Digital Market Overview: Kenya

50 Years of Growth, Innovation and Leadership

■ Overview & Methodology

To understand and help inform UK companies about emerging digital market opportunities in a number of key countries under the UK's Prosperity Fund, the FCO (Foreign and Commonwealth Office) commissioned Frost & Sullivan to provide summary digital market research and analysis across three growing digital markets; telecommunications, digital services and cybersecurity.

The UK Prosperity Fund is an innovative instrument directing £1.2 billion of UK ODA and non-ODA investment to tackle barriers to economic growth, targeting middle-income developing countries. The Fund aims to remove barriers to economic growth in order to reduce poverty – the Fund's primary purpose. It supports delivery of the United Nations' Sustainable Development Goals (SDG), particularly SDG 8, to "Promote inclusive and sustainable growth, employment and decent work for all." Removing barriers and helping harness the potential of developing markets, will also boost global and UK prosperity through increased investment and trade. It is in achieving this latter objective that Non-Official Development Assistance funding is used alongside Prosperity Fund ODA programmes, and in support of the government's post-EU trade policy ambition and wider government policies.

■ Frost & Sullivan Methodology

To complete the project, Frost & Sullivan engaged analysts from its ICT group based in offices in Indonesia, Brazil and South Africa. Four main activities were completed during the process. These were:
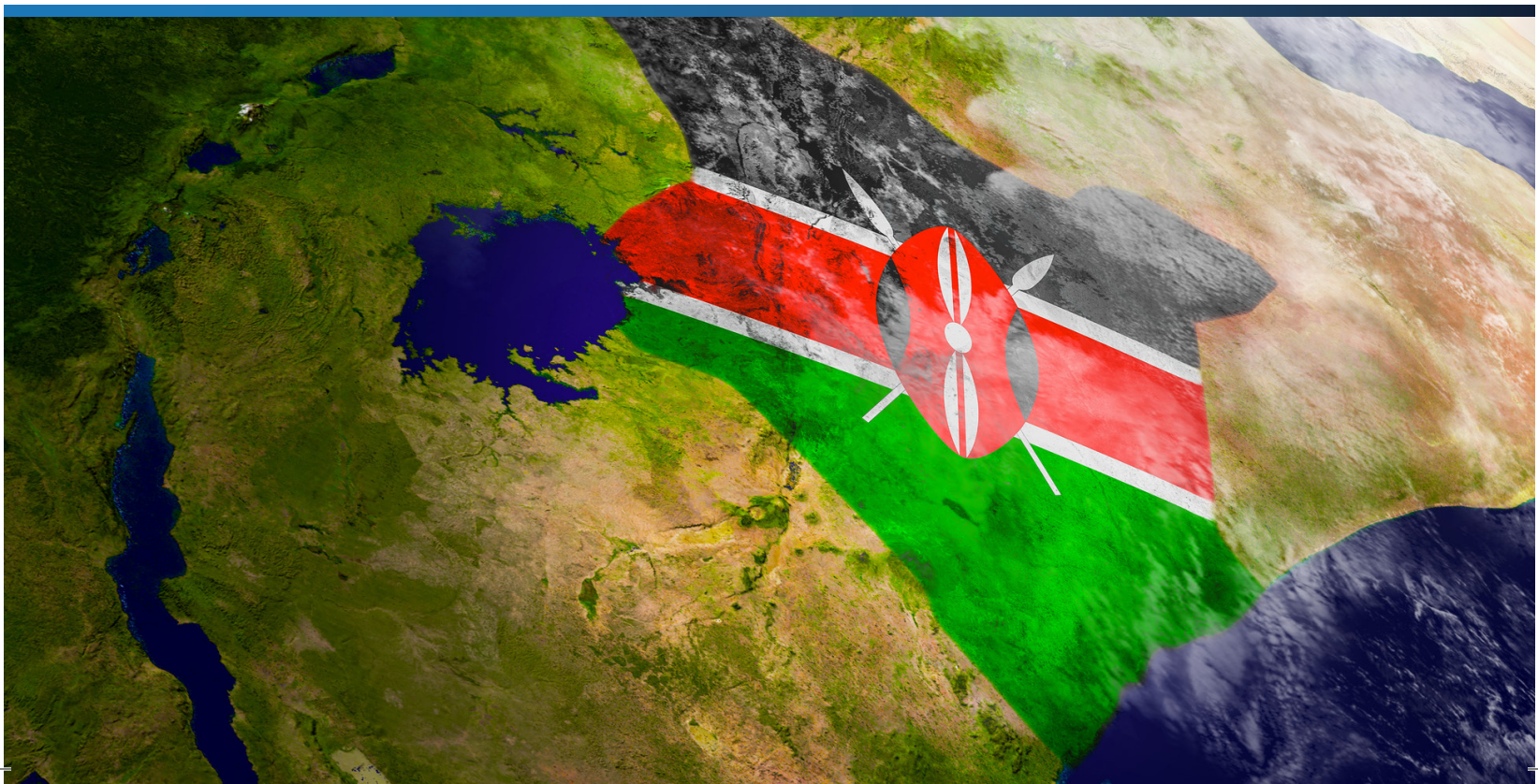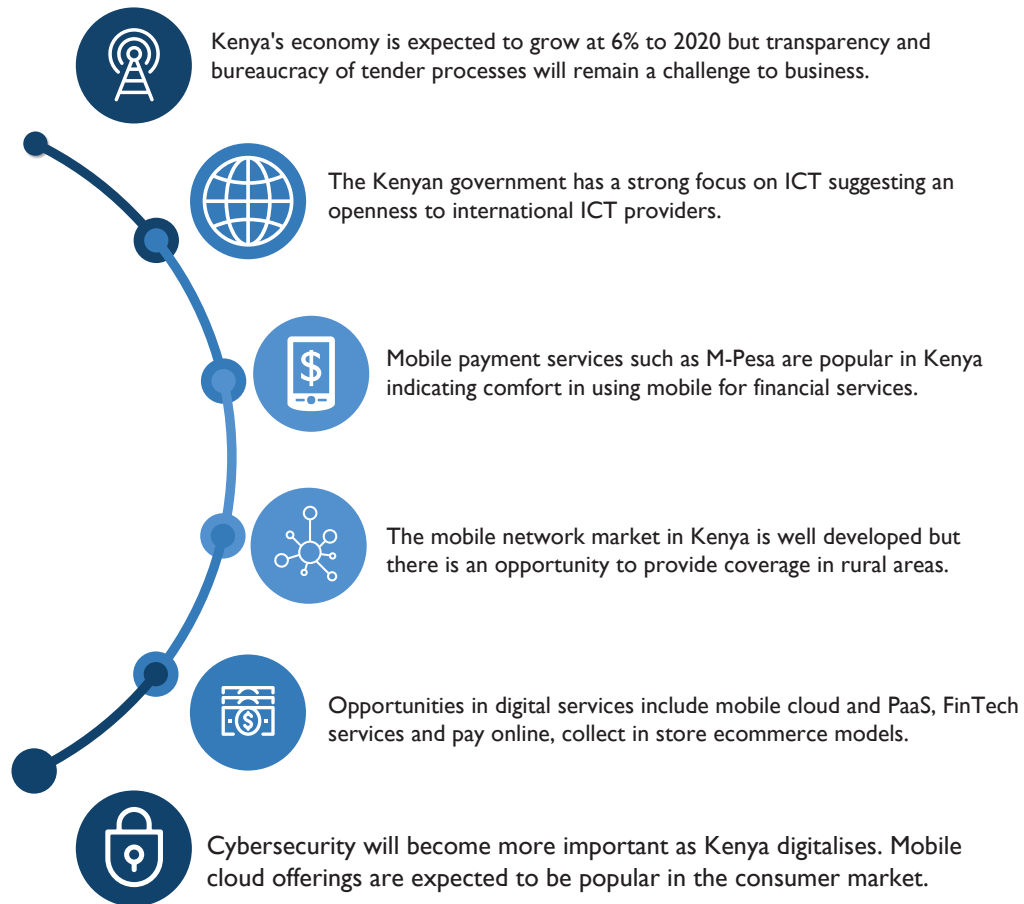
- Internal Data Audit: Frost & Sullivan leveraged information from its ongoing research programme of the ICT sector and digital markets in the target countries.

- In-depth Secondary Research: Frost & Sullivan searched all open sources and published documents, including company information, official government-released information and statistics, international organisations, industry-recognised associations, as well as national and international press.

- Conducting Primary Research: Frost & Sullivan leveraged its existing networks to speak with the major stakeholders and industry participants within the country.

- Forecasting the Market Size: Frost & Sullivan constructed a propriety and bespoke data model that captured all of the research and analysis to forecast the market size across sectors. The methodology followed a simple and transparent approach and used statistics from government-published sources as well as internal Frost & Sullivan data.

EXECUTIVE SUMMARY

Key Findings

Chart 1: Executive Summary

Kenya's economy is expected to grow at 6% to 2020 but transparency and bureaucracy of tender processes will remain a challenge to business.

The Kenyan government has a strong focus on ICT suggesting an openness to international ICT providers.

Mobile payment services such as M-Pesa are popular in Kenya indicating comfort in using mobile for financial services.

The mobile network market in Kenya is well developed but there is an opportunity to provide coverage in rural areas.

Opportunities in digital services include mobile cloud and PaaS, FinTech services and pay online, collect in store ecommerce models.

Cybersecurity will become more important as Kenya digitalises. Mobile cloud offerings are expected to be popular in the consumer market.

Market Forecast

Chart 2: Market Forecast Revenue by Sector, 2017–2022 ($US Millions)

	2017	2018	2019	2020	2021	2022
▪ Cyber Security	$380	$404	$430	$457	$486	$516
▪ Digital Services	$2,337	$2,921	$3,508	$4,057	$4,630	$5,154
▪ Telecoms	$2,745	$2,894	$3,044	$3,194	$3,344	$3,493
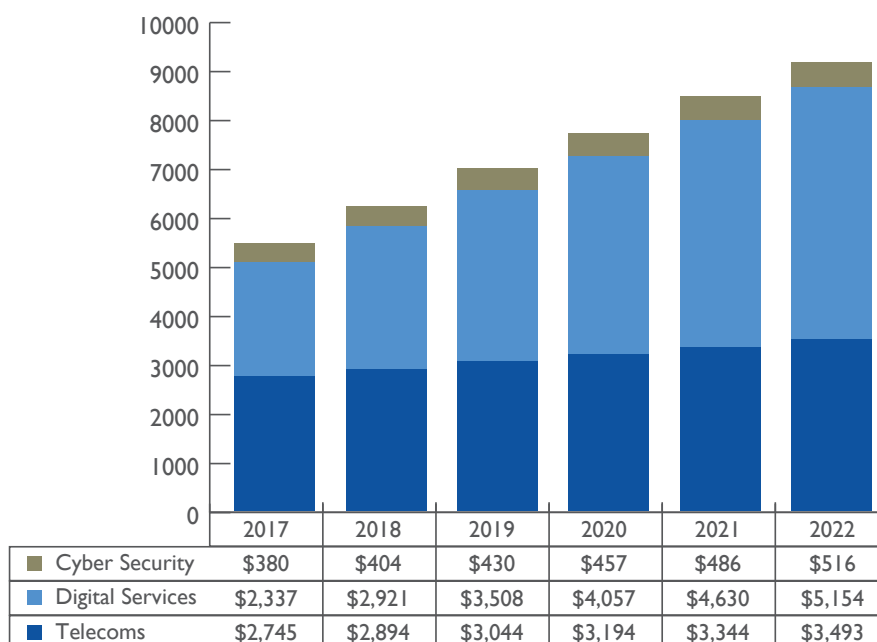
Source: Frost & Sullivan

Telecommunications

Kenya's telecommunications market is expected to grow from **$2.74 billion** to **$3.49 billion** in 2022. Growth is predicted to be driven by rapidly increasing demand for mobile data as businesses and consumers increasingly rely on these devices.

