive to over the top players. They include: freemium, cloud services, and advertising business models.

**Freemium Business Model.** As the usage of smartphones and the Internet continues to increase, OTTs are now focusing on services that are offered on mobile platforms. Many OTTs build on the freemium business model. In the freemium model, companies offer a basic service for free and charge a subscription fee for premium services with advanced features [5]. For OTTs to profit from the freemium business model, they need to have a large customer base where even a small percentage of customers paying for the premium service will generate enough revenue to sustain the OTT. Well known examples of companies who have leveraged this model include Skype and LinkedIn. Skype and LinkedIn have over 600 million and 500 million users respectively, most of whom are using their

services for free. However, the small percentage of users who pay for premium services is enough to generate around a billion dollars in revenue for each of these companies [11]. The cost-free tier attracts many users, which in turn places a huge burden on telecom operator networks. Many users switch from using CSP services like SMS and voice calling to OTT services like WhatsApp and Skype, mainly due to their low cost. CSP data traffic has increased due to the increase in OTT service users. In 2015, Skype had around 250 million users per month [12]. This has a negative impact on CSP voice revenue, which is estimated to continue decreasing in the next few years. Studies show that telecom operators can expect fierce competition in the future from freemium-model services [1].

While CSPs in developing countries face issues of infrastructure upgrades and reduced revenue in voice calls, some CSPs are also benefiting from the freemium business model. According to a 2015 ITU report, four billion people (more than 66% of the world population) from developing countries do not have access to the Internet [7] and only 89 million people in the least developed countries use the Internet, representing a 9.5% Internet penetration rate. These statistics demonstrate a potential market for CSPs to target underserved customers. In Rwanda, for instance, MTN, Tigo and Airtel use the OTTs' freemium business model to reach out and gain new customers. OTTs also enable new capabilities for CSPs. For example, customer comments or complaints are passed on to CSPs cheaply and efficiently through OTT services like Facebook posts. CSPs are then able to get instant feedback from customers through Facebook or Twitter, increasing the efficiency and responsiveness of CSPs. There is also improvement in service due to customer rating and reviews on OTT services. Besides CSPs using OTT services, some have adopted similar business models. In Rwanda, for example, Airtel gave customers who bought a new SIM card 500 MB of data for free, which enabled Airtel to acquire more subscribers. Although this is not a typical freemium business model, it was inspired by the popularity of freemium services. The freemium model has proven to be popular in the Rwanda telecommunication market, and CSPs have built on it to start other business models such as "bundling," explained in Sect. 3.2.

**Advertisement Business Model.** OTTs like Google and Facebook provide their services for free and then sell advertising space to businesses that want to target the same audience [5]. Since the services are free, these OTTs usually have many users who feed them critical information from which they can profit. A typical example is Google search, where users of the Google search engine type in their key search words and businesses interested in the search terms then place a bid with Google to have their products displayed to customers on the first page. Google then uses an algorithm to determine which advertisement to post to the first page of user search results. Advertisements, therefore, are tailored to the exact interests of the user at the time they are displayed. Facebook's business model is also built around this concept, with over 85% of revenue coming from advertisement.

The rise of services like Facebook, Twitter, and Google has had a significant impact in the Rwandan telecommunications industry. First, CSPs are able to market their products and services and reach more customers through OTT services at a very low cost. In Rwanda, CSPs formerly had to put up billboards from district to district and province to province to advertise their products, but through Facebook, WhatsApp, Twitter, YouTube, and other OTT platforms, CSPs reach customers with ease. Secondly, customer satisfaction has increased because there are more ways for customers to communicate with CSPs. Customer care lines are no longer the sole means to file a complaint or place inquiries, as consumers can also use OTT services. When a customer asks a question on MTNs Facebook page, there is no need to wait for MTN to answer the question; any user on the page who knows the answer can respond.

Free OTT services that use the advertising business model have increased CSP traffic as more people use various forms of OTT services. The increase in traffic can have two major impacts on the CSP network. One, CSPs may profit from the increase in data traffic, seen particularly in Rwanda where there is still low market penetration and CSPs are looking for users. Or, two, the traffic may place a burden on the CSPs infrastructure. As there are no reports of CSPs complaining about the burden of data traffic in Rwanda, this suggests that CSPs actually benefit from their customer's use of OTT services. An increase in data traffic increases CSP revenue under metered or pay-as-you-go plans.

