Digital Market Overview: Brazil
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.
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EXECUTIVE SUMMARY

Key Findings

Brazil has one of the largest economies in Latin America, representing 40% of Latin America’s GDP. Despite the recent economic crisis, Brazil still represents a promising market for future ICT investment.

There are expectations that presidential elections, scheduled for 2018, will be followed by greater economic stability and an attendant increase in foreign investments as investor confidence rebounds.

UK companies should consider investments in Tier 2 and 3 cities, where they can engage more meaningfully in economic and community development.

Broadband investments are important, with a goal of 95% coverage of municipalities by 2018. There also are 4.5G and 5G opportunities with telcos.

Cybersecurity is becoming one of the largest markets in the ICT domain because of escalating cyber threats in the country.
**Market Forecast**

Chart 1: Brazilian market forecast revenue by sector, 2017–2022 (US$ Millions)

<table>
<thead>
<tr>
<th>Year</th>
<th>Cyber Security</th>
<th>Digital Services</th>
<th>Telecoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>$3,669.2</td>
<td>$14,138.9</td>
<td>$28,865.1</td>
</tr>
<tr>
<td>2018</td>
<td>$3,987.8</td>
<td>$15,571.6</td>
<td>$29,128.4</td>
</tr>
<tr>
<td>2019</td>
<td>$4,334.2</td>
<td>$17,304.4</td>
<td>$29,455.7</td>
</tr>
<tr>
<td>2020</td>
<td>$4,710.5</td>
<td>$19,177.3</td>
<td>$29,556.7</td>
</tr>
<tr>
<td>2021</td>
<td>$5,119.6</td>
<td>$21,180.5</td>
<td>$29,637.5</td>
</tr>
<tr>
<td>2022</td>
<td>$5,564.2</td>
<td>$23,471.3</td>
<td>$29,687.7</td>
</tr>
</tbody>
</table>

Source: Frost & Sullivan

**Telecommunications**

The telecommunications market is among the largest contributors to the ICT sector. The total addressable market will be worth an estimated US $29.69 billion by 2022. While growth rates are less impressive, this still remains an attractive market that receives billions of dollars in capital investments annually. Key opportunities include mobile communications, data and data storage.

**Digital Services**

Cloud, data centres, Internet of Things (IoT) and Big Data are among the main opportunities for UK firms in Brazil. This market is exhibiting strong growth due in part to the increased demand for data storage. The market is fragmented, with global, regional and local providers offering a variety of solutions. This will require engaging with local and regional enterprises and the public sector.

**Cyber Security**

Cybersecurity is becoming a key focus area due to rapid digitisation. Companies are increasing their investments in cybersecurity to protect their assets. Niche providers, global IT firms and telco providers are active in this market. Finance, the public sector, retail, telecommunications and healthcare are the main target sectors.

**Key Focus Areas for Digital Opportunities in Brazil**

<table>
<thead>
<tr>
<th>Telecommunications</th>
<th>Digital Services</th>
<th>Cybersecurity</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Mobile infrastructure</td>
<td>• BPO</td>
<td>• Network Security</td>
</tr>
<tr>
<td>• Fixed broadband expansion</td>
<td>• FinTech</td>
<td>• Endpoint Security</td>
</tr>
<tr>
<td></td>
<td>• IoT</td>
<td>• Consulting Services</td>
</tr>
<tr>
<td></td>
<td>• VOD</td>
<td></td>
</tr>
</tbody>
</table>
Country Overview

Chart 2: Brazil Metrics

Key Country Metrics (2016)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital City</td>
<td>Brasilia</td>
</tr>
<tr>
<td>GDP</td>
<td>$1.796 Trillion</td>
</tr>
<tr>
<td>Estimated GDP Growth (2017-2022)</td>
<td>2%</td>
</tr>
<tr>
<td>Foreign Direct Investment</td>
<td>$75 billion</td>
</tr>
<tr>
<td>Currency (March 2018)</td>
<td>BRL (R$)</td>
</tr>
<tr>
<td></td>
<td>1 USD = R$3.28</td>
</tr>
</tbody>
</table>

Source: World Bank; IBGE - Brazil; ITU; OICA; Frost & Sullivan

Brazil has the largest economy in Latin America based on GDP, representing almost 40% of the region’s total economy. The country experienced an economic crisis from 2015–2016 and investments fell by almost 30% from early 2014–2017. The country’s annual GDP growth rate decelerated steadily, from an average of 4.5% between 2006 and 2010 to 2.1% between 2011 and 2014, finally recording negative growth in 2015 and 2016.

A variety of factors contributed to the decline in investments, including a deterioration of Brazil’s medium-term growth prospects, rising real interest rates, falling terms of trade, increasing uncertainties related to economic policy, greater corporate leverage and lower cash flows. Some of the factors that have weighed on investment in recent years have begun to normalise, providing some impetus for a recovery. However, continued high levels of corporate leverage and the prospect of continued uncertainty related to economic policy suggest that a turnaround in investment is likely to be subdued.

Meanwhile, positive signs are pointing to stronger investment in the short term. Empirical results suggest that stabilisation of regulated price inflation, terms of trade and real interest rates should boost investment growth and growth expectations. The large and necessary increases in fuel and electricity tariffs in 2015 are not expected to be repeated, and the central bank has begun an easing cycle that is expected to continue until 2018. In addition, Brazil’s terms of trade have improved markedly since the beginning of 2016.
Digital Market Overview: Brazil

Demographic Overview

About 55% of Brazil’s population is of working age, while an additional third—currently up to 14 years old—will start to join the workforce in 2022. Adult literacy is high at 92.6%, with men edging ahead at 92.9% and women at 92.2% in 2015. The middle classes form the largest socioeconomic group, representing 56% of the population.

Despite its size, more than 90% of Brazil’s population lives near the coast, with only 10% living inland. More specifically, the majority of Brazilians live in the southeast, in regions including Sao Paolo (21.4 million), Rio de Janeiro (12.4 million), Minas Gerais (5.9 million) and Rio Grande do Sul (4.3 million). International companies such as Telecom Italia Mobile have launched their broadband services in Sao Paolo and Rio de Janeiro to take advantage of their high population density.

The majority of Brazilians are young or of working age, literate, tech-savvy and have disposable incomes. In addition, although Brazil has a large land mass, most Brazilians live in a relatively small area. This population density is advantageous for foreign investment since even a small network built in the right area will be able to reach a relatively large proportion of the population. With this type of demographic, the country is ideal for future ICT investment over the next five years.

Chart 3: Population Social Structure, Brazil, 2016

Source: Demographic Dividend; National Bureau of Statistics; ITU; World Bank 2016
PESTLE Analysis

Chart 4: PESTLE Analysis Summary, Brazil, 2016

<table>
<thead>
<tr>
<th>Factors</th>
<th>PESTLE Trends</th>
<th>Implications for ICT Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political</td>
<td>The political environment will be uncertain until the 2018 presidential election.</td>
<td>A more stable political climate is expected to boost foreign investment following the election.</td>
</tr>
<tr>
<td>Economic</td>
<td>After two years of severe recession, the country seems to be back on track with regards to its macroeconomic indicators.</td>
<td>With a positive outlook for the economy, investments in ICT should rise, including more Brazilian companies moving to digitise their operations.</td>
</tr>
<tr>
<td>Social</td>
<td>The country has a relatively young population with more than half its citizens falling in the middle class.</td>
<td>This will increase the scope for investments in ICT, creating fresh opportunities for young people to work with new technology.</td>
</tr>
<tr>
<td>Technological</td>
<td>Brazil has one of the most advanced ICT markets in the region in terms of consumer take-up. In 2017, the country had 240 million cellular users—of which 99.7 million were smartphone users—and 45 million fixed lines.</td>
<td>Smartphone penetration is 48% while fixed broadband penetration is 15%, indicating space for growth and investments in fixed broadband.</td>
</tr>
<tr>
<td>Legal</td>
<td>According to the national telecom regulator, about 75% of Brazilian households have no broadband access. One reason is the bureaucratic relationship between operators and the government.</td>
<td>The Brazilian government is organising its ‘Internet for All’ programme following the launch of its first satellite in May 2017. Investment so far has totalled BRL 3 billion.</td>
</tr>
</tbody>
</table>

