ICT Sector Performance Review

for

Indonesia

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List of Abbreviations

4G LTE:	Fourth Generation Long Term Evolution
AAG:	Asia America Gateway cable
ARPU:	Average Revenue per Unit
ATM:	Automatic Teller Machine
BCA:	Bank Central Asia
BI:	Bank Indonesia
BNI:	Bang Negara Indonesia
BPO/ITES:	Business Process Outsourcing/IT Enable Services
BPS:	Badan Pusat Statistik (Statistics Indonesia)
BRI:	Bank Rakyat Indonesia
BRTI:	Badan Regulasi Telekomunikasi Indonesia (Indonesian Telecommunication Regulatory Body)
CAGR:	Compound Annual Growth Rate
CDMA:	Code Division Multiple Access
CEO:	Chief Executive Officer
CIA:	Central Intelligence Agency, USA
DJPT:	Direktorat Jenderal Pos dan Telekomunikasi (Directorate General of Post and Telecommunication)
DSL:	Digital Subscriber Line
EBTIDA:	Earnings before Interest, Taxes, Depreciation, and Amortization
EDGE:	Enhanced Data rates for GSM Evolution
FDI:	Foreign Direct Investment
FWA:	Fixed Wireless Access
Gbps:	Giga bits per second
GDP:	Gross Domestic Product
GPRS:	General Packet Radio Service
GSM:	Global System for Mobile Communications
GSMA:	GSM Association
HHI:	Herfindahl–Hirschman index
HSDPA:	High-Speed Downlink Packet Access
HSPA:	High Speed Packet Access

ICT:	Information and Communication Technology
IFC:	International Finance Corporation
IRD:	Indonesian Rupiah
ITB:	Institut Teknologi Bandung (Institute of Technology, Bandung)
ITU:	International Telecommunication Union
IX:	Internet Exchange
KPPU:	Komisi Pengawas Persaingan Usaha (Business Competition Commission, Indonesia)
KRW:	Korean Wong
MASTEL:	Masyarakat Telematika Indonesia (The Indonesian Infocom Society)
NRA:	National Regulatory Authority
OECD:	Organisation for Economic Co-operation and Development
QoS:	Quality of Service
SIM:	Subscriber Identity Module
SKA:	Sender Keeps All
SMS:	Short Message Service
SPR:	Sector Performance Review
TDD:	Time Division Duplex
TRE:	Telecommunication Regulatory Environment
UMTS:	Universal Mobile Telecommunications System
UNCTAD:	United Nations Conference on Trade and Development
UNDP:	United Nations Development Programme
USD:	United States Dollars
USF:	Universal Service Fund
USO:	Universal Service Obligations
WiMAX:	Worldwide Interoperability for Microwave Access
XL:	PT XL Axiata (A telecom firm)

1.0. Executive Summary

Now fully recovered from the Asian crisis of the late '90s, the Indonesian economy is perhaps at its post-crisis healthiest. The once sluggish telecom markets too have started showing an impressive growth. Indonesian telecom industry is gradually attaining maturity while more opportunities are made available for the users. Despite the urban-rural connectivity disparity and the immaterialized 'Palapa Ring' – the USD 300 - 500 million mega broadband nationwide digital backbone to connect entire Indonesia - the environment is far improved from 2006 and even 2008, when the first two sector performance reviews were done.

Numbers relate the story best. Parallel to the per capita GDP (real) increase from USD 1, 1196 in 2004 to 2,590 in 2009 the communication subsector (including broadcasting) has increased its contribution to GDP from 2.35% to 3.04% for the same period. The aggregate telecom revenue in 2010 was USD 11,000 million. While eleven mobile operators have issued close to 200 million SIMs (about 84 SIMs per every 100 in population) by 2010, the number fixed (wireline and wireless) subscribers have risen to 36 million (15 for 100) with Compound Annual Growth Rates (CAGR) of 33% and 21% respectively between 2005 and 2010. Four providers offer wireless services while wireline, which is now identified as a constricting market, remains the monopoly of one of the two incumbents. Broadband landscape too has undergone a shift with more and more users relying on faster and easily available mobile broadband solutions than on fixed.

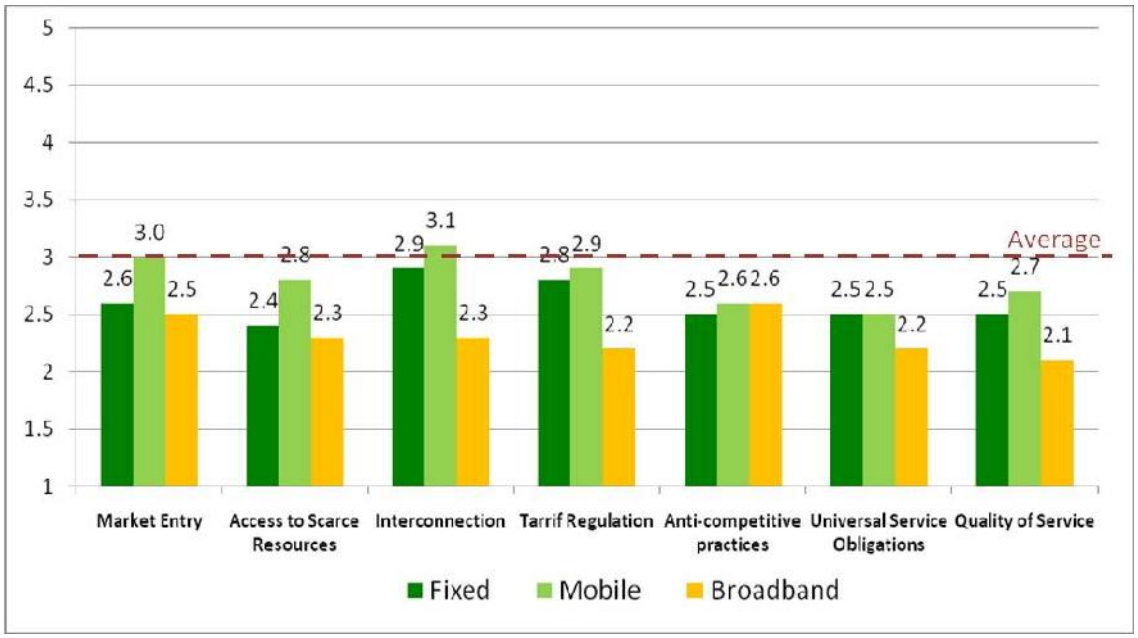
Parallel to this, improvements in regulatory environment can be observed. More competition is seen in both mobile and fixed sectors. The two incumbents no more enjoy special exclusivity right in some markets, which they have once enjoyed. In spite of the WiMAX and 4G issues, which will be discussed in detail in Sections 3 and 4, operators feel satisfied with the scarce resource sharing mechanism. Interconnection charges have been reduced. A section of the telecom industry requests a further reduction, but do not find status quo too bad. Tariff regulation is minimal and complaints about anti competitive moves are rarely raised. After a series of unsuccessful attempts to use Universal Service Obligation money to build infrastructure at rural level, there is a ray of hope with the induction of a new entity. Regulatory measures are being taken to improve quality of the series. Badan Regulasi Telekomunikasi Indonesia (BRTI), the regulator, though still not independent, now plays a more active role. (Section 5)

Indonesia has also found its niche on the social media and m-banking/m-payment applications. Increasing sales of smart phones, against basic models, reflect this trend. (Section 6)

Following similar exercises in 2006 and 2008, Sector Performance Review (SPR) survey asked informed direct and indirect stakeholders in the Indonesian telecom sector to assess the regulatory and policy environment along seven dimensions (market entry, access to scarce resources, tariff regulation, universal service obligations, regulation of anticompetitive practices and quality of service), on a Likert scale of 1 to 5 (1 being highly unsatisfactory, 5 being highly satisfactory, with 3 being considered average). The respondents are selected from 3 categories: those directly impacted by the sector's performance (operators, equipment vendors), those who broadly follow the sector (consultants, lawyers), those who represent the public interest in the telecom sector (consumer groups, other government officials, journalists, etc). The study analyses the results in the light of

recent regulatory incidents. (Section 7) SPR scores by sector and by dimension vary within a range just below average.

Figure 1 : SPR sector scores – Summary



Source: Survey Results

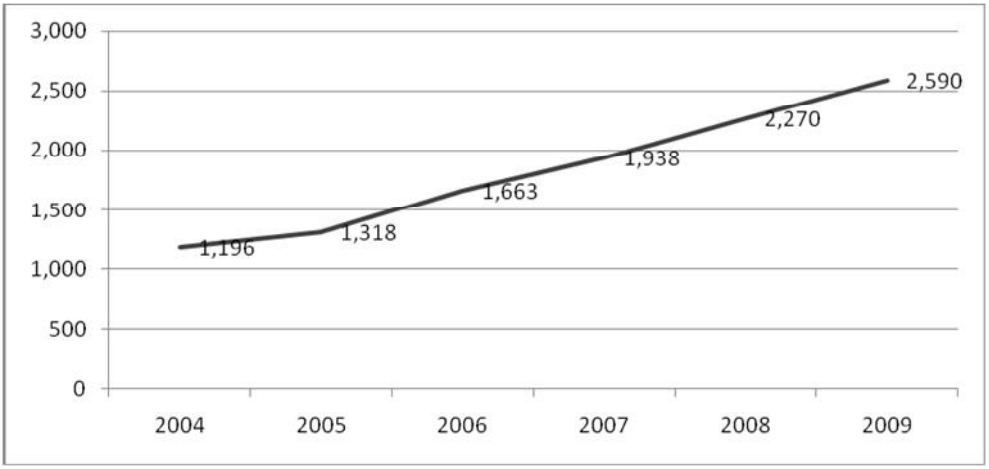
Below-average scores received in most sectors and across dimensions reflect general dissatisfaction. The patterns have remained the same. It is difficult to explain the low scores in the light of the positive developments that take place. It may not mean the respondents have ignored recent developments. Perhaps the expectation levels of the industry and the experts have increased too. The relatively healthy growth in mobile sector is reflected in the higher SPR scores received by the sector for most dimensions, when compared to the fixed sector. On average, the mobile sector scores best, with fixed and broadband following.

The results call for action from the regulatory authorities and the government. The study makes specific recommendations. These include agreeing for a workable solution to a set of issues regarding provision of WiMAX services immediately, allocating of spectrum to 4G LTE, creating proper exit mechanisms in the mobile sector where the number of operators is thought to be too large, fulfilling universal service obligations by using the already collected money to build telecom infrastructure in rural areas, particularly in the eastern region and building a conducive environment for 'beyond telecom' applications like m-banking/m-payments.

2.0. Country overview and macro level perspectives on the telecom sector

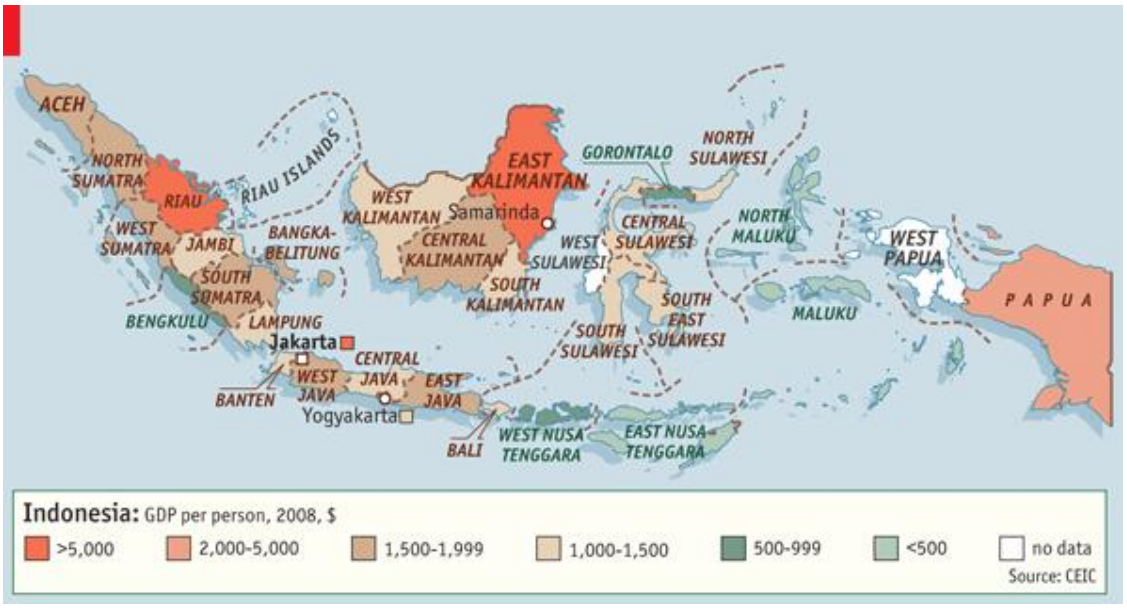
Indonesia, a Southeast Asian archipelago of nearly 17,500 islands, was considered an Asian tiger of the second wave till its economy was badly hit by the Asian crisis in late 1990s. The economy has been gradually recovering since then. In spite of showing a slight setback in the wake of global financial crisis of 2008-9, Indonesia has reported a growth rate of 4.5% for 2009. Per capita GDP (real) has increased from USD 1,196 in 2004 to 2,590 in 2009 (Figure 2) but not without regional disparities. (Figure 3) Inflation in 2009 was at 2.78%, the lowest in the post-Asian crisis period. With the low inflation risk Indonesia could maintain a growth oriented expansionary fiscal policy. (Bank Indonesia, 2009)

Figure 2 : Per capita (real) GDP in Indonesia from 2004-2009 (in USD)



Source: Bank Indonesia 2009

Figure 3 : Regional disparities in per capita GDP in Indonesia, 2008

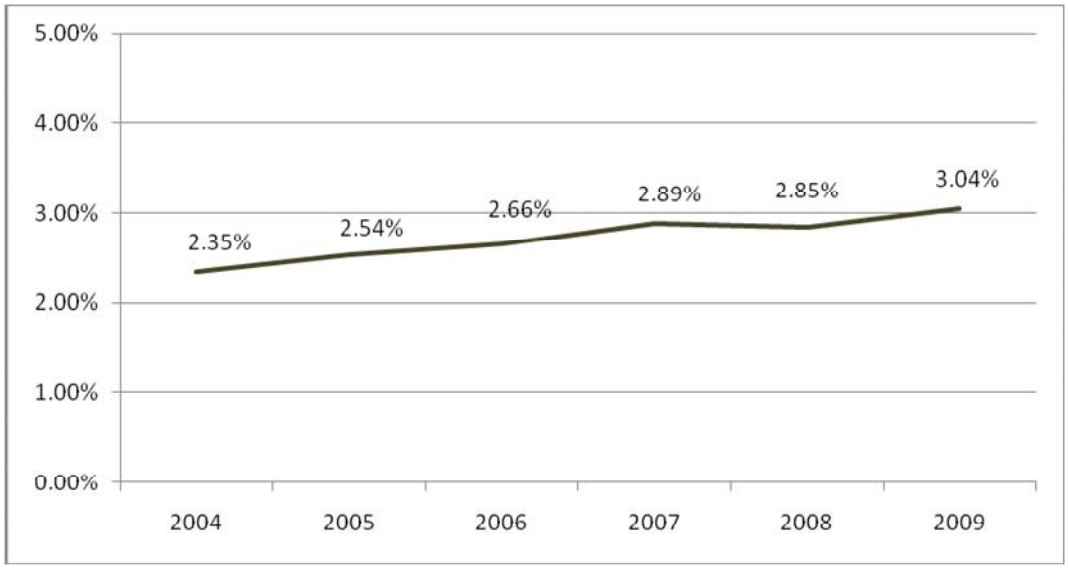


Source: The Economist 2011

Since 2008 significant reforms in the financial sector, including tax and customs reforms, the use of Treasury bills, and capital market development and supervision have been introduced. Indonesia's debt-to-GDP ratio has declined steadily since 2005 because of increasingly robust GDP growth and sound fiscal policies. Though it still struggles with poverty (29.4% of population living below USD 1.25 PPP in 2010) and unemployment (8.1% in 2009), literacy level below that of developed world (92% in 2010) inadequate infrastructure, corruption, a complex regulatory environment, and unequal resource distribution among regions, Indonesia can look forward optimistically for a better future. (CIA, 2011 & UNDP, 2011)

