



Digital Market Overview: Indonesia



HM Government

A Frost & Sullivan White Paper

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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:

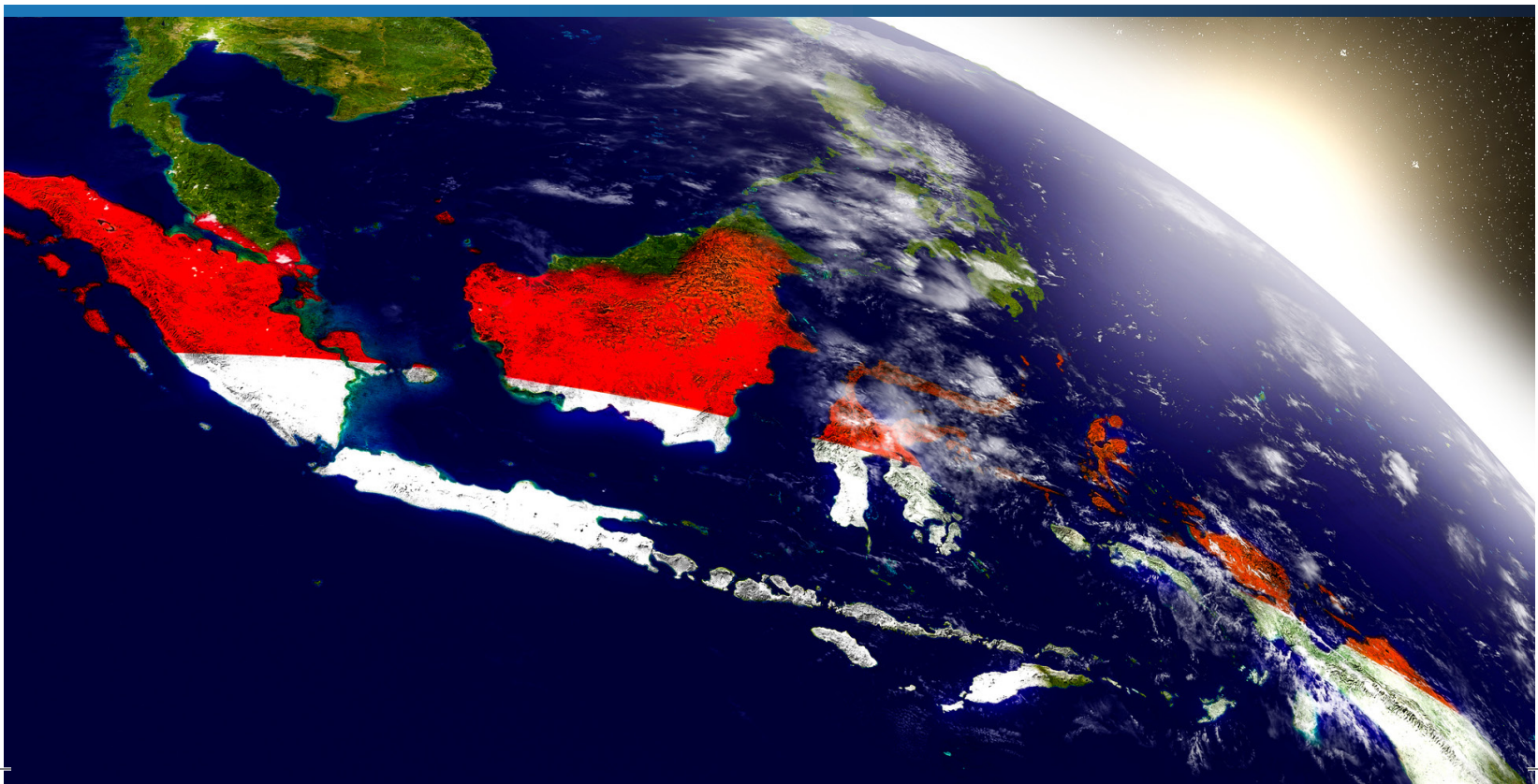
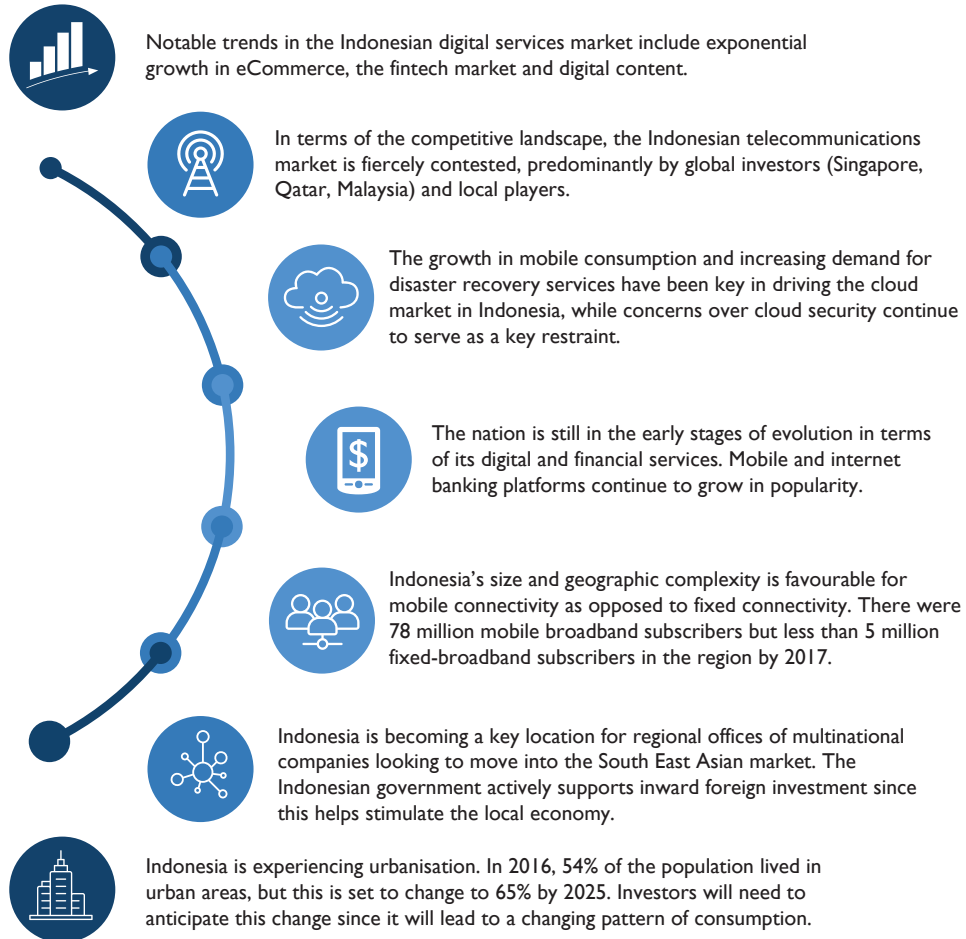
- **Internal Data Audit:** Frost & Sullivan leveraged information from its ongoing research programme of the ICT sector and digital markets in the target countries.
- **In-depth Secondary Research:** Frost & Sullivan searched all open sources and published documents, including company information, official 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.

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EXECUTIVE SUMMARY

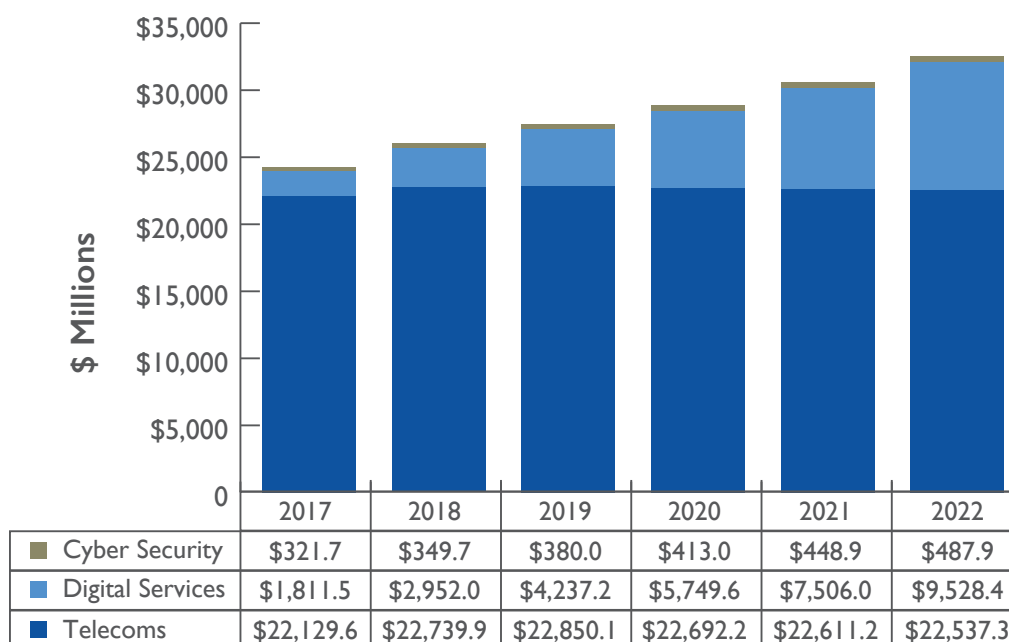
Key Findings

Chart 1: Top 7 Key findings from report



Market Forecast

Chart 2: Total ICT Market Forecast, Indonesia, 2016-2022 (\$US Millions)



Source: Frost & Sullivan Indonesia Market Tracker, Statista

Telecommunications



- The Indonesian telecoms market is competitive, facing reduced profit margins and saturated voice and SMS markets. However, data and value-added services are set to grow to an estimated USD 22.5 billion by 2022.
- Fixed-line broadband penetration is low compared to its mobile counterpart at 1.7% and 30%, respectively.
- The majority of mobile subscriptions use 2.5G technology, but both 3G and 4G uptake is increasing. Prepaid subscribers represent 98.3% of the total.

Digital Services



- Digital services are disrupting traditional business models, with the majority coming from eCommerce, digital finance, and cloud services.
- Investment in local SMEs by angel investors and venture capitalists has grown since 2013 due to adoption of digital technologies.
- Digital finance is the fastest growing digital service, set to total USD 1.25 billion by 2022, followed by cloud services at USD 1.2 billion by 2022.

Cyber Security



- The Indonesian cybersecurity market comprises network security and network advanced malware analysis. Both will account for an estimated 68% of the total market by 2022.
- Government organisations and financial institutions are becoming more vulnerable to cyber-attacks as they produce, accumulate, and exchange data for administrative purposes and online services.

Key Focus Areas for Digital Opportunities in Indonesia

Telecommunications	Digital Services	Cybersecurity
<ul style="list-style-type: none"> • 4G connectivity • Fixed-wireless access connectivity 	<ul style="list-style-type: none"> • Pay-TV • Fintech • Cloud 	<ul style="list-style-type: none"> • Consulting and Advisory Services • Network Security

Country Overview

Chart 3 – Indonesia Demographics and Country Metrics



The Indonesian telecoms market is forecast to grow from USD 22.13 billion in 2017 to USD 22.54 billion in 2022 at a CAGR of 0.37%. The digital services market is expected to grow at a CAGR of 38.33% from USD 1.88 billion to 9.53 billion over the same period, and cybersecurity is expected to grow at a CAGR of 5.53% from USD 573.5 million to 750.5 million.

The information and communication (ICT) sector experienced year-over-year growth of 9.81% from USD 34.0 billion in 2016 to USD 37.3 billion in 2017¹. Government backing will be very important for the future growth of ICT services going forward. The government has proactively supported the ICT sector through a number of initiatives focusing on infrastructure development, policy enabling and legislation.

Economic Perspective

Globally, Indonesia has the 16th highest GDP ahead of equivalent neighbouring countries such as the Philippines (35th), Singapore(37th), Malaysia (38th), Vietnam (45th) and Papua New Guinea (106th)². The economic outlook is positive due to strong domestic growth. However, Indonesian foreign direct investment still represents a lower share of GDP compared to other countries in the region like Singapore.

There are several restrictions that potential investors need to consider before deciding to invest in Indonesia. These include the fact that foreign investors are allowed a maximum stake up to 67% in any Indonesian ISP, and security consulting services need an operational licence from the National Police Headquarters³.

Moreover, a process of regulatory reform is underway, but policies and laws at local and national levels can create unnecessary bureaucracy.