Chart 5: ICT Industry: ICT Readiness Index, Brazil, 2014–2016

<table>
<thead>
<tr>
<th>Readiness Measure</th>
<th>2016* Score</th>
<th>2016 Rank</th>
<th>Change in Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political and Regulatory Environment</td>
<td>3.37</td>
<td>98</td>
<td>-20 ▼</td>
</tr>
<tr>
<td>Business and Innovation Environment</td>
<td>3.44</td>
<td>124</td>
<td>11 ▲</td>
</tr>
<tr>
<td>Infrastructure and Digital Content</td>
<td>4.52</td>
<td>58</td>
<td>-2 ▼</td>
</tr>
<tr>
<td>Affordability</td>
<td>6.16</td>
<td>26</td>
<td>65 ▲</td>
</tr>
<tr>
<td>Skills</td>
<td>4.53</td>
<td>91</td>
<td>0 ◀</td>
</tr>
<tr>
<td>Economic Climate</td>
<td>3.54</td>
<td>79</td>
<td>-15 ▼</td>
</tr>
<tr>
<td>ICT Usage</td>
<td>4.04</td>
<td>57</td>
<td>-10 ▼</td>
</tr>
<tr>
<td>Network Readiness Index Rank</td>
<td>4.0</td>
<td>4.0</td>
<td>-3 ▼</td>
</tr>
</tbody>
</table>

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

Brazil’s ranking in terms of overall network readiness fell by 3 points over the period 2014–2016. While parameters related to affordability and business and innovation environment improved over the two-year period, a deteriorating economic climate took its toll, falling by 15 points between 2014 and 2016.

Recently, Brazil faced challenges brought on by declining trade, labour, and financial markets. Institutional missteps have led to concerns about the quality of public-sector administration. While Brazil has shown improvement in areas such as the protection of property rights and has undertaken measures to curb undue influence, political uncertainty and reduced public funding are impeding growth.

Investments in future digital projects are likely to be deferred until after the presidential elections scheduled for October 2018. The appointment of a new president is anticipated to kick-start a wave of foreign and local investments. In addition to this, the International Telecommunication Union (ITU) global ICT Development Index has ranked Brazil at 66 in 2017. This was one place higher than in 2016.
### Drivers and Restraints

**Chart 6: ICT Industry Drivers, Brazil, 2017–2023**

**INDUSTRY DRIVERS**

<table>
<thead>
<tr>
<th>Industry Drivers</th>
<th>1-2 Years</th>
<th>3-4 Years</th>
<th>5-7 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus on high-value customer segments</td>
<td>L</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Creation of digital and value-added services</td>
<td>M</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Machine-to-machine (M2M) and Internet of Things (IoT) services as revenue sources</td>
<td>L</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>Recovery of purchasing power</td>
<td>L</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Big Data Analytics (BDA) to leverage customer experience and optimise infrastructure</td>
<td>L</td>
<td>L</td>
<td>M</td>
</tr>
</tbody>
</table>

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

**ICT Industry Restraints, Brazil, 2017-2023**

**INDUSTRY RESTRAINTS**

<table>
<thead>
<tr>
<th>ICT Industry Restraints</th>
<th>1-2 Years</th>
<th>3-4 Years</th>
<th>5-7 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low business confidence since 2015, following President Rousseff’s falling approval ratings and subsequent impeachment in 2016</td>
<td>H</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Enterprises delaying some of their larger IT investments due to slow economic growth</td>
<td>H</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Limited understanding among small enterprises about new cybersecurity and cloud technologies</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
</tbody>
</table>

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

### Host Government Structures and Policies

**Ministry of Communications (MCTIC)**

The Ministry of Science, Technology, Innovation and Communications (MCTIC) is responsible for the regulation of public policies related to radio, television, telecommunications, and postal services in Brazil. It seeks to promote technological innovation, economic growth, and digital inclusion.

#### Telecommunications

The Ministry of Communications defines and implements programmes that promote the universalisation of telephony services and the expansion of broadband access. It also proposes and coordinates actions that stimulate the scientific and technological development of the sector, and manages the Fund for the Universalisation of Telecommunications Services (FUST) and the Fund for the Technological Development of Telecommunications (FUNTEL).

#### Postal Services

The Ministry of Communications defines the actions and goals for postal services in Brazil, promoting national integration and stimulating regional development through the Brazilian Post and Telegraph Company (ECT), also known as Correios.

#### Radio and TV

Brazil offers free and open broadcasting services and a pay-TV system, regulated by Anatel, the country’s national telecommunications agency. The Ministry of Communications is responsible for granting the use and monitoring of
broadcasting services, which include commercial, educational, and community radio and TV. Open television is the most popular in the country, covering 98% of the municipalities.

**The Ministry of Communications is linked to three entities:**

**Anatel (National Telecommunications Agency)** is responsible for regulating the telephony, internet, and pay-TV sectors in Brazil. The agency is administratively independent and financially autonomous.

**Telebras (Telecomunicações Brasileiras S.A.)** was reactivated in 2010, the same year the National Broadband Programme was created. It oversees the implementation of telecommunications infrastructure for the expansion of internet access in partnership with the private sector.

**ECT** is responsible for routing and delivering correspondence in Brazil. The company has expanded its operations to the electronic, financial, and logistics sectors.

**Brazilian Government ICT Initiatives**

The figure below illustrates six public sector-led programmes that were active in 2016. However, due to the recession and subsequent period of instability, progress with respect to some of the programmes has been delayed.

**Brazilian Public Software Portal** is a program promoted by the government to encourage and manage collaboration on free open-source software solutions for public administration.

**National Connectivity Plan** was recently formed by the MCTIC. The main aim is to improve coverage and reduce the cost of broadband access. As part of the plan, the government launched its first satellite for delivery of services to excluded areas.

**Internet Civil Framework** is a law that governs internet use in Brazil. This law includes guarantees, rights and duties with respect to internet users. It was supported by the MCTIC and the Ministry for Justice.

**Bem’s Law (Lei do Bem),** also known as the Law of Good, is a law that defines a number of tax incentives for companies undertaking research and development in the ICT sector.

**National IoT Plan** is a new plan which will be deployed in April 2018. Headed by the MCTIC, the plan aims to modernize the provision of public and private services.
**SWOT Analysis**

**Figure 2: Brazil SWOT, 2017**

- **S** - Has one of the largest and most advanced ICT sectors in Latin America
- **W** - Has 240 million active mobile cellular lines
- **O** - Hosts a large base of major corporations
- **T** - High mobile and mobile broadband penetration rates of 115% and 48%, respectively, in 2017

- **S** - Still considered one of the most expensive markets for mobile communications in the Americas
- **W** - Nearly two-and-a-half years of macroeconomic recession and currency devaluation against the US dollar
- **O** - Rural areas have comparatively limited access to good ICT infrastructure
- **T** - GDP heavily concentrated in Tier 1 cities

- **S** - Uncertain political climate marked by bureaucracy and transparency issues and upcoming presidential elections
- **W** - Regulation varies from strong for telcos to weak for content providers
- **O** - Recent credit rating downgrade affecting currency and investor confidence
- **T** - Improving internet speeds and falling prices are expected to boost IP-based applications with a target penetration rate of 98%
- **O** - Enterprise solutions such as cloud, security, Big Data, and IoT are gaining traction
- **T** - The public sector has a specific IoT growth plan
- **O** - Macroeconomic recovery

**Base of the Pyramid**

**BOP Industry Statistics**

- Brazil is home to a large economy which represents 40% of the total in Latin America. However, due to recent political instability, the country experienced negative annual GDP growth in 2015 and 2016. Following the impeachment of President Dilma Rousseff in December 2015, her suspension in May 2016 and her replacement by Vice President Michel Temer soon after, Brazil is set to have a general election in October 2018. Foreign investment has slowed due to falling confidence in the Brazilian economy, and many companies considering investing in Brazil are holding off until after the elections.
- There were 240 million mobile subscribers in Brazil in 2017, of which 77.35 million were smartphone users, representing 37% of the population. This is high in comparison to fixed-line broadband penetration, which was low at 15%. Brazilians prefer to access the internet via mobile broadband because it is portable, easier and cheaper. Fixed broadband requires line installation, which is not always practicable.
- About 55% of Brazilians are of working age and an additional third will be in 2022. The majority of Brazilians are literate, tech-savvy and have disposable incomes.