The role of consumption in driving Indonesia's economic growth can be seen in its in sectoral GDP, the growth of which was spurred to a large extent by non-tradable sectors, such as electricity, gas and water utilities, construction, the transport and communications sector and services. Transport and communications grew by 15.53% in 2009, with a strong performance driven by ongoing market penetration in the communications subsector. As Figure 4 illustrates the communication (including broadcasting) subsector's contribution to GDP has increased from 2.35% in 2004 to 3.04 in 2009. (Bank Indonesia, 2009)

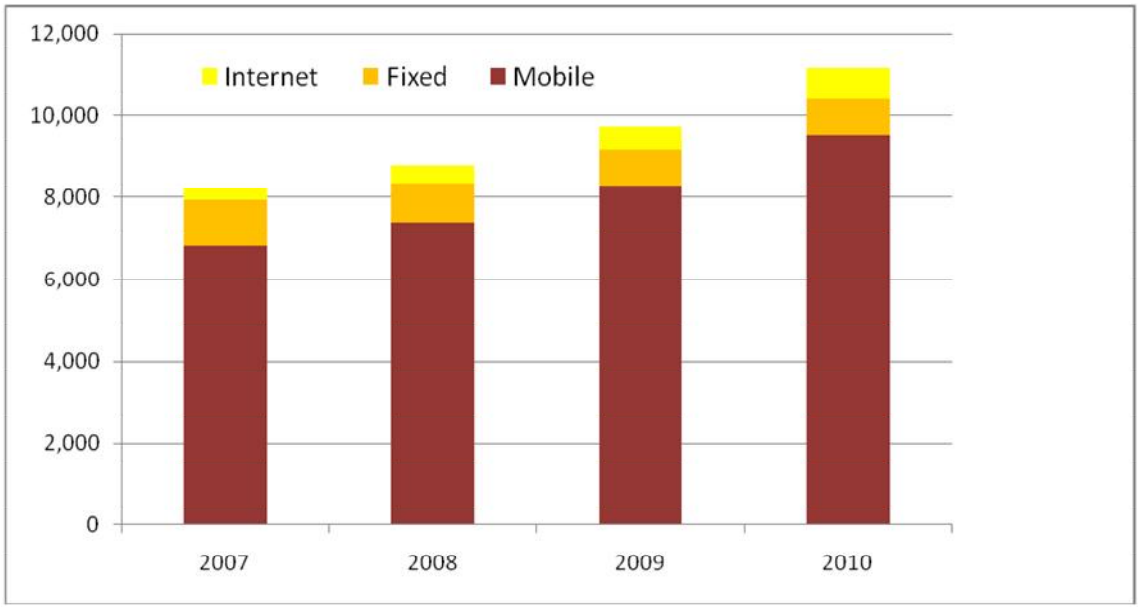
Figure 4 : Communication subsector (including broadcasting) percentage of GDP



Source: Bank Indonesia 2009

For a considerably long period, Indonesian telecom market has been a poor reflection of the market potential of the fourth most populated nation with a population of over 237 million as of 2010 end (BPS, 2011). Now it is gradually attaining maturity both in terms of revenue and penetration. The aggregate revenue from telecom industry in 2010 was USD 11,000 million. (Figure 5)

Figure 5 : Telecom industry revenues from 2007 to 2010 (in USD millions)



Source: Firmansyah 2011[1]

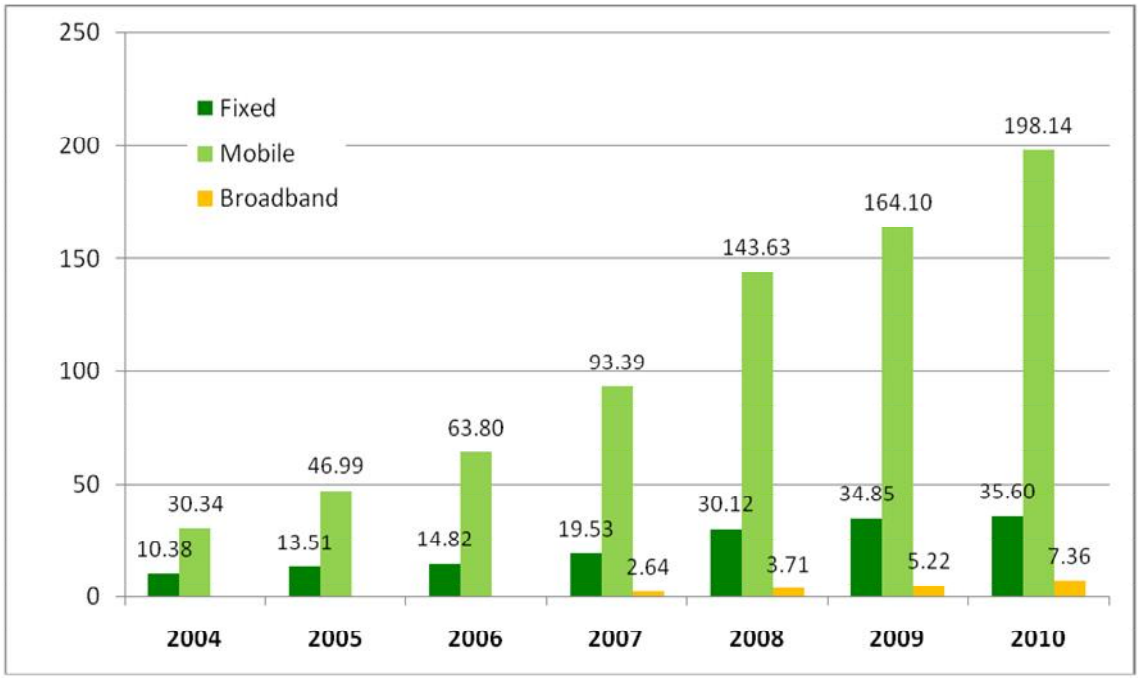
An UNCTAD survey lists Indonesia as the 9th out of the 15 most desirable regions for Foreign Direct Investment (FDI). Telecommunication is an attractive sub sector along with few other service industries, though Bank Indonesia does not provide the exact FDI figures in its annual report. Despite this telecom is being labelled by the protectionists, including those in government, as one of the 'high-polluting industries' (in economic, not environmental sense) and for 'national interests' the government has imposed mandatory foreign investment caps. Foreign investments in mobile and fixed-line telecommunication sub sectors were capped at 65% and 49% respectively in 2007, down substantially from the previous 95% cap for both. This rule was not for Singaporean and Malaysian investors, who already owned large chunks of Indonesia's major telecom operators. (Asia Times, 2007) This can be one of the key barriers that restrict FDI inflows to Indonesia telecom industry.

[1] Currency conversions were done by the authors using the average exchange rate applicable to each period. (Source for exchange rates: Bank Indonesia)

3.0. Market Structure and Market Dynamics

Indonesia has started its movement away from copper and towards waves. In the voice category mobile demonstrates the highest growth over the last five years followed modestly by fixed wireless access (FWA). The five year CAGR (from 2005 to 2010) is 33% for mobile and 21% for fixed. Fixed wireline, after reaching its climax in early '00s now shows a gradual decline. In the data category HSPA based services appears to have solved the issued faced by the Indonesia broadband users for decades. Figure 6 shows the subscriber growth in fixed (wireline and wireless), mobile[2] and broadband[3] sectors since 2004. Indonesia is one of the four countries in Asia Pacific (the others being China, India and Japan) that has increased its number of telecom users by over 100 million since the year 2000. (GSMA & Kearny, 2008)

Figure 6 : Subscriber growth in fixed, mobile (SIMs) and broadband from 2004 to 2010 (in millions)



Source[4]: DJPT 2011, MASTEL 2009 & Firmansyah 2011

Indonesia telecom market is liberalised. The two incumbents no more enjoy the exclusivity rights they enjoyed previously. The Government does not prohibit or discourage operators from attaining a dominant position. It only prohibits operators from abusing a dominant position.

[2] This is the number of SIMs issued and not number of unique subscribers, which should be less because of the single user multiple SIM ownership phenomenon.

[3] Reliable data on broadband subscriptions were not available for the period before 2006.

[4] Multiple sources were used to compile the information in this chart in the absence of a single source. Issues of minor mismatches were resolved by relying on the sources in the same order given above.

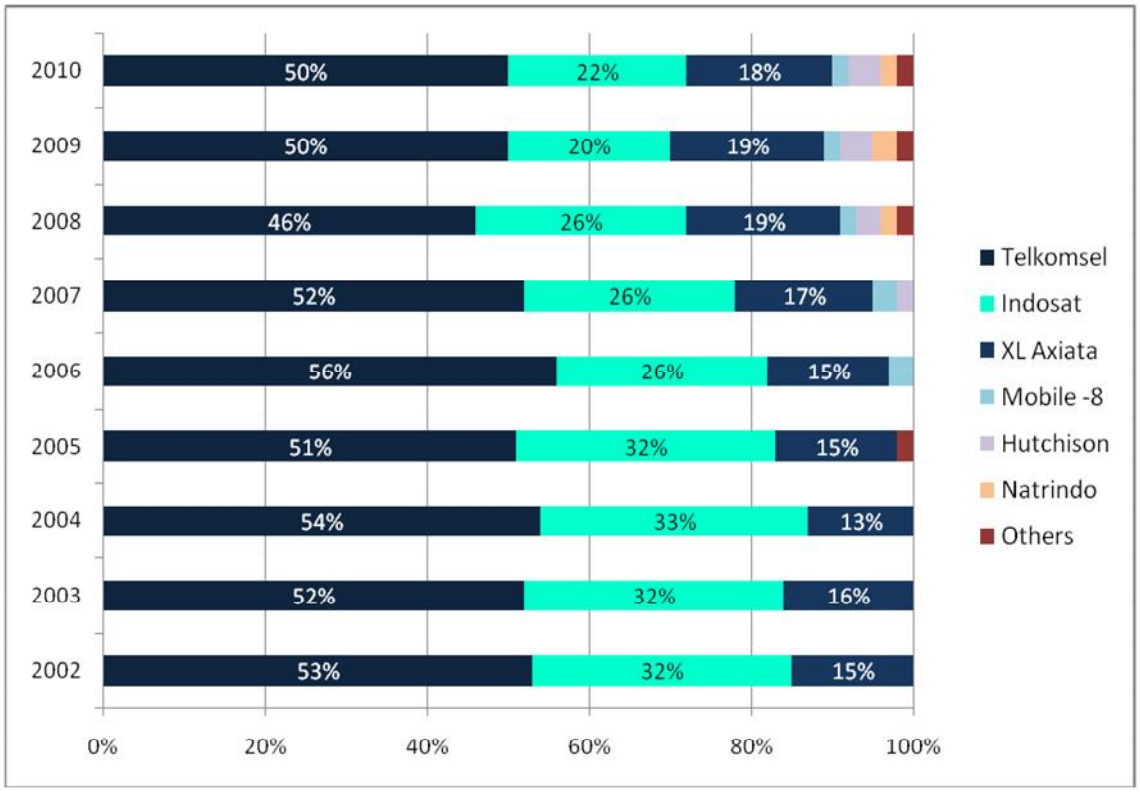
3.1. Mobile sector

Indonesia now has eleven operators providing mobile services. This makes it the country with third largest number of mobile operators in Asia Pacific, following India (15) and Bangladesh (12). (GSMA & Kearny, 2008) Nine operators provide services at national level, though the market is dominated by three of them: PT Telkomsel with its products Halo and Simpati, PT Indosat with Matrix and Mentari, and XL Axiata with XL. As of December 2009, Telkomsel had nearly 50% of the subscriber market share with other two having 20% each. (DJPT, 2011)

Telkomsel is the mobile arm of the main incumbent PT Telkom. 65% of it is owned by Telkom while the remaining 35% by Singapore Telecommunications (SingTel). Indosat is 45% owned by public, 41% by Qtel and 14% by Indonesian government. XL Axiata is owned by Axiata Investment (Indonesia) Sdn Bhd (67%); Etisalat (13%); and public 20%. The rest are privately owned by international and domestic firms. (Digital Media, undated)

Market share of the key players has changed since 2002 with PT Telkom and Indosat losing their share (significantly in case of the latter) with XL Axiata and others gaining subscribers.[5] (Figure 7)

Figure 7 : Market shares of the key mobile operators (number of subscribers) from 2002 to 2009

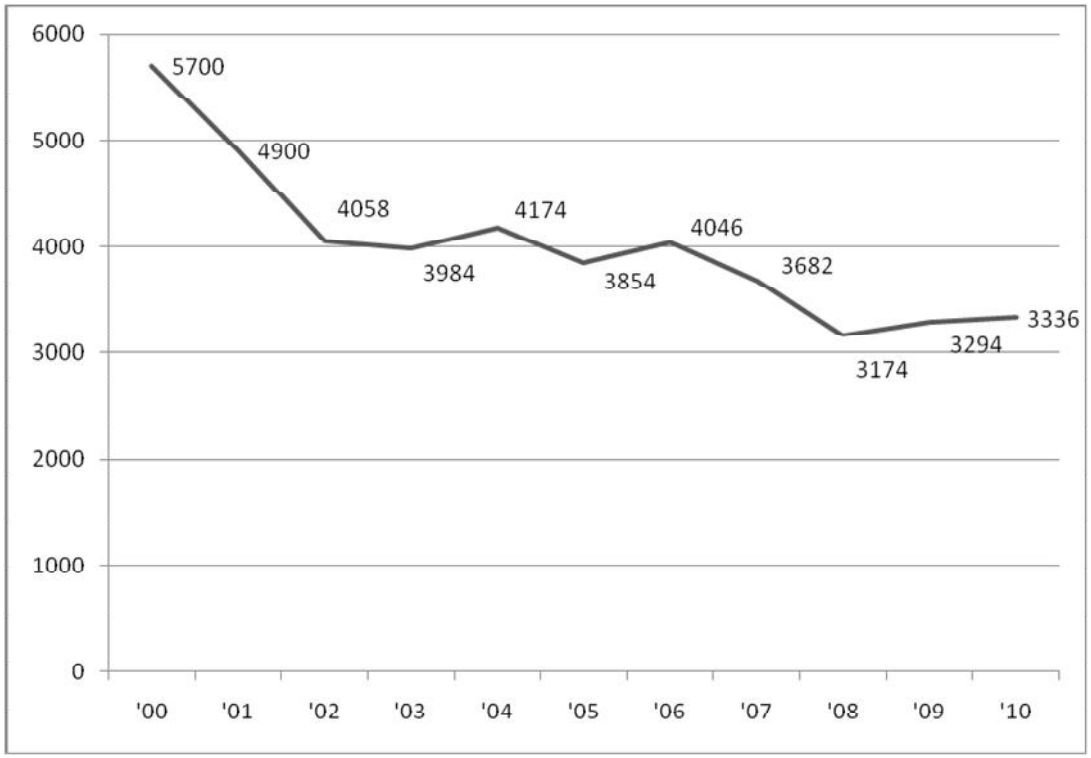


Sources: DJPT (2011) and ITB (Undated)

[5] The information this chart is compiled by authors based on difference sources given. Minor discrepancies across data sets can be attributed to variations within the year and inaccuracies in reporting. Issues of minor mismatches were resolved by taking the data from most reliable source.