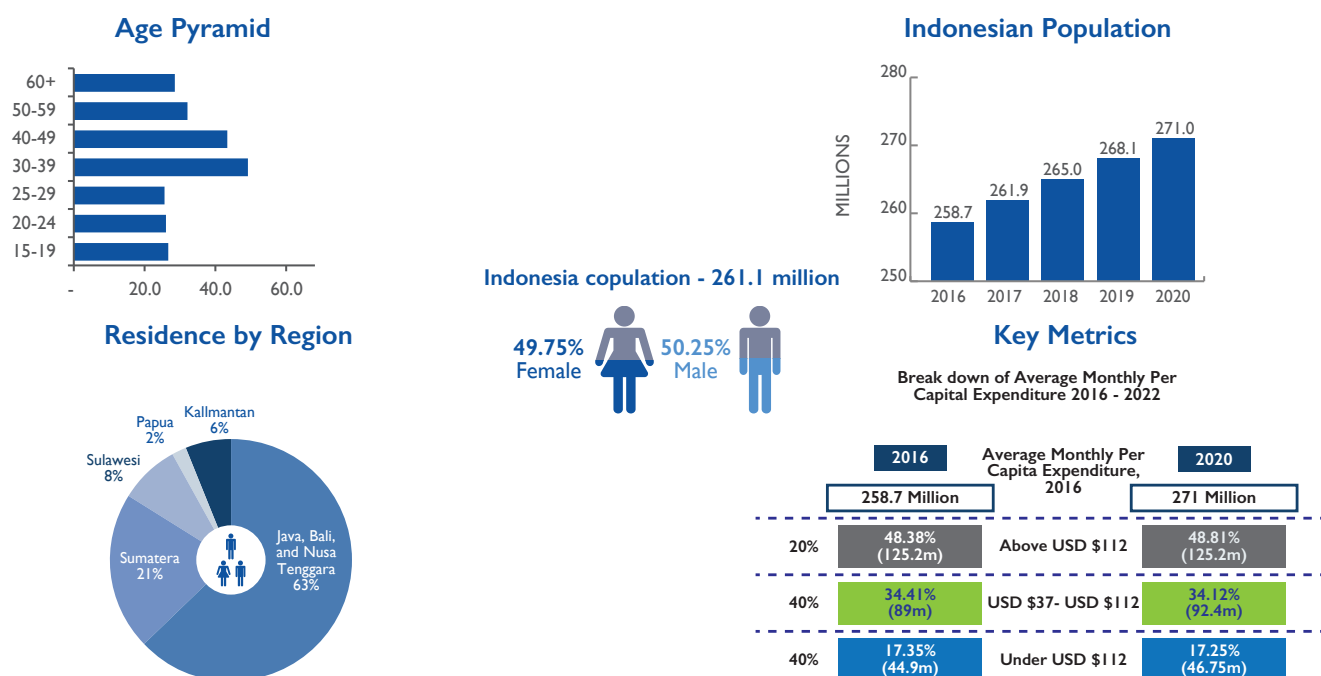


Demographic Overview

Indonesia's population was 258.7 million in 2016 and is expected to grow 4.8% to 271 million in 2020⁴. Indonesia is the fourth most populated nation in the world after China, India and the United States, and is home to the world's largest Muslim nation.

Being the largest economy in ASEAN⁵, with a 40% contribution to the region's GDP, Indonesia is expected to lead the development of the AEC⁶. The country has abundant human and natural resources and a strategic geographic position.

Chart 4: Population Structure, Indonesia, 2016



Source: Central Statistical Agency, Frost & Sullivan

From an ICT perspective, five islands in Indonesia contain the most inhabitants. The island with the largest population is Java, with about 150 million people and home to the capital city, Jakarta. Sumatra is next with an estimated 54 million people and situated close to Malaysia and Singapore. Sulawesi has about 20 million inhabitants, while Kalimantan (Borneo) has about 17 million people. The two smallest main islands are Irian Jaya (New Guinea) and Bali, with 4.5 million people each.

About 40% of the population is aged 39 or younger⁷. The middle-class population is set to fall slightly in percentage terms from 34.4% in 2016 to 34.1% in 2020. The expected growth in population will, however, see the number of people in the middle class rise from 89 million in 2016 to 92.4 million in 2020. While the absolute number will increase due to the increasing population over this time, there is also a lower, more impoverished socioeconomic class that will increase during this period. According to the World Bank, an estimated 165 million Indonesians live on less than USD 5.5 per day⁸.

The number of internet users has grown from more than 89 million in 2015 to 104.96 million in 2017⁹. This is an indication that more than 40% of Indonesians were internet-savvy in 2017, but it also means that 60% of Indonesians could not use the internet in the same year. About 65% of all internet users are based in Java, with 15% living in Sumatera and just under 6% living in Kalimantan¹⁰. The digital divide is prevalent in Indonesia, mostly because of the uneven distribution of sufficient telecommunications infrastructure. Increasing awareness of the benefits of internet access and raising the level of digital literacy would help reduce the digital divide.

Conversely, Indonesia's huge population and domestic consumption base make this country a favourable platform for economic growth and investment potential. This makes Indonesia attractive to investors and is one advantage of operating a business in the country.

PESTLE Analysis

Chart 5: Drivers ICT Industry: Pestle Trend Analysis, Indonesia, 2017

Factors	PESTLE Trends	Implications for ICT Industry
Political	As part of the Nawacita program introduced in 2014, the government provides one-stop services for the processing of investments and business licenses with a 15-day completion target. Nawacita also makes provision for technology development. ¹¹	Enabled a wide variety of new entrants and new business practices to emerge in all sectors, including finance, transport, logistics, retail and tourism. For example, peer-to-peer lending organizations which connect borrowers and investors via online platforms.
Economic	Strong economic growth is fueled by high domestic consumption. Furthermore, in 2015, approximately 75% of online purchases were made via mobile devices ¹² .	Business expansion via Big Data analytics to support data flow transactions both domestically and internationally. This will increase eCommerce growth to USD 130 billion by 2020.
Social	Growing acceptance of the internet as an efficient and convenient channel to connect with the end user	Will result in increasing market access, innovation, productivity and development in omnichannel engagement.
Technological	Digital technologies are in the process of disrupting and transforming traditional markets by enabling online platforms, reducing service delivery times and improving end-user experience.	Transforming business models in a variety of industries and expanding across different sectors to cater to market demand
Legal	The Indonesian government has stipulated that data localization, cloud computing, and disaster recovery centres operating in the country must have a base in Indonesia.	Backup and disaster recovery continue to drive demand, especially from companies that store personal data. In certain circumstances, such companies will need to be based in Indonesia.
Environmental	The Palapa Ring Project is a government-led project set for completion in 2019 ¹³ . It involves the installation of an undersea and terrestrial cable network that covers the five main Indonesian islands.	Opportunities exist to expand mobile broadband coverage beyond the greater Jakarta area, increasing coverage in Western and Central Indonesia and expanding into Eastern Indonesia.

Chart 6: ICT Industry: ICT Readiness Index, Indonesia, 2014–2016

Readiness Measure	2016* Score	2016 Rank	Change in Rank (2014-2016)
Political and Regulatory Environment	3.78	65	3 ▲
Economic Climate	3.05	85	1 ▲
Business and Innovation Environment	4.35	64	-2 ▼
Infrastructure	2.86	105	-20 ▼
Affordability	5.94	38	-1 ▼
Skills	5.13	65	-4 ▼
ICT Usage	4.17	78	-9 ▼
Network Readiness Rank	4.00	73	-9 ▼

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

Source: World Economic Forum

According to the overall ICT Readiness indicators, Indonesia is ranked 73rd out of 139 countries. Conforming to the Ministry of Communication and Information Technology tasks has helped Indonesia maintain its ranking within the top 100. Such tasks include the allocation of ICT resources, the allocation of spectrum and telephone numbers, the enhancement of service coverage, and the regulation of service price rates.

There has been some degree of upheaval with respect to telecoms infrastructure. Code Division Multiple Access (CDMA) operators were given until December 2016 to close down their networks due to falling subscriber numbers. CDMA had also fallen out of favour with hardware manufacturers and end users. One reason was that there was no longer any competitive advantage in using CDMA over Global System for Mobile (GSM). However, future network readiness rankings are set to show an improvement in terms of infrastructure. The spectrum made available by the CDMA shutdown will be auctioned off for use in the development of 3G services, and the Palapa Ring Project will launch in 2019, resulting in the availability of more high-speed services in the region.

Despite an overall decline in the Network Readiness Rank, digitisation is growing across several sectors, including financial services, driven by the fintech boom. Moreover, deployment of digital technologies in this sector, such as Big Data and real-time communications, increases efficiency. In addition, the retail sector is enjoying the advantages of digitisation. Adoption in this sector will lead to improved customer interactions, the simplification of business processes, and the beginning of a cashless society.

Drivers & Restraints

Chart 7: Drivers

INDUSTRY DRIVERS

	1-2 Years	3-5 Years	6-7 Years
Start-ups and small-medium businesses are expected to fuel digital adoption in Indonesia; hence, it will increase the use of technology services such as cloud and cybersecurity solutions	H	M	H
Growing accessibility of the mobile internet, as well as the increasing availability of inexpensive phones	H	M	M
Growing eCommerce has increased the need for financial technology and payment gateway	H	M	M
Growing focus on digital transformation across sectors has seen an increase in expenditure on automated services	H	H	M

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

Chart 8: Restraints

INDUSTRY RESTRAINTS

	1-2 Years	3-5 Years	6-7 Years
Indonesia's size and geographic complexity make it a challenging market to enter and the digital divide is apparent throughout the country.	H	M	M
Limited access to technology and the absence of telecommunications infrastructure leads to low internet penetration in several regions	H	M	M
No single source of legal reference for investment restrictions in government body	M	M	L

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

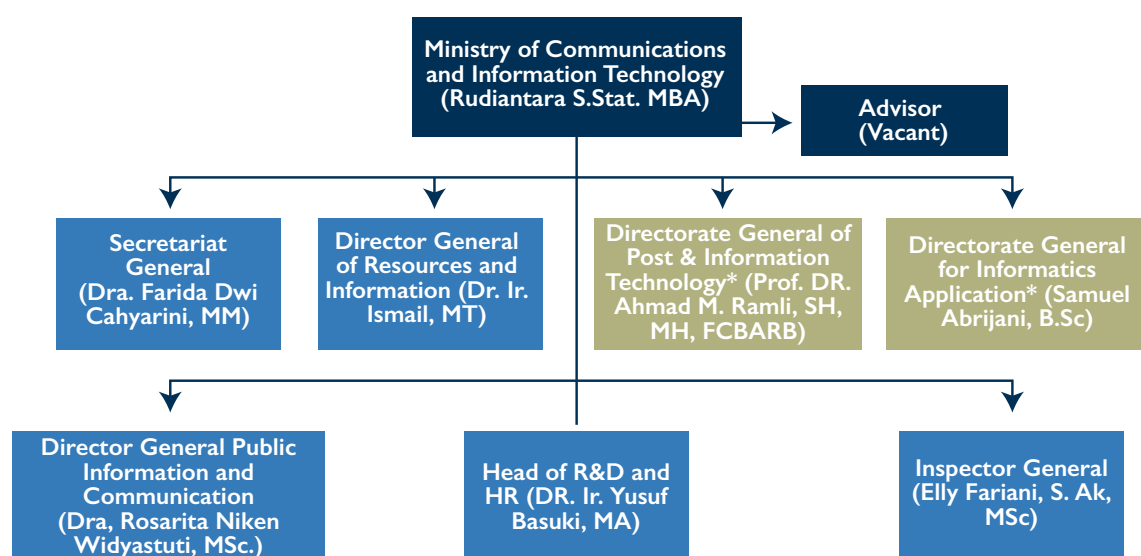
The vast number of SMEs in Indonesia will play a major role in the growth of digital services over the next few years. In addition, the expansion of LTE coverage will allow more existing mobile subscribers to use mobile broadband for more complex tasks such as online purchases, money transferral and communication with government organisations.

Alternatively, Indonesia's geographic make-up means that hardware installation will always be a challenge. Government initiatives that draw on the points defined by the Nawacita Program¹⁴ may help bridge the digital divide.

Host Government Structures and Policies

The Ministry of Communications and Information Technology (MCIT) comprises seven units and five experts. The units are in the chart below. The experts are special advisors to the minister on Law; Social, Economics and Culture; Communication and Mass Media; Technology; and Politics & Security.

Chart 9: Indonesia Government Structures, Ministry of Communication and IT



* Post involved in telecommunication, infrastructure, and service provider

Source: Ministry of Communications and IT

The MCIT is responsible for policies on digital government and telecommunications infrastructure. In addition, it is responsible for overseeing infrastructure projects such as the Palapa Ring Project. The ministry established the Indonesian Telecommunications Regulatory Body (BRTI) to which it delegates authority to regulate, supervise and control telecommunications networks and services¹⁵. The regulator also organizes telecommunications spectrum auctions which are sanctioned by the ministry.

There are a number of government authorities responsible for establishing digital law and policy. They include the ministry, the Secretariat of the Cabinet, the House of Representatives and other related departments. In addition, other ministries need to be involved if the law being proposed comes under their authority. For example, in 2015, the government launched the 2020 Go Digital Vision campaign in an attempt to help boost the digital economy by targeting SMEs and helping them go digital. This scheme was implemented by the MCIT but in collaboration with the Ministry of SMEs¹⁶.

The Indonesian government recently set up a new organisation tasked with providing cybersecurity for government institutions, some private companies and the public. The organisation is known as the National Cyber and Encryption Agency (BSSN). It is headed by Djoko Setiadi, who was appointed in January 2018¹⁷. Setiadi will report to President Joko Widodo. As such, some decisions have yet to be made regarding how this agency will interact with related government ministries, but the MCIT will remain responsible for drafting legislation and regulations regarding domestic cybersecurity and network security. Prior to the existence of the BSSN, the monitoring of cybersecurity was under the authority of the Indonesia-Security Incident Responses Team on Internet Infrastructure (ID-SIRTII). All staff and responsibilities previously under the authority of the ID-SIRTTI are currently being transferred to the BSSN.

The state-owned telecommunications company is PT Telekomunikasi Indonesia TBK (PT Telkom). It currently has a monopoly to operate local and long-distance telephone services in Indonesia. However, this will soon end as the government has begun deregulating the telecommunications market.