**BOP Industry Initiatives**

- Improving broadband infrastructure will increase speeds and bandwidth availability, which is in high demand in some areas. This will allow users to access services that require higher bandwidth, such as Netflix and other equivalent OTT services.
- Increasing confidence in financial institutions will help reduce the number of Brazilians without bank accounts from the current 60 million.
Revenues in the Brazilian telecommunications market fell 5.8% year-over-year (YoY) in 2016 to $38 billion, constrained by a 1.4% revenue decrease in local currency and 4.4% currency exchange rate depreciation in 2016.

Residential segment revenues are expected to have the highest compound annual growth rate (CAGR) at an estimated 4.2% from 2016 to 2022, while revenue CAGR is projected to decline 0.5% in the small and medium business (SMB) segment and 3.0% in the large business segment.

Fixed-broadband services revenues are expected to increase at the highest CAGR of 8.1%, followed by mobile services at 4.1% and data communications services at 1.9%. Fixed-telephony revenue CAGR is, however, likely to experience a 5.9% decline.

Overall, service providers must be aware that, in the current telecommunications environment, differentiation based on performance, coverage area, pricing, ease of use and value-added services is critical in order to not only protect existing revenues but also to push for higher revenues and margins.
Telecommunication services have largely evolved into a triple-play offering comprising landline voice, subscription video and internet access. However, millennials have embraced a new model for communication and content as shown by the increasing popularity of dual-play services comprising broadband and Over-The-Top (OTT) services.

Following a global trend, landline voice revenues in Brazil will continue to decline. Fixed-voice revenues will fall from $5.47 billion in 2017 to $3.22 billion in 2022, representing a CAGR of -10%. The main reason for this is the rising consumer preference for flexible mobile connections. The increase in smartphone penetration illustrates the dual trend of consumers using mobile phone apps to make voice calls and opting for the cheapest data package instead of a traditional telephone connection.

Non-voice services, especially mobile data using 3G and 4G technology, will drive market growth. Wireless revenues are expected to grow from $18.66 billion in 2017 to $20.37 billion in 2022 at a CAGR of 1.73%. Data revenue will show stronger growth from an estimated $4.74 billion to $6.14 billion from 2017–2022, representing a CAGR of 5.31%.

The majority of subscribers in Brazil connect to the internet wirelessly and, as a result, most of the services available online are wireless-enabled. Consumers are likely to base their communication service purchase decisions on whether a package has a strong wireless offering. They are also certain to evaluate the wireless provider’s network performance and customer support record.

Carriers need to overcome a number of issues if they want to maintain their market share. Existing consumers expect their carrier to ensure broadband speeds capable of supporting OTT services that are in high demand. As a result, operators are under pressure to upgrade their services and lobby the government to make new spectrum available for commercial use. While new technologies may address the increase in demand, carriers will also need to seek creative ways to grow capability while managing consumer service expectations.

Many operators worldwide are considering the launch of 5G services within the next five years, although operators in Brazil do not consider 5G rollout a priority in the short to medium terms. Instead, operators such as Telefonica Vivo are...
concentrating on improving the quality of their existing 4G services and the deployment of fibre-optic broadband in the fixed-broadband market.

**Host Government Structures and Policies**

There are a number of government departments that influence telecoms policies, including:

- **Ministry of Cities** – Responsible for urban development and involved in schemes dealing with housing, utilities and smart cities.

- **Ministry of Planning, Development and Management** – Responsible for the federal budget and the management of people and labour in public services.

- **Anatel** – The Brazilian telecoms regulator responsible for the implementation of national telecommunications policy.

- **Ministry of Science, Technology, Innovation and Communication** – An organisation which coordinates science, technology and innovation events in Brazil. The ministry is also responsible for issues regarding internet connectivity.

- **Ministry of Development, Industry and Foreign Trade** – Responsible for implementing and regulating activities related to foreign trade.

**Chart 10: Total Telecommunications Services Market: Revenue Share by Provider, Brazil, 2016**

The three largest telcos in Brazil are América Móvil (Claro Mexico), Telefonica (VIVO) and Oi, which collectively accounted for 74.9% of total revenues in 2016.

**Strengths of Major Telcos**

- **América Móvil**: Strong CAPEX capabilities and significant revenue growth of NET; Brazilian provider of pay-TV and broadband

- **Telefonica VIVO**: Premium price positioning, synergies with Telefonica global footprint, solid expertise in IT sales and financial services platform

- **Oi**: Largest network backbone in the country; cloud/IoT platform

- **TIM**: Multi-service network, 4G coverage and fibre-optic network originally acquired in 2011 through the purchase of AES Atimus, which originally owned fibre networks in Sao Paolo and Rio de Janeiro. TIM has expanded this network further using the electricity network to lay cables.
Large Enterprise Discussion

Businesses in Brazil require ethernet connections capable of accommodating international voice calls, video conferencing and email. In some cases, legacy technology has become a limitation, since it is not scalable to these new needs. For carriers, deregulation and greater competition have eroded revenue from legacy connectivity services.

Competition-driven price pressures and customer migration to more cost-effective, advanced internet protocol services have accelerated the decline of revenues from legacy services. In addition, service providers have been under pressure to deliver more granularity for interconnectivity services and more bandwidth at lower costs to enterprises. The reduction in revenue from traditional services is prompting carriers to look for alternative technologies to deliver similar or value-added services at a lower cost.

Enterprises are becoming cautious about their running costs, which is creating opportunities for telcos to offer outsourcing services such as cloud computing, data hosting and network support.

Opportunities for UK Firms

Major Buyers and Decision Makers

Due to the recent period of political instability, and an imminent general election, the key buyers and decision makers in the government are likely to change within the next 12–18 months. That being said, one of the major decision makers with respect to telecommunications and digital services is the Minister of Science, Technology, Innovation and Communications, Gilberto Kassab.

Areas Where the UK has a Country-specific Strength

British Telecom (BT) has been present in Brazil for 15 years, with 700 employees in the country and both field and satellite networks to support its more than 500 Brazilian customers. The company offers both IT and telecom services, mostly to manage global contracts from the UK, and has a security operation centre (SOC) and a local data centre.
Other UK-based companies with a presence in Brazil include Cobham Communications, BAE Systems and IndigoVision. Cobham officially entered the Brazilian market in 2012 with a new subsidiary in Sao Paulo. The company provides connectivity and bandwidth to the defence, security and commercial markets.

BAE Systems announced the receipt of a USD 54 million contract to supply upgraded vehicles to the Brazilian army. The defence, security and aerospace company will start delivering vehicles with upgraded electronic communications equipment in 2018.

The Brazilian Ministry of Work used Edinburgh-based IndigoVision to supply enhanced HD fixed-dome cameras for increased security and communications at its storage sites. IndigoVision solutions were used during the Rio Olympics in 2016 and at Sao Paolo International Airport.

**Route to Market and Challenges to Entry**

The Brazilian telecoms market is significantly well developed compared to other countries in the region. As a result, the market is large enough to be attractive to companies offering VoD or IPTV services, which can be used in multi-play packages. Netflix has already made inroads into the Brazilian market, but there are still plenty of opportunities for other companies, especially with respect to local content.

Despite the extensive mobile subscriber base, broadband speeds in certain areas are low. In fact, sometimes these speeds are so low that some areas of the country cannot receive services such as Netflix because they are unable to support real-time streaming. However, it may not be necessary to upgrade networks to FTTH or 4G standards. Foreign investors, such as TIM, have gained significant market share using VDSL technology (also known as FTTC). Such upgrades are cheaper than using FTTH because FTTC connections use fibre from the base station to the connection box and existing legacy copper in the last mile. FTTH uses fibre all the way through, including in the last mile, so installation costs of an FTTH network are very high, along with resultant delays in time to market. With this in mind, network investment will be necessary, and there will be opportunities for network infrastructure and software suppliers.

**DIGITAL SERVICES**

**Market Overview**

Brazil’s ICT sector grew 7.6% per year between 2010 and 2016. Also showing growth was software at 14.1% per year, exports at 10.3% per year and BPO at 10.2% per year. In 2016, the overall ICT sector was worth $140 billion, representing 7% of GDP, with the ICT and telecom sectors employing 1 million professionals.