Digital Services

Kenya's digital services market is expected to grow from **$2.34 billion** to **$5.15 billion** in 2022. FinTech services are predicted to become increasingly important. The cloud computing market also contributes significantly, led by PaaS offerings.

Cyber Security
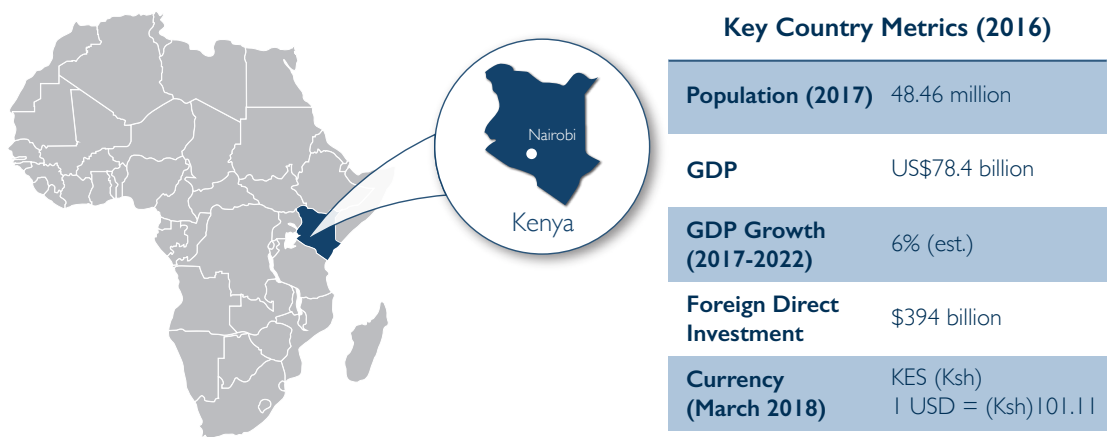
Kenya's cyber security market is expected to grow from **$380 million** to **$516 million** in 2022. Business will focus on more advanced services such as intruder detection and business and consumers will look to improve mobile end-point security.

Key focus areas for Digital Opportunities in Kenya

Telecommunications	Digital Services	Cybersecurity
• Mobile services and data • Application based services	• Pay-TV • Fintech • Niche BPO Services • PaaS	• Managed network security • Endpoint Security • Managed application security

Country Overview

Chart 3: Kenya Demographics and Country Metrics

| Key Country Metrics (2016)	
Population (2017)	48.46 million
GDP	US$78.4 billion
GDP Growth (2017-2022)	6% (est.)
Foreign Direct Investment	$394 billion
Currency (March 2018)	KES (Ksh) 1 USD = (Ksh)101.11

Kenya is a key player in East Africa and is a vital communications and logistics hub. The country has an important Indian Ocean port and strategic land borders with Ethiopia, South Sudan, Uganda, Tanzania and Somalia.

Kenyan growth was expected to slow to about 5.5% in 2017 as a result of drought, weak credit growth, security concerns, rising oil prices and political uncertainty following the 2017 elections. The IMF expects growth to pick up towards 2021, averaging around 6%[1].

Kenya's economy is dominated by the services sector; it makes up about 45% of GDP. This is unusual amongst developing countries as the agricultural sector often dominates. This is a positive indication that the economy is diversifying and modernising. Agriculture makes up the second-largest segment of the economy at 36%. Industry makes up the remaining 19%, with 10% of this consisting of manufacturing[2]. Although the dominance of services is promising, the contribution of agriculture has increased since 2006.

Kenya's ICT sector was worth an estimated $5.48 billion in 2017, constituting 31.7% growth from 2016. The telecommunications segment makes up the vast majority of this at around $3.2 billion[3]. Other important contributors are broadcasting, data centre services, cloud, IT and BPO.
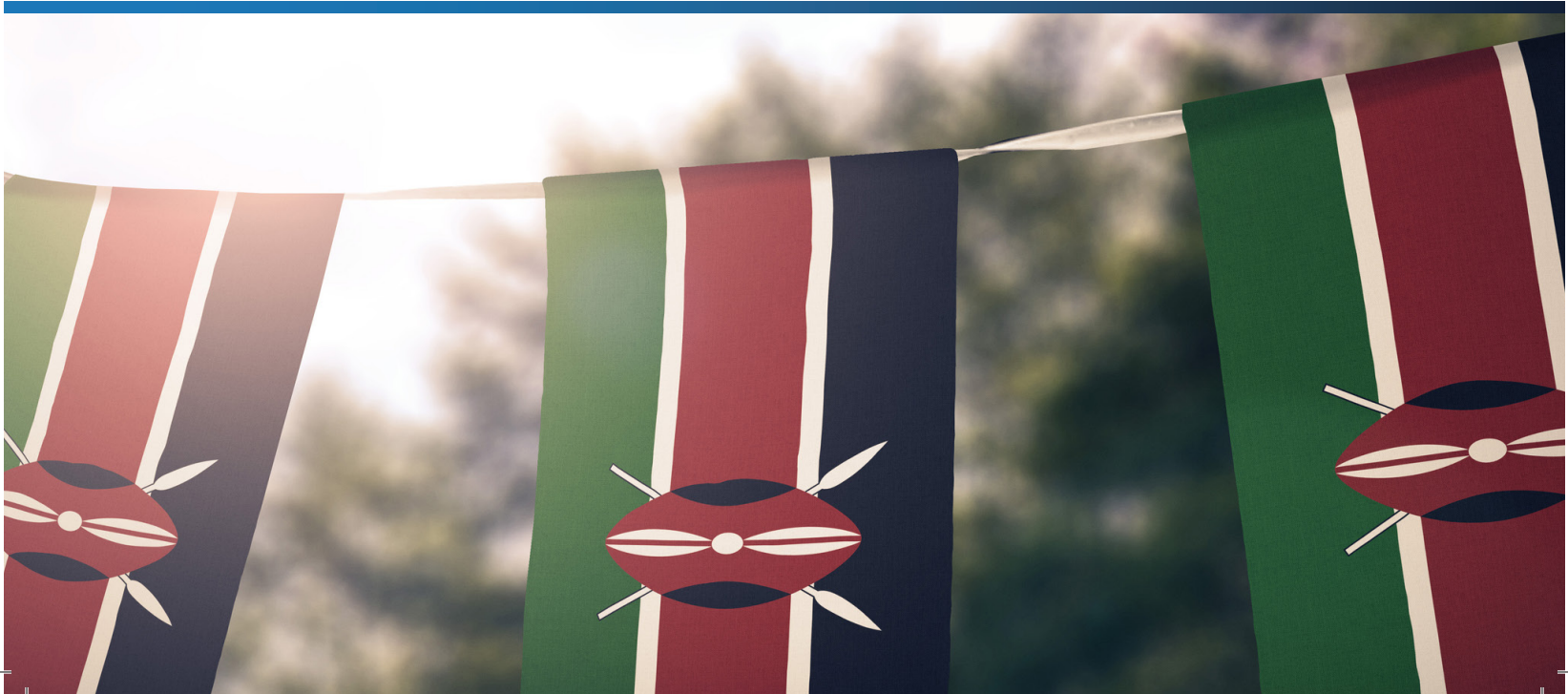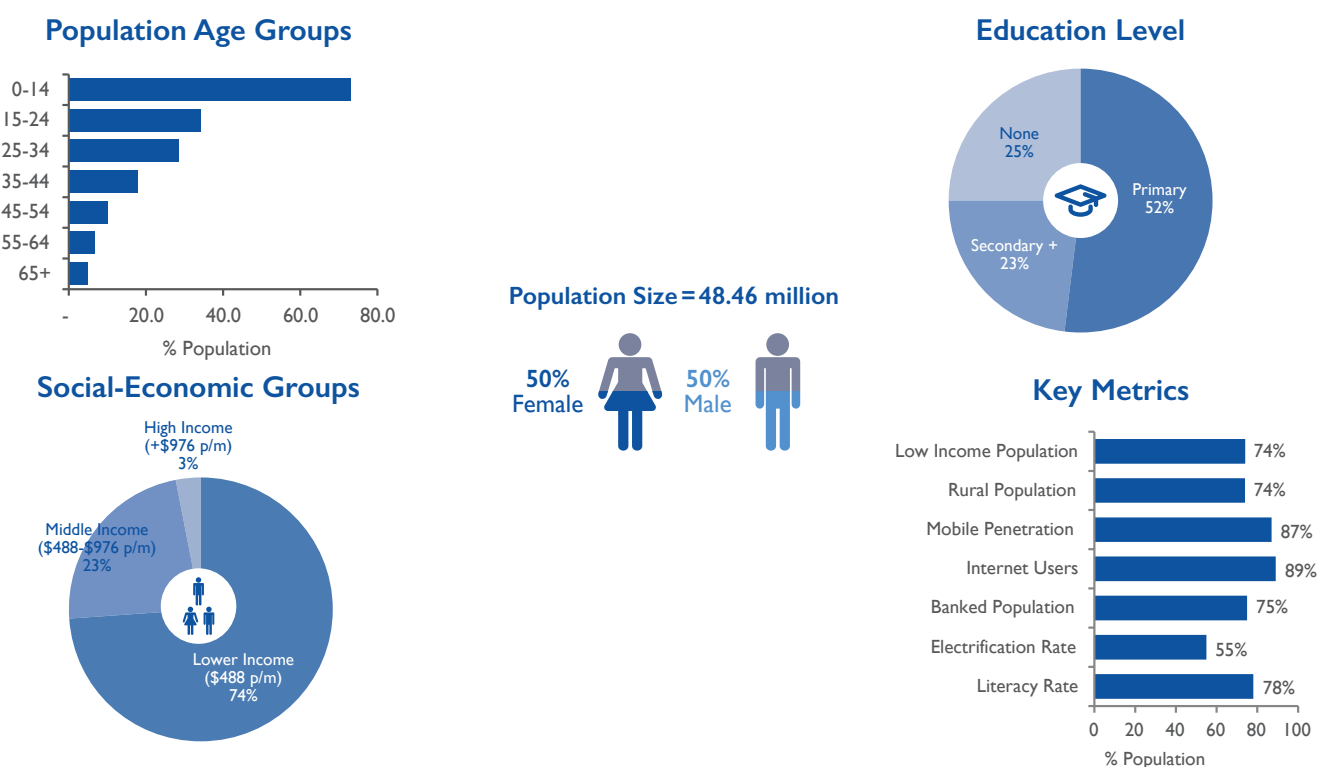
Economic Perspective

Kenya's combination of relatively stable governance, strategic location and young and innovative population has made it an attractive destination for multinational companies. Several notable firms such as Oracle, IBM, Microsoft, Cisco, HP and SAP have offices in Nairobi, and some have based their entire African operations from these offices.