Herfindahl–Hirschman index (HHI) that measures the level of competition has gradually declined from 2000 to 2009, but has never gone below 3000.[6] (Figure 8) This high level of market concentration is due to Telkomsel's dominant position.

Figure 8 : HHI in the mobile sector from 2000 to 2010



Sources: ITB Undated and author calculations based on market share

Indonesia shows some common trends seen in mobile markets in the region over the last few years.

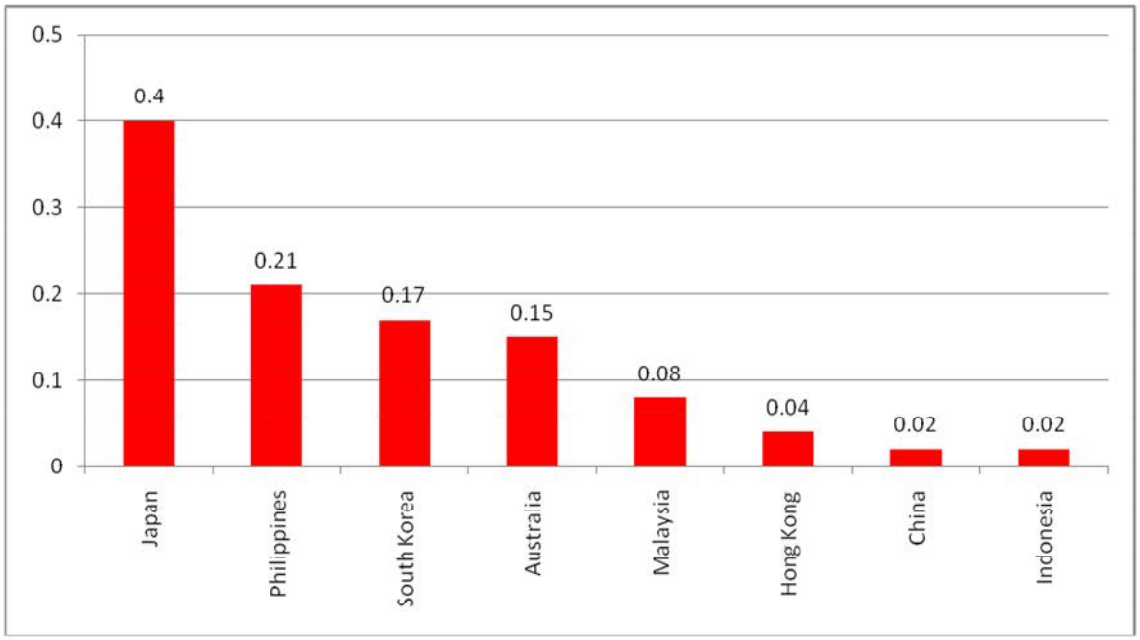
There has been a clear shift from Postpaid to prepaid mode. Prepaid subscribers accounted for 98% of the total mobile subscribers in 2008. (Wireless Intelligence quoted by GSMA & Kearny, 2008) The market also shows signs of saturation with the number of SIMS gradually approaching the population. The over 50% growth rate in 2008 has decreased to 14% in 2009[7] and gained a slight increase to 20% in 2010. Both Frost and Sullivan and GSMA research attributes this growth more to multiple SIM usage than to real expansion.

Intense competition in the mobile sector has also resulted in drastic reductions in prices and change of strategies by operators. Average Revenue Per Minute (ARPM) of all three key mobile operators have dropped from IRD 1,000 (USD 0.10) to 200 (USD 0.02) per minute from the first quarter of 2007 to the fourth quarter of 2008 and remained steady till the end of 2010. (Firmansyah, 2011) This has made Indonesia recording lower ARPMs compared to what its South East Asian/East Asian and Pacific neighbours do. (Figure 9)

[6] The minor variations in the 2007-10 period can be attributed to the absence of reliable subscriber data for some of the smaller operators.

[7] The slide can be attributed to the impact of global financial crisis.

Figure 9 : Average Revenue per Minute in mobile telecom services for selected markets in Asia Pacific, 2008 (in USD)

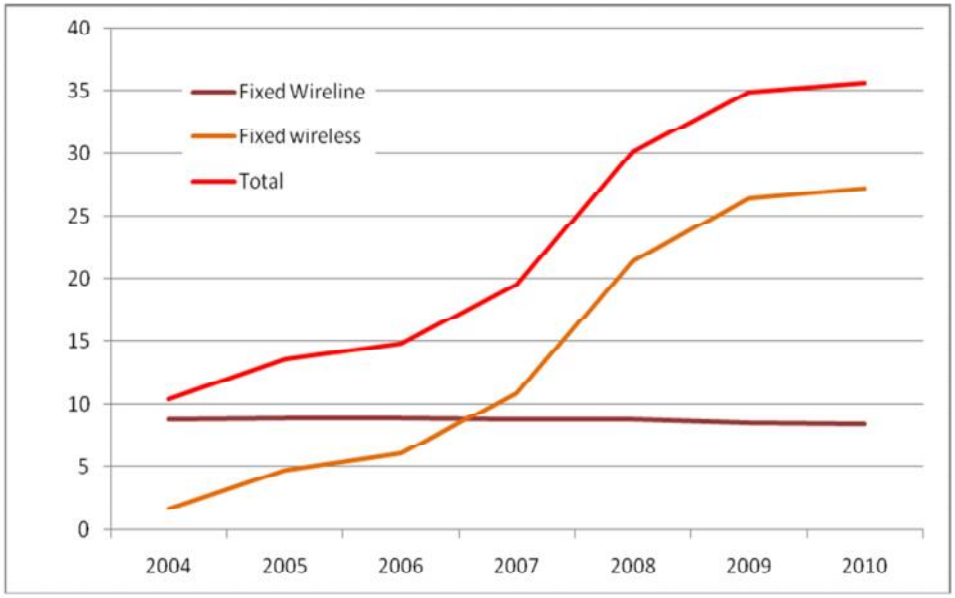


Source: GSMA & Kearny 2008

3.2. Fixed Sector

The size and growth in the fixed sector, as a whole, were significantly lower than in the mobile sector. Total fixed connections in 2010 were only 35.6 million. The number of wire-line connections is gradually decreasing after reaching its climax in 2005. (Figure 10)

Figure 10 : Subscriber growth in fixed wireline and wireless from 2004-2010 (in millions)

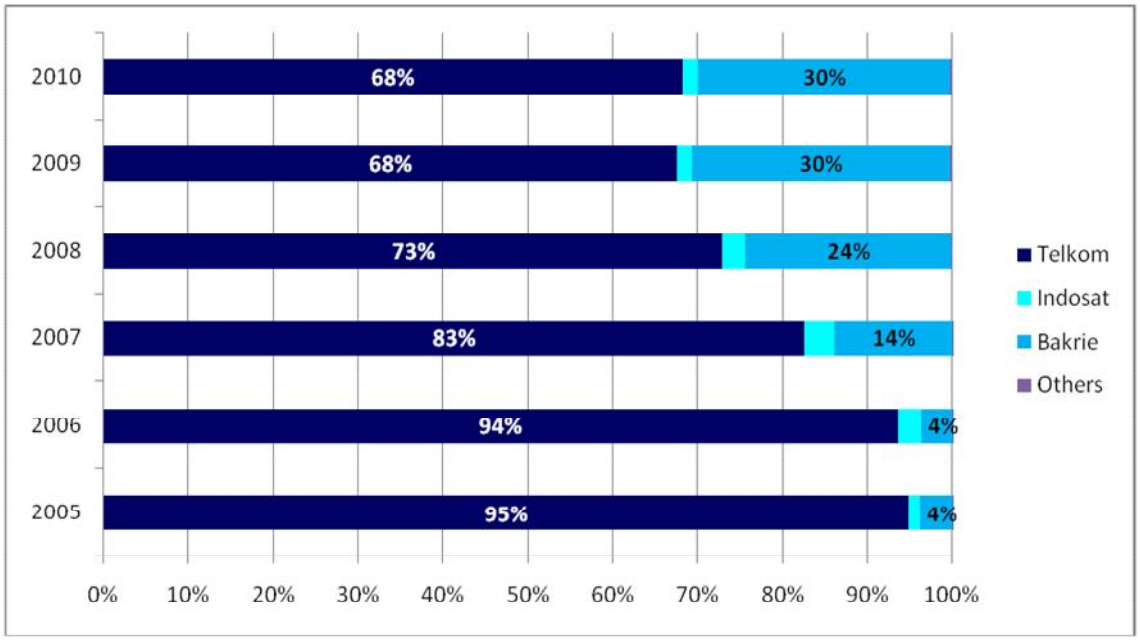


Source: DJPT 2011 and MASTEL 2009

Fixed wireline remains almost a monopoly of the state-controlled incumbent PT Telkom (ownership state by 52% and public 48%) which has more than 99% of the subscribers. By 2010 end PT Telkom had 8,382,000 subscribers, while the rivals Indosat and BBT has provided 44,973 and 2,107 lines respectively. Other operators show no interest in entering into this already constricting market. (DJPT, 2011)

Fixed Wireless Access (FWA) services are provided by 4 operators. Apart from PT Telkom with its brand Flexi, the others are Barkie Telecom[8] (Esia), Indosat (StarOne) and Mobile 8 (Hepi). (DJPT, 2011) The change in fixed market shares (including both wireline and wireless) for the six years ended in2010 is shown in Figure 11.

Figure 11 : Market shares of the fixed operators (number of subscribers) from 2005-2010

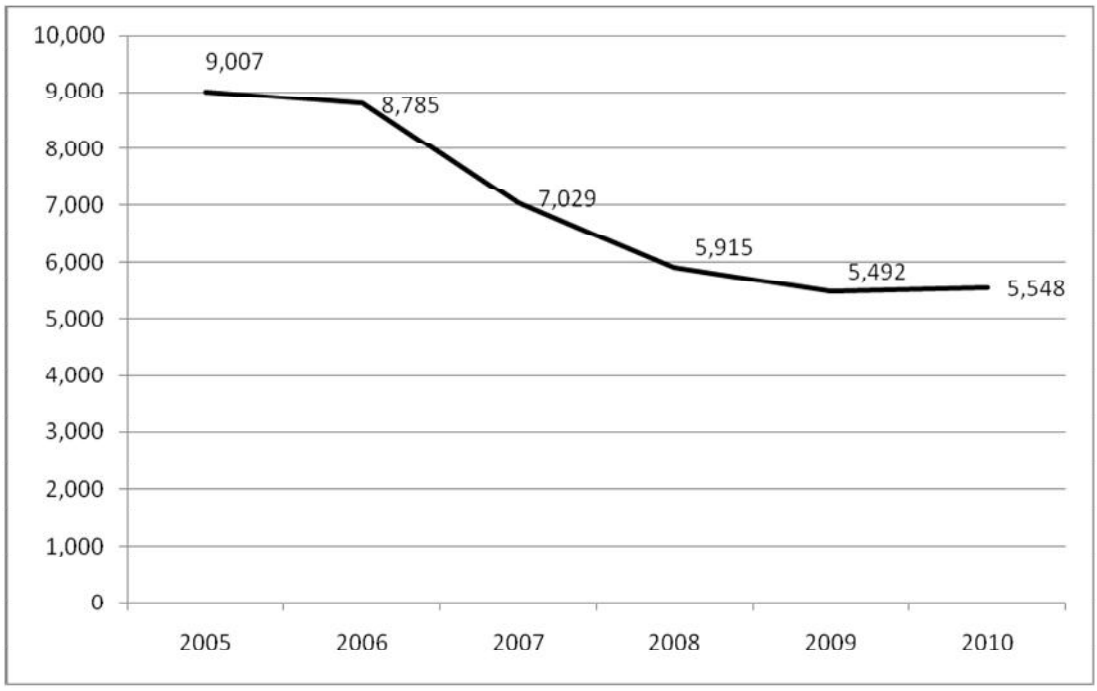


Sources: DJPT 2011 & MASTEL 2009

Compared to the mobile sector, the competetion is less here. HHI has improved from 9007 in 2005 to 5548 in 2010 but it is still high compared to HHI levels in the mobile sector. (Figure 12) Market dominance by PT Telkom contributes to this relatively high figure.

[8] Earlier known as Ratelindo

Figure 12 : HHI in the fixed sector, from 2005 to 2010



Source: Author calculaions based on data from DJPT 2011 & MASTEL 2009

3.3. Broadband sector

The broadband setting is complicated. Fixed broadband services are provided by a large number of ISPs (in hundreds) who depend for local infrastructure and international bandwidth on the monopoly providers PT Telkom and PT Indosat, themselves competitors in providing broadband services. However, mobile broadband is becoming increasingly popular and the new fixed broadband users will be drastically reduced in near future. No market analysis is done as the data available is inadequate for the purpose.

3.4. Competition (in general)

Dominant providers are decided in Indonesia based on scope of business, coverage area of services and the control over markets. A dominant provider is prohibited from engaging in practices such as predatory pricing, cross-subsidies, compelling consumers to use such provider's services and avoiding mandatory interconnection (including discrimination against specific providers).