Due to its potential for greater efficiency, competitiveness and productivity, digital technology has found widespread use across a range of verticals, including healthcare, Fintech and manufacturing. Opportunities for digital transformation are proliferating as the new data-driven economy becomes grounded in pillars such as Big Data, cloud services, IoT and security.
**Host Government Structures and Policies**

The development of Brazil’s digital services has been shaped in recent years by several key regulations and policy initiatives.

1. Brazilian banks are expected to have disaster recovery plans to avoid losing financial data hosted in a third-party provider’s data centre facility. Brazilian Monetary Council (Conselho Moetario Nacional - CMN) lay down minimum requirements to be observed in the preparation and implementation of recovery plans for financial institutions and other entities authorized to operate by the Central Bank of Brazil. This has boosted the country’s cloud and data centre services market, particularly on the connectivity and storage side.

2. Financial institutions, fall under the regulatory authority of Securities and Exchange Commission of Brazil (CVM). But some of these regulations may be too onerous for Fintech companies since a majority of them tend to be start-ups. As a result, regulators are being forced to reconsider some of the regulatory requirements placed on these providers and mobile money providers.

3. The National Bank for Economic and Social Development (BNDES) in Brazil announced in December 2016 the elaboration of an IoT study that will devise public policies to be implemented between 2017 and 2022. This initiative is expected to drive investments in the IoT ecosystem.

**Market Size and Forecast**

**Chart 12: Pay-TV Services (Consumer) Market Revenue Forecast, Brazil, 2017–2022, (US$ Million)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue (US$ Million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>7,421.9</td>
</tr>
<tr>
<td>2018</td>
<td>8,268.1</td>
</tr>
<tr>
<td>2019</td>
<td>9,163.6</td>
</tr>
<tr>
<td>2020</td>
<td>10,108</td>
</tr>
<tr>
<td>2021</td>
<td>11,103</td>
</tr>
<tr>
<td>2022</td>
<td>12,148</td>
</tr>
</tbody>
</table>

**Pay-TV**

The Brazilian pay-TV market was worth more than $7.4 billion in 2017 and is estimated to grow to $12.15 billion by 2022 at a CAGR of 11.05%. At the end of 2017, there were more than 18 million pay-TV connections in Brazil, but this was down almost 800,000 from 18.8 million in 2016.

Grupo Claro has the largest share of the pay-TV market at more than 50% with its NET and Claro HDTV brands. This is followed by Sky/AT&T with a 29.8% market share, Vivo with an 8.8% share, and Oi with an 8.5% share; the remainder have a 2.7% share that includes Nossa TV with 0.7%, Algar with 0.5%, Outros with 1.1%, and Cabo with 0.3%.

The main technologies used are Direct-to-Home (DTH) with 10.7 million viewers and cable TV with 7.6 million viewers, with other technologies also in the fray, such as FTTH, MMDS and TVA (UHF).

OTT services are popular, as evidenced by the presence of Netflix. With an estimated 3.5 million subscribers in 2017, Brazil is Netflix’s fourth-biggest market after the US, Canada and the UK. In addition, 71% of video-on-demand users in Brazil used Netflix in August 2016, which is impressive considering the widespread problem of pirated content and the fact that Netflix is a pay-TV service.
The trend of Netflix subscriptions increasing even as traditional pay-TV subscriptions fall illustrates a sea change in viewing behaviour. A sizeable mobile broadband subscriber base is driving the increase in OTT services such as Netflix, and the introduction of offline viewing is further boosting uptake since a large proportion of subscribers are unable to watch content online due to inadequate speeds.

Chart 13: Digital Services (Consumer) Market Revenue Forecast, Brazil, 2017–2022, (US$ Millions)

Brazil’s mHealth market will be worth an estimated $250 million in 2022, up from $64.5 million in 2017, representing a CAGR of 31.12%. Interest is increasing for both professional and consumer-focused digital health solutions, although many of them—despite demonstrating positive outcomes—are still in the pilot phase.

Brazilian consumers are exhibiting a pent-up demand for self-management health and wellness tools that track and/or monitor exercise, sleep, biometric conditions, diet and nutrition, and meditation, and that supply details about their health and well-being.

Chart 14: Mobile Health Structure in Brazil
mHealth Opportunities in Brazil

Activity monitoring is steadily being developed overseas. Although experiencing a growth curve in Brazil, adoption remains low due to price and a lack of awareness.

Wellness and fitness are expected to surge because of lifestyle changes and increasing smartphone penetration. Delivery as part of a platform with a broader scope is promising.

Social health networks must be addressed as communication and content touch points between patient and doctor and amongst doctors.

Concierge and advisory services are being explored by telco groups in the Brazilian market and remain linked to SMS use. Expanding service functionalities could improve patient adherence and compliance.

Risk mapping can leverage communication between private and public sectors. From epidemiology to population risk factors, several focal points can address multiple needs. Population stratification and healthcare management should be considered key business strategies.

Mobile telehealth consultations/virtual visits, or mobile-based consultation via apps, can be disruptive to delivery and access, yet the practice faces multiple adoption hurdles, including Brazilian regulatory issues, medical culture, and lack of pilot programs to prove the benefits.

Chronic disease management can drastically change patient care and affect providers, payers, and employers.

Further mHealth development requires the education of major participants in the value chain—pharma, private insurers, healthcare providers, and government—led mainly by mHealth vendors and ICT companies to help them understand the importance of integrating such solutions into the entire ecosystem.

mEducation

Brazil’s mEducation market will be worth an estimated $521.2 million in 2022, up from $134.5 million in 2017, growing at a CAGR of 31.12%.

mEducation in Brazil is still in the early stages, but some educational content providers have set up e-learning platforms in the largest private schools in Brazil. In addition, the e-learning market is growing and there is now a wider range of college courses offered.

In particular, there has been an increased demand for English courses. This is due to the rising number of vacancies in the Brazilian job market that require proficiency in English. Mobile apps such as Duolingo are popular, as are apps used to prepare students for the ENEM exam, a standard university entrance exam.

Insurance

The Insurance market is estimated to reach $437.8 million in 2022, up from $145.2 million in 2017, growing at a CAGR of 24.7%.

The expansion of the middle class has created a number of opportunities in the insurance market. Microinsurance—insurance for people with an income of less than $4 per day against specific occurrences, e.g., car accident, in exchange for a regular payment—is one such segment that has gained popularity in Brazil. TIM Brazil offers a number of microinsurance products that are available via SMS. They include Personal Accident Funeral Assistance, Crime Victims Assistance and Sweepstakes.

The use of technology is becoming increasingly popular amongst Brazilian insurance brokers. Many have updated their marketing strategies in an attempt to reach new market segments, and acquiring contracts using mobile communications is becoming more commonplace.
Fintech

Although penetration of mobile services in Brazil is high, the proportion of the population without a bank account is still significant at 60 million, or less than 30% of the population\(^{17}\). This ‘unbanked’ population relies on cash or over-the-counter (OTC) transactions instead of electronic transactions.

The mobile channel is the second most popular method of conducting financial transactions in Brazil and is set to become the most popular method in the short term. However, most transactions are still non-financial, which may be the result of a lack of comprehensive services in the mobile channel or a lack of user trust.

By 2022, Brazil is expected to have 83.4 million registered mobile money and payment users. Telcos could potentially leverage mobile wallets to increase average revenue per user (ARPU) over the next five years through revenue share or preferred placement opportunities. Value can be added to the mobile wallet experience by delivering marketing and customer support services.

The Brazilian government is encouraging the integration of mobile payment institutions with the current financial system in an attempt to promote financial inclusion. There are already laws that allow institutions other than banks, such as business units of telcos, to be responsible for mobile money and payment services. Similar to the global scenario, the Brazilian government is concerned about where customers are entrusting their funds. Mobile payment institutions must set up a trust account because they are not allowed to intermediate funds, which is the reason that telcos seek partnerships with banks.

mAgriculture

Even as demand for food production increases, the Brazilian agricultural sector remains in the early stages of adopting technologies that support higher productivity and reduce labour dependency.