In 2014, President Joko Widodo devised a nine-point program of priorities that should be addressed for the advancement of the country (known as the Nawacita Program). As part of the program, the government will reform bureaucracy and provide one-stop services for the processing of investments of business licenses. The government will also provide funding for technology development, including the construction of science and technological parks.

Some of the key targets include the increase and development of fixed-broadband infrastructure and mobile broadband access by prioritising eGovernment, eEducation, eHealth, eLogistics, and eProcurement.

Indonesia ICT Roadmap

The ICT roadmap is part of the National Development Plan 2005-2025, which is a general plan that incorporates a cross-departmental approach across government for the improvement of countrywide systems such as transportation and utilities as well as national connectivity and digital services. Within the ICT roadmap, there are four main pillars which serve as the bedrock upon which the objectives of the Roadmap are achieved:

Chart 10: National ICT Roadmap, Indonesia, 2005–2025



Infrastructure & Security

- The Palapa Ring project is the major infrastructure project that is a central part of the Indonesia Broadband Development plan (IBP) 2014–2019. The project involves the construction of a fibre-optic network comprising 35,000 Km of undersea cable. The network will be operational by the end of 2018 but fully completed by 2019.
- The National Cyber and Encryption Agency (BSSN) launched in early 2018. Decisions regarding its specific roles and responsibilities are currently taking place.

Adoption and Creative Utilisation

- Adoption of digital services in the creative industry helped develop economic competitive advantage in this industry by leveraging natural resources and skillful human resources.
- The Indonesian government is planning to support the digitisation of 8 million SMEs by 2020. This is part of the government's aim to increase the value of SMEs by USD 10 billion by 2020¹⁸.

Regulation and Legislation

- Regulations regarding the sharing of passive infrastructure and open access have been reassessed.
- Spectrum management is an ongoing process, especially with respect to the recent shutdown of CDMA networks and the development of 3G and 4G services.

Funding

- In terms of the IBP, investment is set to total USD 23.3 billion, and in 2017 alone, the Indonesian government spent USD 1.5 billion to improve connectivity.
- The Palapa Ring Project was funded via public/private partnership. Private operators are responsible for network construction but will recover capital costs via the availability of infrastructure services.

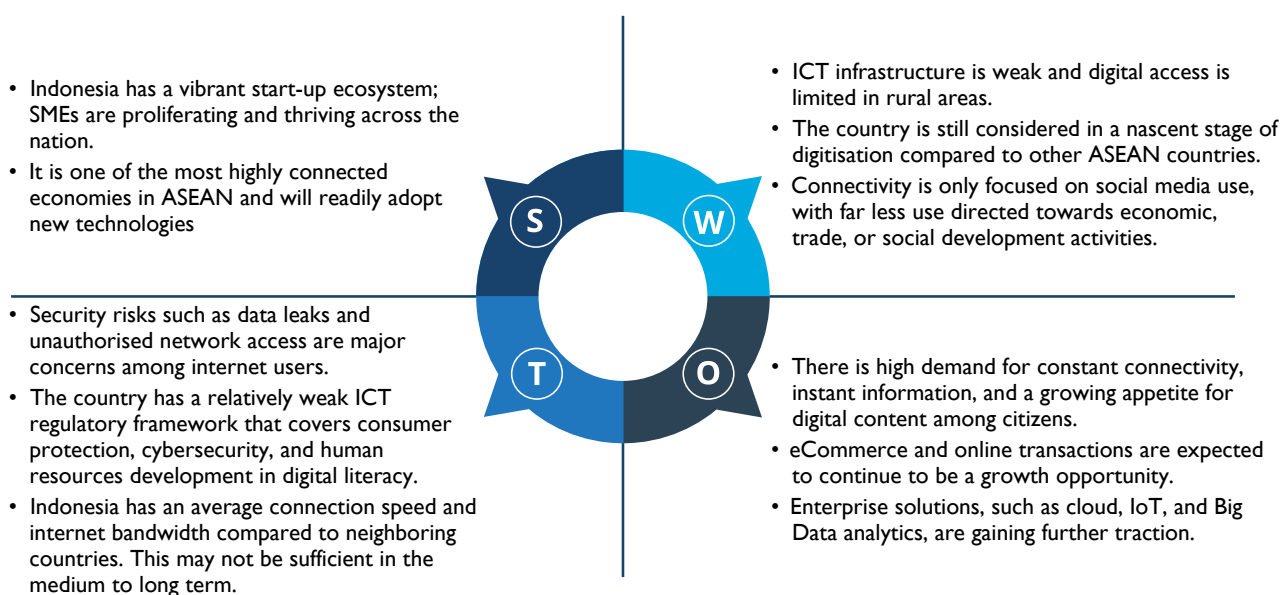
Main Targets:

Infrastructure and Security	Adoption and Creative Utilization	Regulation and Legislation	Funding
<ul style="list-style-type: none"> • Increased coverage of fixed-broadband from 15% at the end of 2013 to 71% of urban households and 49% of rural households by 2019 • Increased fixed-broadband speeds from 1Mbps at the end of 2013 to 20 Mbps in urban areas and 10Mbps in rural areas by 2019¹⁹ 	<ul style="list-style-type: none"> • The successful launch of campaigns such as Go Digital Vision, such that they increase awareness of the benefits of digital services for SMEs • The successful digitisation of 8 million SMEs by 2020 • Connecting the government network (e-government) 	<ul style="list-style-type: none"> • Finalisation of passive network sharing agreements such that operators can launch affordable services but still make a profit • Successful spectrum refarming after the CDMA shutdown in December 2016 and the analogue switch off in early 2018 	<ul style="list-style-type: none"> • Completion of Palapa Ring project and the creation of a sufficient revenue stream to ensure recovery of capital costs

SWOT Analysis

Chart 11: SWOT Analysis Indonesia

SWOT ANALYSIS – Indonesia



Base of the Pyramid

BOP Industry Statistics

- Internet penetration is on the rise in Indonesia. In 2000, fewer than 5 million Indonesians used the internet. By 2016, there were over 97 million users²⁰. The mobile network is more widespread compared to the fixed network and as such the majority of internet users gain access via the mobile network.
- While smartphones are contributing to increased internet penetration, smartphone penetration remains low at 23.7% in 2017 and is heavily concentrated in Jakarta and the country's secondary cities of Java and Sumatra. Fixed-broadband penetration was less than 1% in 2016. Poor fixed infrastructure is due to a lack of investment and Indonesia's geography as an archipelago, but it is hoped that the Palapa Ring project will help to increase fixed-broadband usage beyond 2019²¹.
- A more immediate problem is that the heavy reliance on mobile networks for internet access is straining capacity and is adversely affecting internet and telephony quality. Indonesia's youth is leading its telecommunications revolution. The average age in Indonesia is 24 years, and 60% of the population is under 39 years of age²².
- Young Indonesians, especially those in the rapidly growing urban middle-class areas, are early adopters of mobile technology and internet technology.

BOP Industry Initiatives

As a developing country, Indonesia is working to advance the country's economy by increasing investment in the information technology sector. Based on Frost & Sullivan data, Indonesia's expenditure on IT has become the largest in Southeast Asia.

- IT spending in the country is predicted to reach USD 3.8 billion in 2019, up from USD 1.6 billion in 2014. Cloud and data centre services are the growth engines when it comes to enterprise IT spending in Indonesia.
- Banking, financial services, and insurance will continue to be the biggest spenders on IT services, while manufacturing and transportation will show steady growth with respect to adoption.
- Managed services, especially managed network services, are expected to drive government spending, while cloud-based services, enterprise software, and connectivity services could be extensively used in public infrastructure projects and the education sector.
- More accessible and affordable broadband services will create scope for deploying new disruptive technologies, including mobile internet, IoT, work automation, Big Data, and mobile applications.
- Accessible broadband will create new possibilities for peer-to-peer banking and use of mobile money. In this area, eCommerce and eBanking will increase in popularity, and the fintech market will have a transaction value of USD 38.5 billion by 2022²³.

Indonesia's rapid mobile communications growth, lack of fixed-broadband infrastructure and large number of operators are stretching the capacity of its wireless networks. Indonesians are increasingly reliant on mobile technology in their daily lives and will readily use bandwidth-heavy applications, such as the downloading and viewing of video content.

With such high technology penetration, Indonesia is quickly becoming a major target market for technology players and spending on IT is starting to show healthy year-over-year growth. In 2015, total IT expenditure in Indonesia was USD 18.4 billion, having increased at a CAGR of 12.4% during 2011-2015. The key factors that contributed to this market growth were the increasing support from the Indonesian government and rising adoption of eCommerce. However, increasing piracy in the software segment could pose a challenge to market growth.

TELECOMMUNICATIONS

Market Overview

Chart 12: Telecommunications Industry Overview, Indonesia, 2016

Telecommunications Industry Overview, Indonesia, 2016	
Mobile Subscriptions	388.04 million
Mobile Penetration Rate	150%
Fixed Line Penetration	1.7%
Internet Penetration	31%
Mobile Broadband Penetration	30%
Mobile Coverage	2G :49.8%, 3G : 38.9% LTE: 11.4%
Number of MNOs	6

Source: Frost & Sullivan Wireless Tracker

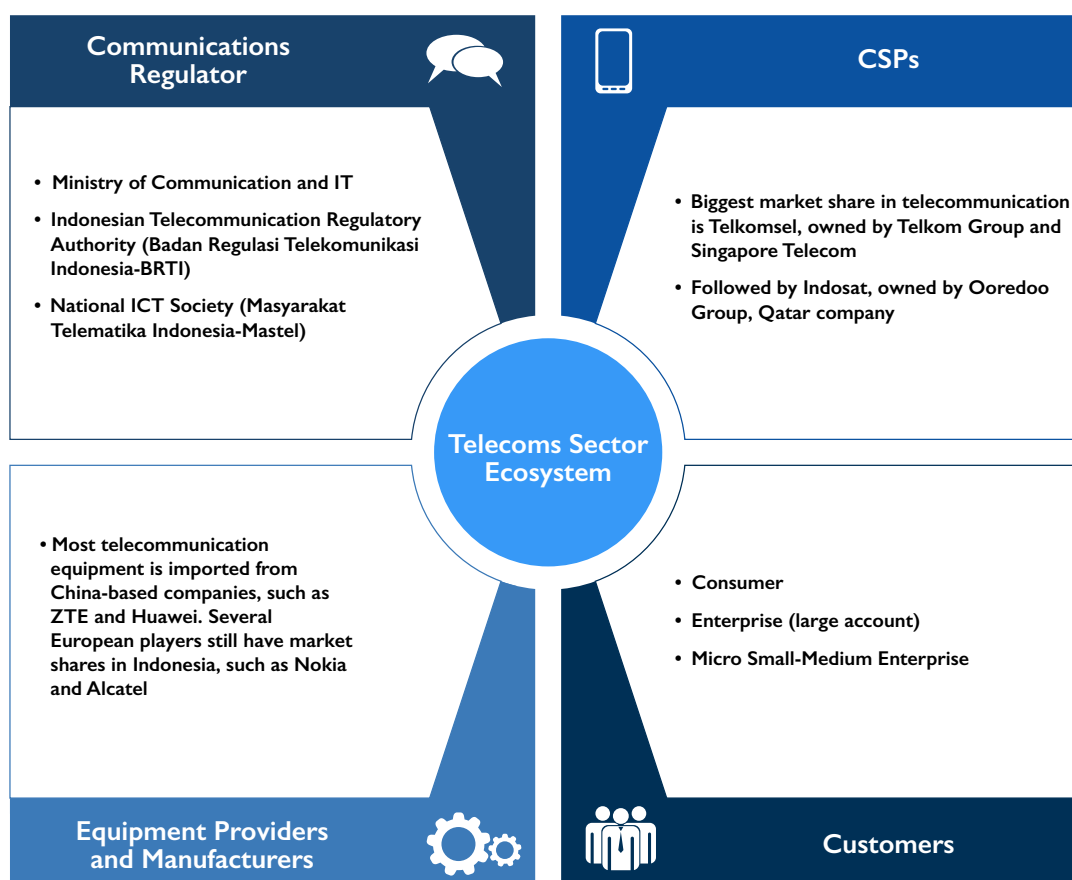
There are six mobile operators in Indonesia, namely state-owned Telkomsel, Indosat Ooredoo, Hutchison 3 Indonesia, XL Axiata, Smartfren and Net1.

Four of the operators, Telkomsel, Indosat Ooredoo, Hutchison 3, and XL Axiata, operate GSM networks, and until December 2016, four of the seven MNOs also operated CDMA networks.

Mobile penetration is high, amounting to 150% or 388.04 million mobile subscribers. This shows that many Indonesians have more than one mobile phone. Since fixed-line broadband penetration is less than 1%, the majority of people rely on mobile broadband to access the internet, hence the similarity between mobile broadband penetration and internet penetration.

Almost 50% of cellular users are still on 2G, while 34% use 3G and the rest are on 4G. The government plans to restrict the use of 2G-based mobile services in an attempt to increase the use of services supported by 3G and 4G networks. The regulation is basically intended to increase the growth of 3G/4G network subscribers by encouraging churn away from 2G networks. In addition, operators backed up this regulation by encouraging the take-up of 3G and 4G services and incentivising smartphone use.