KPPU, Indonesia's Business Competition Commission has power to intervene to prevent anti competitive practices. It also has the authority to supervise foreign transactions that may have an unfavorable effect on the Indonesian market, including mergers and acquisitions. This covers (a) mergers of foreign companies, one of which operates in Indonesia, (b) mergers between foreign and domestic companies (whether or not operating in Indonesia), or (c) any other form of merger that has a foreign nature. (Telkom-PT, 2010*)*

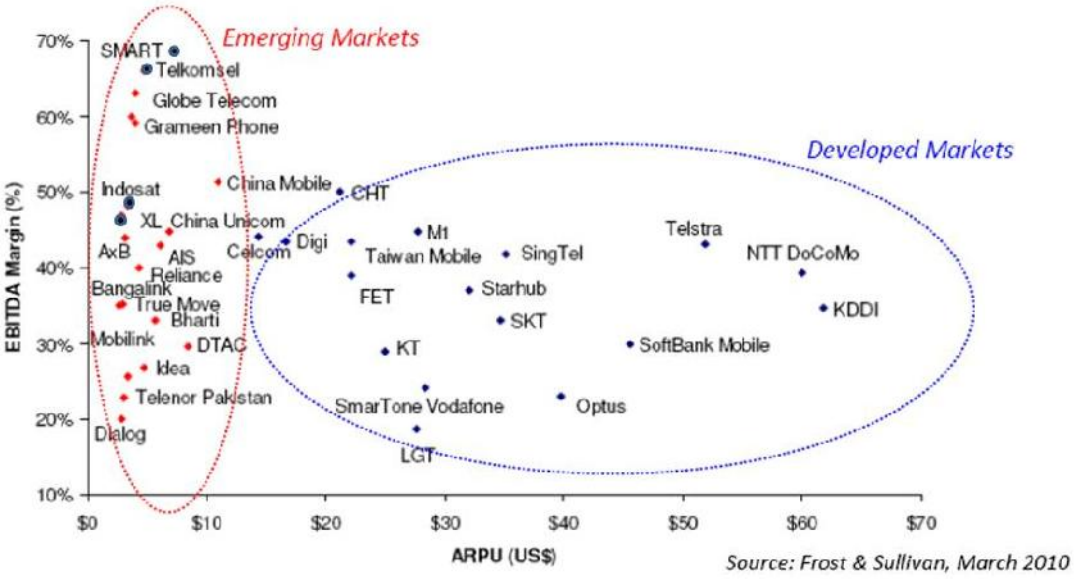
The high competition has resulted in a large number of brands. Indonesia has over 20 brands across both post paid and prepaid segments, as well as the GSM and CDMA segments. As of 2008, there

were 12 GSM and 11 CDMA brands; and 13 pre-paid and post-paid brands. Each of these brands has attempted a different value proposition targeted at individual customer segments, ranging from professionals to factory workers to trendy college students. (GSMA & Kearny, 2008)

Industry reaction to the high competition among the relatively high number of telcos is in the form of mergers, acquisitions, resource sharing to promote common branding. Two small players Smart and Mobile 8 agreed to share their resources in promoting a single set of mobile services called SmartFren.[9] As of March 2011, Bakrie Telkom was planning to purchase the CDMA arm of PT Telkom in an attempt to reinforce its own product Esia. Even full mergers and acquisitions might be possible.

Indonesia's telecom market is well known for its low ARPU's. This has not prevented the key firms from achieving high EBIDTA margins as shown in Figure 13.

Figure 13 : ARPUs and EBDITA margin of selected telecom firms in Asia Pacific (Indonesia telcos in black dots)



Source: Frost and Sullivan quoted by Wolter 2010

[9] This has been incorrectly called a 'merger' by some sections of the Indonesian press. It is only a joint venture. Mobile-8 had 2.5 million subscribers while Smart Telecom had 3.5 million at the time of this agreement.

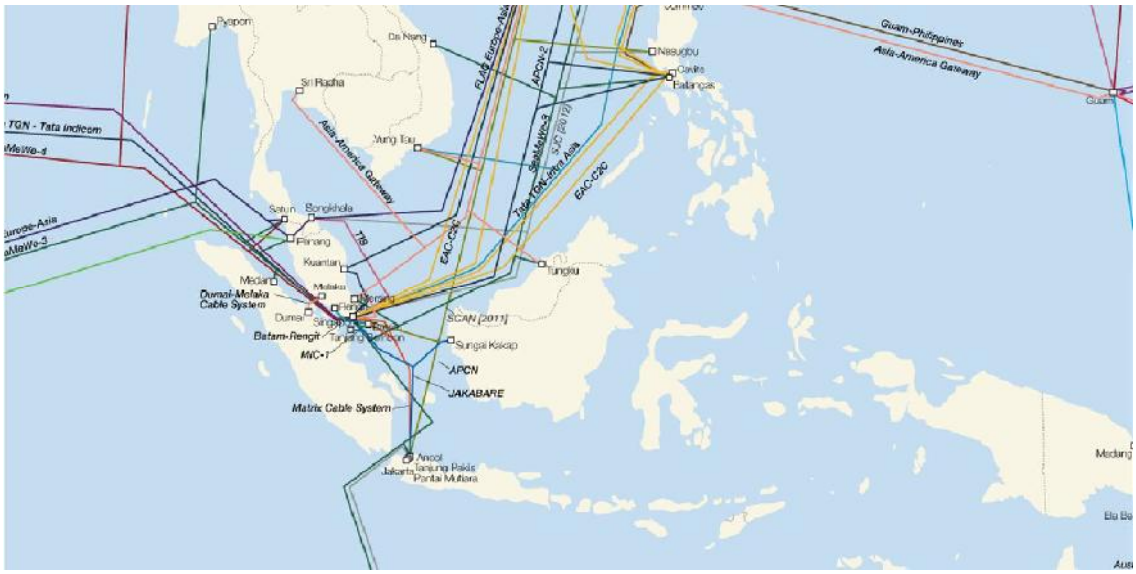
4.0. Infrastructure: availability, usage and quality

4.1. Backbones: International and domestic

Indonesia connects to the world using two different modes: submarine cables and satellite.

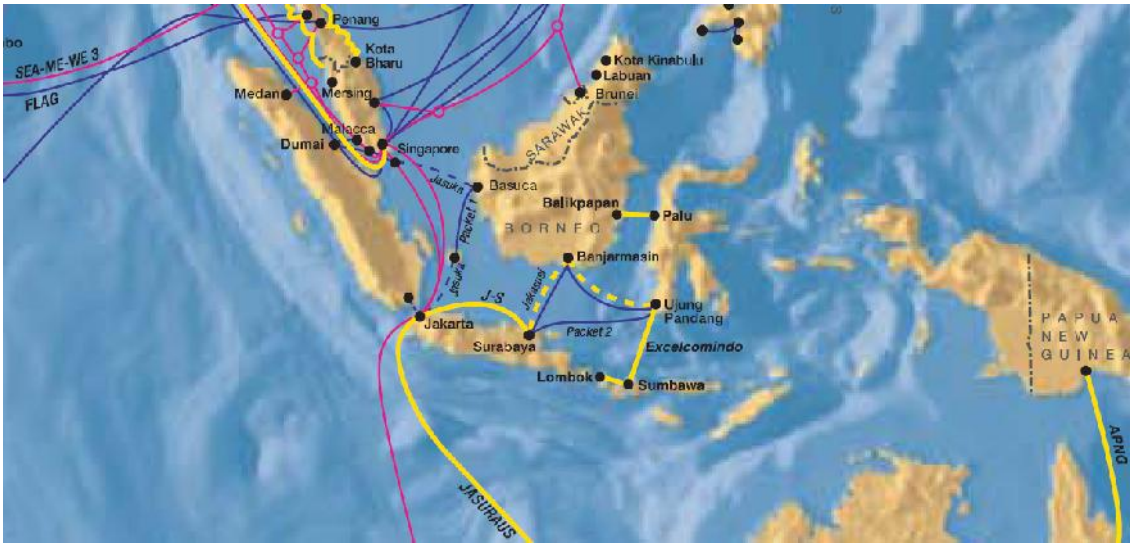
Sub-marine cable access is gained through multiple points in the islands Borneo, Sumatra and Java with Jakarta. They have the best connectivity thanks to four international cables. (Figure 14). Some of the other key islands, which still do not have direct international connectivity, are linked via domestic submarine links by operators. (Figure 15) This still leaves the vast majority of the 17,500 islands unconnected.

Figure 14 : International sub-marine cables, Indonesia



Source: Telegeorgaphy 2011

Figure 15 : Domestic sub-marine cables, Indonesia



Source: Alcatel Undated

Indonesia also has an ambitious satellite communication program, which started in mid 1970s. Four sets of communication satellites named Palapa Ax to Dx were launched since then. Except for the Palapa D, launched in August 2009, the rest were mainly for broadcasting purposes. Palapa D will have a data link that will be used for providing broadband facilities.

4.2. Mobile and FWA last-mile technologies and issues

4.2.1. Tower construction

Some of the mobile and FWA operates faced difficulties in tower construction but now the issue has been largely addressed. According to the regulator any operator, irrespective of whether they are 'domestic' or 'foreign' – as conveniently defined by Indonesian press to demarcate firms with significant foreign investment – can erect their own towers, if they do so themselves. The earlier rule that prevents 'foreign' operators from building towers is no longer valid. If outsourced, both the tower provider and contactor have to be 100% 'domestic'. The only exception is publicly owned tower providers.

Indonesian regulator strongly encourages tower sharing in an attempt to reduce infrastructure costs. This has become successful where competition is not too high.

4.2.2. Introduction of 4G LTE

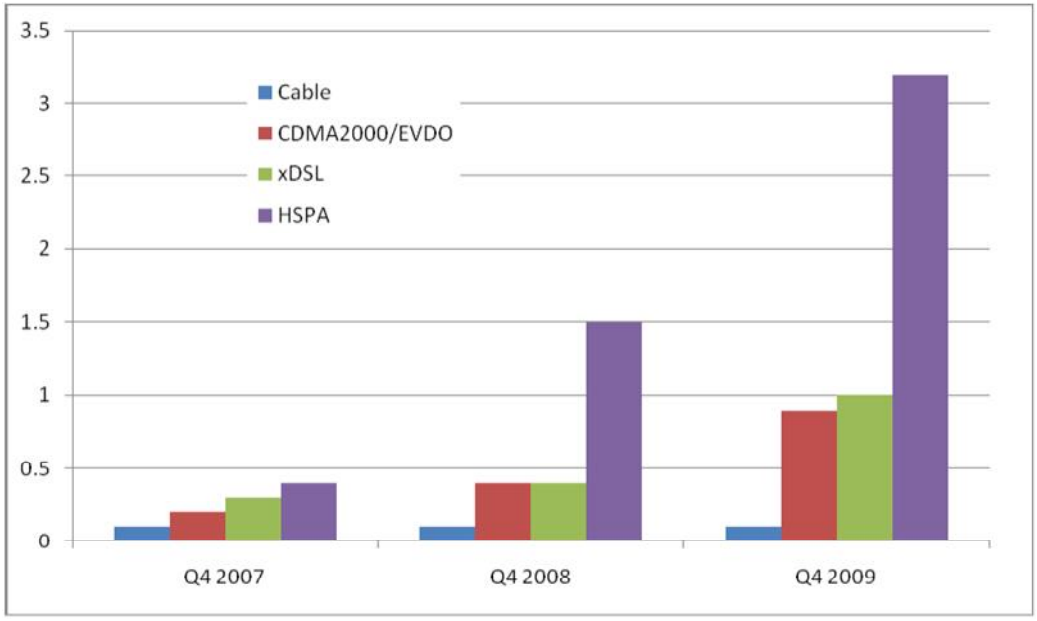
Releasing 2.6 GHz frequency range, identified as ideal for 4G LTE services, will be a problem as it has already been allocated for satellite communications. This will seriously delay the 4G availability in Indonesia, despite the operators' enthusiasm. Some operators have already completed trials.

The other possible frequencies that can be allocated to LTE, include 1.8GHz, 900MHz, and 700MHz. However re-farming needs to be done since 1.8GHz has is already allocated for 2G and 3G services. 700MHz is still occupied by some organizers of free-to-air television broadcasts. Freeing that too might be a problem though all national broadcasters (both radio and television) are expected to migrate to digital broadcast by 2018. India and China have held a first commercial LTE in 2.3GHz frequency. The technology used is TDD (Time Division Duplex)-LTE. Studies in both countries shows feasibility but in Indonesia 2.3 GHz is already allocated for WiMAX services. (Slikers Weblog, 2010)

4.3. Broadband last-mile technologies and issues

Broadband landscape is changing. The movement from fixed broadband to mobile broadband is the most visible fact but subscriptions to packages based on other technologies, except cable are on the rise. (Figure 16)

Figure 16 : Indonesia's broadband evolution by technology (number of subscribers in millions)



Source: Wireless Intelligence, ITU quoted by Cabello 2010

4.3.1.WiMAX

After 3-4 years long process Indonesia regulator finally decided that band 2.3 GHz and 3.3 GHz would be used for WIMAX service in January 2010. Of the 73 telecom companies that participated in the bidding, eight winners were chosen for the 15 franchise zones. Each regional zone is assigned to a maximum of two operators. (Telecomasia, 2010)

After more than a year of this award, Indonesia is yet to experience WiMAX-based broadband services. At least three disputes between the prospective service providers and the regulator delays WiMAX launch. Strictly speaking they are not legal disputes as all operators have agreed to these 'unfavorable' conditions. However, with the changing environment now they face difficulties in moving ahead unless the game plan changed.

The initially agreed standard is 802.16-2004 (aka 802.16d), sometimes referred to as 'Fixed WiMAX', since it has no support for mobility. Now with developments in the area of mobile broadband, the operators are requesting for 802.16e-2005 which supports nomadic (mobile) WiMAX. Though changing standards is technically possible, and both are not allocated yet, the regulatory decision is delayed, possibly due to imbalance it can make in the broadband market. (BRTI, 2011)

The WiMAX operators are offered 2.3 and 3.3 GHz, which some of them claim is not the global standard.[10] The other problem is the difficulty in obtaining equipment that work in this frequency

[10] It is factually incorrect. In the absence of uniform international licensed spectrum for WiMAX, the WiMAX Forum has published three licensed spectrum profiles: 2.3 GHz, 2.5 GHz and 3.5 GHz, in an effort to drive standardisation and decrease cost, but that does not prevent the use of other frequencies.

range. According to the regulations they have to be manufactured by a firm that meets the minimum local ownership requirements by the government. They cannot be imported. The operator representatives claim the only firm that used to manufacture such equipment has stopped production.