The main reason the Brazilian agricultural sector has not yet adopted technologies for mass food production is the lack of affordable technologies. Precision agriculture-enabling technologies would improve productivity without harming the environment. These include wireless sensor networks, global navigation satellite systems (GNSS), cloud computing, M2M communication, artificial intelligence, BDA, predictive analytics, robotics and drones.

Solutions that are either in use or being developed include apps that help farmers make informed decisions in the field, rooftop farming technology in land-scarce regions, and monitoring systems that record information that can be accessed through the cloud.

Chart 15: Digital Services (Business) Market Revenue Forecast, Brazil, 2017–2022, (US$ Millions)
Cloud IaaS

Brazil is the most developed country in the region in terms of cloud adoption, reflective of the high demand for cloud-based services. Cloud revenues totalled $617 million in 2016 and are set to increase to more than $2.8 billion in 2022 at a CAGR of 7.86%.

Brazil was the first country in Latin America with established data centres from large cloud providers. Additionally, the country already had a significant number of data centre providers, including Locaweb, Tivit, UOL Diveo, Ascenty, and Sonda IT, and telecom operators offering Internet as a Service (IaaS).

While some Brazilian companies are still experimenting with the cloud or making their first investments, others are in the next stage with respect to developing long-term cloud strategies that combine multiple deployment models to serve current and future needs.

The hosted private cloud still has an important place in the market. The public cloud will grow at high rates through the forecast period, driven by its cost benefits and greater number of cloud-native applications. However, the largest growth opportunities will emerge from the hybrid deployment model. Other opportunities will come from managed services offerings and the growth of multi-cloud providers.

Brazilian companies have a better understanding of the cloud concept and are making investments in the cloud. Although there are only a few companies in the region that are operating 100% in the cloud, several are investing in IaaS and have plans to increase their cloud investments.

Although demand for storage is expected to increase, revenue growth will not be proportional because of the low prices of storage solutions. Brazilian companies rely more on the cloud to host simpler and, on a smaller scale, more strategic workloads, so demand for computing as a service will also remain high.

Cloud IaaS Providers

AWS was the pioneer in public cloud services and is the Brazilian market leader. The company officially came to Brazil in 2011 and has acquired important clients in the country, such as Magazine Luiza and GOL. AWS offers a comprehensive plan that includes traditional computing and storage services (EC2 and S3), database management, high-performance computing, and support services.

Despite entering the market after AWS, Microsoft has also emerged as a strong participant in Brazil with its Azure IaaS. The company is leveraging its client base and channel partners for growth. Its focus is a hybrid model.

While IBM SoftLayer’s revenue in Brazil is less than those of AWS and Azure, IBM has a large client base for hosted private, hybrid, and full outsourcing cloud projects. It also has a larger data centre footprint in Latin America to better serve companies that do not want their information to cross national borders. Google, though a smaller provider, is starting to make its presence felt. The company officially started to sell the Google Cloud Platform in 2015.

Data Centre Services Providers

Brazilian data centre services revenues totalled $1.37 billion in 2016, and are set to increase to more than $2 billion in 2022 at a CAGR of 7.86%.

At the beginning of the cloud trend, most traditional data centre providers wanted to compete directly with the large public IaaS providers, such as AWS, but their inability to scale and compete on price made most of them change their strategy, especially in 2016. While some stopped offering public cloud IaaS and focused on the hosted private sector—as was the case with HP and Verizon, which had part of their data centre assets acquired by Equinix in December 2016—others maintained their public offering but without a strong sales push. Several data centre providers started offering managed services for AWS, Google and Microsoft as a way to capture revenue from public cloud projects.

Finance, government and ICT are the verticals most likely to outsource, although retail, healthcare and education are increasingly opting to do so. Data centre clients perceive certifications as an important criterion for outsourcing their
information to third parties. The most important certifications are provided by the Uptime Institute for Infrastructure and are divided into design, construction and operational sustainability. This institute is a US-based professional services organisation which certifies data centres once they have undergone a quality control process. Data centres with this accreditation will have a higher client demand for outsourcing services.

**Trends Impacting the Data Centre Market**

- **Modular or containerised data centres that offer a degree of portability**: Modularity allows the flexibility for data centres to be moved where they are needed, but they are difficult to customise because they come in specific sizes.

- **Automation allowing for improved efficiency and ability to serve clients**: Data centre companies are investing in software-defined data centre (SDDC) platforms that virtualise multiple data centre components and manage them as a cohesive unit. However, some staff may be necessary to manage situations when multiple issues occur simultaneously.

- **Green data centres**: Such centres promote practices that increase equipment efficiency and lower environmental pollution.

**Chart 16: Data Centre Services: Porter’s Five Strengths**

<table>
<thead>
<tr>
<th>Threat of New Entrants</th>
<th>Bargaining Power of Suppliers</th>
<th>Rivalry Among Existing Competitors</th>
<th>Bargaining Power of Buyers</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are still considerable opportunities for new entrants, with providers expanding facilities or building new ones and private equity firms investing in data centre companies. The threat of new entrants is high.</td>
<td>Service commoditization and the increasing number of providers limit supplier bargaining power; however, offerings such as full outsourcing and cloud computing could improve it.</td>
<td>Competition is high in the region. Providers need to look for new revenue sources to combat commoditization and price erosion.</td>
<td>The trend to unify IT services contracts and the ease of changing providers strengthens buyers’ bargaining power.</td>
</tr>
</tbody>
</table>

**Data Centre Providers**

Data centre providers are focusing on the expansion of their cloud portfolios to enable hybrid IT deployments, regional expansion through acquisitions and the expansion of existing sites.

IBM announced two new SoftLayer data centres in the region in 2015—one in Brazil and the other in Mexico—to expand its cloud footprint.

Tivit, a Brazilian data centre firm, acquired Synapsis in 2014 and, in doing so, expanded its footprint to incorporate Chile as well as Brazil. Santiago-based Synapsis has more than 300 customers in Chile.

UOL Diveo is focusing its strategy on multi-cloud, which is the use of multiple cloud computing services in a single architecture to provide clients with agility and lower costs.

Equinix announced its fifth data centre in Brazil in Sao Paulo, with an area of 20,000 square metres and 8,000 square metres of raised floor.
**Key Takeaways for Data Centres**

Data centre providers will have to offer their clients managed services that go beyond infrastructure to combat commoditisation and price erosion through more value-added services.

Security, disaster recovery, and business continuity planning solutions will be key areas of expansion for data centre service providers to minimise downtime and ensure data confidentiality. Offering cloud services as a more value-added service will increase competitiveness.

Service providers need to plan carefully by looking at the specific business needs of their clients and being as consultative as possible to understand priorities and provide solutions that best fit clients’ strategic objectives.

**Industrial IoT (IIoT) Market Snapshot for Brazil**

The common characteristics of any IoT-connected device include a unique identifier, an IP address, and internet connectivity, plus the ability to emit and receive information, interact with other objects, and perform these functions without requiring either human-to-human or human-to-computer interaction. Architecturally, an IoT deployment has three basic components: edge, network and core. The edge is where the managed devices—the “things”—live. The things contain embedded intelligence that links them via the network to the core.

With ubiquitous connectivity becoming the norm globally and the IoT a reality, Brazilian industrial IoT revenue is projected to reach $3,293.6 million in 2021, up from $1,346.2 million in 2016. Hardware was the main revenue contributor, at 44%, followed by services, software, and connectivity.

Software and services are expected to gain revenue share from 2018 to 2021 as the cost of communication and sensing modules declines.

Most IoT spending over the next two years is expected to come from the smart automotive industry, since commercial vehicle telematics represented the bulk of M2M connections in the Brazilian IoT market in 2016. The country’s transport and logistics services are mainly road-based because rail networks are limited, and vehicle and cargo theft are major concerns.

With a more positive outlook being perceived in early 2018, it is expected that companies in other verticals will resume technology investment initiatives in order to enter the Brazilian IIoT market.
**Key Takeaways for IoT**

The IoT enables more products to become products as a service (PaaS) as opposed to the traditional 'sell and forget'. It is also deepening PaaS relationships by providing richer information, improved services and, ultimately, greater value.

In October 2017, the Ministry of Communication and the Brazilian Development Bank announced an initiative for the expansion of IoT in Brazil. The plan provides guidelines for the development of all IoT sectors, but some sectors will be prioritised by the programme. Such sectors include smart cities, health and IIoT.