FDI fell dramatically from $1.4 billion in 2015 to $394 million in 2017. This can largely be attributed to political uncertainty and rising oil prices[4].

Kenya's population of 48 million people is particularly young with an average age of 19 years. The population is regarded as being particularly innovative, especially with respect to developing and adapting technological solutions to combat specific regional problems. The success of mobile transfer service, M-Pesa, in the region is testament to this. Kenya's population is growing at 1.69% annually[5], suggesting a fast-growing consumer and enterprise market.

Demographic Overview

Chart 4: Population Structure, Kenya

Population Age Groups

Age Group	% Population
0-14	
15-24	
25-34	
35-44	
45-54	
55-64	
65+	

Education Level

None 25%
Primary 52%
Secondary + 23%

Population Size = 48.46 million

50% Female   50% Male

Social-Economic Groups

High Income (+$976 p/m) 3%
Middle Income ($488-$976 p/m) 23%
Lower Income ($488 p/m) 74%

Key Metrics

Metric	% Population
Low Income Population	74%
Rural Population	74%
Mobile Penetration	87%
Internet Users	89%
Banked Population	75%
Electrification Rate	55%
Literacy Rate	78%

While Kenya's population is comparatively well educated in terms of literacy rates (78%), the vast majority only has primary schooling, and only eight years of schooling are compulsory. Furthermore, the large rural population (77%) implies that the easily addressable market for ICT service providers is smaller than it may appear at first glance[6]. Although Kenya's cities enjoy well-developed ICT infrastructure, implying that the market is easy for providers to serve, this remains a challenge in rural areas. However, because about 1% of Kenya's population is urbanising every year, the easily addressable city market is growing healthily due to migration alone[7].

PESTLE Analysis

Chart 5: Pestle Chart, Kenya

Factors	Description	ICT Impact
Political	Kenya's 2012 and 2017 presidential elections were both marred by controversy and violence. The 2017 election was rerun but boycotted by the opposition, leaving incumbent Uhuru Kenyatta victorious[8]. Bureaucracy and transparency of tender processes have often been a problem in Kenya. In addition, Transparency International Corruption Perceptions Index puts Kenya at 146 of 180 countries in 2017[9].	Kenya's unstable political situation will serve to raise the perceived risk to investors, thereby increasing the return required for investment to take place. Any firm looking to expand its presence into Kenya will have to carefully navigate local bureaucracy and may face issues with transparency of contracts.
Economic	Kenya's GDP was estimated at $78.4 billion in 2016 and growth at 5.7%, 5.8% and 5% in 2015, 2016 and 2017, respectively. Agriculture is the largest employer, accounting for 75% of the workforce[10]. Kenya is ranked 80th on the Ease of Doing Business Index[11].	The developing status of Kenya's economy suggests that there is ample room for growth in the region. Agricultural businesses are less likely to demand a high amount of ICT-related products than services and industrial businesses.
Social	Kenya has a population of 48 million, growing at 1.69% annually. The population is very young, with an average age of 19.7 years, and 26.5% living in urban areas. Kenya's literacy rate is about 78%[12].	Kenya's young, well-educated population and high population growth rate make it an attractive destination for technological investments.
Technological	Kenya has identified technological innovation as one of the key pillars in its 2030 plan. Nairobi is sometimes referred to as the 'Silicon Savannah' and is home to a large number of technological incubators and start-ups. The Communications Authority of Kenya estimates internet penetration at 90% and about 90% of Kenyans own and use mobile phones[13].	Kenya's stance on technological development is attractive to ICT firms considering whether to expand into the country. Furthermore, ICT infrastructure is well developed, especially in urban areas. Kenya enjoys the best connection speeds on the African continent (~12mbps) due to a number of undersea cables that land in the country.
Legal	The fundamental laws of Kenya are similar to those found in most European countries. Competition law in Kenya is maintained and upheld by the Competition Authority of Kenya, established under the Competition Act of 2012. Resident firms pay a corporate tax rate of 30%, whereas non-resident firms pay a rate of 37.5% and are not eligible for certain tax deductions[14].	Kenya's legal system closely resembles those used in Europe and thus should not constitute a significant barrier to entry for British firms. Corporate tax rates are relatively high, especially for foreign firms.
Environmental	Kenya faces a number of environmental challenges, including water, pollution, drought, habitat destruction, deforestation and insufficient waste collection and sanitation.	Although environmental challenges do not pose a specific threat to ICT firms, they may serve to dull growth in Kenya as a whole.

ICT Environment

Kenya is actively trying to establish itself as a key ICT hub in the East African region. The country appears to be making good progress in this regard, helped by having strong connectivity infrastructure and a young, innovative population. Despite this, the country currently faces considerable political uncertainty and issues surrounding the transparency of tenders remain a major barrier to growth.

Chart 6: ICT Readiness Index*, Kenya, 2014–2016

Readiness Measure	2016 Score	2016 Rank	Change in Rank (2014-2016)
Political and Regulatory Environment	3.7	75	-4 ▼
Economic Impact of ICT	3.4	54	0
Business and Innovation Environment	4.0	93	17 ▲
Infrastructure	3.1	99	-5 ▼
Affordability	4.3	102	-5 ▼
Skills	4.2	96	-2 ▼
ICT Usage	3.6	84	2 ▲
Network Readiness Rank	3.8	86 (of 143)	6 ▲

*The scores are measured on a 1-to-7 scale that captures four main sub-indices: Readiness, Environment, Usage, and Impact.

Source: World Economic Forum

Kenya's overall rank has improved from 92 to 86 between 2014 and 2016, despite a drop in four of the seven sub-indices examined. This increase is due to dramatic improvements in the business and innovation environment sub-index. In this specific sub-index, Kenya performs well in categories measuring availability of latest technologies, venture capital availability, intensity of local competition, quality of management schools and government procurement of advanced technology. The implication is that the Kenyan government and people understand the value that technology can have and thus ought to be receptive to new and innovative digital products entering the market. Although Kenya's score for the metric measuring the economic impact of ICT is not high in absolute terms, it ranks 54th in the world. This supports the conjecture that businesses, government and consumers will be receptive to new technologies as ICT has already had a substantial impact on the Kenyan economy.

The decline in the political and regulatory environment sub-index is easily explained by the uncertainty surrounding the 2017 elections. Furthermore, declines in the infrastructure, affordability and skills indices reflect that other countries have overtaken Kenya in these matters.

Drivers & Restraints

Chart 7: Industry Drivers, Kenya, 2017–2022

INDUSTRY DRIVERS

	1-2 Years	3-4 Years	5 Years
Strong focus on technology from consumers, business and government.	M	M	H
High number of ICT incubators, especially in Nairobi.	H	H	M
Relatively strong connectivity and infrastructure backbone	M	H	H
Young, growing population with a history of innovation	H	H	M

Impact Ratings: H = High, M = Medium, L = Low

Chart 8: Industry Restraints, Kenya, 2017–2022

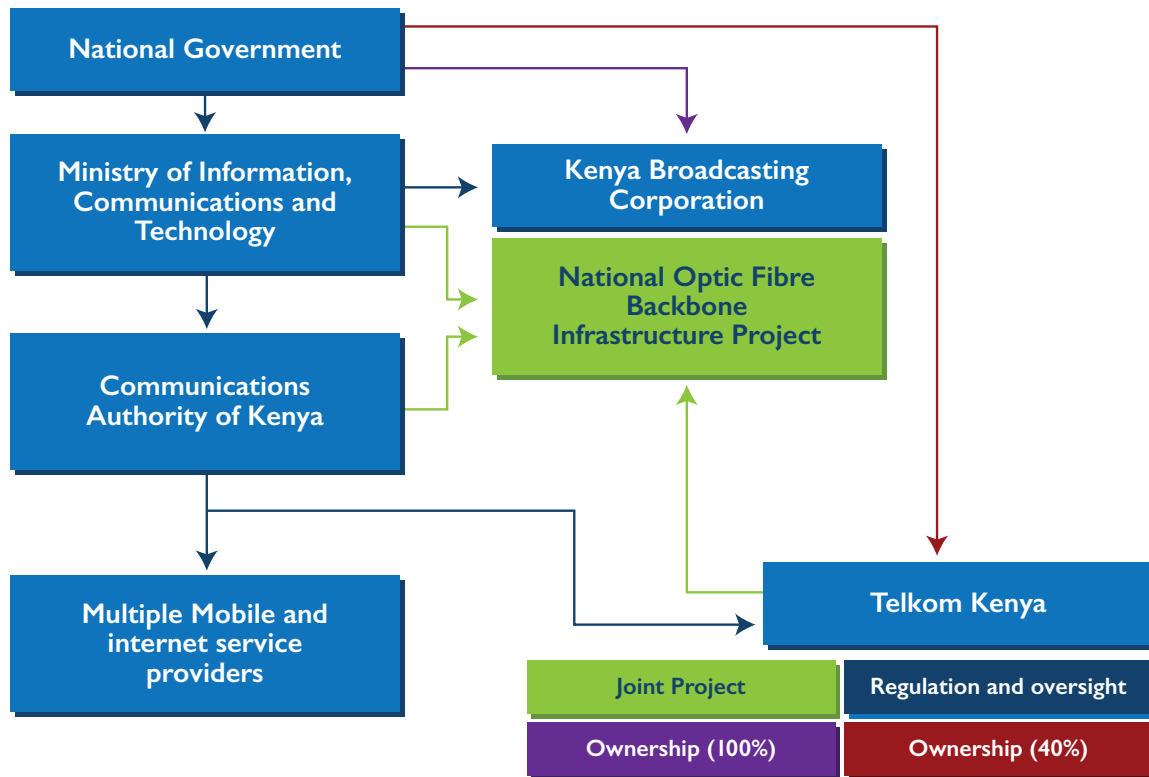### INDUSTRY RESTRAINTS

	1-2 Years	3-5 Years	6-7 Years
Issues around reported transparency and difficulties with the bureaucratic process in business and government dealings	H	H	H
Weak economic climate as a result of drought and oil price declines	H	M	M
Political uncertainty implies higher risk attached to ICT investments in Kenya	H	M	L
A large rural population implies that the easily accessible market for ICT products and services is relatively small.	H	H	M

Impact Ratings: H = High, M = Medium, L = Low

Host Government Structures and Policies

Kenya's telecommunications industry is governed by the Ministry of Information, Communications and Technology. The two state-owned firms most relevant to the ICT sector are the Kenyan Broadcasting Corporation (the national broadcaster) and Telkom Kenya, which is 40% government-owned.