4.4. Urban rural disparities

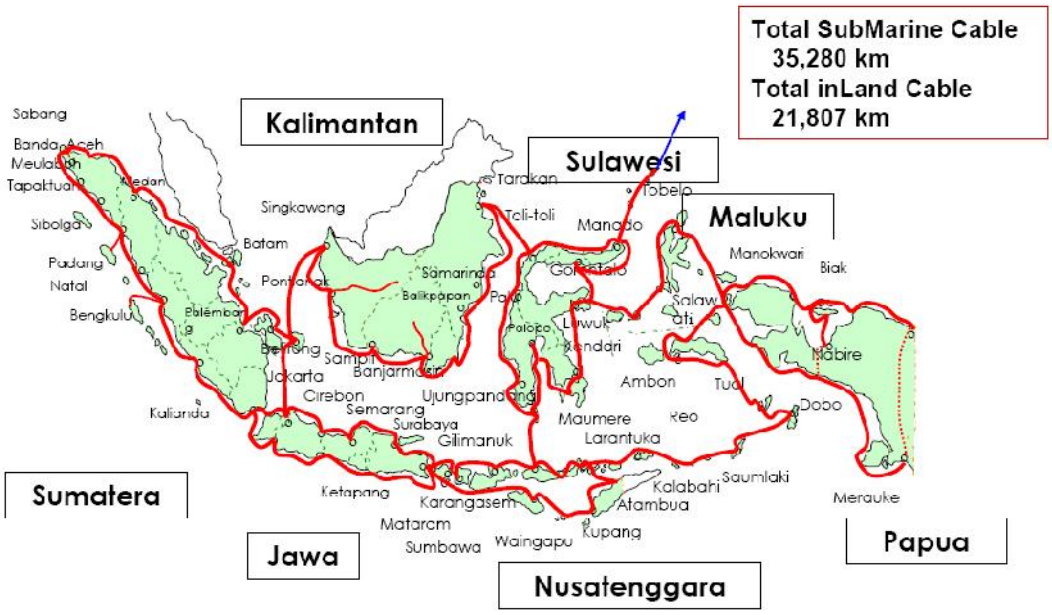
Clear urban rural disparities in telecom services exist. Few other islands show agreeable connectivity rates, but Java remains the most promising island for telecom growth, both voice and broadband. Besides being the most populated island, it shows the relatively strong purchasing power compared to the rest. Sumatra, with a significant population can be treated as the second most promising market. Kalimantan, Sulawesi and Papua and other parts are less attractive to telcos with their low population density and low income levels. At least three major operators have expended their services to these islands, but the bulk of their revenue still comes from Java and Sumatra. Smaller operators are expected to expand their networks outside Java but it would certainly take time. (Pefindo Credit Rating Indonesia, 2010)

Donny and Mudiardjo (2009) claims 43,000 of Indonesia villages, 65% of the total, are not served by any network. This situation might have improved by now, but not significantly. A large number of small islands still stay out of the telecom networks, as the connectivity costs are not justified by the market sizes.

GSMA estimated 93 million of Indonesian population (approximately 40% of the total) unconnected in 2008. It also places Indonesia among four other countries, namely China, India, Pakistan and Bangladesh that makes 96% of Asia's unconnected population. (GSMA & Kearny, 2008)

Palapa ring was country's solution to make easy and affordable access of telecom services for all. Started as a 'dream' project in the pre-Asian crisis era, the initial plan was to use government funds to build this national fiber optic backbone that was to connect the country at large, with special focus on the eastern region - the area within Sulawesi, Bali and Papua triangle. The project objectives, scope and estimates differ among sources, as perhaps the idea has been toyed for a prolonged period. According to Donny and Mudiarjo (2007) the plan was to lay over 25,000 km undersea and terrestrial cables in an integrated ring shape spread out from Sumatra to West Papua. Every ring was to transmit broadband access of about 300–10,000 Gbps. (Figure 17)

Figure 17 : Blueprint of (proposed) Palapa ring



Source: Iskandar, 2007

The project is yet to materialize in 2010 end and its future looks uncertain. The government's effort to get local telcos to fund the project had failed, and all members except PT Telkom have left the consortium. Still the government expects to complete the project by 2012. The latest scope is estimated at 35,280 km undersea and 21,870 km underground fiber-optic cables. (Jakarta Post, 2010)

5.0. Beyond telecom: E Applications, Services, Human Resources, Innovation

While not having a BPO/ITES industry of significant size, Indonesia has found its m-applications niche mainly in two areas, social media and mobile payments/mobile banking.

5.1. Social media

The social media use in Indonesia, particularly Facebook and Twitter is legendary. Indonesia, with Brazil, Venezuela, Netherlands and Japan, was among the top five largest twitter users in December 2010. If one account per a user were assumed 20% of the current Indonesian population uses Twitter. (ComScore Data Mine, 2011)

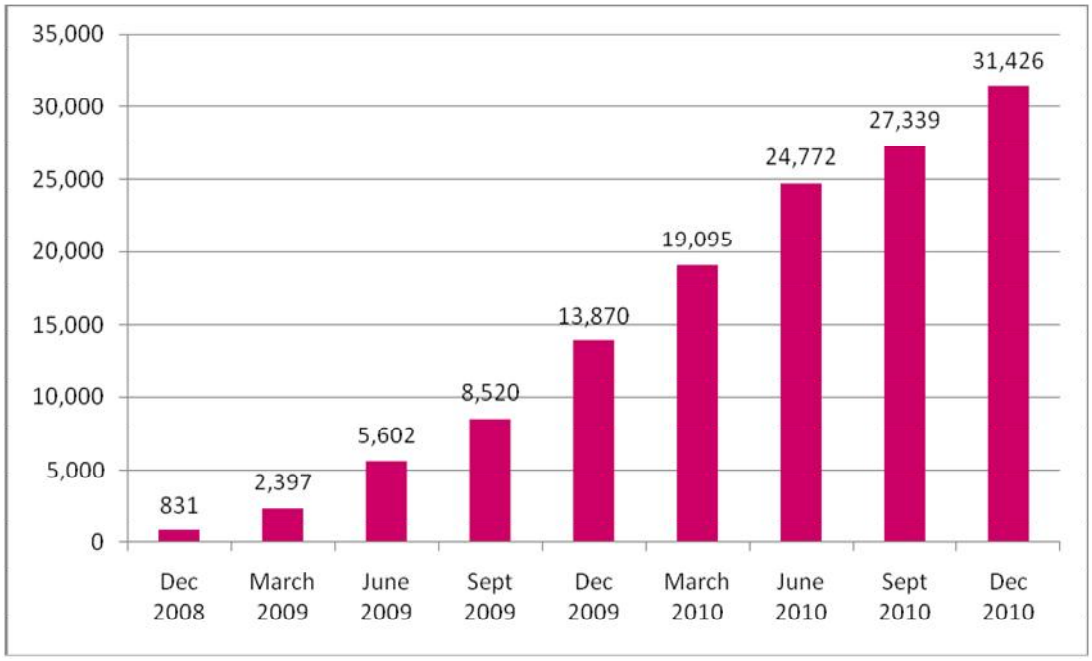
Indonesia is also the country with the second largest Facebook user population. (Table 2). The expansion has had humble beginnings with a short two year history. (Figure 18)

Table 1 : Top ten countries with the largest number of Facebook users as of December 2010

	Country	Number of users
1.	United States	145,331,600
2.	Indonesia	31,425,840
3.	United Kingdom	28,770,560
4.	Turkey	23,832,200
5.	France	20,307,260
6.	Philippines	18,768,040
7.	Mexico	17,821,820
8.	Italy	17,615,900
9.	Canada	17,414,640
10.	India	16,509,680

Source: Checkfacebook.com 2010

Figure 18 : Expansion of Indonesia's Facebook users (in '000s) 2008 December to 2010 December



Source: Checkfacebook.com 2010

A notable fact is the growth in social media use happens without any serious expansion in content development, which is still at its early stages. The growth in mobile handset sales, perhaps, reflects the trend toward user generated content. Percentage of Qwerty phone sales to total has increased from 9.4% in 2009 to 43.7% in 2010 while touch phones increased market share from 4% to 7.4%. Non Qwerty phone sales have dropped. (Gfk, 2010)

Unsuccessful attempts have been made to block content considered as pornographic. The government was also quick to deny rumors of banning some categories of handsets, including blackberrys. These regulatory actions do not seem to have a notable impact on either way.

5.2. Mobile Banking and Mobile Payment applications

Indonesia looks a country tailor-made for mobile banking (m-banking) and mobile payment (m-payment) applications. Majority of the population is till 'unbanked' - only 60-70 million Indonesians have bank accounts. The number of mobile subscribers is growing and by 2013, more than 150 million Indonesians are estimated to have a unique mobile account. This mix of demand and potential present an ideal opportunity for financial services delivered on mobile. (IFC, 2010)

While mobile banking services were available for few years they were disproportionately concentrated upon the larger developed urban areas of Jakarta, Bandung, Surabaya, and Denpasar and Bali. Table 3 shows the SMS and mobile banking products offered by few leading banks (among parallel products) and Table 4, the information on usage as reported by three banks. SMS/Mobile

banking services are still not as popular as ATM services or Internet banking services. The landscape may change as this is just the inception.

Table 2 : SMS/Mobile banking products offered by leading banks

	Bank/E Channel	**Internet Banking**	**SMS Banking**	**Mobile Banking**	**Phone Banking**
1.	Bang Negara Indonesia	BNI Internet Banking	BNI SMS Banking	-	BNI Phone Plus
2.	PT Bank Central Asia	KLIK BCA	SMA BCA	M BCA	BCA By Phone
3.	Bank Mandiri	Mandiri Internet Banking	Mandiri SMS Banking	-	Mandiri Call
4.	PT. Bank Rakyat Indonesia	BRI Internet Banking	BRI SMS Banking	BRI Mobile Banking	BRI Call
5.	Bank Danamon	Danamon Online Banking	-	Danamon Mobile Banking	Danamon Access Centre
6.	PT. Bank Permata	Permatanet	Permata Mobile	Permata Mobile	Permatatel

Source: BRTI 2011

Table 3 : Use of SMS/Mobile banking against parallel modes (information from selected banks)

Channel	Indicator	Bank Mandiri		PT Bank Central Asia		Bang Negara Indonesia	
		2009	2010	2009	2010	2009	2010
ATM	Volume	123	142	413	432	-	166
	Value	8,867	11,167	47,380	51,486	-	9,821
Internet Banking	Volume	6	27	98	178	1	1
	Value	437	1,001	67,965	96,255	403	587
SMS/Mobile Banking	Volume	34	42	54	78	11	18
	Value	150	299	6,808	10,419	91	173

Volume in millions of transactions; Value in USD million

Source: BRTI2011

M-payments are not limited to m-banking. IFC identifies three models of operation: the telco-led, the bank-led and third party. The last one offers a particularly interesting option as it is operator-agnostic and benefits from the possibilities offered by the current banking regulations.

IFC ranks the demand for mobile banking services in Indonesia in the order of top-up, bill payments, transfers, remittance and transactions. Each can be offered either with or without a banking account, so a growth of these services not necessarily translates into an increase in the number of savings accounts. (IFC, 2010)

Still challenges are plenty. About 20-30% of the population will not participate either because they earn below the threshold or the live in area too remote. Lack of awareness adds to the issues. IFC recommends overcoming these problems by conducting awareness workshops, running location specific m-remittance and utility payments trials as pilots and providing detailed cost analysis to build trust among participants.

Bank Indonesia (BI), the central bank, has shown an evident interest in m-payment developments. Under the BI regulation no 11/12/PBI/2009 on electronic money BI stipulated, inter alia, whether a bank or not every m-payment service provider has to take a license from BI.

Indonesia as principal, issuer, acquirer, clearing processor and /or end settlement processor; transactions should be done only in Indonesian Rupiah; all players should maintain a minimum level of security standards specified; maintain limits of IDR 1,000,000 and 5,000,000 (USD 115 and 230) respectively for unregistered and registered user categories and the value of e-money a service provider holds should be equal to the user deposits. A service provider can only perform transactions but cannot generate mobile money. (BRTI, 2011)

Three telecom companies, PT Telkom, PT Telkomsel and PT Indosat have been granted licenses to provide m-payment services. More are waiting. The operators, in general, feel BI regulations are conducive to m-payment developments.

6.0. Institutions and the Policy & Regulatory Environment

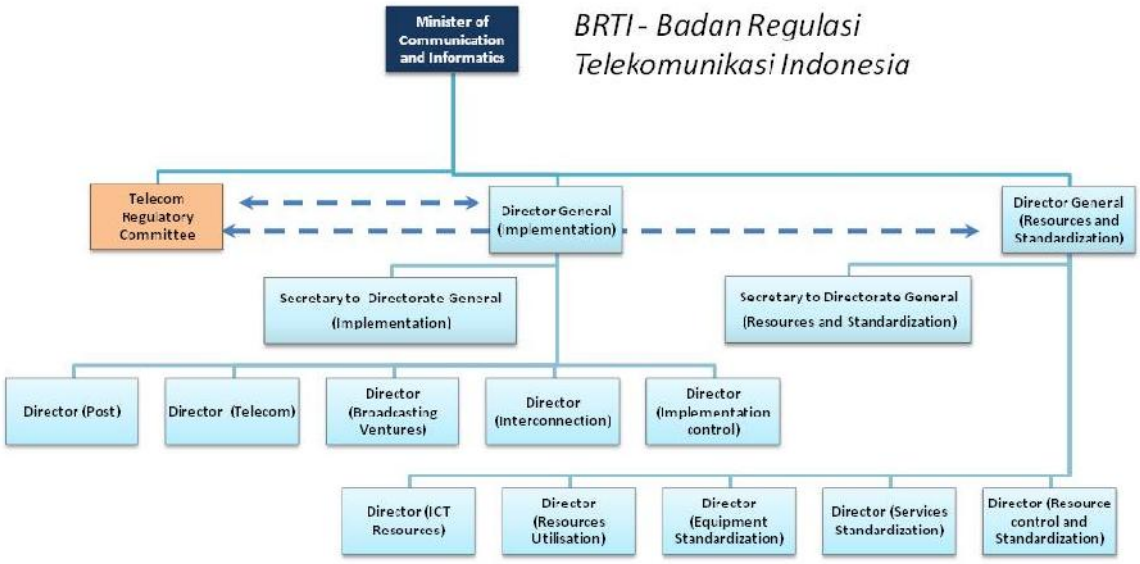
Indonesia has not had a separate regulator for the longer period of its hundred plus years of telecom history. Since 1964-1989 Department of Posts, Telephone and Telegraph played the combined role of policy maker, regulator and even partially an operator. In 1989 Directorate General of Posts and Telecommunications (DJPT) became the regulator. Post-1989 reforms also partially privatized the two state-owned enterprises - PT Telkom and PT Indosat which operated in monopoly markets the former focusing on domestic connectivity and the latter international. They maintained their exclusivity rights for these services till mid '00s. (Wattegama et el, 2008)

Although the Telecommunication Law of 1999 provided the government the option to create an independent regulatory agency, that was not exercised until 2003. A ministerial decree established the Indonesian Telecommunications Regulatory Body or Badan Regulasi Telekomunikasi Indonesia (BRTI) to be effective starting January 2004.

Unlike in many countries where the setting up of a National Regulatory Authority (NRA) preceded market liberalisation, in Indonesia, there was a reversal of sequence – BRTI came into existence nearly 10 years after first GSM licenses were issued.

The stated objective was to ensure transparency, independency, and fairness in telecommunication network and service operations. Since its inception, BRTI was seen as a 'transitional' body that would become fully independent only at some undetermined time. BRTI's role has become more prominent since then but even as of 2010 end it has not become fully independent.