Enabling technologies, including small and powerful low-cost sensors, high bandwidth, reliable and secure networks, BDA solutions, data handling and management platforms, monitoring, network management, and usage tracking applications, will be developed.

The cloud assists with IoT application development and lifecycle management. By providing access to a standard set of published interfaces or application programming interfaces (APIs), cloud platforms shorten the time to develop and bring new applications to market.

**BPO Snapshot in Brazil**

The Brazilian BPO market stood at USD 3.67 billion in 2016 and is set to grow to USD 5.1 billion in 2022 at a CAGR of 5.63%. Brazilian IT companies are increasingly outsourcing many of their non-core business processes. This is set to continue with the increasing demand for data centres and cloud access.

The largest provider of BPO services in Latin America is Atento. The company is operational in 13 countries and employs 150,000 people. Atento has more than 30 contact centres in Brazil—23 of which are in Sao Paulo. More than half of its global employees work in Brazil, which is the company’s main market.

In 2016, Atento published operating BPO revenue of more than USD 800 million from Brazil alone, claiming a 24.7% share of the Brazilian market.

**Big Data Analytics (BDA) Snapshot in Brazil**

Exponential data growth fuelled by connected devices has compelled organisations to revisit their ability to use Big Data to make more intelligent, real-time decisions. Considering the hyper-competitive business environment, this critical need has given rise to a new breed of analytics solutions focussed on prediction, data visualisation, and dynamic decision-making.

The BDA market is gaining momentum in Brazil as companies become more familiar with its concepts and benefits. The Brazilian market is the most advanced in terms of revenue and maturity in Latin America. It generated revenues totalling $1.16 billion in 2016\(^{21}\).

Brazil accounts for approximately 47% of Latin America BDA market revenue and will continue to dominate\(^{22}\). Most vendors see growth in Brazil due to opportunities emerging in the financial services, ICT, and retail verticals. Many vendors are attracted to the Brazilian BDA market due to its low maturity and the opportunity to garner big revenues. In addition, Brazilian companies are looking for BDA solutions to improve their processes and productivity in a difficult economic and political climate.

BDA market revenue is primarily from the B2C-oriented financial services and ICT verticals, which were early adopters. Over the forecast period, retail’s revenue share will experience the greatest increase, illustrating the need to improve customer purchase experience.

**Areas of Technology-specific Strength**

Service providers in the market are largely involved with the service side rather than the technology development side. Brazil has a fairly limited domestic technology development base and relies mostly on imported hardware and software. For example, the majority of handsets in the market are shipped in from overseas markets, with only a small portion developed
locally. As a result, there are opportunities for hardware and software manufacturers to form business relationships with existing operators in Brazil.

**Opportunities for UK Firms**

**Cloud** – Servers, desktops, racks and other infrastructure for the cloud market are imported from overseas. Most of the software-based cloud services, such as ERPs, are provided by international companies such as SAP, Oracle and Sage. There is a growing opportunity for UK-based Sage (established in 2012 in Brazil) to further increase its Brazilian customer base of 60,000. Local Brazilian IT services providers such as TOTVS, Tivit and UOL Diveo are now, however, offering IT solutions that rival some of the solutions offered by international providers.

Current and future IT projects in which UK firms can be potentially involved:

**CITI SP:** New ‘Silicon Valley’ technology hub in the middle of Sao Paulo. The International Centre of Technology and Innovation should open in 2020 on a public-private partnership platform. This centre will transform the area into the biggest technology hub in Latin America. Companies like IBM, Cisco, Microsoft, Facebook and Google are already in conversation with Sao Paulo local government authority.

**Digital Port Recife:** One of the main technology parks and innovation environments in Brazil. It also represents the new economy of the State of Pernambuco. Situated in Recife, its main areas of work are software and ICT as well as Creative Economy, with emphasis on segments like games, multimedia, cine-video-animation, music, photography and design. Since 2015, the Porto Digital has also worked in the strategic urban technology sector.

**Major Buyers and Decision Makers**

Brasscom, the Brazilian Association of Information and Communication Technology Companies, promotes the ICT sector with public authorities, public and private clients and other representative entities, propagating trends and innovations, intensifying relations, proposing public policies and promoting market growth. The organisation has connections across the sector and is worth contacting by UK ICT-oriented companies.

**Areas Where the UK has a Specific Strength in the Country**

UK companies have opportunities to provide supporting IT equipment for cloud service providers in the market. The data sovereignty requirement for banks has led to a growing spend on IT and telecoms infrastructure as service providers look to boost capacity in preparation for the growth in demand for cloud services.

UK companies can also potentially offer IT solutions to SMEs and large enterprises. While large foreign vendors may dominate the IT space, local providers are developing their own solutions rather than reselling those of foreign providers, such as IBM and others.

Examples include Steer Davies Gleave, a UK-based company that supplies infrastructure solutions and digital intelligence. In 2014, the company worked with the Brazilian government to upgrade its national railway to transform the system into an open-access model.

PCA Group is another UK-based company which not only works with Brazilian clients, but has been based in Sao Paulo since 2010. The company is a CRM consultancy for the mobile telecommunications industry.

UK firm Micro Focus also has a Brazilian regional operation, established through the acquisition of Sao Paulo-based Borland Software in 2009. The company provides software solutions mainly in the finance vertical.

**Route to Market and Challenges to Entry**

Providing IT services such as cloud, IoT and BDA to the public sector will require engaging with Brazil’s ICT ministry as it is responsible for implementing the government’s ICT strategy and managing IT operations. For the private sector, it will require targeting large and medium-sized IT providers that can resell global/UK companies’ IT solutions to different industry verticals.
CYBERSECURITY

Market Overview

Chart 18: Security Market Landscape, Brazil, 2017

- Brazil is one of the more digitally advanced countries in Latin America, and, as a result, is a hotspot for cyberattacks.
- Brazil is one of the most targeted countries for cyberattacks. It is estimated this cost the economy $22 billion in 2017.
- Increasing awareness and growing need for protection are driving cybersecurity investment in the country.

Market Evolution

In 2016, Brazil ranked fourth globally in terms of cybercrime. In 2017, according to a report by Norton Cyber Security, Brazil recorded the second-highest number of cybercrimes globally after China, affecting about 62 million people and causing losses of $22 billion in 2017. One of the main factors in this increase has been the popularity of smartphones, which are now at 240 million devices in Brazil, or 114 devices per 100 inhabitants. The rising number of attacks, particularly Distributed Denial-of-Service (DDoS), has been central to the growing demand from enterprises for security services. Providers are adapting their security services to address the growing shift into the cloud.

Addressable Market

Banking and financial services has been the sector with the greatest investment in security services, especially enterprises with a focus on finance and payments in eCommerce. However, other sectors are becoming more engaged with cybersecurity, especially critical infrastructure and large commercial organisations.

Government agencies and departments of revenue and finance, including the Revenue Authority and Ministry of Finance, are leading the uptake of cybersecurity in the public sector.

Competitive Environment

The market is dominated by systems integrators and operators that partner with international security vendors. Local providers offer bespoke security solutions for the market. While still at an early stage of development, the market is moving towards managed security services.

Government Structures and Policy

Brazil has adopted a tactical approach towards cybersecurity with the Army in command.

The government is trying to secure the country’s cyber space by mandating standards on encryption and communication for federal agencies and all entities in which the government has a stake. Brazil is also in a partnership with Argentina to co-develop cybersecurity processes.

Through the creation of CDCiber, the Army aims to have a specific apparatus that looks into the government aspects of cybersecurity, and the agency is entrusted with 24x7 monitoring of government networks.

Source: Frost & Sullivan and 2017 Norton Cyber Security Insights Report - Global Results

Acknowledging the threat of online espionage, CDCiber’s role has broadened. Brazil has officially recognised a national CERT, a government CSIRT and a sector-specific SCIRT for implementing internationally recognised cybersecurity standards.