National Government

Ministry of Information, Communications and Technology

Kenya Broadcasting Corporation

National Optic Fibre Backbone Infrastructure Project

Communications Authority of Kenya

Multiple Mobile and internet service providers

Telkom Kenya

Joint Project

Regulation and oversight

Ownership (100%)

Ownership (40%)

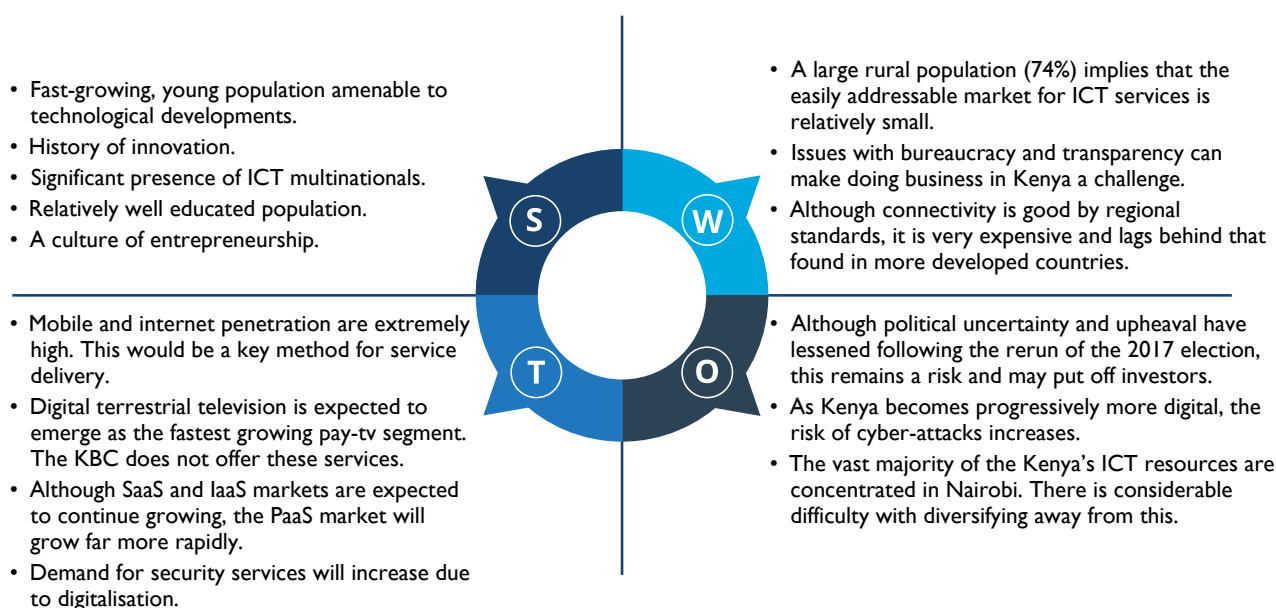| Agency	Function
Ministry of Information, Communications and Technology	The Ministry of Information, Communications and Technology is responsible for formulating, administering, managing and developing Kenya's information, broadcasting and communications policy. The ministry is divided into the State Department of Broadcasting and Telecommunications and the State Department of ICT and Innovation.
Telkom Kenya	Telkom Kenya is a partially state-owned (40% holding) telecommunications provider. It is the only provider of fixed-line services in the country. Telkom Kenya used to provide mobile services via its former brand Orange Kenya. Following its sale to private equity firm Helios Investment Partners in June 2016, Telkom Kenya now uses its own brand—Telkom Kenya.
Communications Authority of Kenya	The Communications Authority of Kenya is responsible for the regulation of the greater telecommunications sector. The Authority was established by the Kenya Information and Communications Act of 1998 and is tasked with facilitating the development of the ICT sector.
National Optic Fibre Backbone Infrastructure Project (NOFBI)	NOFBI is a project undertaken by government, the Ministry of ICT, the ICT Authority and Telkom Kenya that seeks to ensure adequate fibre connectivity to all 47 of Kenya's counties. Phase 1 was completed in 2009 and provided a national fibre backbone, whilst phase 2 began in 2014 and seeks to link all significant regional hubs to the network.
Mobile and Internet Service Providers	Kenya has three primary mobile service providers: market leader Safaricom, Equitel and Telkom Kenya.
Kenya Broadcasting Corporation	The Broadcasting Corporation of Kenya is the state-owned radio and television broadcaster. It is entirely government-owned and regulated by the Ministry of Information, Communications and Technology.

National ICT Masterplan, 2013–2018

Kenya's ICT policy has been broadly determined by the National ICT Masterplan, developed by the Ministry of Information, Communications and Technology since 2013[15]. The primary focus of this is to ensure that Kenya's ICT sector makes a major positive impact towards the achievement of certain national development goals. The ICT Masterplan clearly lays out the manner in which the Ministry of Information, Communications and Technology believes that these developmental objectives can be achieved. The two main goals in the Masterplan are the creation of 180,000 jobs and the sector contributing 8% to GDP by 2019. Kenya claims to have recognised that future successful countries will be those based on 'knowledge economies' and the ICT Masterplan is designed to aid Kenya's transformation into a regional technological hub.

As Kenya's current ICT Masterplan expires in 2018, there is some uncertainty around policy goals going forward. Kenya's Vision 2030, a set of development goals to be attained by 2030, does, however, suggest that technology will continue to be a key focus area. Through its Vision 2030 proposals, the Kenyan government is committed to making use of science, technology and innovation to support the economic, political and social pillars of the scheme.

SWOT Analysis

Chart 9: SWOT Analysis, Kenya

S
- Fast-growing, young population amenable to technological developments.
- History of innovation.
- Significant presence of ICT multinationals.
- Relatively well educated population.
- A culture of entrepreneurship.

W
- A large rural population (74%) implies that the easily addressable market for ICT services is relatively small.
- Issues with bureaucracy and transparency can make doing business in Kenya a challenge.
- Although connectivity is good by regional standards, it is very expensive and lags behind that found in more developed countries.

T
- Mobile and internet penetration are extremely high. This would be a key method for service delivery.
- Digital terrestrial television is expected to emerge as the fastest growing pay-tv segment. The KBC does not offer these services.
- Although SaaS and IaaS markets are expected to continue growing, the PaaS market will grow far more rapidly.
- Demand for security services will increase due to digitalisation.

O
- Although political uncertainty and upheaval have lessened following the rerun of the 2017 election, this remains a risk and may put off investors.
- As Kenya becomes progressively more digital, the risk of cyber-attacks increases.
- The vast majority of the Kenya's ICT resources are concentrated in Nairobi. There is considerable difficulty with diversifying away from this.

BOP Industry Statistics

- The Communications Authority of Kenya reports the country as having 43.3 million internet users, translating into a penetration rate of 89.4%[16]. The CIA, on the other hand, reports Kenya's internet penetration as being 26%[17]. Given that Safaricom reports ~35% of the population as mobile data customers in its audited 2017 annual report, the Communications authority estimate is used in the remainder of this report[18].

- Kenya is aiming for universal electrification (95% electrification rate) by 2021. Government sources suggest that, currently, about 55% of the population has access to electricity, up from 27% in 2013. Kenya produces about 9.6 billion kWh annually and consumes around 7.7 kWh annually. Kenya is a world leader in renewable energy production, with 54% of total energy stemming from these sources[19].

- Kenya's adult literacy rate, 78%, is high compared to the rest of Africa. Importantly, the youth literacy rate (87%) exceeds the adult literacy rate, indicating that basic education is improving[20].

- About 75% of Kenyan adults have access to a financial account of some type. This is considerably higher than the average in sub-Saharan Africa of 26%. Furthermore, 55% of the population has access to an account at a formal financial institution such as a traditional bank[21].

BOP Industry Initiatives

If the internet penetration statistics offered by the Communications Authority of Kenya are accurate, Kenya is already close to achieving universal internet access. Some of this success can be attributed to a government and private programme to provide Wi-Fi connectivity, through hot spots, to historically underserved and mostly rural towns. One such hot spot, in the town of Nakuru, attracted 30,000 unique users per day[22].

Electrification rates have increased substantially since 2013, but universal electrification by 2021 remains a significant challenge given the country's large rural population. Standard grid provision is expensive, especially in rural areas. In 2017, the World Bank approved a $150 million International Development Association credit intended to enable access to off-grid solar energy for marginalised rural communities in Kenya.

Despite Kenya's rapid progress in electrification, outages remain common for several reasons.

|

TELECOMMUNICATIONS

Market Overview

Chart 10: Telecommunications Industry Overview, Kenya, 2016

Telecommunications Industry Overview, Kenya, 2016	
Mobile Subscriptions	39.8 million
Mobile Penetration Rate	87%
Fixed Line Penetration	0.5%
Internet Penetration	89.4%
Mobile Broadband Penetration	37.3%
Number of MNOs	3

Source: CAK, ITU

The traditional telecommunications market in Kenya comprises three mobile network operators and one fixed-line operator. Safaricom, the largest mobile network operator (MNO), has a market share of over 70%. Much of Safaricom's dominance in the mobile segment is due to its M-Pesa mobile phone-based money transfer service, available nationally.

Currently, Safaricom has an estimated 71.2% of mobile subscriptions in the country, whilst Airtel and Telkom Kenya hold 17.6% and 7.4%, respectively[23]. Smaller Mobile Virtual Network Operators (MVNOs) control the remainder of the market.

The Communications Authority of Kenya issued five MVNO licences in an attempt to end Safaricom's dominance in the sector. They went to Finserve Africa Limited (a subsidiary of Equity Bank), Mobile Pay Limited, Zioncell Kenya Limited, Lycamobile and Homeland Group. The relatively poor performance of MVNOs, coupled with Safaricom's growing market share, suggests that the government's plan to increase competition in the sector by licensing MVNOs has not been particularly successful[24].

Fixed-line penetration in Kenya is low at about 0.5% of the population[25]. The very low fixed-line penetration rate in Kenya can be attributed to the country's enthusiastic preference for mobile technology (mostly driven by M-Pesa) as well as the large rural population, implying high costs for fixed-line providers.