Chart 13: Telecoms Industry Structure, Indonesia, 2017



Recent Developments

The CDMA operators were given until December 2016 to migrate their customers away from their CDMA networks and onto GSM alternatives. The operators are Telkomsel (Flexi), Indosat Ooredoo (StarOne), Net1 (Ceria), Mobile-8 (Smartfren) and Bakrie Telecom (Esia). The move was part of the government's plan to sell off the newly available 2100MHz radio frequencies for use with next-generation services.

The installation of undersea cables has helped operators build on their fixed-market presence from 2012 to 2017. Mobile operators largely target consumers and SMEs who are driving the demand for bandwidth-heavy digital content and social media. Large enterprises are looking to fixed-broadband using FTTH to support the uptake of IP-based communications and cloud applications. However, the fixed-line business is not a top priority for most service providers due to the requirement for a high level of investment for network deployment, especially in rural areas.

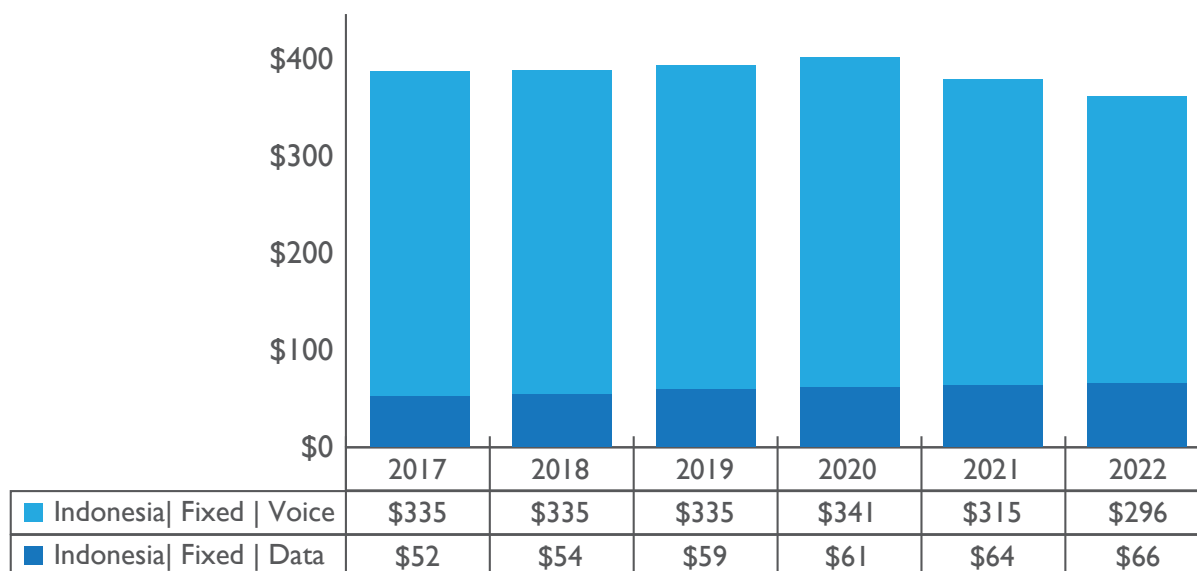
Chart 14: Telecommunications Market, Indonesia, 2017

WIRED TELECOMS	WIRELESS TELECOMS	SATELLITE
<ul style="list-style-type: none"> Telkom is the only player offering PSTN services, and most customers are based in the business sector. Larger companies are looking to install FTTH via the upgrading of legacy ADSL networks. 	<ul style="list-style-type: none"> Based on Frost & Sullivan data, the smartphone penetration rate in Indonesia is expected to grow exponentially from 67.1 million users in 2017 to an estimated 133.2 million in 2019. 	<ul style="list-style-type: none"> Telkom is to launch a new Satellite 3S in anticipation of the increasing demand and support for the achievement of Telecommunications, Information, Media, Entertainment, and Services (TIMES) strategic objectives.

Market Size

Wired Telecommunications Activities

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



State-owned Telkom has maintained its monopoly in the fixed-line market segment, while Indosat is the other major player in this segment. In both cases, their subscribers are located mainly in urban areas. Due to a requirement for high up-front investment, there is little interest in fixed-line deployments. Telkom used only 3.7% of its CAPEX on fixed-line infrastructure in 2016.

Revenue from fixed voice services will plateau and start to fall after 2020. There will be a fall from £335 million in 2017 to £296 million in 2022 (CAGR = -2.45%). The main reason for this is growth of mobile services, which are more accessible, affordable and can be obtained on a prepaid basis (do not require a contract or a line of credit). Fixed data will continue to increase, but this will be minimal, up from USD 52 million in 2017 to USD 66 million in 2022 (CAGR = 4.88%). Fixed services will not increase by any significant amount without heavy investment in infrastructure. The completion of the Palapa Ring project will change this.

The low penetration and low demand are significant constraints when considering increasing fixed-broadband services using upgraded fixed-line networks. In addition, broadband access using the existing ADSL technology is attractive for micro SMEs compared to more expensive fibre-optic or leased-line options.

The government has acted by charging operators and service providers a 0.75% levy on their gross revenue via the Universal Service Obligation program. The funds are used for emergency facilities and to provide basic telephony services, including fax and internet in remote areas²⁴.

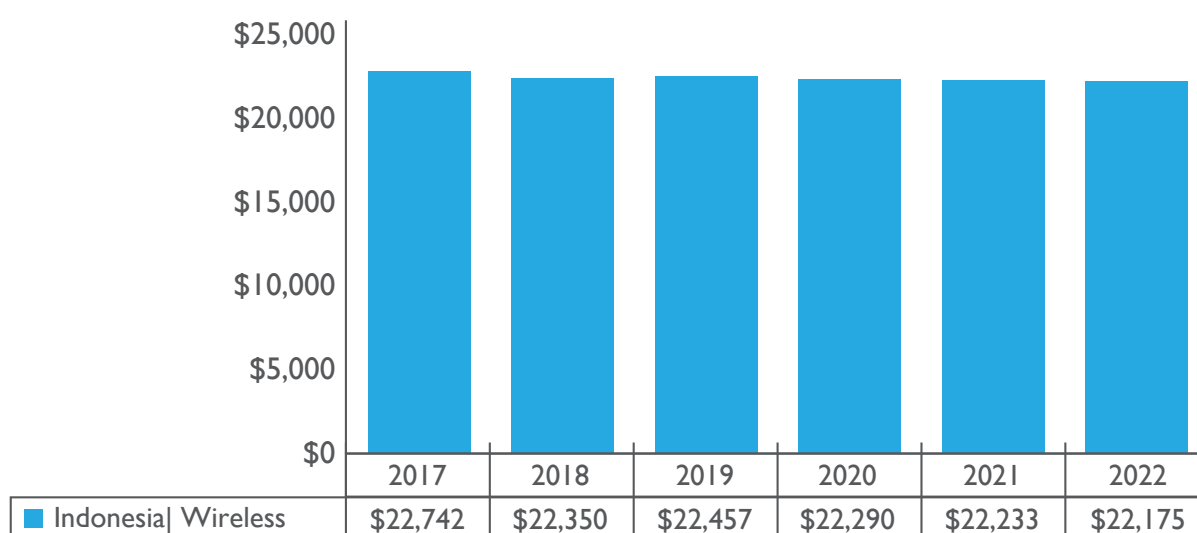
Chart 16: Wired Network Operators Analysis, Indonesia, 2016

Network Operators	Subscribers	Market Share
Telkom	10,911,109	85.7%
Indosat Phone	1,820,640	14.3%
Total	12,731,750	100.0%

Source: Frost & Sullivan Wireless Tracker

Wireless Telecommunications Activities

Chart 17: Wireless Telecommunications Market Revenue 2017–2022, (\$US Millions)



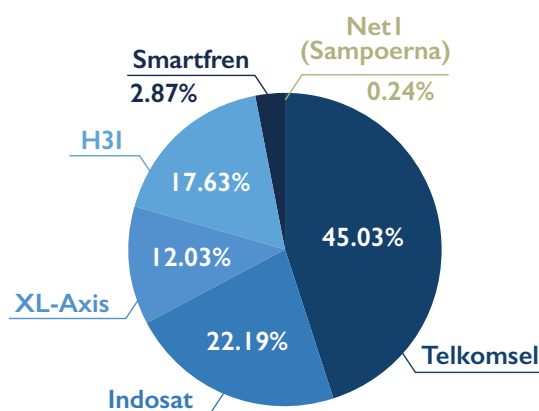
The wireless telecommunications market in Indonesia has experienced exceptional growth because mobile operators have been busily positioning themselves as growth rates start to moderate and competition becomes more intense. Market leader Telkomsel, the mobile subsidiary owned by Telkom group, continues to maintain a huge presence despite increased pressure from the competition.

The shape of the market has changed since several newer operators, with foreign partners, have entered. With 4G services launched following a somewhat controversial licensing phase, there has been much interest in how the operators manage the next-generation challenge.

We envisage that the wireless market will experience a period of stagnation in terms of revenue growth. With penetration at more than 100%, the market is completely saturated, and the migration of mobile subscribers from cheaper 2G and 3G (GSM) services to more lucrative 4G services will take time.

In October 2017, Telkomsel was announced as the winner of a 30MHz block of 2.3GHz spectrum in a bidding process organised by the MCIT. Telkom paid USD 75 million for the block, outbidding rivals, including Hutchinson 3, Indosat Ooredoo, XL Axiata and Smart Telekom. Telkomsel used the additional frequency to realign its existing services²⁵. This includes deploying LTE technology in all the frequencies it owns simultaneously, which will enable it to develop its 4G business more rapidly²⁶.

Chart 18: Mobile Subscriber Market Share, Indonesia, 2017



Source: Frost & Sullivan Wireless Tracker

Satellite Telecommunications Activities

Satellite services have been available in Indonesia since the launch of its own domestic satellite system in the mid-1970s. Since then, Asia's satellite market has grown and expanded to uses other than television.

Currently, the largest segment of the market involves mobile connectivity and backhaul, but providers also offer satellite communication services to the corporate sector, video services and consumer broadband.

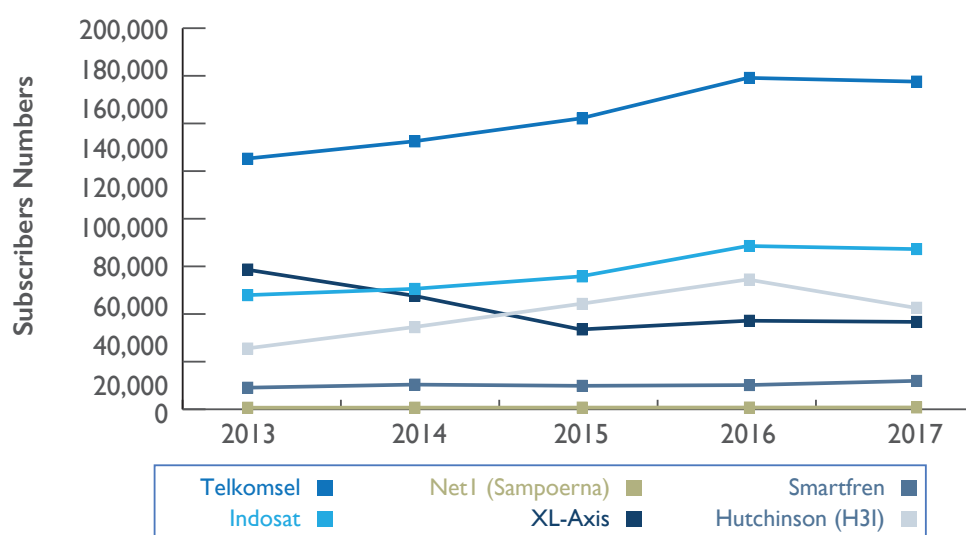
Indonesian-based satellite service provider BigNet signed a USD 78 million long-term deal with Singapore-based Kacific Broadband Satellites²⁷. Both parties are working together to formulate a new high-speed broadband service which will be available to Indonesians via a satellite dish.

Competitive Analysis

Further details regarding the main telecommunications companies active in Indonesia are shown in the following table:

Company	Details
Telkomsel	Part state-owned and part owned by Singapore Telecom. In H2 17, Telkomsel recorded net profit of USD 1.1 billion, with digital business contributing 39.3% of the revenue ²⁸ .
Indosat	Owned by Qatar-based Ooredoo (65%), the Indonesia government (14.29%) and Skagen AS (5.51%). Lost some market share due to in-creased interest in data at the expense of SMS and voice. Indosat is the first company to undertake frequency realignment, resetting its holdings to 2100MHz.
H3I	Owned by Hutchison Whampoa Group (65%) and Indonesian tycoon Gari-baldi Thohir (35%). H3I launched mobile services in 2007 and within 10 years gained its 17.6% market share. H3I also won a bid at the 2100MHz frequency auction and will use this to enhance its network.
XL-Axis	A subsidiary of Malaysia's Axiata Group, which acquired Axis Telecom in 2014. XL will be adopting a dual-brand strategy, whereby XL will be the premium brand and Axis will be the budget brand. XL spent USD 500 mil-lion on capital expenditure projects in 2017, including pay-TV, broadband internet and voice telephony.
Smartfren	Owned by Sinar Mas Group (60%), Public (31%) and Dubai-based Jerash Investment Ltd (9%). Launched services in 2010 offering fixed-wireless access and CDMA. Following the shutdown, Smartfren switched from CDMA to LTE and has offered 4G services since 2014.
Net I	The brand is owned by PT Sampoerna Telekomunikasi Indonesia (STI), a subsidiary of Sampoerna Strategic Group. Formerly known as Ceria, it used to operate a CDMA network, but since the shutdown has offered 4G services using the 450MHz frequency. STI formed an alliance with the ICE group in December 2015 as part of its plan to expand and improve its wireless network.