<table>
<thead>
<tr>
<th>Government Department/ Other Stakeholder</th>
<th>Function Brief</th>
</tr>
</thead>
<tbody>
<tr>
<td>The National Defence Council (CDN)</td>
<td>An advisory body of the President of Brazil on matters related to national sovereignty and security</td>
</tr>
<tr>
<td>Presidential Office for Institutional Security (GSI)</td>
<td>Directly linked to the office of the President and responsible for matters involving cybersecurity (Civil-related aspects), military affairs and cyber defence.</td>
</tr>
<tr>
<td>Department of Information and Communication Security (DSIC)</td>
<td>Responsible for guaranteeing the availability, integrity, confidentiality and authenticity of information and communication for the federal public administration.</td>
</tr>
<tr>
<td>Chamber of Foreign Affairs and National Defense of the Council of the Government (CREDEN)</td>
<td>The Department of Information Security, CREDEN, and the Secretariat of Strategic Affairs form the trio that are key players in shaping cyber security in Brazil.</td>
</tr>
<tr>
<td>Ministry of Justice-Department of Federal Police</td>
<td>The Brazil Federal Police participates in the I-24/7 global police communications system developed by Interpol to connect law enforcement officers, including cybercrimes</td>
</tr>
<tr>
<td>Brazil MoD</td>
<td>Brazil’s cyber security is under the aegis of the army and the MoD liaisons with the civilian side</td>
</tr>
<tr>
<td>Brazil Intelligence Agency</td>
<td>This oversees concessions of digital social media monitoring and developing cryptographic security measures to protect public institutions.</td>
</tr>
</tbody>
</table>
**Key Government Programmes**

<table>
<thead>
<tr>
<th>Programmes</th>
<th>Function Brief</th>
</tr>
</thead>
</table>
| **Cyber Defense Room (CDCiber)** | • CDCiber is the apparatus used by the army to oversee civil affairs  
• Its principal objective is to provide protection to military and government networks, from both internal and external attacks  
• It is in charge of cyber security in case of mega events  
• It generates cyber incident simulation and analysis malicious codes |
| **Enactment of the Carolina Dieckmann Law** | Amended the Brazilian Criminal Code, several cyber activities were defined as crimes. With regard to organisations, the following cybercrimes are the most relevant:  
• espionage.  
• conspiracy;  
• crimes against means of communication;  
• tapping of communications;  
• violation of the secrecy of correspondence;  
• breach of confidence (disclosure of secrets);  
• unauthorised access to computer systems;  
• document falsification; |
| **Decree No: 6703 - The National Defense Strategy** | • This mentions cyber security as a sector where national independence is to be developed through autonomous technology capabilities.  
• It outlines key CI areas including services, particularly with regard to energy, transport, water, and telecommunications.  
• It provides direction to the Ministries of Defense, Mines and Energy, Transport, and National Integration and Communications, aiding in their evaluation, monitoring, and risk reduction. |
| **Anatel Public Consultation No: 21** | This regulation for critical telecommunication infrastructure protection established measures to be undertaken by telecom operators to promote risk management processes related to security and performance of network and telecommunication. |
| **Marco Civil Law** | • This mandates companies to store Brazilian data in servers located in Brazil. |
• The 3 instruments set out standards to be adopted by federal administrative and executive branches.  
• They provide accreditation requirement and minimum standards for cryptographic algorithms and confidentiality of data in communication between federal functionaries. |
| **Brazilian Civil Rights Framework for the Internet Law No. 12,965/2014** | • The jurisdiction law that specifically restricts the sharing of cyber threat information. |
| **Brazilian Civil Code Bill No. 5.276/2016 and 330/12** | • Bill No. 2.276/2016 intends to create a civil data framework, with definitions of personal data, anonymous data, what data can be sold and what can be collected, among other points.  
• the other bill (No.330/12) is being discussed and, in addition to providing important definitions related to cybersecurity, also suggests the creation of a central authority for the protection of personal data. |
| **The Distributed Honeypots Project** | • This is a PPP venture between academia, military, government, and industries.  
• It installs honeypots in various Brazilian cities.  
• It identifies signatures of well-known malicious/abusive activities, such as worms, bots, scans, spams, and other malware.  
• It notifies the responsible networks of Brazilian IPs with recovery tips and donates sanitized data of non-Brazilian IPs to other CERTs. |
**Stakeholder Structure**

**Chart 20: Cybersecurity Market Structure, Brazil, 2017**

- Distributors are an important middle-man for the main stakeholders in the market. They are responsible for the mass distribution of large volumes of vendor products from both Brazilian and overseas companies.
- In Brazil, Westcon ranks among the leading distributors.
- Some of the leading vendors in the Brazilian market include Fortinet, Cisco, IBM and Kaspersky and niche locals, like Cipher and Arcon.
- There is growing pressure on vendors to offer comprehensive solutions to cater to all security needs.
- Despite having a local presence, they rely heavily on distributors and resellers to drive and market their products.
- Large IT providers are using the strength of their brand to establish a presence in the security market.
- The market is dominated by leading foreign and local systems integrators. ISPs and CSPs are also looking to enter the market to grow their enterprise solutions.
- There is a growing number of security consulting providers.

**Market Size and Forecast**

**Chart 21: Cybersecurity Market Revenue Forecast, Brazil, 2016–2022 (US$ Millions)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Government</th>
<th>Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>$736</td>
<td>$2,640</td>
</tr>
<tr>
<td>2017</td>
<td>$800</td>
<td>$2,869</td>
</tr>
<tr>
<td>2018</td>
<td>$869</td>
<td>$3,118</td>
</tr>
<tr>
<td>2019</td>
<td>$945</td>
<td>$3,389</td>
</tr>
<tr>
<td>2020</td>
<td>$1,027</td>
<td>$3,684</td>
</tr>
<tr>
<td>2021</td>
<td>$1,116</td>
<td>$4,003</td>
</tr>
<tr>
<td>2022</td>
<td>$1,213</td>
<td>$4,351</td>
</tr>
</tbody>
</table>
The total Brazilian cybersecurity expenditure in 2016 was just over $3.5 billion with strong growth over the next five years, reaching $5.5 billion in 2022. The majority of the spending is driven by the commercial sector and businesses investing to protect their operations. However, cybersecurity remains a growing priority for the government with expenditure expected to reach $1.2 billion by 2022.

There are growing requirements across a number of cybersecurity segments and offerings.

<table>
<thead>
<tr>
<th>Segments</th>
<th>Discussion</th>
<th>Level of Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrusion Detection and Prevention System</td>
<td>Compatible with the cloud environment and on-premises network is not considered to be a segment of concentration in cybersecurity in Brazil.</td>
<td>Decline</td>
</tr>
<tr>
<td>Identity Management</td>
<td>Among the goals of Brazil (Estrategia) is achievement of transparency, protection of privacy, democratization of access to information and safeguard of confidential information assets which is in line with international legal standards and hence demand in this segment is expected to rise.</td>
<td>Growth</td>
</tr>
<tr>
<td>Secure Networks, Email, and Web Security</td>
<td>Establishing strategic developments and best practices (Brazilian Civil Rights Framework for the Internet, Law No. 12,9965/14) in the area of cyber security of information &amp; communications is the main objective to be achieved.</td>
<td>Growth</td>
</tr>
<tr>
<td>Advanced Persistent Threat (APT)</td>
<td>Threats in the Brazilian market are becoming much more advanced with hackers attempting frequent financial crimes, industrial espionage, and data theft.</td>
<td>Growth</td>
</tr>
<tr>
<td>Threat Intelligence, Detection and Remediation</td>
<td>Brazil had witnessed a massive surge of economic and financial activities moving online (e-comm, banking etc.) similar to North America and Western Europe.</td>
<td>Growth</td>
</tr>
<tr>
<td>Advance Endpoint Detection and Response</td>
<td>Brazil witnessed a multifold increase in Internet access and mobile phone subscriptions, with more than half of its population currently online which is giving a push for the requirement of securing them.</td>
<td>Growth</td>
</tr>
<tr>
<td>Internet of Things (IoT) Security</td>
<td>With the introduction of “IoT Action Plan 2017”, it can be seen that Brazil is reading itself for various applications and economic impacts of the IoT in the four environments prioritized by the study: rural, cities, health and industries.</td>
<td>Stable</td>
</tr>
<tr>
<td>Supervisory Control and Data Acquisition (SCADA security)</td>
<td>Industrial automation is on the rise in the country especially in the critical national infrastructure domain placing Brazil at 13th rank all over in top markets.</td>
<td>Unidentified</td>
</tr>
</tbody>
</table>

The following analysis provides a more detailed snapshot of the market conditions for the following three segments. These are growth areas of particular importance to the Brazilian market.