Although Telkom Kenya currently has a monopoly in the fixed-line market, the government has embarked on a process to license a second fixed-line operator. This operator is expected to be operational by 2019. Various privately owned companies, most notably Safaricom, have had fixed-line provision as a strategic goal at some point in time. This suggests that there is some belief that fixed-line services have the potential to grow. This growth will be contingent upon finding a way to provision fixed-line services to relatively small populations at low costs.
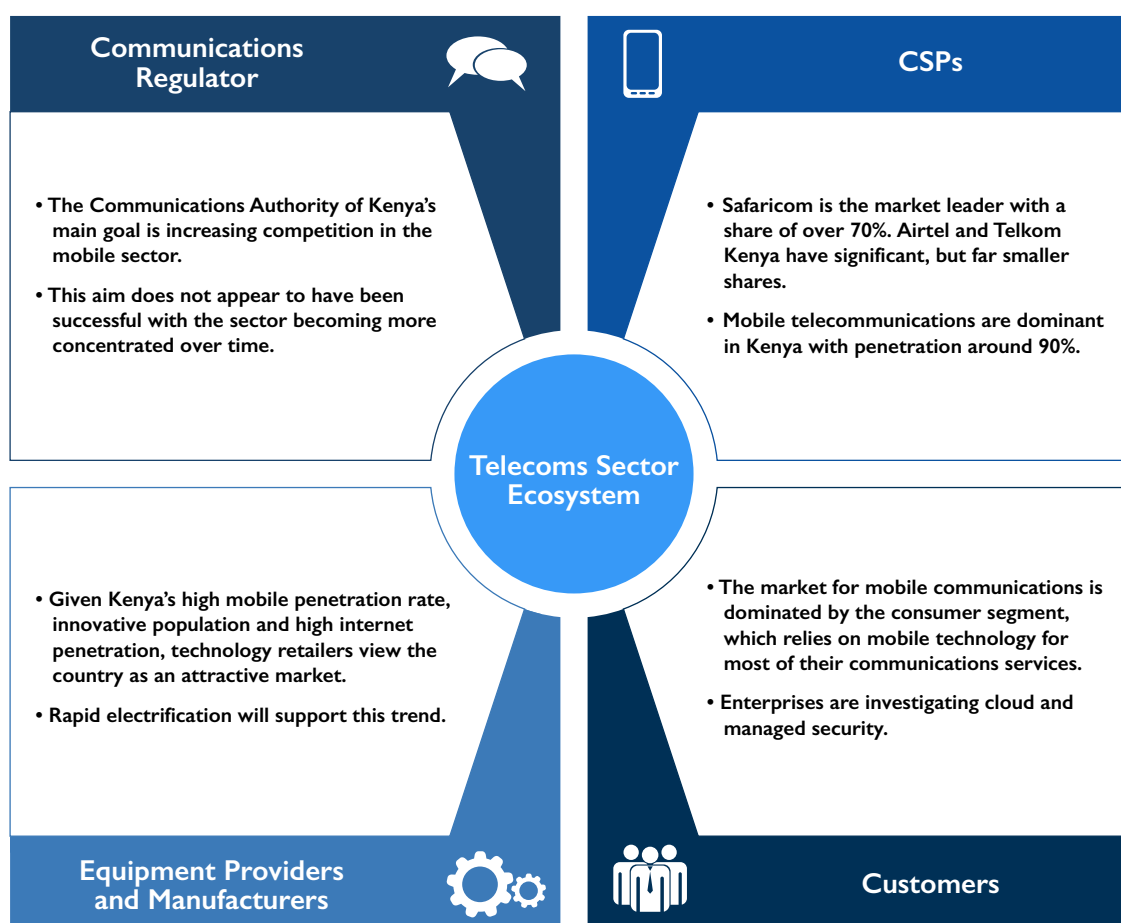
Although the mobile telecommunications industry has proven vital to Kenya's growth and technological development, a number of significant challenges remain to the sector's continued growth. These include:

- Cost of connecting rural populations
- Intermittent blackouts
- High corporate tax rates
- Lack of competition in the sector
- Market driven by subsidiary services (M-Pesa)

The undersea cables that land in Mombasa form the core of Kenya's ICT infrastructure. There are currently three cables landing in Mombasa, namely SEACOM, the Eastern African Submarine Cable System (EASSy) and the East African Marine Systems cable (TEAMS). The three cables represent a cumulative bandwidth availability of 6,400 Gbps. Furthermore, the lower Indian Ocean Network 2 cable provides 1.28 Tbps of bandwidth between Kenya, Rwanda, Tanzania, Ethiopia and Madagascar.

Kenya's internal fixed-line systems are plagued by regular power outages and logistic problems that have considerably slowed deployment. There are on average 36 service interruptions a year and a fixed-line request can take over 100 days to complete.

Chart 11: Telecoms Industry Structure, Kenya, 2017

Communications Regulator
- The Communications Authority of Kenya's main goal is increasing competition in the mobile sector.
- This aim does not appear to have been successful with the sector becoming more concentrated over time.

CSPs
- Safaricom is the market leader with a share of over 70%. Airtel and Telkom Kenya have significant, but far smaller shares.
- Mobile telecommunications are dominant in Kenya with penetration around 90%.

Telecoms Sector Ecosystem

Equipment Providers and Manufacturers
- Given Kenya's high mobile penetration rate, innovative population and high internet penetration, technology retailers view the country as an attractive market.
- Rapid electrification will support this trend.

Customers
- The market for mobile communications is dominated by the consumer segment, which relies on mobile technology for most of their communications services.
- Enterprises are investigating cloud and managed security.

Recent Developments

Rapidly improving electrification will substantially increase consumer demand for ICT products and services. Mobile data, 3G and 4G, in particular, are expected to drive the market in the coming years given Kenya's predilection for mobile technology. Enterprises will use improving fibre connectivity in urban areas to move to the cloud, with PaaS expected to be particularly popular. Backup and disaster recovery, as well as network and application security, are expected to be key spend areas as these will help maintain business continuity.

Chart 12: Telecommunications Market, Kenya, 2017

WIRED TELECOMS	WIRELESS TELECOMS	SATELLITE SERVICES
FTTH, FTTB **Backhaul Services**	**Hybrid Power Systems** **Mobile Tower Financing**	**Cellular Backhaul** **VSAT in Oil & Gas, Mining**
A lot of the fibre deployments have been on long-distance networks and backhaul. However, there is growing interest in last-mile fibre access.	MNOs are adopting hybrid systems to power cellular equipment in rural areas. They are also forming partnerships with tower companies to expand coverage.	There is still a lot of reliance on satellite technology for backhaul and for basic coverage in some sectors in remote areas (Oil & Gas and Mining).

Source: Frost & Sullivan

A. Wired Telecommunications Activities

Kenya's wired telecommunications market is underdeveloped, with only 0.5% of the population able to access a fixed-line subscription[26]. This situation is attributable to the expense of connecting the large rural population to fixed-line networks as well as to the popularity of mobile services such as M-Pesa. Kenya has just one fixed-line provider, the partially state-owned Telkom Kenya. The government was in the process of awarding a licence to a second fixed-line provider in 2017, but there does not appear to be any significant recent developments.

Chart 13: Wired Network Operators Analysis, Kenya, 2016

Network Operators	Subscribers	Market Share
Telecom Kenya	242,300	100%

Source: CAK

There are indications that fixed-line communications in Kenya will become more prevalent given the infrastructure backbone provided by the National Optic Fibre Backbone (NOFBI) project. Furthermore, fibre connections are on the rise with support from a number of internet service providers, especially in large cities.

B. Wireless Telecommunications Activities

Kenya's mobile penetration rate was an estimated 87% in 2016, with internet penetration estimated by the Communications Authority of Kenya at 89.4%[27]. These figures are likely to be somewhat inflated given the high incidence of dual SIM ownership in Africa.

Kenya has three mobile network operators with significant market share: Safaricom, Airtel and Kenya Mobile. Furthermore, the country has licensed five MVNOs, but of these, only Finserve has acquired any significant market share.

Chart 14: Mobile Subscriber Market Share, Kenya, 2017
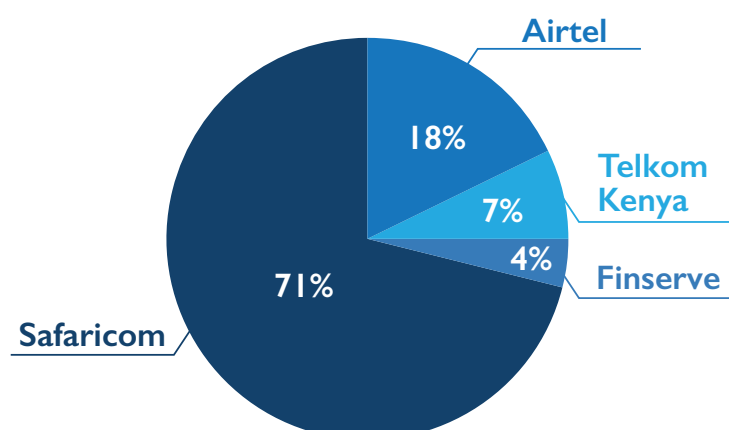
Source: Frost & Sullivan

As Kenya's population appears well served by mobile networks, the primary regulatory concern in the industry has been increasing competition in general and reducing Safaricom's market share in particular. Much of Safaricom's dominance is a result of offering the exceptionally popular M-Pesa service.

Satellite Telecommunications Activities

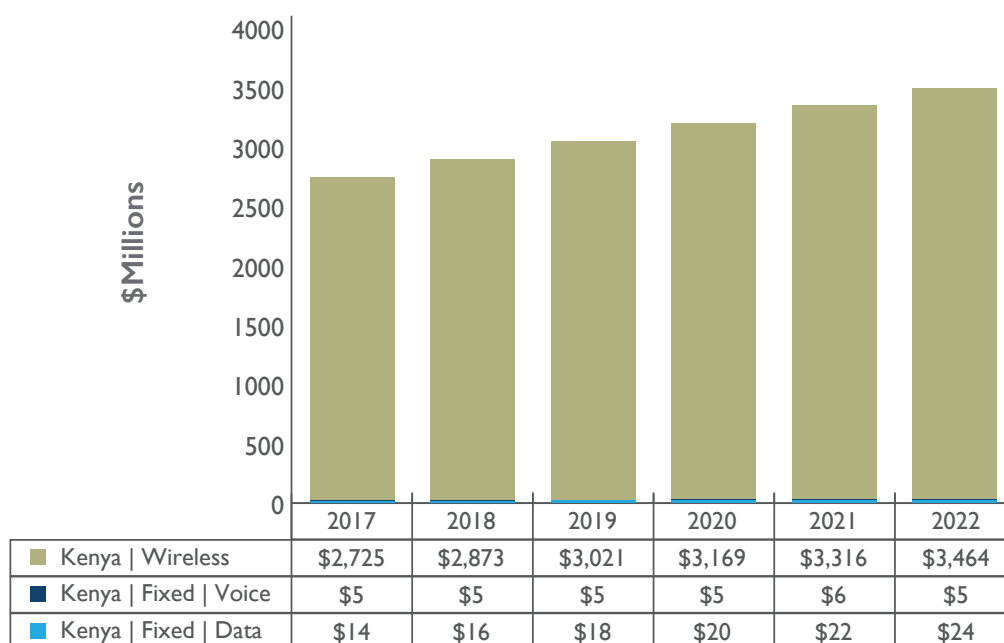Satellite communications have been used in the following areas:

- Weather Forecasting
- Radio and TV Broadcasting
- Military
- Navigation
- Global Telephone and Mobile Communications

The main challenge with remote area connectivity is how to minimize operational expenditure so that dispersed, low average revenue per user (ARPU) communities are served profitably. As we move beyond the current 7 billion cellular subscribers worldwide, traditional mobile network business models are no longer economically viable. This is due to the next billion users being more expensive to serve (due to geographical dispersion) and having lower budgets to spend on communications. For MNOs, this means that future growth will require many more cell sites to cover increasingly larger areas with smaller user populations. At the same time, the expanded networks are likely to bring lower revenues due to lower income levels across those regions.

Satellite connectivity is a popular service offering in Kenya with a host of internet service providers offering very small aperture terminal (VSAT) packages. These are appealing as they avoid the infrastructural challenges associated with fixed connectivity. The popularity of satellite is expected to decrease, especially in urban areas, as last-mile connectivity challenges are resolved, thus making fixed-line connections cheaper and more appealing than satellite offerings.