Chart 19: Subscriber Growth by Operator, Indonesia, 2013–2017



Source: Frost & Sullivan Wireless Tracker

Major Market Initiatives

Further infrastructure details of the Indonesian Broadband plan are shown below. This is part of the country's ICT roadmap.

Chart 20: Telecoms Services Industry Initiatives, Indonesia, 2017

Project Name	Description	Stakeholder	Cost	Timeframe
Flagship 1	Nationwide Backbone FO Palapa Ring	Ministry of Communication And Information Technology	IDR 14 Trillion (USD 1.1 Billion)	Ongoing
Flagship 2	Shared Duct/Passive Infrastructure		Under Indonesia Broadband Plan (USD 27 Billion)	Long-term plan to 2012-2025
Flagship 3	Rural Terrestrial Broadband Piloting within USO Area			
Flagship 4	Government Network and Consolidated Data Centre			
Flagship 5	USO Fund Reform to Support Broadband Ecosystem (not only for infrastructure)			
Flagship 6	National Digital Literacy Programme to Fasten Broadband Adoption and Utilisation			

Areas of Technology-specific Growth

Almost 70% of cellular users are on 2G, 25% on 3G and 5% on 4G²⁹. The government's plan to restrict the use of 2G-based mobile services, in tandem with the closing down of CDMA networks, has made 4G technology an area of specific growth in this region.

Opportunities for UK Firms

Major Buyers and Decision Makers

Following the launch of the National Development Plan in 2005 and the Indonesia Broadband Development Plan in 2014, the major buyer and decision maker at the moment is the Indonesian government. In terms of ICT and/or digital services, the best ministry to contact would be the MICT.

Areas Where the UK has a Specific Strength in the Country

The UK is Indonesia's fourth-largest trading partner, worth USD 2.48 billion in 2016. In terms of investment, the UK is ranked as the second-largest European investor, valued at USD 306 million in 2016. The UK's main exports to Indonesia are machinery and transport equipment, chemical and related products, and crude materials³⁰. Currently, the UK has a minimal presence in the country with respect to the ICT sector.

The Indonesian government has various programs providing support to bring internet and communications access to all parts of the country. One of the largest programs is The Indonesia Broadband Plan (2014–2019), described in the ICT roadmap plan, and aimed at providing internet access to users in rural areas. As part of the plan, local and international communities and service providers have to submit plans and proposals tailored to the varying needs of different parts of the country. Service providers would be allowed to retain a portion of the universal service payment that they would then use for rural access projects.

The plan also involves using some of the proceeds of the universal service fund for part of the government's infrastructure development of the Indonesia Broadband Plan. Indonesia plans to construct about 35,280 km of undersea fibre optics and 21,708 km of underground fibre optics to deliver nationwide telecommunications services by 2025. Based on this current development, this is an area where the UK can bring its expertise and capital to enable Indonesia to achieve its goals.

Route to Market and Challenges to Entry

Due to the changes to the regulatory landscape and strong competition among telecommunications players catering to a price-conscious market, UK firms will need a deep knowledge of the Indonesian market before committing. Telecommunications are particularly important as an enabler or catalyst for other sectors and as a means of promoting greater transparency in all aspects, including access to government services.

The government will be a critical partner because infrastructure, such as fibre-optic ducts, uses public rights of way along streets and utility towers. Municipalities should facilitate access for using public rights of way. A good example is Jakarta, where the local government gave access to a network provider to lay ducting throughout the city for operators to use at a cost-based price. Operators can now use the ducting to install services in public areas, like free Wi-Fi at bus stops.

DIGITAL SERVICES

Market Overview

Digital services are disrupting and transforming traditional markets and business models in Indonesia. Using digital services to collect and analyze Big Data and leverage cloud computing will boost productivity in many sectors of the Indonesian economy. Linking small businesses to eCommerce opportunities could provide access to markets, technology, and business partners.

Chart 21: Digital Services Market Overview Indonesia



Recent Developments

Cloud Services

Indonesia's cloud services market is set for rapid growth due to growth in online media consumption and the demand for cloud-based disaster recovery solutions. Indonesian cloud computing spend was approximately USD 172 million in 2016 and is expected to reach USD 1.2 billion in 2022 with CAGR of 38.6%³¹.

Private clouds are favoured by large enterprises and multinationals such as banks and telecommunications providers. These companies are prepared to pay a premium for cloud services due to concerns over data security. Public clouds tend to be favoured by micro-SMEs, and there were 57 million SMEs in Indonesia in 2014³², which contributed 60% to Indonesia's GDP. Due to their vast number, public clouds are expected to lead the growth of the Indonesian cloud market in terms of adoption.

Digital Financial Services

Peer-to-peer lending is becoming increasingly popular in Indonesia, with the total value of transactions set to reach USD 150 million by 2021³³. Growth is partly driven by the increasing financial gap, increased internet access, increased use of Big Data technology analytics to create product differentiation, and government support for micro-finance companies capable of offering alternative financial solutions.

P2P lending services offer the greatest opportunity to leverage existing financial services since they can be marketed as a new service for untapped markets such as the unbankable society. Private banks distributed financing totalling approximately USD 8.6 billion while loans were within the range of USD 74,000–1.5 million³⁴. The largest share of the financing comes from state-owned banks and government agencies, totalling USD 16.2 billion (more than 65% of the total)³⁵.

eCommerce

The Indonesian government aims to increase the value of the eCommerce market to USD 130 billion by 2020³⁶. In the IT segment, the eCommerce industry is the most highlighted and attractive industry for investors compared to other similar industries or service markets.

The Indonesian government plans to support the digitisation of 8 million SMEs by 2020. This is part of the government's aim to increase the value of SMEs by USD 10 billion by 2020³⁷.

Host Government Structures and Policies

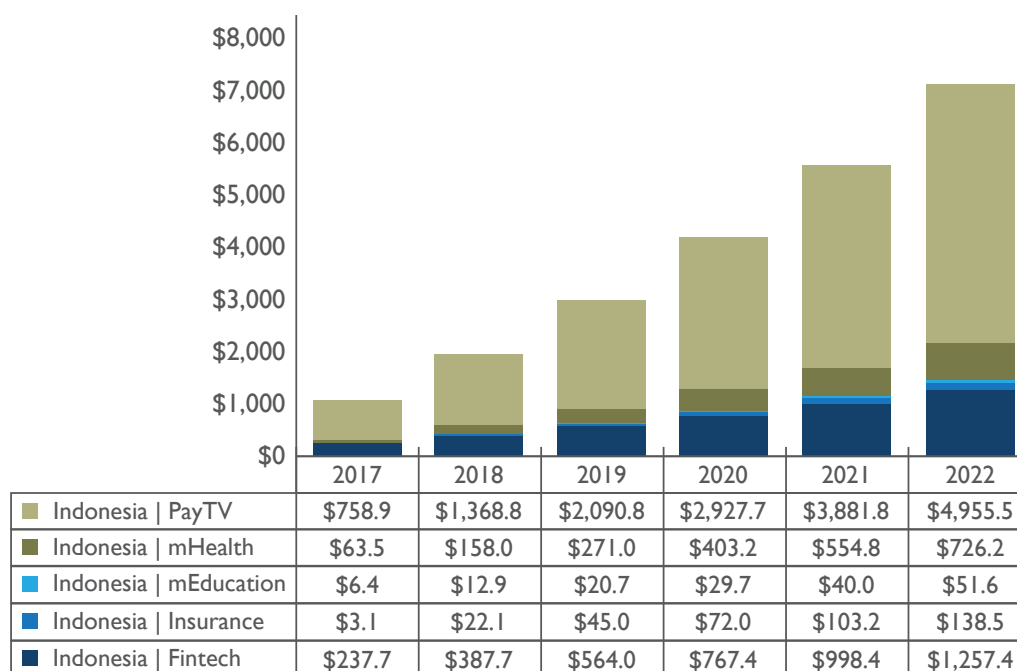
Several legislative bodies have shaped the development of Indonesia's digital services. The government agency stakeholders in charge of policymaking are The Commission for the Supervision of Business Competition (Komisi Pengawas Persaingan Usaha or KPPUU), the Ministry of Trade, the Ministry of ICT, Bank of Indonesia and the Financial Services Authority (OJK). Other government ministries and agencies, the private sector and associations are also involved³⁸.

Chart 22: Government Regulation on Digital Services Indonesia

1	<p>» Government Regulation No. 82 comprises the following key points:</p> <ul style="list-style-type: none"> i. A limitation on the ability of organizations to use technologies requiring cross-border data flow to gain unfair advantage. ii. That data centres with information on Indonesian public services have disaster recovery centers in Indonesia.
2	<p>» An exception to the rule ii) is applied to banks, which can host specific information outside of Indonesia subject to OJK approval. However, the information cannot contain customer identifiable information.</p>
3	<p>» According to the OJK, digital financial services providers are responsible for consumer protection, liability and integration of three main organizational types: banking, capital markets and non-banking financial institutes.</p>

Market Size and Forecast

Chart 22: Digital Services (Consumer) Market Revenue Forecast, 2017–2022, (\$US Millions)



Of the digital services, pay-TV predominates, and revenues are set to increase from USD 758.9 million in 2017 to USD 4.9 billion in 2022 (CAGR = 45.54%). The Indonesian pay-TV market is small in relation to the mobile market, with subscriptions at 18% of TV households, representing 7.5 million subscribers in 2017³⁹. Reasons for this include the prevalence of piracy, competition with free-to-air TV and price.

Despite this, Netflix signed an agreement with Telkom in 2017 and now offers services in Indonesia. The agreement followed a dispute between Netflix and Telkom whereby Telkom argued that Netflix did not have the correct permit and voiced concerns about the content Netflix was offering⁴⁰. The dispute illustrates the importance of having local support when entering the Indonesian market, especially if the entrants are offering content or services which will be seen by the masses.

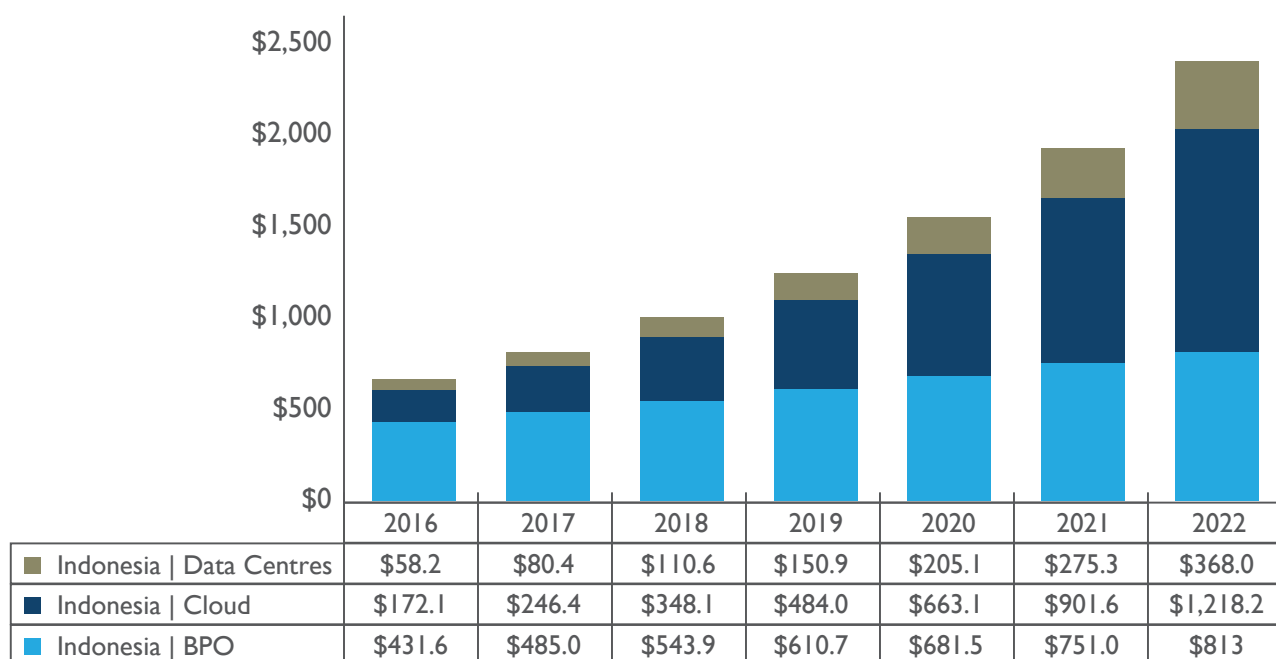
The use of IT in the Indonesian healthcare sector is still in the early stages, but revenues are set to increase from USD 63.5 million in 2017 to USD 726 million in 2022 (CAGR = 62.8%). The Indonesian government is in the process of rolling out its national health insurance system which will be available to all by 2019. Citizens will be able to access healthcare via their card, which will facilitate the future use of mobile health systems.