- Endpoint Security (Secure Networks, Email and Web Security, Intrusion Detection and Prevention System)
- Network Security (APT, Advanced Endpoint Detection and Response)
- Managed Security Services (Threat Intelligence, Detection and Remediation)

**Endpoint Security Snapshot for Brazil**

The use of an endpoint as the only security strategy is still a common practice in Brazil. Many companies consider it to be a robust product that offers adequate protection, ignoring the fact that attacks are currently much more complex. Many companies tend to be more reactive than proactive, investing in security only after being attacked.

Endpoint security providers must make further inroads into the telecommunication channel if they want to increase awareness and grow their business. There are significant opportunities for expansion due to the growing use of smartphones. Security can be offered as a value-added service by ISPs to leverage their national presence.
The market will continue to grow due to the increasing complexity and volume of ransomware, malware, and other security threats.

Security is becoming such an important issue for companies that they are allocating a separate budget specifically for cybersecurity. Antiviruses, anti-spam and firewalls are important but do not offer enough protection for the type of serious attacks that often take place. Companies are now under pressure to secure their data and networks using much more progressive solutions.

Vendors must differentiate themselves by offering advanced threat protection endpoint solutions that can uncover, investigate, and remediate advanced threats using artificial intelligence.

Endpoint protection vendors must develop protocols and interfaces that will allow their solutions to work with other network security solutions such as SIEM and NAC. Emphasis should be placed on creating synergistic functionalities that will augment overall security efficacy.

**Network Firewall Snapshot for Brazil**

The network firewall market is reaching maturity. It generated revenues of $182.4 million in 2016 and is likely to reach $328.2 million in 2021 at a CAGR of 12.5%. Firewalls have undergone multiple changes to maintain a base level of security efficacy in the face of rapidly changing threats. Unified threat management (UTM) and next-generation firewalls (NGFW) are used to create modern network firewall systems with a range of multifunctional security capabilities.

The increasing maturity of companies and the complexity of cyber attacks are driving market growth.

In the future, security needs will only become more complex. ISPs will need to communicate with their customers and adapt to their needs. Moreover, providers must understand the vertical in which they exist and offer optimal solutions for end-user safety.
**Managed Security Services Snapshot for Brazil**

MSS is transforming in Brazil; once dominated by asset management and monitoring, clients are showing interest in services that require a higher level of security and risk management to combat advanced threats.

Customers want solutions that solve problems, rather than just offering an alert about potential problems. Successful MSS providers will demonstrate trustworthiness in remediation without interrupting a customer’s operations.

Telcos are playing a more important role in the MSS market because they own backbone communications infrastructure and can easily monitor network traffic and apply analytics to detect and subsequently block malicious activity before it reaches a company’s network. Partnering or negotiating with Telco companies could provide one option to enter the market.

**Chart 24: MSS Market: Revenue Forecast, Brazil (Commercial), 2016–2021**

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue ($ Million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>180.3</td>
</tr>
<tr>
<td>2017</td>
<td>208.0</td>
</tr>
<tr>
<td>2018</td>
<td>238.6</td>
</tr>
<tr>
<td>2019</td>
<td>272.5</td>
</tr>
<tr>
<td>2020</td>
<td>309.3</td>
</tr>
<tr>
<td>2021</td>
<td>350.1</td>
</tr>
</tbody>
</table>

Revenue CAGR, 2016–2021 = 14.2%

The lack of a qualified workforce in Brazil is a driver for MSS. As security becomes much more complex, companies are strengthening their relationships with MSS providers so that they can focus on their core business.

As companies in Brazil implement new technologies, new and more complex vulnerabilities are becoming a reality. IoT, Big Data, bring your own device (BYOD), software-defined networks (SDN), cloud computing, virtualisation, and blockchain are changing the way companies operate and the dynamics within their IT infrastructure. The demand for security asset management and monitoring, which is a more basic MSS, rises accordingly.

The growth of BYOD is having a positive effect on organisations’ operations, and companies will continue to encourage employees to use personal devices. However, this also brings risks of remote access, and currently many of these companies do not have adequate security mechanisms or policies to ensure protection. This will drive a growing need for security services to cover the capability gap.

The Latin American market is not as mature as those in North America and Europe. As a result, there are opportunities for new entrants, investments, and mergers and acquisitions (M&As), and space for MSS providers to improve the quality of their offerings and become closer to customers, thus increasing their revenues with new services.

Mature markets have adopted more dedicated internet and corporate networks, and have higher smartphone penetration. Cyber threats are much more common, so companies tend to invest more in MSS.
Competitive Overview

The competitive environment in the Brazilian cybersecurity market is complex. It is composed of niche participants, telcos, and global IT companies. There is a mix of international providers and local companies that provide a full range of products and services. There has been heavy presence of the multinational US ICT companies, including IBM, HPE, Cisco and Symantec. However, the Brazilian industry base is growing.

End users often look to more specialised and niche local suppliers as they are seen as better able to respond to customer needs with more direct knowledge of the Brazilian market. Companies such as Tempests Security Intelligence are an example of local companies that continue to grow in the market. The acquisition of EZ-Security in February 2018 shows its ambition to lead the way for local suppliers in the Brazilian market.

Areas of Technological Strength

The Brazilian cybersecurity industry has a number of strengths and the industrial base continues to grow. Whilst previously there was a tendency to rely on international companies, the technological development of companies is improving. Consulting, managed security services and threat intelligence are all areas where local industry has strong expertise to provide to end users.

Opportunities for UK Firms

Brazil has benefited from leveraging expertise and cyber solutions from outside of the local industry. Initially this leaned towards US ICT companies and Spanish companies, such as Telefonica and Indra, which have strong presence in the region. In addition, Israeli companies have supplied a range of security solutions to Brazil as well as the wider region. This demonstrates an encouraging trend that the government and companies will look to more established international suppliers to fill capability gaps for which the local market is unable to cater.

Brazil offers a range of opportunities for UK companies in cybersecurity. Despite the high threat and impact to the economy, cybersecurity is still at an early stage in the country. Greater education of the risks and how to protect networks and systems is a key demand and fits the UK cyber industry’s strength in cyber consulting. As a starting point, this could lead to opportunities to deliver more cyber solutions and products. Targeting the larger enterprises and industries that have a higher volume of cyberattacks, such as financial, CNI and government, will provide a good starting point.

Major Buyers and Decision Makers

The government stakeholders will continue to be the major influencers in the market when it comes to legislation and regulation, which will drive adoption rates in the country. However, the growing awareness of cyber threats and impacts to
business will drive adoption from large organisations. Cyber continues to grow on the risk register, and chief information officers and chief information security officers continue to drive cyber agendas. Engaging with these individuals across industries and verticals to better understand their needs and requirements is essential for companies to be successful. Consultative selling over simply pushing products has seemed to be more successful in the market. It is highly probable that they will face different challenges. Companies need to tailor cyber solutions and products to meet these challenges if they are to be successful.

There are two segments that are forecast to provide greater opportunities in the Brazilian cybersecurity market over the next few years:

- Financial organisations are considered key targets for cybersecurity attacks, not only due to their typically large size, but also because they manage large depositories of cash and financial transactions. This applies to both government-controlled organisations such as Caixa Econômica Federal and Banco de Brasil and commercial banks, including Banco Bradesco Financiamentos.

- Telecoms companies with their large volumes of data on customers and financial transactions are also among the companies most targeted by cyber criminals. Management and protection of their IT systems are mostly taken up by international technology vendors such as Huawei, IBM and HP; however, the need for additional and niche cyber solutions is growing.

**Route to Market and Challenges to Entry**

The market is becoming increasingly congested and will require significant investment to establish local offices to serve the local market. The most feasible option for companies without an in-country presence would be partnering with local re-sellers and systems integrators. The government has confirmed cybersecurity as a sector where national independence should be achieved through the development of autonomous technology capabilities. Certain ICT domains are restricted to Brazilian companies by law, and companies will face hurdles in entering the market. Nexus Guard works with the Brazilian government on cybersecurity. The Buy Brazil Act further emphasises the need for Brazilian partners.
ENDNOTES

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25. Frost & Sullivan
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