Market Size and Forecast

Chart 15: Telecommunications Market Revenue Forecast 2017–2022, ($US Millions)

	2017	2018	2019	2020	2021	2022
Kenya	Wireless	$2,725	$2,873	$3,021	$3,169	$3,316	$3,464
Kenya	Fixed	Voice	$5	$5	$5	$5	$6	$5
Kenya	Fixed	Data	$14	$16	$18	$20	$22	$24

Source: Frost & Sullivan

The Kenyan telecommunications market is expected to grow moderately up to 2022, driven by the mobile and data segments in particular. Kenyans have demonstrated a willingness to rely on mobile phones for key services such as money transfers. Over time, the mobile services that Kenyan's rely on will diversify, fuelling growth in the market. The forecast is dependent on the good general economic health of the country. If political turmoil continues, growth will be lower than expected.

Opportunities for UK firms

Mobile Infrastructure in Rural Areas:

UK-based African Mobile Network (AMN) is a company that may be able to exploit this opportunity. AMN funds the construction of mobile base stations in rural areas and operates under a revenue-sharing model with local operators.

Fixed-line Services

Although the government has shown some signs of bringing another fixed-line operator into the market, it is not clear that this is an attractive opportunity. Fixed-line services can have an advantage over mobile services as they can be less costly, but this requires significant economies of scale to be realised. It is not clear that demand would be sufficient in any of Kenya's cities to reach this scale.

Satellite Communications

Some of Kenya's most isolated communities may not be practically serviceable by traditional tower infrastructure. In these cases, the provision of VSAT satellites is often the only way to ensure connectivity.

Areas Where the UK has a Specific Strength in the Country

The United Kingdom is one of the top five trading partners with Kenya, so the authorities are used to the movement of goods and services between the two countries.

The UK already has a significant indirect presence in the Kenyan telecommunications market. UK-based Vodafone has a 40% stake in the country's dominant mobile operator Safaricom.

Route to Market and Challenges to Entry

The primary challenge to entry for UK telecommunications firms looking to establish a presence in the Kenyan market is the dominance of the market leader, Safaricom (which is, in part, a UK firm). The government has already made several unsuccessful attempts to erode Safaricom's market share. The primary challenges to firms seeking to improve connectivity in rural areas will be financial and logistical.

DIGITAL SERVICES

Market Overview

Mobile technology has been central to the development of some of the most innovative solutions in Africa in a range of sectors, including finance, agriculture, healthcare and education. Start-ups have leveraged the growing access to mobile networks and internet services to enable innovation in these sectors. Some of the main opportunities for growth identified in this research include cloud services, fintech services, business process outsourcing (BPO) and eCommerce.

CLOUD COMPUTING	FinTech SERVICES
PaaS, SaaS, IaaS	**International Remittances**
All segments of the cloud market are expected to grow over the next 5 years, with PaaS leading the way.	**Kenya has the largest international mobile remittance market. Increased competition to M-Pesa is expected.**
eCOMMERCE	**BPO SERVICES**
Payment, Facilitation	**Niche Services**
eCommerce is expected to become more prevalent with improved connectivity and increased trust in online transactions.	**Contact centre services are growing steadily and niche market segments are expected to develop.**

Recent Developments

Cloud Services

» Cloud services are becoming steadily more viable in Kenya as connectivity becomes cheaper and more reliable. As a result, several large, international players such as Salesforce, Seven Seas Technologies and IBM have entered the market. Furthermore, Internet Solutions recently re-entered the market.

Fintech Services

» Fintech has a rich history in Kenya following the adoption of M-Pesa. The majority of start-ups located in Nairobi's many technology incubators are fintech firms.

» Credit, mobile payment and banking services represent the core of the market, but there are also innovations in the agricultural and peer-to-peer lending domains.

BPO Services

» The Kenyan government has recently reiterated its interest in the country's BPO sector, and it is expected to generate 10,000 jobs by 2022.

» Niche services such as analytics and knowledge process outsourcing are expected to lead growth.

eCommerce

» eCommerce in Kenya is expected to grow healthily off the back of mobile services. This is due to low levels of fixed internet access and computer usage.

» Much of Kenya's start-up activity is around mobile payment systems.

Host Government Structures and Policies

Given the breadth of the digital services market, there are a number of relevant stakeholders at play.

Central Bank of Kenya

The Central Bank of Kenya plays a significant role in the regulation of digital services, especially as they involve financial information. Many firms have suggested that these regulations are overly stringent and unclear.

The Central Bank is also responsible for the regulation of the national payment system which determines the conditions under which operators seeking to use the system may enter the market.

Communication Authority of Kenya

The Communications Authority is charged with regulating the communications industry in general and will thus have a bearing on digital services regulation, especially cloud and BPO services.

Ministry of Information, Communications and Technology

The Ministry of Information, Communications and Technology is responsible for developing and managing policy on ICT. This will impact all forms of digital services.

Market Size and Forecast

Chart 16: Digital Services (Consumer) Market Revenue Forecast, 2017–2022, ($US Millions)
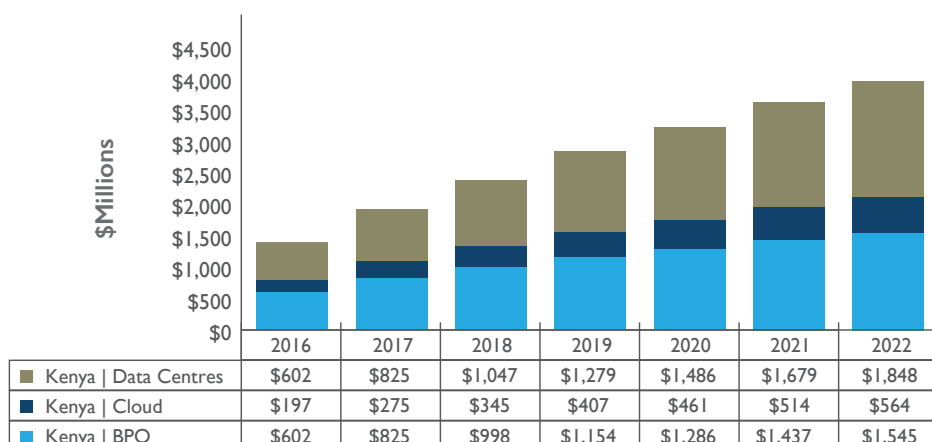

	2017	2018	2019	2020	2021	2022
Kenya | Pay TV	$151.0	$175.5	$201.2	$227.9	$255.6	$284.6
Kenya | mHealth	$147.8	$206.2	$275.7	$356.9	$450.5	$557.1
Kenya | mEducation	$59.8	$85.5	$116.1	$152.2	$193.9	$241.6
Kenya | Insurance	$5.2	$7.9	$11.1	$14.9	$19.4	$24.5
Kenya | Fintech	$53.5	$63.8	$74.9	$87.0	$99.9	$113.7
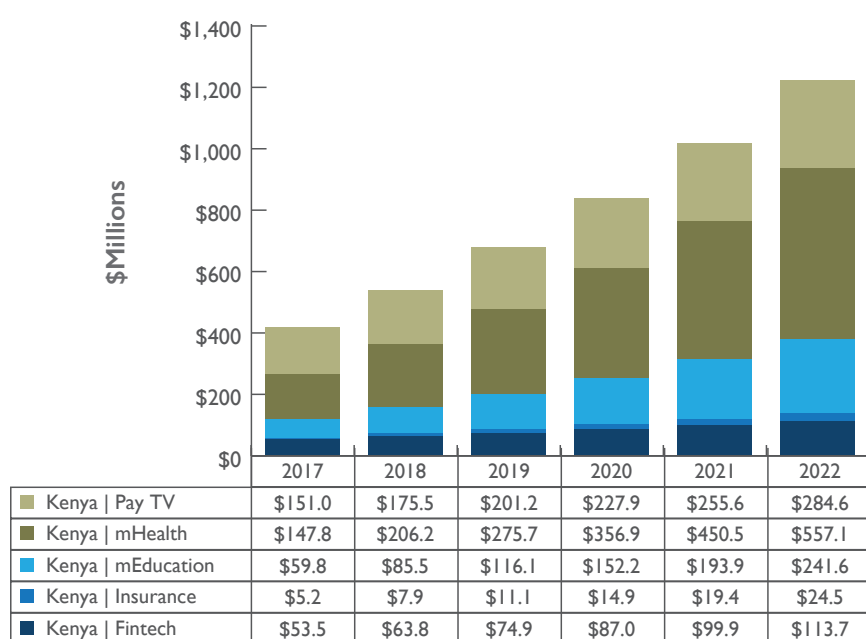
Chart 17: Digital Services (Business) Market Revenue Forecast, 2017–2022, ($US Millions)

	2016	2017	2018	2019	2020	2021	2022
Kenya | Data Centres	$602	$825	$1,047	$1,279	$1,486	$1,679	$1,848
Kenya | Cloud	$197	$275	$345	$407	$461	$514	$564
Kenya | BPO	$602	$825	$998	$1,154	$1,286	$1,437	$1,545

Cloud Services Market

Kenya's cloud service market is expected to grow at a healthy rate with PaaS driving growth. This is attributed to PaaS offerings displaying higher per-unit revenues than IaaS or SaaS offerings. Additionally, PaaS deployments offer developers far more control over their applications than SaaS offerings.

Furthermore, Kenya's cloud service market will expand as connectivity and energy constraints are mitigated.

Hybrid public-private cloud models are expected to become more popular due to increased trust in cloud systems and the cost advantage these models offer.

Kenya's cloud market has seen the entry of many large international firms, primarily from the United States, frequently in partnership with local providers whereby the local provider acts as a broker and manages the transition process. An example of this is a reseller partnership between Google and Nairobi-based Naisoft, whereby Naisoft resells Google cloud services in the Kenyan market.

PaaS
2016: $39 million
2019: $94 million

SaaS
2016: $59 million
2019: $109 million

IaaS
2016: $99 million
2019: $189 million
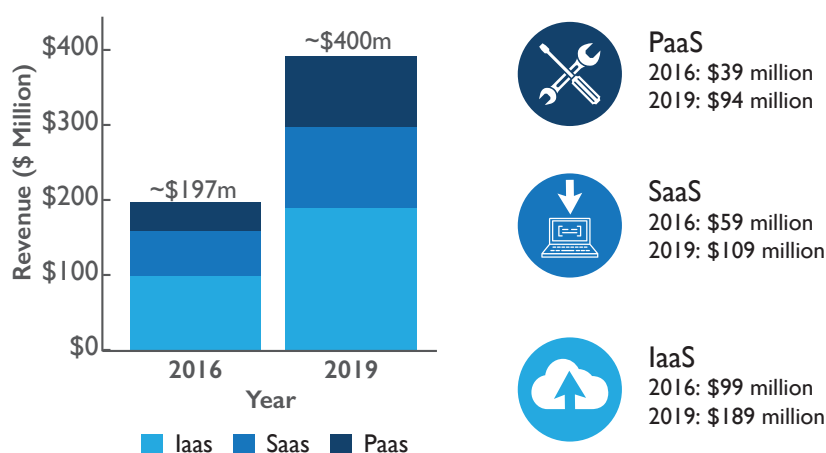
- Demand for cloud services was estimated at **$197.4 million in 2016**, and grew by almost 40% in 2017 to **$275 million**.
- Growth is expected to be driven by PaaS and the easing of constraints around trust and connectivity.
- Unusually, the public sector leads the private sector in terms of cloud adoption in Kenya with 35.6% of public-sector institutions using cloud services compared to 23% of private businesses[28]. This divergence is attributable to a clear policy of digitalising government services.