**Cloud Services.** OTTs like Google and Amazon are providing cloud services to both businesses and individuals all over the world. They provide services like storage, applications like enterprise resource planning (ERP) that include accounting and customer management software, computer networks, and server space. These services are helping businesses reduce expenditures on initial installations, such as paying for technical labor and expensive equipment, thereby saving cost and deployment time. Business employees have the luxury of working from anywhere in the world and can collaborate easily with coworkers. Businesses need not bother with equipment maintenance, as this service is provided by CSPs. The cloud model has helped CSPs increase revenue by providing cloud services to many businesses in Africa. The ability to reduce the cost of initial investments and scale easily to match growth has led to the popularity of cloud services, particularly for small and medium enterprises.

In Rwanda, CSPs like MTN are offering cloud services to small and medium businesses. Cloud solutions include voice and data services. CSPs offering cloud services are able to increase their own revenue by reaching more businesses with extended service offerings. Customers have the opportunity to work with local service providers, and gain benefits including services that are tailored to their needs and the ability to pay in their own country currency to access these services. In Rwanda, the success of the cloud model has been facilitated by development of an optical fiber backbone network that serves around 90% of the country.

### 3.2 Hybrid Business Models

**CSP Business Models After the Rise of OTTs.** With the rise of OTTs, some of which offer similar services as CSPs, telecom operators have had to change the way they operate, such as changing the structure of their loyalty programs, and even partnering with OTTs. CSPs partner with OTTs to provide services to consumers, and allow them to win prizes or earn rewards for using a particular service [13]. For example, a content provider offering e-commerce services might award consumers different points for using the service. The loyalty points can then be converted into data credit for the consumer to use, or converted into M-Pesa, a mobile phone based money transfer service that allows users to deposit, withdraw, send, and pay for goods through a mobile device. The intent is that consumers continue to use these services to make online purchases even after the promotion ends [13]. The CSP continues to provide reliable data for the consumer, which creates an engagement, and both the CSP and the OTT benefit from the consumer purchasing more data and buying more products [14].

**Bundling: CSP Bundling Before OTTs.** Bundling is a marketing strategy whereby entities (CSPs) providing several products/services separately offer users a discount for using the same products grouped as a single, combined package [15]. Bundling can include products offered by a single company or services from different companies put in a single package [16]. There are variations of bundling: pure bundling, mixed bundling, and intermediate bundling. Pure bundling occurs when a user buys the full bundle. Mixed bundling occurs when a consumer purchases separate parts of the product; either one, two, or all of the products included in the bundle. The intermediate bundle allows users to benefit from the second product only if the first product is purchased [15].

Over the years, CSPs have bundled services in the same package in order to satisfy their customers. However, they typically only bundled services that they offered directly like voice and SMS, voice and data, or voice, SMS, and data. With the rise of OTT services like WhatsApp and Skype, which have billions of users all over the world, CSPs began to lose revenue from voice and SMS. According to Dorflinger, revenue development growth in relation to traffic development growth shows that data traffic is increasing exponentially while voice revenue is decreasing [13]. However, the data revenue is not enough to cover the investment in infrastructure needed by CSPs. Most CSPs have had to adopt bundling as a business model to accommodate the impact of OTTs. CSPs are not only bundling their traditional services, but also adding OTT services in their bundles to attract more customers. Some CSPs have added OTTs as a marketing strategy for their services.

**Bundling CSP Services with OTT Services, the Rwandan Context.** The bundling of services has become an essential component of CSP business strategies. These bundling services are usually targeted towards specific groups of customers: low, medium, or high income classes, or corporate or residential customers. Bundled services help to bridge the rising gap between the usage of

OTT services and traditional telecom services like voice and SMS. Traditional telecom companies have usually offered voice, SMS, and data separately, but have now adopted a bundling model whereby voice, SMS, and data are clustered into a single package and sold to subscribers at a lower price than what they would sell for as individual packages.