Figure 19 : Organisational Structure of BRTI



Source: BRTI, 2011

BRTI comprises of both the offices of Directors General of Communication and Informatics and the Telecom Regulatory Committee. (Figure 19)The default BRTI Chairman is one of the Director

Generals. The seven commissioners (includes the Chairman)[11] who form the Telecom Regulatory Committee are from different backgrounds related to telecom. Each will serve for a term of three years, which can be extended maximum to another term if necessary. While the minister appoints two, five are chosen among the public through a competitive selection process. The commissioners cannot be affiliated with telecommunications businesses, political parties or the armed forces.

Regulatory committee members are expected to take decisions based on consensus, but if they cannot reach one, there will be a vote with everyone enjoying same voting rights. Theoretically the decisions should be taken after considering the alternative opinions and members should act sans any external pressure. Once arrived, the decisions are announced as a form of a Director General decree.

As BRTI is not a fully independent entity but still closely connected to the government segregating its role as a policy implementer from that of government makes little sense. An analysis of news reports shows some of the commissioners now play a bigger role in regulation than they did during the previous studies in 2006 and 2008.

The issue of BRTI's independence came into spotlight in January 2011 when a Yogyakarta-based research firm PR2Media claimed five media regulatory bodies Indonesian Broadcasting Commission, the Indonesian Telecommunications Regulatory Body (BRTI), the Film Censorship Board, the Information Commission and the Press Council may not be as independent as they should be, given their dependence on state funding. All five receive their funding from the government and employ staff members vetted by the ministries with which they work. The researchers said they must completely detach themselves from any state support. BRTI while admitting it is 'somewhat of a proxy' for the Informatics and Communications Ministry, serving mainly to carry out its duty to regulate, supervise and control the telecommunications sector in accordance with the 1999 Telecommunications Law, emphasized BRTI's decisions in the past has been always made independent of the ministry, since public representation in the body outweighed government representation. (Jakarta Globe, 2011)

Komisi Pengawas Persaingan Usaha (KPPU) is the competition authority with jurisdiction over many industries including telecommunication. The responsibility of KPPU is to ensure competitive behavior in any industry. It is supposed to take ex-post regulatory action based on competition law, after determining that there has been anti-competitive behavior in the market.

The regulatory environment might undergo serious changes under the proposed Bill of Telematics Convergence, scheduled to be discussed in the House of Representatives (DPR) in the middle of 2011. This new piece of legislation is supposed to unify laws governing technology businesses, covering all aspects of 'telematics'. (Indonesia Finance Today, 2011)

[11] This is as of March 31, 2011. The number of Commissioners has increased since then.

7.0. Effectiveness of the Telecom Policy and Regulatory Environment

The SPR instrument[12] was developed by LIRNEasia and documented in detail in Samarajiva et al 2007. It asks informed stakeholders to rate (on a Likert scale of 1 to 5, 1 being highly unsatisfactory, 5 being highly satisfactory) the Telecom Regulatory and Policy Environment in a country along seven dimensions. Five of the seven dimensions are based on the GATS fourth protocol on telecom services. QoS and Tariff Regulation dimensions have been included, given their importance.

Potential respondents come from 3 different categories:

- Category 1: those directly involved in the sector such as operators, equipment vendors.
- Category 2: those indirectly impacted by the sector or those studying/observing the sector with broader interest such as consultants and lawyers.
- Category 3: those who represent the broader public interest such as media personnel, other government officials, retired regulators, civil society organizations.

Though multiple modes were available including an online survey, the two methods used in Indonesia were e-mail and face-to-face interviews. The numbers of responses received from the categories were 15, 15 and 17 respectively.

The methodology specifies that each category should contribute equally to the final SPR score. Therefore, weights are used to equalize the contributions made per category.

The first SPR survey was conducted in Indonesia in 2006 only with six dimensions (without QoS) and in two sectors (fixed and mobile) only. The second survey in 2008 was done for three sectors and across all seven dimensions. SPR scores from the three surveys scores are compared wherever possible.

The 2010 survey evaluated the effectiveness of the regulatory environment from January 2010 to January 2011, and the survey itself was carried out from February 2011 to March of 2011.

7.1. Market Entry

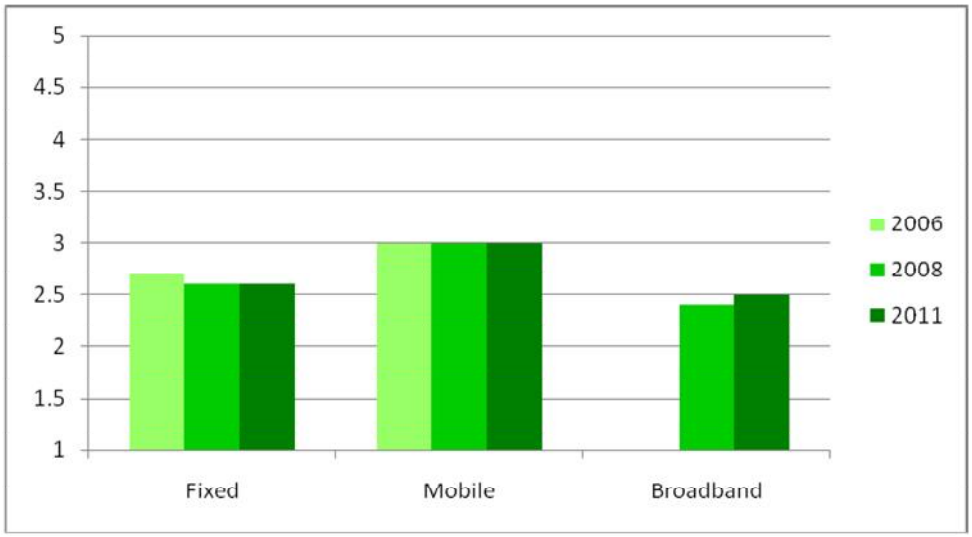
There were no new entrants during the period under study. As explained in section 3.1, the competition in the mobile sector is harshest, followed by that in FWA. Fixed wireline shows no further growth possibilities. Industry is yet to face the competition in broadband, as only a fraction of the potential demand is met.

The industry feels the country has more mobile operators than it needs. This notion has been expressed openly by some industry leaders.[13] Even the relatively small operators feel so. MASTEL (Masyarakat Telematika Indonesia or the Indonesian Infocom Society) too expresses concern about the high number of operator and expects few small operators to merge in near future.

[12] Earlier called TRE Instrument

[13] Hasnul Suhaimi, CEO, XL Axiata noted this in his presentation at a public seminar attended by almost all top level telco personalities on March 16, 2011 and there were no challenges.

Figure 20 : TRE Scores – Market Entry



Source: Survey Results

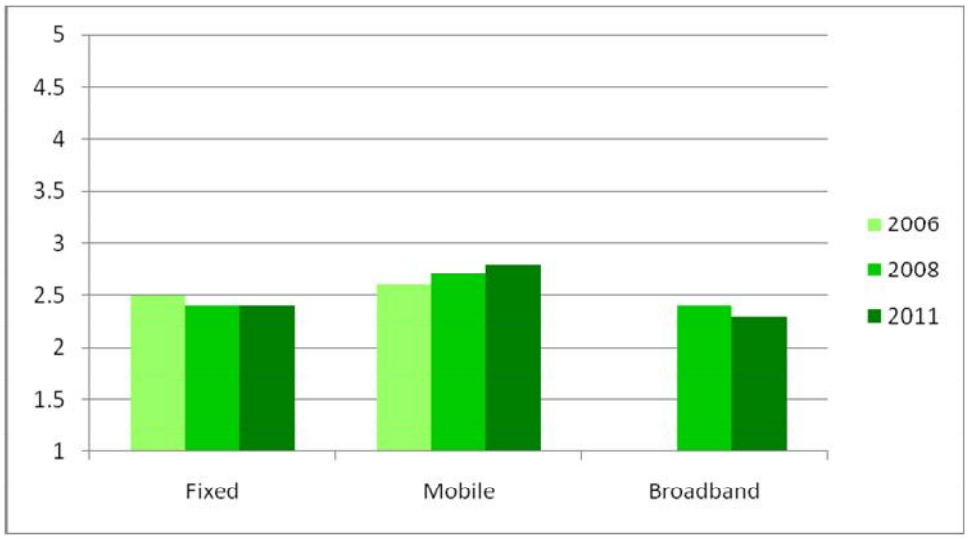
The survey results show no notable variation from previous ones. (Figure 20) The higher score for mobile might indicate the relatively easier entry. The industry, not surprisingly, does not anticipate any new entrants at this point.

Looking from another angle, the industry senses a difficulty in market entry with new services. The reasons are twofold. The number of different license types for telecom services is high. For instance, an operator needs a separate license for providing long distance services, IDD and VoIP even if it processes a license for fixed telecom services. Then the procedures of obtaining one, even when the conditions are fulfilled are cumbersome and time consuming, particularly for smaller operators, but even some of the bigger players feel it. The relatively lower scores that continue from 2006 might be an indication of this. The slight increase in broadband may be a reflection of the entry made possible for mobile operators.

7.2. Access to Scarce Resources

The scores were notably low in this section, with no sub-sector reaching even the mid-point score of 3. (Figure 21) It indicates the gamut of issues the industry faces, or it perceives facing.

Figure 21 : TRE Scores – Access to Scarce Resources



Source: Survey Results

Severe limitation in the spectrum availability is seen a key issue by multiple operators (both mobile and fixed wireline) though no real problems were presented. The perception is when the bandwidth is shared by a large number everyone gets less than they deserve. There is also a valid complaint that the bigger players were given wider ranges while the smaller ones have to be complacent with relatively narrow ones. It is not clear how far these issues affect the operations.

Issues regarding WiMAX and 4G LTE (Please refer sections 4.2.2 and 4.3.1 for a comprehensive description) easily explain the drop in scores for broadband.

Infrastructure sharing is another concern. Problems of tower constructions existed for several years. Operators have only a vague idea about the regulation, which has changed over the time, but multiple parties agree about the negative impact to them.

Operators also see the interactions with local governments as a major delaying and cost-escalation factor. They are supposed to interact with over 400 regional governments, which invariably expect financial contributions of varying sizes and nature. There are no fixed procedures or fees.

In the middle of this murky environment, a hope still exists for more frequency allocation for the telecom sector through spectrum refarming.

7.3. Interconnection

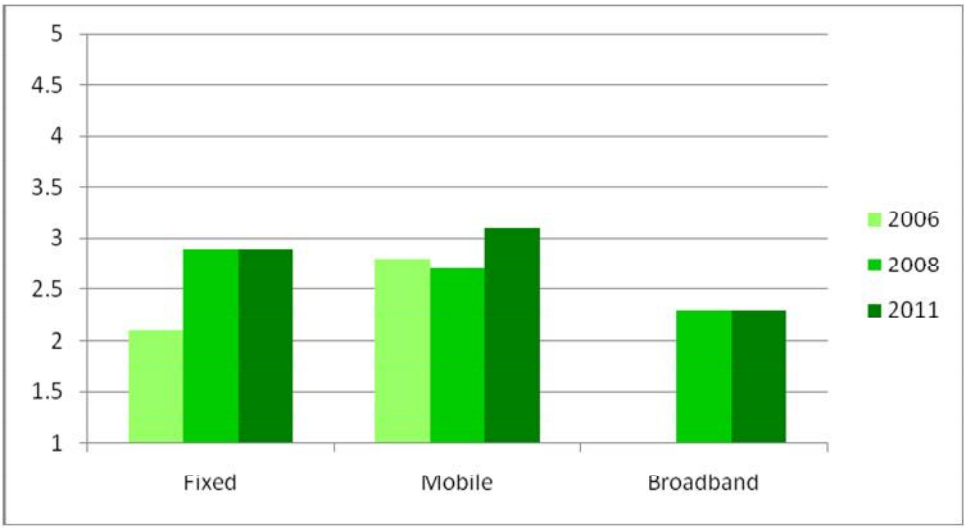
There are no procedural issues in interconnection. The Telecommunications Law makes ‘any to any connectivity’ obligatory. This means that a network provider must permit interconnection of its networks with any other network operator, irrespective of its size and date of market entry. Interconnection fees have to be agreed by each network provider and calculated in ‘a transparent manner’. The government regulation provides guidance with respect to the interconnection scheme between telecommunication network providers. Even the relatively small operators do not see interconnection a hassle.

Cost-based interconnection provisions were introduced in January 2007, making the process simple and relatively straightforward. The law requires the incumbent operator to propose non-discriminatory and transparent rates. That proposal requires the regulator's approval. Once approved, incumbent publishes it.[14]

The current interconnection rates were introduced in 2009. At every revision, the rates have come down approximately by 4-8%. The incumbent has seen its interconnection revenue drop from 16.2% of its consolidated operating revenues in 2007 to 14.5% and 11.9% respectively in the years that followed. (Telkom-PT, 2009)

The scores remain the same for fixed. A more visible improvement is in mobile. (Figure 22). The higher mobile score might reflect the increasing drop in interconnection charges. The overall sub-average response can be linked with the dissatisfaction of most operators on the incumbent dominance in interconnection fee calculations. [15] Across industry, explained one interviewee, the interconnection costs drop at about 15% annually, but the current structure does not reflect this change, favoring large operators over smaller. Some looks for an alternative scheme based on the average interconnection costs of all operators.[16]

Figure 22 : TRE Scores – Interconnection



Source: Survey Results

There are no interconnection charges for SMS messages and operators have no complains about this 'Sender Keeps All' (SKA) scheme introduced in 2007. Mixed feelings were expressed about the

[14] Theoretically the regulator should consider the rates proposed by all dominating operators, i.e. those who control more than 25% share in a market, in deciding interconnection charges. The incumbent is the only player that controls such a share in any market.

[15] Other operators feel the charges too high. XL Axiata prefers IRD 200 on-net interconnection rate per minute at IRD 100 and IRD 600 off-net rate at IRD 150. (Suhaimi)

[16] Though this looks fair on the face of it, the implementation can be a nightmare. The success depends on the careful estimation of interconnection costs, sincere reporting and genuine efforts to keep interconnection costs low by each operator. It not necessary guarantees a lower rate.

prospect of having the same for voice. The large operators object as an SKA scheme is more favorable for the smaller ones.