The key opportunities in the Kenyan cloud services market revolve around making mobile and mobility services more accessible to small and medium-sized enterprises. Data protection laws will need to be considered in this process, and a differentiating feature may be for the provider to ensure compliance with these laws as smaller firms may lack the capabilities.

'Lite' mobile CRM and ERP solutions may prove popular as well as PaaS offerings that provide flexibility and easy programming interfaces.

Competitive Overview

The Kenyan cloud market is split between local and international providers. Frequently, local providers act as resellers and brokers in partnerships with large international providers. Companies such as Seven Seas Technologies, Angani, Safaricom, Dimension Data, IBM and Salesforce are active in the market.

Chart 18: Cloud Services Market: Service Revenue Share (%), Kenya, 2016
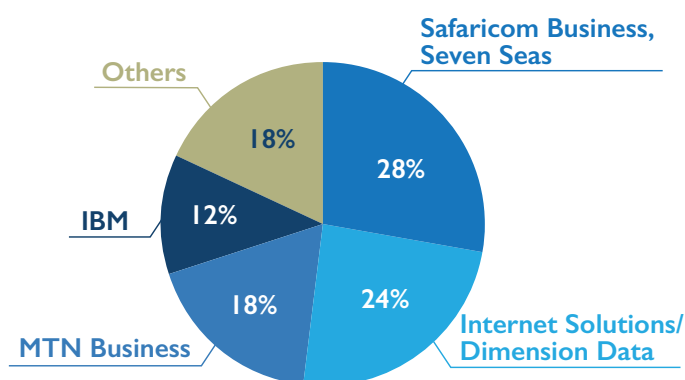
BPO Sector

The Kenyan government is targeting the creation of 10,000 jobs in the BPO sector by 2022. Although demand from domestic firms for BPO services is limited, Kenya is a fairly attractive destination for international firms seeking to outsource these functions. Kenya has a good combination of strong connectivity and education, as well as relatively low labour costs. Furthermore, Kenya is situated in an attractive time zone for European customers.

Although the BPO market is currently dominated by traditional call centre services, niche services such as knowledge process outsourcing and market research and analytics are expected to boom from 2018 to 2022.

Most of the growth in the BPO industry is expected to be on the back of increased demand from retailers, fast-moving consumer goods firms, eCommerce firms and fast food chains.

Competitive Overview

The Kenyan BPO market is made up of about 16 firms, including some prominent international companies such as Accu BPO and Omron Adept Technologies. There are also a number of home-grown firms in the market such as Ken-Tech Data. The BPO industry covers services such as in- and outbound contact centres, data entry, capture and conversion, medical and financial transcription, and software and web development.

Fintech

Kenya performs remarkably well relative to other developing countries in terms of financial and digital inclusion. This is primarily due to high adoption rates of mobile money services amongst traditionally underserved groups. The range of mobile money services is broadening to include insurance and loan products.

An estimated 75% of Kenyan adults have access to a financial services account of some type, considerably higher than the sub-Saharan average of 26%. This represents a 50% increase since 2006[29].

Kenya's primary payment system is the Kenya Electronic Payment and Settlement System (KEPS) and is used by commercial banks to transfer funds between their accounts. It is administered by the Central Bank. Additionally, Kenya makes use of two regional payment systems to facilitate transactions with regional partners—the East African Payment System and the Regional Payment and Settlement System. The two primary retail payment systems (systems used by consumers for standard transactions) are mobile phone money transfer services and payment cards[30]. The Chart below details the total value of transactions processed over these payment systems in 2016, which provides some indication of the addressable market.

KEPS/ Regional — $287.1 billion
Mobile — $33.15 billion
Cards — $13.8 billion
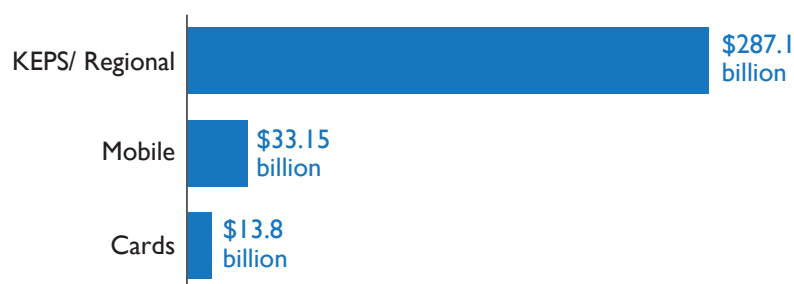
Source: KCB

The most significant aspect of the Kenyan payments market is the dominance of mobile payments over card payments. Note that card payments made online through a mobile device are classified as card payments. Mobile payments are those made using mobile wallet services or applications such as M-Pesa. The dominance of mobile markets reflects the success of M-Pesa and other mobile financial service offerings in the country. As smartphone penetration in Kenya increases, the variety of mobile financial service offerings is expected to increase.

Competitive Overview

Current estimates suggest that there are about 40 significant fintech firms in the Kenyan market. Although M-Pesa is dominant, several other firms have exploited niches in the mobile payments market. BitPesa, for example, enables regional mobile payment using Bitcoin rather than traditional currency, and Kopo Kopo offers a SaaS suite that allows small businesses to process mobile payments. The market has proven attractive to large international firms such as Vodafone (through Safaricom and M-Pesa) and Opera as well as to local start-ups—many of which stem from Nairobi's many tech incubators. There is evidence that the mobile payment market is maturing and that other avenues, such as insurance and loans, are being explored.

eCommerce

The Kenyan market appears particularly well suited to eCommerce due to the high use of mobile phones in the country and the population being accustomed to conducting transactions over mobile phones.

The Kenyan market is sometimes compared to the Chinese eCommerce market in the early 2000s and, as such, should benefit from employing similar strategies. Two important similar strategies will be to make buying and selling on eCommerce platforms as cheap as possible and also to enable real-time text communication on the platforms. Whilst Kenyans are fairly comfortable with mobile payments, the population has shown a reticence toward trusting product images, and real-time text communication may mitigate this. Another challenge to eCommerce operators is ensuring an efficient and viable delivery network due to difficulties in achieving economies of scale in the relatively poor cities.

Competitive Overview

The main competitors in the eCommerce market in Kenya are Jumia, OLX, Kilimall and Cheki. Although OLX is still operational in the country, it recently closed its Kenyan offices. Key challenges in the industry involve developing viable and efficient delivery networks.

Areas of Technology-specific Strength

Digital service providers in the cloud and BPO markets are largely involved in the provision, rather than the development, of services, whilst Kenyan firms are more prevalent in the fintech and eCommerce markets. The physical technology required for the delivery of digital services is typically imported, and it is not clear that Kenya could produce these products more efficiently.

A key strength in the digital services market is the acceptance of mobile services. Any consumer solution entering the market would have to be mobile-compatible. Mobile healthcare services are expected to grow particularly rapidly as the sophistication of these offerings increases.

Opportunities for UK Firms

Cloud – There is significant opportunity for the development and sale of mobile cloud services in the Kenyan market. The primary opportunity lies in targeting small and medium enterprises with mobile-compatible versions of ERP and CRM solutions.

Fintech – Successful fintech offerings in the Kenyan market have typically focussed on addressing specifically Kenyan problems. M-Pesa, for example, was successful as it provided easy, cheap access to a historically under-banked Kenyan population. Kenyan's have shown a preference for mobile commerce and the opportunity lies in developing more advanced mobile services around healthcare, finance and insurance.

eCommerce – eCommerce has great potential in Kenya due to a willingness to make payments online or through a mobile money account. The primary restraint to growth in this area is under-developed transportation and delivery infrastructure. There is an opportunity here for vendors with creative delivery solutions to capture the market. A possible strategy here would be to employ a pay online, collect at store model.

UK presence in the country

Sage and Vodafone (through Safaricom and M-Pesa) appear to be the most prominent UK firms in the Kenyan digital services market.

Sage has an office in Nairobi as well as 11 local partners that resell its payroll, HR and payment systems.

Route to Market and Challenges to Entry

On the consumer side, it is vital that any proposed digital service offering be mobile-compatible due to the prevalence of mobile usage in Kenya. Furthermore, smartphone penetration in the region is steadily increasing, thus increasing the sophistication of viable digital service offerings.

Given the acceptance of fintech by the Kenyan population, a possible route to entry in the consumer market is to acquire one of the many smaller fintech firms in the industry. This would resolve some of the primary barriers to entry, most specifically bureaucratic red tape and a lack of local knowledge.

On the corporate side, the most effective route to entry is likely through partnerships with smaller local resellers. This model is already popular in the Kenyan market. A key differentiating feature here will be how well the service adapted to the Kenyan market.

CYBERSECURITY SERVICES

Market Overview

Chart 19: Security Market Landscape, Kenya, 2016

	Market Evolution
• Kenya is technologically advanced and connected relative to the rest of Africa. This makes it an attractive target for cyber-attacks. • The economy lost an estimated $175 million to cyber-crime in 2016. • Lack of education and technical skills are crucial barriers to improved security.	• Increasing number of attacks targeting mobile money platforms through social engineering and malware.
	Addressable Market
	• 96% of organizations have a security budget of less than $5000 per year. • BFS, government and telecommunications appear to have lower security budgets than other sectors.
	Competitive Environment
	• Market is dominated by systems integrators and operators that partner with international security vendors. Local providers provide bespoke security solutions for the market. • While still at an early stage of development, the market is moving to managed security services.

Source: Frost & Sullivan

Recent Developments

- Government plans to implement the Network Early Warning System and National Intrusion Detection and Prevention System are criticised by privacy advocates as means to increase population surveillance.
- Ministry of ICT has committed to establishing a task force for assessing security issues around blockchain and IoT.
- Microsoft management has warned Kenyan firms of the importance of cybersecurity when digitalising.
- Customer fraud identified as a primary security risk.

Host Government Structures and Policies

The Kenyan government has recognised that the risk and cost of cyber-attacks increases as the country's ICT infrastructure improves and as more Kenyan people and businesses move online.

The ICT Authority developed a cybersecurity strategy in 2017 in an attempt to mitigate cyber-risk moving forward. The strategy outlines Kenya's cybersecurity vision and key objectives in accordance with Kenya's Vision 2030 ICT goals.

The security strategy has four primary goals[31]:

1. Enhance the nation's cybersecurity posture in a manner that facilitates the country's growth, safety and prosperity.

2. Build national capability by raising cybersecurity awareness and developing Kenya's workforce to address cybersecurity needs.

3. Foster information sharing and collaboration among relevant stakeholders to facilitate an information-sharing environment focused on achieving the strategy's goals and objectives.

4. Provide leadership by defining the national cybersecurity vision, goals and objectives, and coordinating cybersecurity initiatives at the national level.

Increased political awareness of cyber-risks should result in heightened awareness of the problem in Kenyan businesses. Small ICT budgets, especially in smaller firms, will remain a barrier to adoption.