The mEducation market in Indonesia is small, with revenues at USD 6.4 million in 2017. Despite this, it is set to rise to USD 51.6 million in 2022 (CAGR = 51.81%). One of the most popular applications of mEducation is for learning English. Indonesians recognise English as being important for international relations, and English-learning mobile applications such as Duolingo are popular.

Fintech revenues in Indonesia are set to increase from USD 237.7 million in 2017 to USD 1.25 billion in 2022 (CAGR = 39.54%) while mInsurance will increase from USD 3.1 million in 2017 to USD 138.5 million in 2022 (CAGR = 113.8%). The increasing financial gap has driven the growth of fintech companies offering digital financial services in Indonesia. Based on data from the International Finance Corporation, the total micro-SME financing gap has reached almost USD 28 billion. Only 12% have access to credit and manage to grow to a sustainable size, while the rest have limited capacity to scale their business⁴¹. In addition, 45% of micro-SMEs are unfunded from any formal financial institution (bank), and only 4% received financing from a bank in 2014.

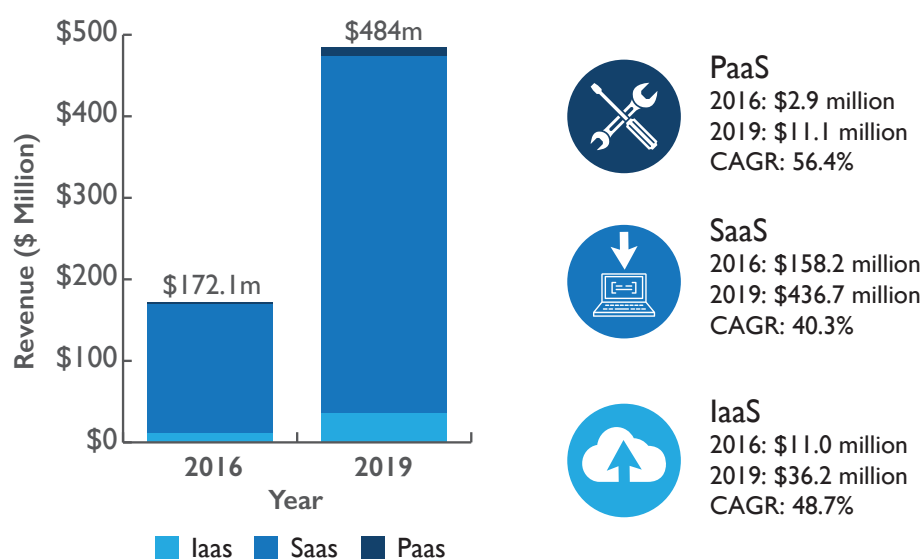
Cloud Services Market

Chart 23: Digital Services (Business) Market Revenue Forecast, 2017–2022, (\$US Millions)



The Indonesian cloud market is projected to lead the growth of the Southeast Asia cloud ecosystem. It is expected to grow at a CAGR of 38.6% from 2016 to 2022 to reach an overall market size of more than USD 1.218 billion in 2022 from more than USD 170 million in 2016. Micro-SMEs have driven much of the public cloud market growth, utilising public cloud for web hosting, email, and office productivity tools.

Chart 24: Cloud Services Market: Service Revenue Forecast, Indonesia, 2016–2019



Source: Frost & Sullivan

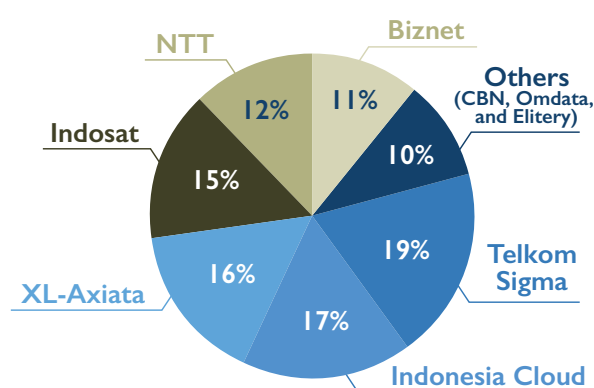
In 2016, SaaS acquired the largest revenue share in 2016 at 92%, followed by IaaS with a 6.39% share and PaaS with a 1.69% share. PaaS and IaaS services are expected to be the fastest-growing segments of the three with estimated CAGRs at 56.4% and 48.7%, respectively. Growth in mobile consumption and increasing demand for disaster recovery services have been key in driving the cloud infrastructure market in Indonesia.

The opportunity for UK companies to expand their footprint exists in Indonesia. There are significant monetisation opportunities in Java, the most populated region. UK companies can serve the market by deploying data services and upselling data centre and cloud services as part of their ICT offerings to Indonesian customers. Furthermore, UK companies can leverage Big Data analytics by using cloud services and introducing this capability to Indonesian enterprises.

Competitive Overview

Given its large and growing addressable market in Southeast Asia, the Indonesian cloud market is fiercely contested by global cloud vendors and local telecommunication participants.

Chart 25: Cloud Services Market: Service Revenue Share, Indonesia, 2016



Source: Frost & Sullivan

Telcos dominate the public clouds, and the top four companies (Telkom Sigma, Indonesia Cloud, XL Axiata and Indosat) had similar market shares in 2016. Local telecommunication providers are best placed to offer cloud services because they can leverage their established networks and data centre infrastructures.

Many cloud service providers are increasingly offering bespoke solutions to cater to the burgeoning Indonesian micro-SME segment. For instance, in April 2015, Telkom Sigma launched its STAR Cloud service specifically aimed at start-up firms and SMEs. One of the highlights of STAR Cloud is a cloud-based eCommerce web platform. Other smaller cloud providers are establishing their footing in the Indonesian cloud market by offering niche, but important, cloud services. For instance, Biznet achieved a 300-customer milestone within four months of its partnership with Internet Initiative Japan (IIJ) by rolling out a Big Data analytics solution.

With the Indonesian cloud market still on its growth trajectory, many key cloud participants continue to emerge, thus proving that Indonesia has potential for UK companies to establish business in the country. For instance, UK companies can merge and partner with local cloud service providers that focus on the SME segment, one of the largest segment groups in the cloud service market.

Digital Financial Services

In 2016, Indonesia had more than 61 million micro-SMEs that contributed GDP totalling more than USD 637 million. This total contribution by micro-SMEs to the national GDP is an accumulation of all sectors (e.g., agriculture, mining, transportation, communication, financial services, etc.).

Chart 26: Number of Small, Medium and Large Enterprises, Indonesia, 2016 -2020

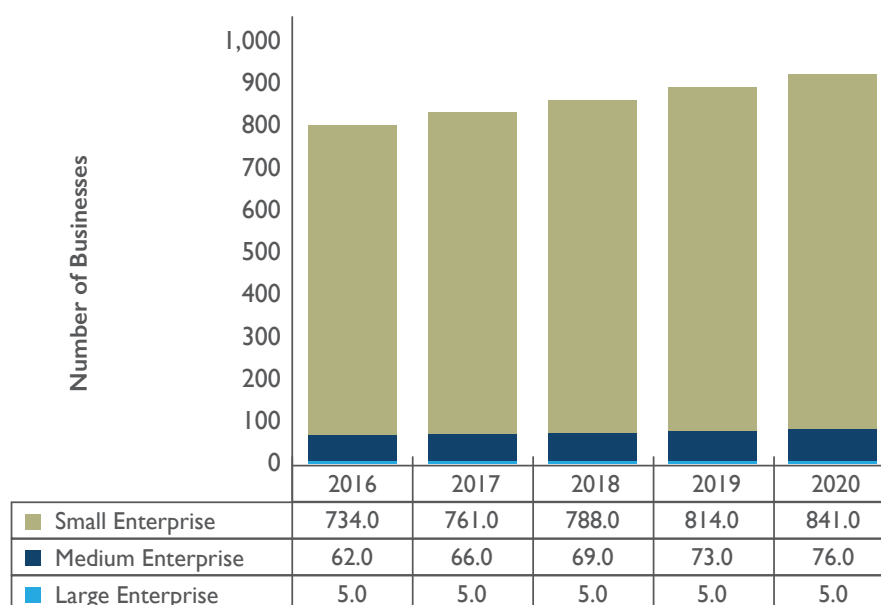
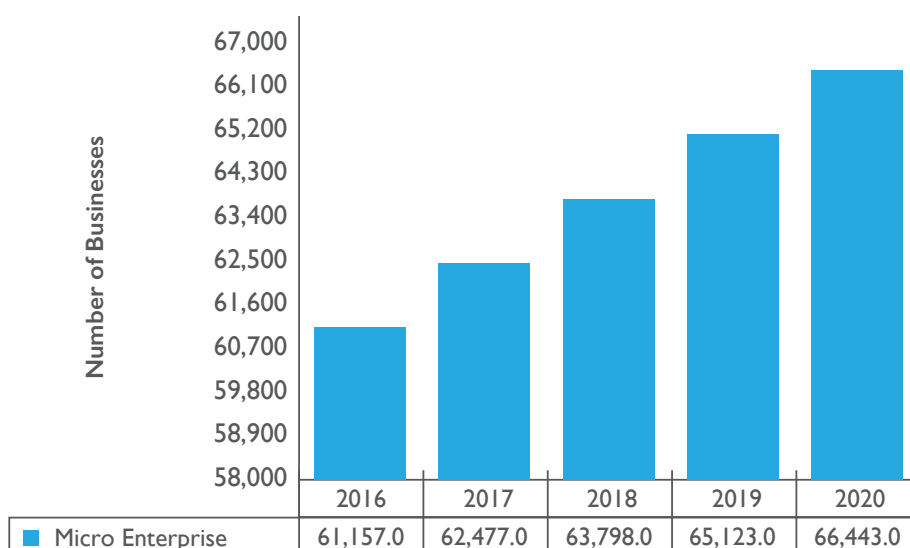


Chart 27: Number of Micro-SMEs, Indonesia, 2016–2020



Source: Frost & Sullivan

The micro-SME segment faces certain challenges when trying to meet banks' expectations and terms, such as the requirement for collateral, credit history and short-term bridging capital, which is usually not offered by banks.

Digital financial services providers are the best place to take advantage of this gap. In addition, P2P lending can play a major role in bridging financing by improving access to credit for a broader range of consumers and businesses.

Chart 28: Amount of GDP Financing in USD Billions, Indonesia, 2016-2020

	2016	2017	2018	2019	2020	2021
GDP Financing	26.40	27.24	28.11	29.00	29.92	30.88
Other Financial Institution	0.49	0.51	0.53	0.54	0.56	0.58
P2P Lending	0.010	0.015	0.027	0.049	0.088	0.159

Source: Bank Indonesia; Frost & Sullivan

By 2016, more than USD 26 billion in loans had been disbursed to support GDP financing. One of the resources originated from the Other Financial Institution category. P2P lending from this category represented 1.2% of the total, amounting to USD 10 million. This makes P2P lending a significant source of financing.

With estimated values at approximately USD 15 million and a growth rate of 80% over the next five years, UK companies can proactively grow the P2P lending sector and reach a sizeable target.

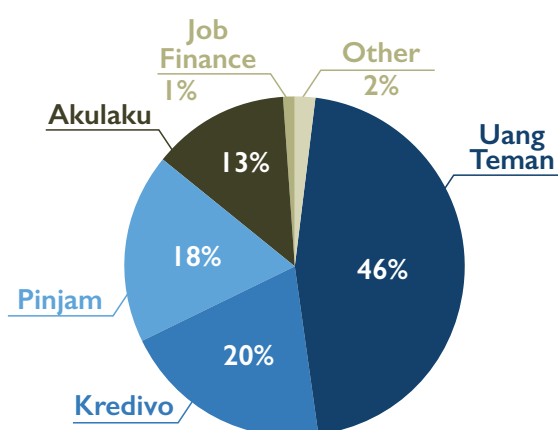
Competitive Overview

Existing players are primarily focused on funding for micro-SMEs and personal loans. The P2P lending business is relatively new in the Indonesian financing market. Most of the participants have been start-up businesses since 2015, and the number of players is expected to grow 35% in 2019.

Most personal loan companies (such as Uang Teman, Doctor Rupiah, and Julo) offer loans using balance sheets and engagement with their customers via mobile applications. Only Pinjam stands out by using a pawning scheme.

eCommerce lenders have a unique way of serving their customers. It is an alternative payment solution for non-credit card users. The top players serving this market segment are Kredivo and Akulaku. They target young consumers in need of short-term loans to purchase goods (mostly electronic items) via an eCommerce platform.

Chart 29: P2P Lending Market, Indonesia, 2016



Source: Frost & Sullivan

With total disbursement of USD 5.6 million, Uang Teman has the largest market share in the P2P market, reaching almost 46% of the market with total loan disbursement of IDR 35 billion since first launching in 2015. Uang Teman competes against unauthorized money lenders and traditional banks that offer short-term micro-lending options, as well as other P2P players that share the same business model, such as Julo Finance.

Due to rising competition in the eCommerce lending sector, companies such as Kredivo and Akulaku now offer new product differentiation in the P2P lending segment. Both participants offer a product which caters to consumers in the medium and higher classes in need of short-term loans for the purchase of items via eCommerce.