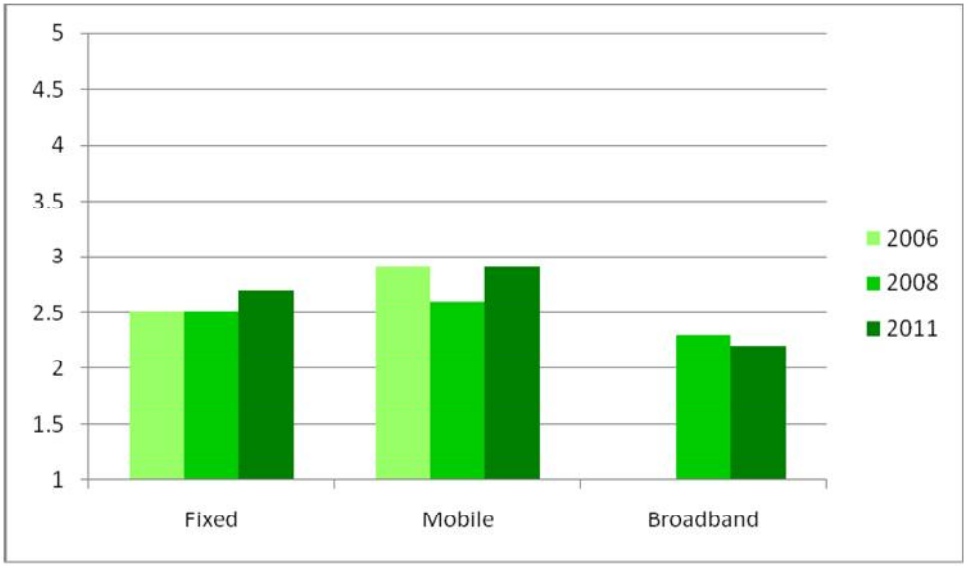
National Internet exchange (IX) in Jakarta was seen essential around mid '00s to ease the problem of high local Internet traffic on the links with severely limited capacities. Similar Internet Exchanges were planned for cities like Surabaya, Bandung and Yogyakarta. (Purbo, 2005) Recent paradigm shift from fixed to mobile broadband oriented developments make these IXs redundant. Still that does not explain the low scores in broadband.

7.4. Tariff Regulation

There is no tariff regulation in any sector. The regulator sees three components to fixed and mobile tariff. Interconnection charge, the first component, is the only one decided by the regulator. Retail service activity cost and the margin are decided by the operators. Therefore regulator has no bearing on the overall charges.

The improvements in the scores both in fixed and mobile may be linked to the simplification of the system from a more complicated previous one. (Figure 23) The drop in broadband may perhaps reflect the costs which have not undergone price wars and is felt too be too high by consumers. Broadband prices are not regulated.

Figure 23 : TRE Scores – Tariff Regulation



Source: Survey Results

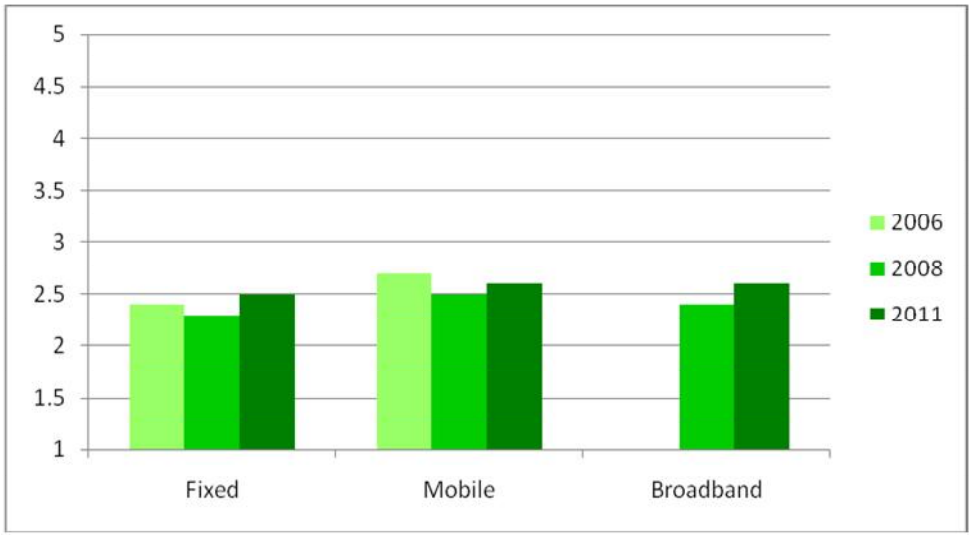
7.5. Anti Competitive Practices

Compared to 2008 TRE survey cycle which was notably action-packed, the period under study in the 2011 survey was uneventful. KPPU, Indonesia's Business Competition Commission, has not made any interventions within the period. This is remarkable given its previously prominent role.

Except for the general perception among the rest about the 'favorable treatment' for incumbent operators there is nothing to support the perceived anti-competitive practices. (Figure 24) This

perception too is not always based on evidence. MASTEL feels the existence of a level playing field with no bias toward the incumbent and/or larger operators.

Figure 24 : TRE Scores – Anti Competitive Practices



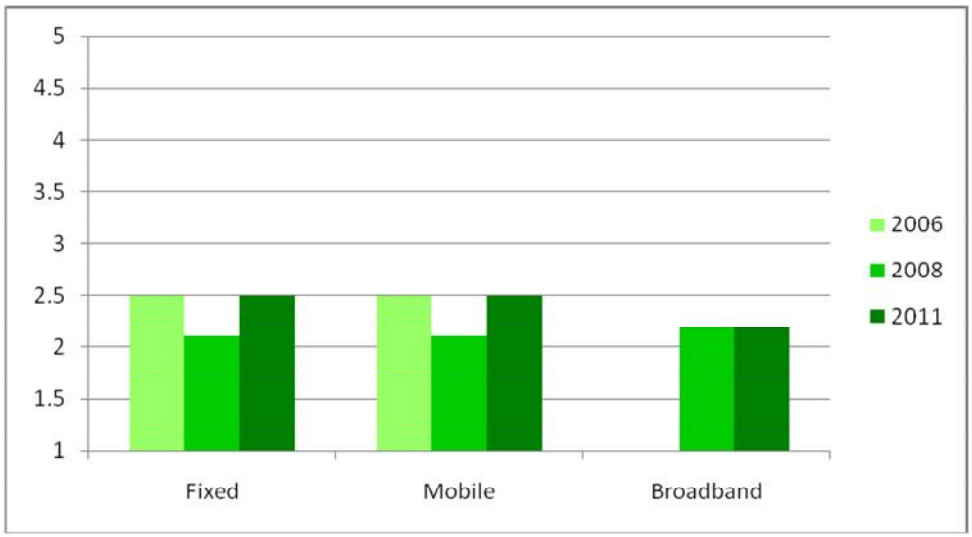
Source: Survey Results

The scores here do not reflect the development in the industry. While the anti competetive practices are being largely subdued since 2006, the score do not refelct this point correctly.

7.6. Universal Service Obligations

Yet again, and not surprisingly, the scores for USO here were among the lowest in the survey. (Figure 25) This clearly indicates the negative feelings about the Universal Service Fund (USF) that has failed to meet its obligations in expanding the telecom network to rural/remote areas.

Figure 25 : TRE Scores – Universal Service Obligations



Source: Survey Results

Despite this, the government continues to collect a percentage of each operator's gross revenue for USO Fund. The rate has increased to 1.25% from previously 0.75% in 2009. The total collection amounts to a staggering IDR 11 trillion (USD 1,254 million). Only a small fraction of this is used to build infrastructure in rural areas by the incumbent PT Telkom. The bulk of the money is being treated as if were any other tax and used by Indonesia government.

The industry feels the money should fully be utilized in building telecom infrastructure. The extremely limited investments from the USO happened so far bring little comfort to the industry.

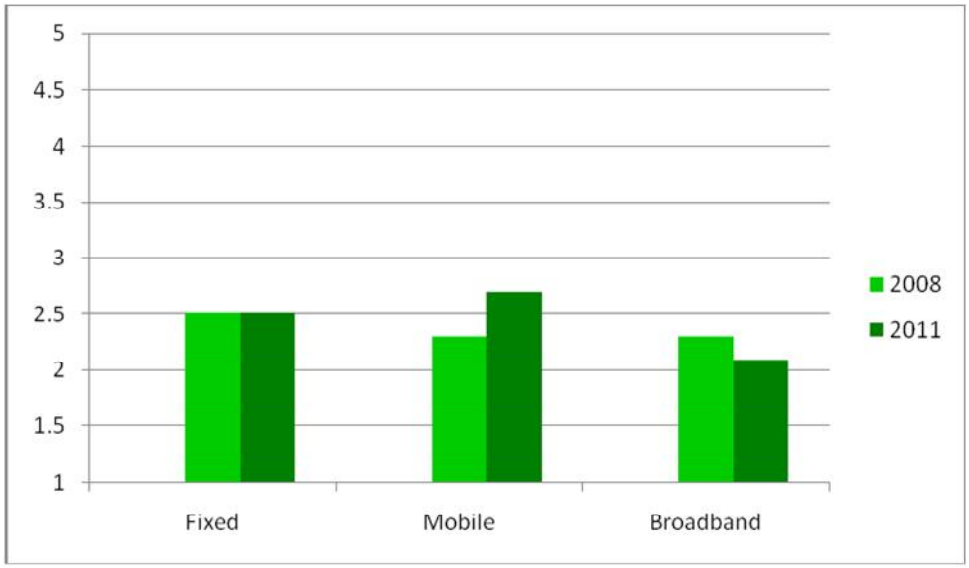
In a parallel development, all telecom operators except the incumbent PT Telkom that formed the consortium to build the 'Palapa Ring' to provide broadband access to relatively less connected eastern Indonesia have withdrawn. The key reason for them to resign from this highly ambitious IRD 3 trillion (then USD 325 million[17]) project that planned to lay a fiber network of aggregate length 11,000 km was the government's inability to use the USF for any purpose favorable for the telecom industry.

There is a little hope that the USF money will be used to expand telecom services, but not just in rural areas, though. This could be the reason behind the moderate increase in scores, both in fixed and mobile.

7. 7. Quality of Service

The scores remain to be low for the second consecutive time (Figure 26), without a clear explanation. Mobile and fixed wireline QoS are monitored by the regulator quarterly with the cooperation of the operators. Operators have to publish the QoS data in their web sites. Despite this the perception on QoS regulation is not positive.

Figure 26 : TRE Scores – Quality of Service



Source: Survey Results

[17] The budget value of this project varies across multiple sources

BRTI has ambitious plans to monitor broadband QoS, both fixed and mobile, which is yet to materialize. The industry and the users feel the broadband quality acceptable, at least far better than what it was few years back. Unavailability of wireless services in few 'blank spots' within the business areas of Jakarta[18] has been pointed out by users, but this does not seem to be a crucial issue for casual browsing, the mobile broadband users typically engage in.

[18] The most probable reason can be loss of Line of Sight (LoS) among high rise buildings.

8.0. Conclusion

The 2011 TRE scores have not improved discernibly from those of 2006 and 2008. Further, the same pattern continues, the low-scoring dimensions (e.g. USO) continuing to score low. The aggregates in both fixed and mobile sectors are slightly better than those of 2008, but only two dimensions contribute to this minor improvement. In broadband, the aggregate has dropped. All TRE scores except in two dimensions in mobile sector are sub- average.

This is hard to explain as the regulatory environment has shown drastic improvements since 2006. A more level playing field is created with the two incumbent companies no more enjoying their historical exclusive rights in certain telecom services. At least some issues related to scare resources have been successfully addressed. Current interconnection arrangements make industry complacent, though not everyone is happy with rates. Interconnection rates have gradually declined since 2006. Traffic regulations are minimal compared to what was in 2006. No concerns about anti competitive practices. Universal Service Obligation still is not for its intended purpose but at least there is a ray of hope with the new Institute for ICTs. Quality of Service, if not improved yet, certainly will soon. The process has begun. Though there is room for development of the regulatory environment, but the changes that have already taken place are significant.

There is only one explanation to the mismatch between the survey scores and the actual development. The industry expectation levels too have grown with time. The industry, telecom experts and even the public obviously anticipate more than what they did in 2006 and 2008. The regulator needs to understand this high level of expectation.

While not all present issues are easily and quickly addressable, the regulator should focus on few immediate priorities. This includes correcting few past mistakes even at a significant cost.

Agreeing for a workable solution to WiMAX issue is as imperative as allocation of spectrum to 4G LTE. Out of these two competing technologies only one will eventually survive. The market should decide the winner. Regulators' responsibility is to offer equal opportunities to both. As the only way to arrive at solution is through consensus, regulator should immediately start the dialogue with all relevant stakeholders. Further delay will certainly not make things better.

Telecom industry, particularly the mobile sector, needs a good exit mechanism as the high number of operators has contributed to market inefficiencies. Three players still control 90% of the market, with attempts by relatively small players to capture higher market shares have failed. The reasons are not clear, but a larger player is assumed to shower high efficiencies, as higher the volume, lower the incremental costs per each new user addition. This does not mean the elimination of relatively small players. More options like offering value added services (e.g. SMART Telecom intends to focus on content development, instead trying to increase their subscriber numbers), mergers, acquisitions and resource sharing are available. The industry itself should initiate most of these moves.

Fulfilling universal service obligations is important for two reasons. Continuous existence of unconnected regions can hamper the overall telecom growth. Equally importantly, the industry will lose faith as they see the money collected from them is not being used for telecom developments. Bridging the urban rural digital divide is a politically favorable move. Despite the sizable initial

investments, that guarantees a growth in telecom industry specifically followed by the other industries that depend on it and economy.

The time is also ripe for Indonesia to focus on applications beyond telecom seriously. It has already identified the two niches, e-money and social networking. Telecom regulator should work closely with financial regulator and other relevant authorities to create a user friendly, active and effective platform for the development of these applications. It may also require a closer dialog with the operators.

Finally, taking the observations of the three studies (2006, 2008 and 2011) as a whole, the regulator appears to have passed the difficult times, even though it wasn't directly indicated from the survey results. Fine tuning, not revamping, the regulatory environment is what the industry and the public anticipated. With the priorities have been identified the regular needs to have a clear strategy to make that a reality.

Annex 1: SPR Survey Methodology

The SPR assessment is a diagnostic instrument for assessing the performance of the laws affecting the telecom sector and the various government entities responsible for implementation. It is an important part of evaluating a country's ICT sector's performance.

The desired objective of telecom policy reform and regulation is improved sector performance, measured in four dimensions: connectivity, price, quality of service and choice. If the SPR scores are low (say, in comparing one dimension against another, in comparing scores for a particular year against another year, or in comparing scores for one country against the scores for another), it may be that the regulatory performance needs to be improved. However, the perception measure of the SPR needs to be assessed against actual sector performance indicators (of connections, price, quality and choice). In the case where sector performance indicators show performance that can be considered satisfactory but SPR scores are low, it may be possible that the problem is the communication of the regulatory actions. If the latter conclusion is reached, the appropriate action would be to improve the way the regulatory authority communicates its actions.

The SPR can also be used as a tool for investors to assess regulatory risk in a country, particularly by those considering investment opportunities in the telecom sectors of more than one country, with the SPR ranking of the countries indicating regulatory risk.

Investment and risk

Investment is necessary for improving sector performance and investment risk is the primary determinant in making investment decisions – the higher the risk, the higher the potential rate of return. At the point of investment, investors consider risks associated with three environments.

The macro-level or country risk comprises factors that may affect the entire economy, such as inflation and foreign exchange fluctuations, as well as overall political stability. Market or commercial risk is comprised of factors such as demand, the effect of substitutable products and services, and performance of competitors. Regulatory risk refers to risks emanating from government action, including, but not limited to, the actions of the actual sector-specific regulatory agency with authority over the industry in question.