Kenya is relatively advanced in terms of cybersecurity policy. The Information and Communications Act of 1998 mandated the creation of a national cybersecurity management framework through the establishment of a national Computer Incidence Response Team (CIRT). The National Kenya Computer Incidence Response Team Coordination Centre (

National KE-CIRT/CC) is mandated with coordinating the response to and management of cybersecurity incidents nationally and to collaborate with relevant local, regional and international actors[32].

Market Size and Forecast

The demand for cybersecurity services in Kenya varies greatly with the size of organisation under consideration.

Chart 20: % Proportion of Enterprises with ICT Security Policy, Kenya, 2016[33]:
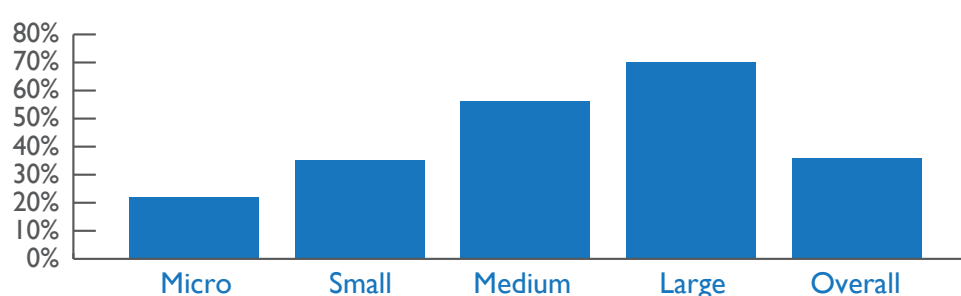
The overall proportion of organisations with an ICT security policy in place is brought down considerably by the large proportion of micro-enterprises in the Kenyan economy.

Although smaller enterprises are considerably less likely to have an ICT security policy, use of basic ICT equipment, such as computers and mobile phones, does not vary considerably by enterprise size. In terms of protective measures employed, most organisations of any size make use of some form of anti-virus software, but more sophisticated security measures are either confined to larger enterprises or hardly used at all.
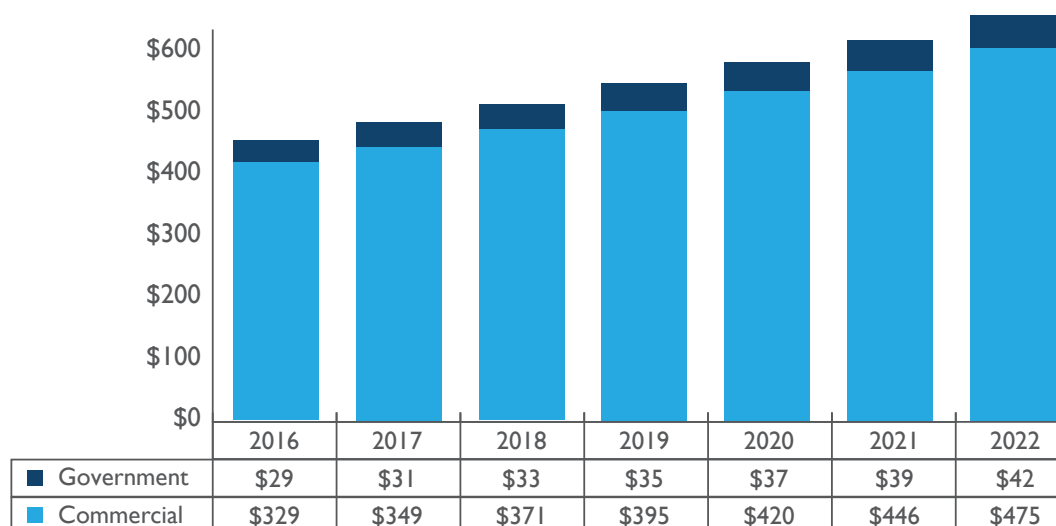
Chart 21: Security Measures Employed (%) and Enterprise Size, Kenya, 2016[34] [35]

Security Measure Employed	Micro	Small	Medium	Large	Total[36]
Anti-virus	78.4	89.3	95.6	97.7	84.9
Anti-spyware	21.0	33.6	52.5	67.4	34.0
Firewall	31.1	48.6	66.4	81.6	46.6
Spam filter	25.9	40.4	56.6	74.7	39.6
Secured communication between client and server (SSL, SHTTP)	9.9	22.5	42.5	58.2	23.5
Authentication software or hardware for internal users	12.4	25.8	49.9	62.5	27.1
Authentication software or hardware for external users	6.2	13.7	25.2	33.2	14.1
Intrusion detection system	6.4	13.5	27.6	39.8	15.0
Regular backup of critical data	28.9	42.8	65.7	82.6	43.7
Off-site backup	15.9	23.9	42.3	57.2	26.1
Computer passwords	58.0	71.1	82.9	86.2	67.7
None	19.9	9.0	3.1	2.3	11.3

As evident from Chart 21, there is a high level of use of basic anti-virus software across all firms. This suggests that growth in the cybersecurity market will be driven by other factors. These are likely to be cloud-based spyware, firewall backup facilities for smaller enterprises, and authentication and intrusion detection for large enterprises.

Market Size and Forecast

Chart 22: Cybersecurity Market Revenue Forecast, 2016–2022 ($US Millions)

	2016	2017	2018	2019	2020	2021	2022
■ Government	$29	$31	$33	$35	$37	$39	$42
■ Commercial	$329	$349	$371	$395	$420	$446	$475

Source: Frost & Sullivan

Kenya's commercial cybersecurity market is expected to grow from an estimated $329 million in 2016 to $475 million in 2022. This is driven by increasing threats as cyber becomes a greater priority across financial services and telecoms. Whilst the government lags behind larger African countries such as Nigeria and Kenya, greater engagement will see a slow increase in expenditure of $ million to $42 million in 2022.

Competitive Analysis

Kenya's cybersecurity market is primarily made up of local and international firms that re-sell services from large security providers such as AVG, Kaspersky and Fortinet as well as providing consulting services. The exact nature of competition in the market is difficult to assess due to security services frequently being bundled with other IT services and due to these services often being purchased by means of cross-border electronic transactions. As the member states of the World Trade Organisation maintain a moratorium on the discussion of customs duties on eCommerce, countries do not keep records of imports and exports of security services.

Although the banking and financial services sector is reportedly most at risk of cyber-attacks in Kenya, an estimated 77% of these organisations have a dedicated security budget of less than $1,000 per year. In addition 87% of government departments and 77% of telecommunication organisations also have a dedicated security budget of less than $1000 per year[37].

This suggests that while about 62% of organisations in these sectors have experienced cyber-crime, they have not yet split security into a separate budget item. This will constitute a challenge to security providers as security will have to compete with various other services for its share of funding. Furthermore, security services are often viewed as a cost centre and, whilst they may save a business a considerable amount of money, they do not further the businesses growth.

Chart 23: Assessment of Key Providers, Kenya, 2017

Service Provider	Key Differentiating Features	Growth Strategy	Key Sectors
Internet Solutions	Internet Solutions Kenya seeks to provide and end-to-end security solution that is comprehensive and reliable.	Internet Solutions Kenya is seeking growth through targeting the enterprise market with solutions branded as being comprehensive.	• Financial Services • Public Sector • Telecommunications
Dimension Data	Dimension Data Kenya offer a suite of security services including managed security, architecture assessment and secure mobile access.	Dimension Data seeks to target large enterprises. Cloud and mobility are central to growth strategy.	• Financial Services, • Media and Communications • Manufacturing • Public Sector
Smaller, local ICT service providers	Smaller providers partner with international security software providers to service the Kenyan market. Some of these firms also offer security consulting services.	Various	Various

Areas of Technology-specific Strength

Chart 24: Cybersecurity Spending Trends, Kenya, 2016
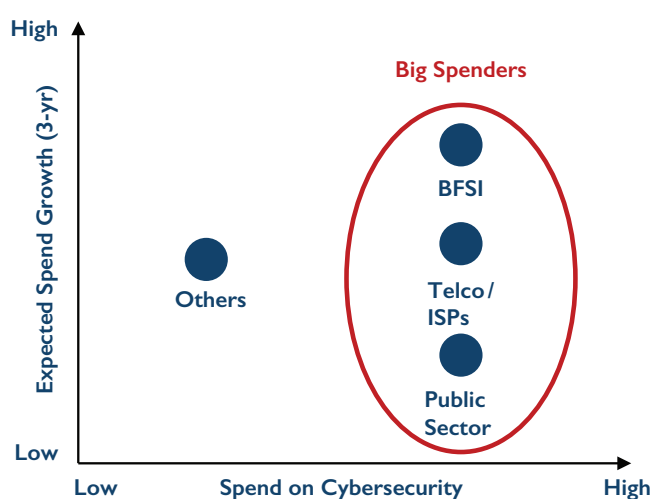
Financial Services

The banking and financial services industry is currently one of Kenya's biggest cybersecurity spenders. It is predicted that cyber security expenditure in the industry will grow relatively quickly over the next three years. The industry is a key target for cyber-criminals due to the value of the information that the industry possesses. Expenditure is likely to focus on security of mobile access and end-point security.

Telecoms

With their extensive accumulation of customer data and financial transactions, operators are among the most targeted sectors by cyber criminals. Kenya's telecommunications operators spend fairly heavily on security currently, and this spend is expected to grow at a moderate rate as mobile phone usage diversifies.

Government and Public Sector

Although government does not appear to publish their cyber security expenditure, it is more advanced in cyber security policy and engagement than other sectors. Despite the public sector remaining a key target for cyber attack, there is no indication that there will be a sudden increase in funding for cyber security solutions in government as budget constraints restrict growth.

Opportunities for UK Firms

The primary need in the Kenyan cybersecurity market revolve around the provision of anti-spyware, firewall and back-up services for smaller enterprises, and more advanced services, such as authentication and intrusion detection, for larger enterprises.

Mobile security is also likely to become a more important area as more and more business-critical functions are conducted using mobile devices.

Areas Where the UK has a Specific Strength in the Country

The UK does not appear to have any firms with physical operations in Kenya that provide cybersecurity services. The actual market presence of UK firms is not possible to assess due to the frequency with which these services are ordered and delivered online.

Route to Market and Challenges to Entry

The most promising route-to-market strategies will involve considerable marketing of the service in Kenya. Notably, a physical presence in the country is not likely required, and services could either be sold through partnerships or exclusively online. The online nature of the security market makes marketing vital due to brand recognition. Security spending in Kenya believed to be about to increase as the country becomes more digitalised. It is likely that mobile cloud-based security in particular will be in high demand.

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32. Ibid

33. Serianu Kenya Cyber Security Report 2016 – www.serianu.com/downloads/KenyaCyberSecurityReport2016.pdf

34. Note that firms that do not have an official security policy (see Chart 20) may still employ security measures of some type.

35. Serianu Kenya Cyber Security Report 2016 – www.serianu.com/downloads/KenyaCyberSecurityReport2016.pdf

36. Note that the 'Total' column is the average across all firms and this gives more weight to small and medium enterprises as there are far more of these in the Kenyan market.

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