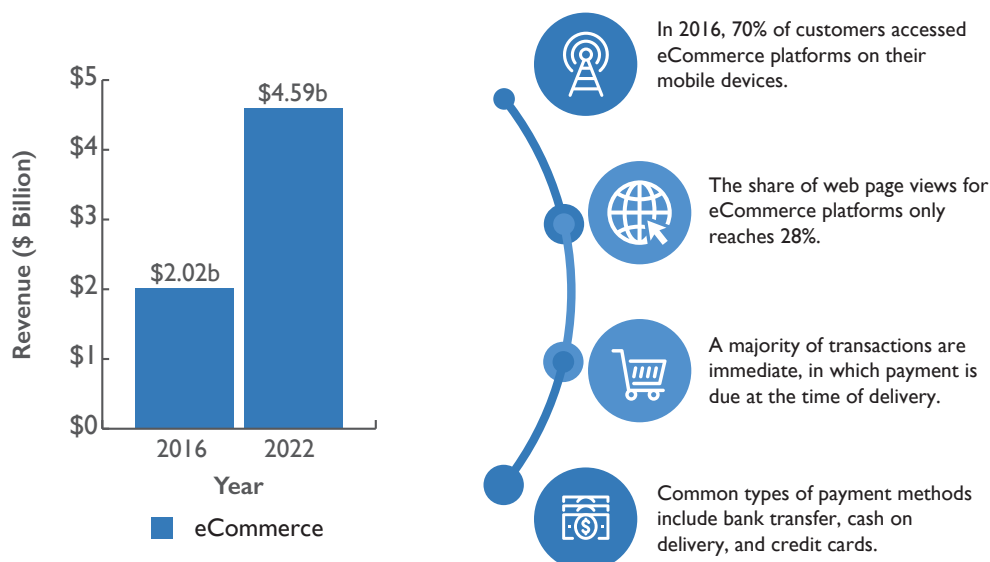
Other than Pinjam, most of the players are offering unsecured loans with short-term periods. Pinjam replicates the pawn lending business model in which the debt is secured by a personal asset of the borrower and in which valuable items, such as gold and electronic goods, are usually pledged as collateral.

eCommerce

The Indonesian eCommerce market is projected to increase from \$2.02 billion in 2016 to \$4.59 billion in 2022. This makes Indonesia one of the fastest-growing eCommerce markets in the ASEAN region, after Vietnam and the Philippines. The growth in eCommerce is likely to prompt a shift towards more cloud-based eCommerce web hosting and website applications, allowing companies to tap into the cost savings and scalability that a cloud model provides.

The Presidential Regulation on the Roadmap for the National eCommerce System 2017-2019, released in August 2017, has become one of the key drivers for the growth of the eCommerce market in Indonesia⁴². The roadmap provides guidelines for Indonesia's digital economy sector and prioritises the development of the National Payment Gateway (NPG).

Chart 30: eCommerce Market: Service Revenue Forecast, Indonesia, 2016–2022



Source: Frost & Sullivan

Competitive Overview

The Indonesian eCommerce market is highly competitive. The top five companies are:

Company/Brand	Visitors in February 2018 (millions)
Lazada (general)	111.8
Blibli (general)	43.88
Shopee (general)	32.63
JD (general)	12.76
Bhinneka (electronic equipment)	7.32

This may change in the near future following the launch of Amazon's Prime Now service in Singapore in December 2017. The launch is seen as part of a larger expansion into the Southeast Asia region, and with its sizable consumer market, Indonesia will be part of this expansion.

Areas of Technology-specific Strength

Indonesia is the largest economy in ASEAN and a member of G-20 major economies. The country's GDP is projected to reach more than USD 1.5 trillion by 2022⁴³. Such strong economic prospects make Indonesia one of the top investment destinations for inward investment in eCommerce. The eCommerce segment has attracted many joint ventures between local and foreign investors, raising almost USD 158.7 million in investment in 2016.

Opportunities for UK Firms

Cloud – The increasing use of Big Data analytics and IoT are fuelling the demand for cloud-based storage solutions. Spending on IoT in Indonesia is expected to increase from USD 28.8 million in 2013 to USD 1.35 billion in 2020⁴⁴.

Fintech – Improved broadband services will create new possibilities for P2P lending and use of mobile money, which will help increase financial inclusion.

eCommerce – eCommerce and Indonesian-language net-based services should take off in 2019. Indonesian firms partnering with UK firms that focus on global eCommerce and internet applications could bring these innovations to Indonesia.

Major Buyers and Decision Makers

Chart 31: Cloud Services Adoption Trends, Indonesia, 2016

Sector	Adoption Scale	Notes
Manufacturing	High	Ministry of Trade
Telecommunication/Information Technology	Medium	Telkom Sigma, Indosat, XL Axiata
Banking and Financial	Medium	Bank Indonesia, Bank Mandiri, Bank Central Asia
Government	High	Ministry of Trade, ICT and Finance, Defence
Education	Low	Ministry of Education

Chart 32: Digital Financial Services Adoption Trends, Indonesia, 2016

Sector	Adoption Scale	Notes
Banking and Financial	High	Bank Central Asia, Bank Mandiri
Retail	Medium	Tokopedia, Bhinneka.com
Public Sector	Low	Finance Authority, Ministry of Trade
IT & Telecoms	High	Elevenia, XL Axiata
Small Enterprise	Medium	Micro-Finance

Areas Where the UK has a Specific Strength in the Country

Due to heavy competition, most of the foreign players have built a footprint via joint venture partnerships with local players. The opportunities for UK firms lie in collaborative and joint venture projects. Such projects include the creation of business incubators and start-up coaching programs. UK firms are best placed to expand the Indonesian economy because of the established relationship between the UK and Indonesia. This is especially the case in education through the scholarship scheme, whereby about 4,700 Indonesian students study at various universities in the UK.

Route to Market and Challenges to Entry

Digital services are still relatively new in Indonesia, and there is a shortage of skilled people with IT expertise in data analytics, cloud management and cybersecurity.

Cloud security remains a concern for many companies in Indonesia. Enterprises have reason to be concerned about security risks, which include unauthorized access to applications and data leaks, particularly in a shared cloud environment.

The Indonesian retail and eCommerce companies are looking to adopt Big Data analytics. Enterprises are beginning to understand that analytics can be useful in understanding consumer behaviour and predicting trends. To use analytics, enterprises will be required to use Big Data software, which will require high-processing power.

P2P lending providers and small-medium finance institutions need to improve management information and reporting systems because of the adaptation of new ICT technology and the necessity to integrate with the government's financial supervision system. In addition, the geographically dispersed markets in Indonesia could create lack of awareness and understanding of consumer products in digital financial services.

CYBERSECURITY SERVICES

Market Overview

Chart 33: Security Market Landscape, Indonesia, 2016

	Market Evolution
<ul style="list-style-type: none"> Indonesia has identified cybersecurity as a primary area of importance to ensure stable future development. Cyber-attacks in Indonesia are rapidly increasing. Each quarter, Indonesia's cyber hacker traffic doubles, with an estimated cost to Indonesia at USD 10.7 billion each year. By 2013, cyber-attacks infiltrated over a dozen government web-sites, with 36 million incidents of hacking in total. 	<ul style="list-style-type: none"> The Indonesian cybersecurity market continued to grow in 2016 and reached USD 297 million as government and large organisations and businesses across verticals decided to spend big on network security solutions and secure content management. Distributed Denial of Services Solution (DDoS) attacks became more prevalent in Indonesia in 2016, stimulating the adoption of DDoS solutions. The increased penetration of high-speed broadband and mobile internet services is also making it easier for hackers to launch volumetric DDoS attacks.

Source: Akamai, DAKA Advisory and Frost & Sullivan analysis⁴⁵

Addressable Market

- Government bodies, banks and other financial institutions are now offering their services online, which makes them vulnerable to cyber-attacks.
- In addition, concerns over infrastructure protection, data security, network availability, resilience, and performance drove greater interests in cybersecurity solutions to mitigate the attacks and maintain service continuity.
- Adoption of on-premises solutions remained mainstream in the country due to ownership and legacy infrastructure. However, due to lack of skills and lower costs, managed security services that are based and delivered in-country are expected to increase.

Competitive Environment

- Most ICT components are mainly dominated by foreign products (60%), and only 30% of joint assembly is conducted for software design in-house.
- There are no cybersecurity technologies produced domestically. Though the marketplace for cybersecurity products in Indonesia currently uses indigenous cryptographic programmes for ministry efforts (which are mandatory for government programmes), they do not produce technology products.
- The restrictions on foreign investment as mandated by the government lead to difficulties for foreign firms wanting to invest in the market.

Host Government Structures and Policies

The major recent development in the governance of cybersecurity in the country is the creation of the new National Cyber Encryption Agency, Badan Siber dan Sandi Negara (BSSN). The Indonesian president officially swore in the chief of the agency, Major General Djoko Setiad. The main responsibilities for this agency are to establish regulations and policy and develop better protection while coordinating Indonesia's existing cybersecurity capabilities.

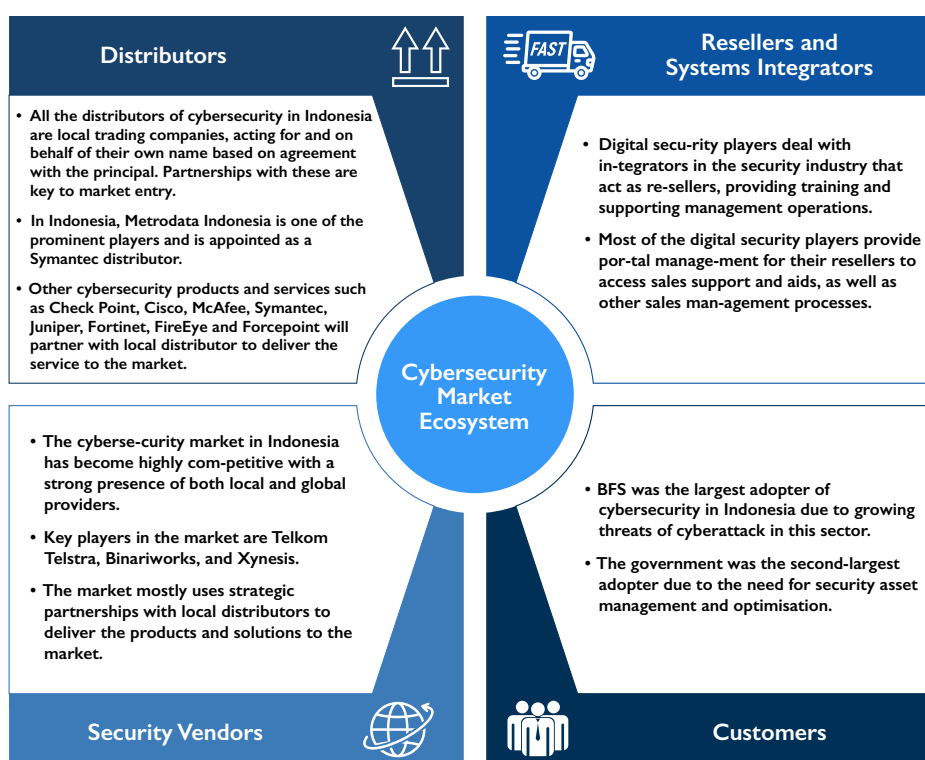
Indonesia's cybersecurity regulatory frameworks are undeveloped and loosely enforced. The weak regulatory system raises concerns for foreign firms and also exacerbates problems of data security and protection. Although there is no standalone cybersecurity law in Indonesia, there are some Indonesian laws subject to development in cybersecurity:

- » Law No. 11 of 2008 on Electronic Information and Transactions (ITE) is the first cyber law in Indonesia and the main instrument for the regulation of online content and electronic transactions. The ITE Law contains provisions, such as (1) provisions on electronic information, records, and signature; (2) provision of electronic certification and electronic systems, and electronic transactions; (3) domain names, intellectual property rights, and protection of privacy rights; (4) prohibited acts; and (6) investigation.
- » Law No. 14 of 2008 on Public Information Disclosure. This law regulates information that is produced, stored, managed, sent, and/or received by a public agency. The law states that every public agency is obligated to allow access to public information, except classified information. This law identifies the classification of classified information.
- » Law No. 17 of 2011 on National Intelligence identifies the classification of government secrets.
- » Law No. 25 of 2009 on Public Service identified critical or strategic sectors for public services, such as education, health, energy, banking, transportation, natural resources, ICT, and tourism.
- » Law No. 23 of 2006 on Citizen Administration. This law contains provision of protection of citizens' personal data, such as date of birth, citizen number, and family certificate number.
- » Government Regulation No. 82 of 2012 on the Electronic System and Transactions. It regulates seven matters from the total nine matters that need to be regulated by the government. These are Provision of Electronic Systems, Electronic Agent Operator, Provision of Electronic Transactions, Electronic Signature, Provision of Electronic Certification, Trust Mark Certification Body, and Domain Name Administration.

Aside from these foundational laws, the 2008 Information and Electronic Transaction Law was the most meaningful addition to Indonesia's legislative landscape. The Information and Electronic Transaction Law adheres to the United Nation (UN) Commission's standards for international trade law and addresses issues of cybersecurity.