Tigo-Rwanda packages different services in a single service bundle named the “Cyizere pack,” which costs 100 Rwandan francs (0.11 USD). With this pack, a customer receives 800 s of Tigo-to-Tigo voice calls, 13 SMS messages to other Tigo customers, and 3 MB of data. Customers only have 24 h to use these services. This type of service bundle costs less than the individual sum of each of the services when purchased separately.

**Changes in Interactions and Targets.** Under this business model, telecommunication operators have changed the way they interact with their customers. Traditionally, the telecommunications operator would install the infrastructure and wait for clients to join by subscribing for service. Using this strategy, operators have a significant amount of investment in infrastructure and other services like technical support and customer service, without a rapid return on investment. A telecommunication operator in Norway, Lyse, piloted a project to provide discounts to users who physically dug trenches for the final connections in fiber to the home projects [17]. The project improved connectivity for the local area, created a bond between Lyse and its customers—who felt that they were participating in the growth of the company—and created financial benefits for both.

In Rwanda, another alternative business model was used. The government of Rwanda partnered with Korea Telecom (KT) to provide fiber optic and 4G wireless network coverage across the whole country. Other telecom operators act as mobile virtual network operators (MVNOs) to KT, who provides 4G wholesale service. This model has resulted in improved coverage and quality of service, and a reduction in consumer prices. Incumbent operators such as MTN, Tigo, and Airtel now focus on the different value added services that they can offer their subscribers, rather than the quality of their infrastructure. The telecommunication operators are able to take advantage of the popularity of content providers to provide services to the final consumers. In return, the content providers benefit from the fact that subscribers are using their services and contribute user-generated content.

## 4 Discussion and Recommendations

We observe that telecommunications companies in Africa need to place innovation and collaboration with OTTs at the core of their business strategy. CSPs need to understand the needs of different customer segments and offer unique and affordable solutions. As the penetration rate of mobile phones continues to grow in Africa, CSPs must pursue continued partnerships with OTT players to provide consumers with services that are relevant to their needs. This partnership is likely to increase the growth of local content and contribute to the growth of small and medium enterprises, private content producers, and even machine-generated sensor information.



#### 4.1 Business Model Recommendations

The global population now stands at over 7 billion people. Of these, there are 3.2 billion Internet users in the developed world and 2 billion users in developing countries [7]. About 2 billion people do not have access to the Internet [7]. Many OTTs understand that there is a large community of people who are not yet connected to the Internet, and that for them to expand their services to these people, they need to increase accessibility.

We propose a business model where CSPs collaboratively build infrastructure with OTTs as a service. Under this model, CSPs and OTTs form strategic partnerships to share resources and infrastructure in order to reduce the cost of deployment. This can create low CAPEX potential for CSPs who are now able to offer relatively cheaper services or affordable data bundles to customers. For example, in the US, Google has partnered with Sprint, T-Mobile, and US Cellular to create a Mobile Virtual Network called *ProjectFi* that provides phone, messaging, and data services to consumers [9] using 3G/4G technology. The mobile subscriber's devices are able to select the carrier with a stronger signal. It is important that CSPs partner to build and share infrastructure because of the reduction in required initial capital expenditures [2].

CSPs should also consider developing mobile applications that are built around the freemium business model. These applications can provide current services such as airtime top-up and mobile money, and can include extra features which are relevant to consumers. For example, they can create an event announcement application where users can check for free what events, such as concerts and games, are happening in their area, while at the same time allow them to buy tickets using the CSPs online mobile money payment system. If this model was implemented, it has the potential to enable service providers to reach new classes of customers, increase mobile subscriptions by offering unique services, and drive demand for existing and new services.

## 5 Conclusion

The telecommunications market is changing quickly due to the emergence of OTTs, who are able to offer services without the bounds of regulation and infrastructure investment. They are providing services sought by customers and are improving connectivity, particularly among the underserved. CSPs have three choices: (1) to do nothing and proceed with declining traditional business models, (2) to move to block OTT services from using their infrastructure without a direct tariff, or (3) to adopt the strategies of OTTs to better serve market demand and ensure their competitiveness in the market. CSPs can also learn by benchmarking against the success of OTTs to assess and optimize the best strategies. There are opportunities for CSPs, OTTs, and consumers as long as service providers are willing to predict, innovate, reduce cost, and partner with other stakeholders.

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