Stakeholder Structure

Chart 34: Cybersecurity Market Structure, Indonesia, 2017

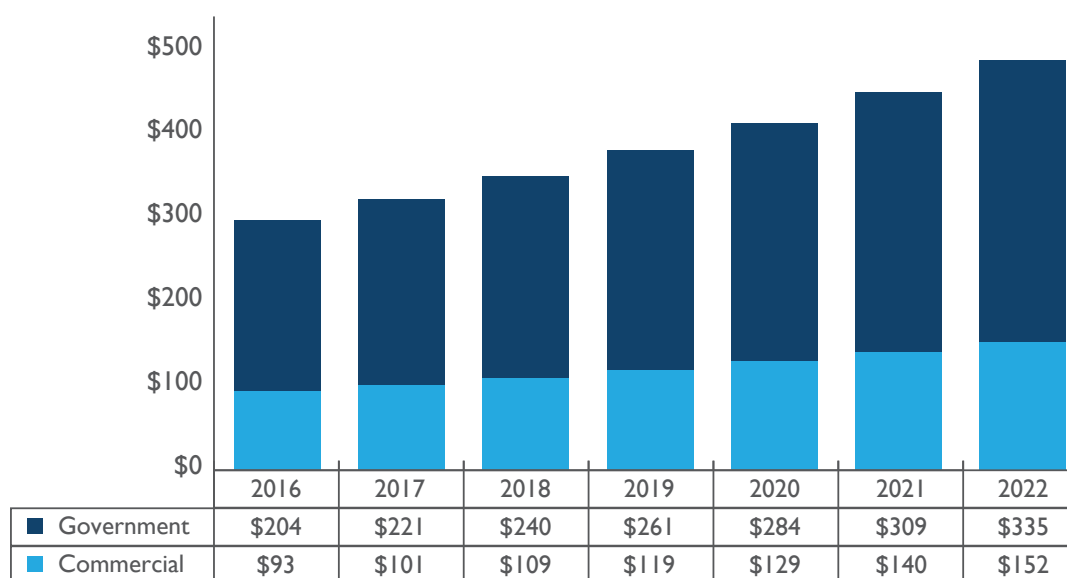


Market Size and Forecast

The commercial cybersecurity market in Indonesia grew by 25.8% on a year-over-year (YOY) basis and was valued at approximately \$93 million in 2016⁴⁶. The market size and forecast is as follows:

- Network solutions remained the largest revenue contributor in 2016, making up 66.2% of the cybersecurity market share. The segment grew by 19.6% on a YOY basis due to massive investment by service providers and the target market⁴⁷.
- Network solution providers have catered to the market by providing firewalls, intrusion defense systems (IDS), intrusion prevention systems (IPS), and secure socket layer virtual private networks (SSL VPN). Moreover, the largest market for this solution comes from banks and government organisations.
- The cybersecurity market is expected to maintain its significant growth at a CAGR of 24.7% in the next five years⁴⁸. Investment is likely to take place among service providers, large banks, and government authorities that have a large budget for security and need to comply with strict compliance requirements, such as data sovereignty, data protection, and privacy.
- The second-largest contributor to the cybersecurity market is secure content management with 19.5% of the total market. The segment is set to grow at 21.2% YOY with a CAGR of 13.4% during the forecast period, 2016-2022⁴⁹.
- Investment in cybersecurity services is expected across industries, particularly banking, eCommerce, media, and government. Thus, SMEs will be the key adopters of cloud-based services in the next five years.
- BFS and government organisations may prefer hardware appliance-based solutions and only outsource the DDoS mitigation operation to vendors to protect some parts of their network or service infrastructure due to compliance requirements. A small number of them may opt for hybrid mitigation models to enhance mitigation capacity against DDoS attacks at both application and network layers.

Chart 35: Cybersecurity Market Revenue Forecast (\$Millions), Indonesia, 2016–2022



- The rest of the key solutions include network-based advanced malware analysis (NAMA) and web application firewall, with shares of 6% and 3%, respectively. Sandboxing is also growing in Indonesia since the government is encouraging all industries to have this capability⁵⁰.
- Moreover, the sandboxing enterprise is able to analyze threats by using security analytics and code emulation, as well as various other methods, such as correlating contextual information and reputation or drilling down to the binaries and looking for suspicious codes.

Chart 36: Cybersecurity Segment in Indonesia

Segment	Discussion	Level of Demand
Managed Security Services	Growing requirement of managed security services to address challenges in resources and costs to implement good cybersecurity practices	Growth
Intrusion Detection and Prevention System	Advanced authentication has been applicable largely to government systems and financial institutions. Social media, eCommerce and other businesses introduced multifactor authentication transaction systems, which are well accepted and growing in demand.	Growth
Identity Management	As the Central Bureau of Statistics reports, Indonesia has the sixth most internet users (over 80 million) in the globe. Protecting these users and their information is crucial for the country's national security plan.	Stable
Secure Networks, Email, and Web Security	Growing phishing attacks and adoption of cloud networks in Indonesia pushed many organisations to stop seeing cybersecurity as an IT cost but rather consider it a solution to facilitate business growth or trust, and are investing more to secure their networks.	Growth
Advanced Persistent Threat (APT)	APT groups have successfully breached financial institutions in Indonesia in the past, driving organisations to invest in security. Several APT-based trainings and workshops are being conducted in the country in collaboration with Japan's JICA, showing a growing awareness of the threat.	Stable
Threat Intelligence, Detection and Remediation	In 2017, Indonesia established the new National Cyber and Encryption Agency with an aim to protect the cyber domains of government and private firms by tracking cyber crimes and identifying perpetrators.	Stable
Advanced Endpoint Detection and Response	Indonesian Ministry of Communications and Information Technology released Regulation No. 20/2016 concerning privacy protection and data security in electronic systems, which is expected to help boost advanced endpoint protection solutions.	Stable
Internet of Things (IoT) Security	Threat intelligence, threat monitoring, and detection will be the key services that organisations are focusing on due to the increasing attack surface caused by the emergence of IoT and the converged digital environment.	Growth
Supervisory Control and Data Acquisition (SCADA) Security	One of the identified issues by the Indonesian national cyber agency is creating ways to identify and protect digital assets and infrastructures, including critical services driving adoption of SCADA security in the future. More basic systems are required in the short term.	Stable

Indonesia is poised for fast growth in the cybersecurity segment, and it is expected to become the fourth-largest market in Southeast Asia. It is estimated to generate total revenue of USD 349 million in 2018⁵¹. The key drivers for market growth include investment by local telecommunications and internet service providers to upgrade infrastructure and expand cybersecurity offerings.

Adoption of on-premise solutions remained mainstream in the country due to ownership and legacy infrastructure. In the next five years, the adoption trend will remain similar with the strong adoption of on-premises mainly taking place in service provider and government organizations.

Competitive Analysis

Chart 37: Assessment of the Key Players, Indonesia, 2017

Local Service Provider	Key Differentiating Features	Growth Strategy	Key Sectors
TelkomTelstra	The provider designed a cybersecurity solution for organisations by adopting recommendations from consultancy services and delivering the customised services based on requirement.	Serving customers with end-to-end managed solutions portfolios offers unparalleled infrastructure reach and quality by leveraging Telkom's broad and rich domestic and global network (Telkom International) capability and infrastructure.	<ul style="list-style-type: none"> • Financial Services • Public Sector • Manufacturing • Service Provider
Binaryworks	Binaryworks offers information security services that focus on improving network and system security by offering customized systems	Creating its own products that are ready to use on multiple platforms	<ul style="list-style-type: none"> • Healthcare • Financial Services • Transportation • Manufacture
Xynexis	Xynexis methodology on delivering information assurance is based on in-depth business and industry knowledge, hands-on technology skills, and customer-specific plans of action. Cater to the customer using in-house frameworks, customised tools, and standardised business processes.	Xynexis delivered a new line of managed security services through another subsidiary—Noosc. The services enable the organisations to fully manage the SOC, continuously monitor within the internal operational security risk profiles, and pro-actively respond to any incidents.	<ul style="list-style-type: none"> • Public Sector • Financial Services • Retail • Manufacturing

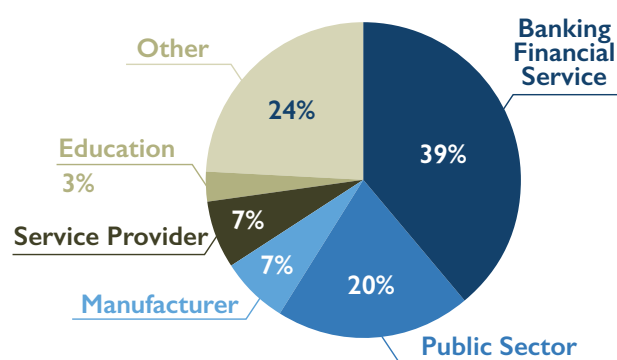
Areas of Technology-specific Strength

The take-up of security services is set to increase over the next few years with local service providers (telecommunication providers and security specialists) starting to build their security operation centres (SOCs) and promote cybersecurity to their customers. In addition, both of the main players are expected to expand their security services by working with international cybersecurity providers to offer customer premises, equipment-based management or monitoring services.

Moreover, the cybersecurity partnership model is getting greater traction among local businesses as some of the security service providers and telecommunication operators started to offer cybersecurity solutions as a result of partnerships with foreign players that have experience and capabilities in building and running a commercial SOC. Furthermore, local players, such as TelkomTelstra, Binaryworks, and Xynexis, are gaining fast return on investment by providing outsourcing services and SOC.

Opportunities for UK Firms

Chart 38: Revenue Breakdown of Cybersecurity by Vertical, Indonesia



- The financial services sector has become one of the main spenders on cybersecurity, as it is the biggest target for hackers.
- Financial services account for ~40% of market spend on cybersecurity products, followed by the public sector, service provider, manufacturing, and education.
- Due to growing digitisation, the public sector experienced one of the highest growth rates in security spending.
- Other verticals include healthcare, retail, logistics, oil and gas, energy, mining, agriculture, utilities, eCommerce, and business process outsourcing.

Source: Frost & Sullivan Analysis⁵²

Financial Services

The financial services sector was the largest spender on cybersecurity. The market is expected to grow at a CAGR of 27.5% from 2015–2020 with strong potential for DDoS mitigation, hosted web application firewall, and security asset management or monitoring services.

Though many banks and finance organisations have spent heavily on security solutions, the shortage of expertise, domain knowledge, and skilled security resources drives them to outsource their requirements for cybersecurity to take care of online security risks. In addition, most of their internal resources are unable to keep up with the changing threat landscape and are therefore unable to optimise their deployed security infrastructure or even SOC.

Government and Public Sector

The government and public sector became the second-largest revenue contributor at 20% due to the strong demand for key infrastructure protection services within government bodies. The adoption of cybersecurity in this sector is growing in recent years because the government proactively campaigns for increased security awareness, especially the Ministry of Finance, Ministry of Defense, Ministry of ICT, and Ministry of Trade.

Service Provider and Manufacture

Service provider and manufacturing verticals also add significant market share to the overall market. These industries are expected to see greater adoption of cybersecurity in the future due to the increasing demand for hosted security services, compliance, and security for the operational technology environment. There will be a growing requirement for managed security services to fill the capability and skills gap.

As one of the top economies in ASEAN and one of the emerging market economies of the region, Indonesia's economy has experienced strong growth and has maintained macroeconomic stability⁵³. The country's democratic regime is still relatively young but continues to make strides towards establishing a market economy supported by legal frameworks. Historically negative attitudes towards the defense system, embedded nationalism, and the weak legal system make the business climate challenging to navigate for UK firms.

Although technological access is limited in Indonesia, the online environment is quickly expanding and faces increasingly hostile cybersecurity threats. In response, Indonesia has recognized the importance of cybersecurity but implemented patchwork solutions.

At present expenditure on cyber security is relatively low. However, as engagement grows across government and greater collaboration with industry continues, this is expected to increase in the future. UK firms could capitalise on the considerable resources allocated to the information technology sector. Furthermore, given the underdevelopment of Indonesia's cybersecurity, there is an opportunity to construct Indonesia's infrastructure from scratch.

Areas Where the UK has a Specific Strength in the Country

There are UK cyber companies operating in the cyber market but only on a limited basis. The government and end users rely on local telcos and cyber companies in the region. Due to the size and strong investment in ICT infrastructure over the coming years, there is likely to be growing requirement for reliable and proven cyber technologies that UK companies can provide.

Route to Market and Challenges to Entry

The import burdens in Indonesia are relatively modest, and the costs are low. This is particularly relevant to UK firms seeking to export goods and services to the private sector in Indonesia. Indonesia's general importing parameters, at a minimum, show that it takes 23 days to complete the documentation preparation, receive customs clearance and technical controls, and process ports and terminal handling and inland transportation. It costs USD 660 if using the most-favoured nation tariff of 7%⁵⁴. Furthermore, the Indonesian customs process is rather nuanced; however, Indonesia has tried to implement uniform importation requirements. The standardisation of certain aspects of the customs process should make it easier for UK firms to export to Indonesia.

Components of the customs process may pose technical barriers to trade. Notably, personal-use import goods such as computers and cell phones are prohibited. Other electronic products are restricted for import, including telecommunications devices, electronic parts, and photocopiers. Consumer IT devices are also subject to new labelling regulations that were implemented in 2010, which require Indonesian language translations for documentation and packaging⁵⁵. UK firms should take all of these importing restrictions into account when considering whether to enter the Indonesian market.

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