Risk is partially a matter of objective analysis. An investor can calculate an expected rate of return on a new investment based on factors within his control and assumptions based on factors outside his control. However, risk is, to a great extent, also a matter of perception. Macro-level and regulatory risks are both difficult to measure objectively, but at a minimum, a subjective measure of both is necessary when making an investment.

The scope presented in this toolkit is the regulatory environment within which telecom operators and potential new entrants function; that is, a subset of the overall regulatory risk environment here described as the telecom regulatory environment, and which includes only telecom-specific aspects.

The SPR methodology presented here is a measure of perception that is affected by a number of different factors. For example, the context of the investment (new versus incremental) and nature of the telecom sub-sector (mobile versus fixed) will affect the perception of the SPR.

A Brief History

The original SPR instrument was designed to assess regulatory effects on investment (see Samarajiva & Dokeniya, 2005). It asked stakeholders to assess the telecom regulatory environment across five dimensions (market entry, allocation of scarce resources, interconnection, regulation of anti-competitive practices and universal service obligation) for the fixed and mobile sectors.

The dimensions were adapted from the Reference Paper of the Fourth Protocol of the General Agreement on Trade in Services. A dimension for Tariff Regulation was added. The Reference Paper also refers to the Independence of the Regulator, but this was left out of the dimensions selected because it is seen as a process variable different from the other outcome variables.

The initial SPR surveys (the pilots as well as the 2006 implementation across six countries in Asia) therefore had a total number of 12 items (six for each sector) to be ranked. Learning from the 2006 survey, and in keeping with the changing nature of the telecom sector, new dimensions and new sectors were added and incorporated in the 2008 survey, as discussed below.

The process

The SPR asks senior level stakeholders to assess the Telecom Regulatory Environment in a country across a number of dimensions (listed below).

It makes considerable effort to keep to a small number of questions because the ideal respondents are senior managers, including CEOs of operators. A lengthy questionnaire runs the risk of being ignored or passed to more junior staff to complete.

The respondents are asked to rate the quality of the regulatory environment for each dimension on a scale ranging from 1 (highly ineffective) to 5 (highly effective). So the respondent has to select a score (1, 2, 3, 4 or 5) and simply circle it (or click, in the case of a web-based survey). Posing questions in this format ensures that responses can be easily analysed without losing any qualitative information as often occurs when using open-ended questions.

The SPR survey is administered at the same time in multiple countries (nine in the 2008 survey, six in the 2006 cycle) by a team of researchers. The survey questionnaire is sent out with a cover letter stating that participation is voluntary and that respondent's confidentiality is guaranteed.

Each survey questionnaire is accompanied by a short narrative statement describing each of the dimensions, using language from the accompanying Reference Paper as much as possible. A brief summary of significant telecom policy and regulatory actions that were taken within the previous 12 months is also included.

Questionnaires are sent to large number respondents representing ¬agreed-upon sector categories. Follow-up emails and phone calls are made to ensure a high response rate.

While the SPR Scores are the most direct output of a SPR study, more meaningful analysis is done by analysing the SPR scores in light of actual sector performance indicators for a particular country.

The three sectors

From 2008 onwards, SPR surveys are designed to address three sectors – fixed, mobile and broadband (prior to 2008, only the mobile and fixed sectors were surveyed).

It has been argued that with increased fixed-mobile convergence, the separation between the fixed and mobile sectors is irrelevant. While this was apparent in the 2008 survey findings, regulation of fixed sectors still remains different to the regulation of the mobile sector in several countries. Therefore analyzing them separately may be quite important. Indeed, the convergence of fixed and mobile SPR scores will be one of the best pieces of evidence on actual (as opposed to wishful) fixed-mobile convergence. On the other hand, India has now converged regulation of the two sectors; so, for this country, the two sectors are treated as one and it may be appropriate to send out a joint "fixed + mobile" questionnaire instead of two separate questionnaires.

As previously mentioned, in addition to the fixed and mobile sectors, the broadband sector was added to the 2008 survey. In the developing world, broadband access is emerging as a new ground for policy making and private sector service provision. Unlike the developed world, broadband may not mean the traditional fat pipe is reaching homes. Instead, most access may come from mobile broadband. Therefore, the term broadband refers to multiple modes of accessing the higher speed internet – be it through mobile phones, other mobile devices, internet kiosks or home PCs. Given that the survey is predominantly conducted in emerging economies, we take the lowest (slowest) commonly accepted definition of Broadband, which defines it as "an 'always on' internet connection with a minimum download/upload speed of 256kbps" (OECD 2007).

As noted above, all three sectors may not be applicable to all countries. Furthermore, other minor definitional changes may also need to be made. These country-specific variations to the methodology should be discussed with LIRNEasia/RIA!/DIRSI or the relevant coordinator and agreed upon prior to conducting the survey.

The seven dimensions

For each of the three sectors mentioned above, the respondent will assess (i.e. provide a score on a scale of 1 – 5 for) each of the following seven dimensions:

1. Market entry
2. Allocation of scarce resources
3. Interconnection
4. Regulation of anti-competitive practices
5. Universal service obligation
6. Tariff regulation
7. Quality of Service

Of these, the first five dimensions are based on the Reference Paper of the Fourth Protocol of the General Agreement on Trade in Services and reflect the broadest international consensus of the most important aspects of telecom regulation.

Tariff Regulation was added following pilot studies and input from researchers.

Based on early 2008 discussions at LIRNEasia, it was agreed that Quality of Service (QoS) is increasingly important. While the traditional (incumbent-led) fixed sector always had basic QoS measurements, increasingly QoS for mobile is becoming important – for example, completing a financial transaction via the various m-payment methods is only feasible if the mobile signal does

not drop half-way through the transaction. Similarly, depending on the application being used, Broadband QoS becomes increasingly important (e.g. simply browsing can tolerate higher levels of latency that VoIP applications simply cannot). At the moment, objective measures for measuring Broadband and Mobile QoS are neither common nor standardised. However, meaningful perception measures about regulation relating to QoS can go a long way in putting QoS on the regulatory and policy agendas.

The Likert Scale

Using the Likert Scale, each of the seven dimensions is scored on a scale of 1 to 5, where 1 is Highly Ineffective and 5 is Highly Effective. The Likert Scale is a well-known psychometric response scale often used in questionnaires.

The raw data collected for the survey using the Likert Scale is ordinal data and, therefore, the distinction between neighboring points on the scale is not necessarily always the same. For instance, the difference in effectiveness expressed by giving a score of 4 rather than 3 might be much less than the difference in effectiveness expressed by giving a score of 5 rather than 4.

Since the data collected is summarised in the final SPR scores, it is possible to transform the 1 to 5 scale to a different scale like -2 to 2 which makes it easier to interpret. However, there is a possibility that a transformed scale portrays a different level of perception to the respondent. For example, giving a score of 3 in a 1 to 5 scale and giving a score of 0 in a -2 to 2 scale might not appear the same for some respondents. Therefore it is recommended that the 1 to 5 scale be kept constant in doing the SPR survey.

Clearly, the Likert Scale may be subject to distortion. Respondents may avoid extreme scores (central tendency bias); or may try to portray themselves or their organisation in a more favorable light (social desirability bias).

The Respondents: Categories, Weights, Minimum Numbers

- Categories

The different stakeholders that are involved in the SPR have been grouped into three categories according to their common interests.

- Category 1: Stakeholders directly affected by telecom sector regulation

E.g. Operators, Industry associations, Equipment suppliers, Investors

- Category 2: Stakeholders who analyse the sector with broader interest

E.g. Financial institutions, Equity Research Analysts, Credit Rating Agencies, Telecom consultants, Law firms

- Category 3: Stakeholders with an interest in improving the sector to help the public

E.g. Academics, Research organisations, Journalists, Telecom user groups, Civil society, Former members of regulatory and other government agencies, Donors, Current government employees from organizations related to the telecom sector excluding those in the telecom regulatory & policy hierarchy (i.e. excludes anyone from the regulatory agency, policy making body (often Ministry of Post and Telecom or similar), the Minister in charge of Telecommunications etc.)

Note that certain Financial Institutions (listed in category 2) may take an equity stake in an operator and, thereby, may also be an Investor (category 1). It could also be that within the same financial institution, respondents from one unit (say, the Equity Research division) falls into Category 2 (since they analyse the sector as a whole) while another unit (say, the Investment/Asset Management division that owns shares of the operator) falls into Category 1. In such instances the researcher must deal with the categorisation of respondents on a case-by-case basis.

- Weights

Contributions from each category are of identical importance to the final SPR scores. Therefore, if there are an equal number of respondents for each category, the SPR Assessment will reflect the views of the respondents of each category in an equal manner.

However, if response rates differ and the sample selection procedure does not produce an equal numbers of respondents from each category, then an overrepresentation of some categories and underrepresentation of others will result. This will cause problems in comparison.

Ideally, each category should make the same contribution to the final result. In order to achieve this balanced representation, overrepresented categories are given a weight of less than one and underrepresented categories are given a weight of greater than one, in such a way that all three categories equally contribute to the final score.

- Minimum number of respondents

Even though weighting deals with numerical imbalance, it is important to have a sufficient number of respondents for all three categories because the sample size determines the precision with which population values can be estimated; i.e. the larger the sample, the more precise the estimate. As a practical matter, sample size is often the dominant factor in determining the precision because very few respondents from a particular category will make the final SPR score highly sensitive to each respondent's input in that category.

Having taken the above factors in to account, as well as the practical constraints associated with the survey, it is necessary to have a minimum of 15 respondents from each category in any country (for a minimum of 45 total respondents). Only in micro-states (e.g. Bhutan, Maldives and countries with populations of under or around 1 million), a minimum of 5 respondents from each category is accepted (for a minimum of 15 total respondents).

Having a larger number of respondents per category also allows more sophisticated analysis without compromising the respondent's anonymity. For example, category 1 represents players who are already in the market. Certain regulatory regimes may unduly favor those who have already passed (by whatever means) the barrier to entry. For these respondents, overly cumbersome market entry procedures may indeed serve as a positive and keep new entrants out. However to analyse at the level of respondent categories, a larger data set is required.

Annex 2: Annex 2: Summary of Regulatory and Policy Events for Indonesia (Jan 2010 – Jan 2011)

January, 2010	Indonesia's 84,3% wireless penetration (204.8 mil subscribers) as claimed by Frost and Sullivan research was attributed more to SIM card churn than real expansion by Nonot Harsono, Committee Member, BRTI.
January 19, 2010	Indonesia telecommunication regulator decides that band 2.3 GHz and 3.3 GHz will be used for WIMAX service. Of the 73 telecom companies that participated in the bidding, eight winners were chosen for the 15 franchise zones. Each regional zone will have a maximum of two operators.
February 25, 2010	Minister of Communication and Information defends his plan to pass a draft of Ministerial Decree on Content (for ICT sectors). According to him this draft will protect people from technology-based pornography as well as part of character building. However, broadcasting and press stakeholders in this sector consider this as first step of state intervention against freedom of expression.
March, 2010	Two of Indonesia's smaller operators, Mobile-8 Telecom and Smart Telecom joined hands to work under a new brand name SmartFren to deliver mobile broadband services. Mobile-8 has 2.5 million subscribers while Smart Telecom has 3.5 millions. New investor to both of them is Sinar Mas Group who becomes major shareholders in respective entities. The total transaction of this synergy amounts to IDR 211 billion.
March 4, 2010	BRTI reviews its policy in implementing SKA (sender keeps all) in its interconnection for text/SMS. Major players support this view as they consider it suitable for competition. Minor players reject this idea as it gives them smaller portion when settling interconnection. ATSI (Indonesian Association for Cellular Operators) questions interconnection number used by BRTI as they are 4 years outdated. But it supports SKA approach.
March 15, 2010	Ministry of Finance released levy duty on the import of goods and telecommunications equipment manufacture materials for fiscal year 2010.
March 17, 2010	The government has backed away from a plan to allow foreign companies to invest in the domestic telecommunication-tower sector, despite warnings from Investment Coordinating Board that investment by local companies will not be sufficient.
March 19, 2010	Level 3 Communications in USA has announced that it would be providing connectivity for PT Telkom Indonesia International (TII). Specifically, It would provide high speed IP services through its Los Angeles gateway, plus wavelengths to backhaul it all from there to the landing station of the Asia America Gateway cable (AAG).
April, 2010	Ministry of Communication and Information was criticized when the past 6 months it hasn't assigned a Director General of Post and Telecommunication. This creates a vacuum position as DJPT is ex-officio Commissioner in BRTI that carries administrative weight. The previous had been mutated as Secretary General of the Ministry itself. The new

	one is instated in early April 2010.
April 20, 2010	BRTI plans to mediate settlement issue over airtime dispute between seven cellular operators and Indonesian Association for Internet Kiosks that involves IDR 54 billion for the period of 2005-2007. The Kiosks association considers themselves as victim of unfair treatment on airtime portion. Cellular operators involved i.e. Telkomsel, XL Axiata, Indosat, Smart, Axis, Mobile-8 and Sampoerna Telkom.
May, 2010	PT Indosat signed a contract with Sweden's Ericsson to upgrade and modernise its network to a new HSPA Evolution network capable of maximum speeds of 42Mbps – Asia's fastest mobile network.
May 26, 2010	South Korea's SK Telecom has entered Indonesia's mobile market via a digital content joint venture with Telkomsel-owned PT Telekomunikasi. The partnership, which is 51% owned by PT Telekomunikasi and 49% by SK Telecom, is for a data exchange hub for music, games and video clips in the Southeast Asian country. The initial combined investment will be around 12.5 billion KRW (USD 10.3 million), of which SK Telecom will invest USD 5 million.
June 28, 2010	Indonesia's fixed wireless telephony operator Bakrie Telecom has announced the official launch of its first mobile broadband services. Bakrie promises to offer 'a different Internet experience' through value added services, applications as well as compelling content and affordable rates.
July 14, 2010	A communications ministry spokesman has revealed Indonesia's plans to use a controversial anti-pornography law to restrict porn websites soon. The ministry had received many complaints, including from Indonesia's child protection commission and Islamic group Muhammadiyah, about pornographic content on the internet, he said.
August 3, 2010	The Indonesian government has repealed the licenses of four WiMAX auction winners. Rahajasa Media Internet, Internux, and a consortium of Comtronics Systems and Adiwarta Perdania have lost their licenses, awarded to them in 2009, for failure to live up to their commitments. The four other winners PT First Media, PT Telekomunikasi Indonesia, PT Indosat Mega Media and PT Jasnita Telkomindo have all began to develop their networks.
August 5, 2010	The government has denied any plans to block BlackBerry services in Indonesia following reports that such a step was being considered because of security concerns.
August 11, 2010	The Indonesian Ministry of Communications and Information Technology has announced the ban of pornographic sites in the country. The ministry has conducted a technical test of the banning program with the six largest internet service providers in Indonesia — Telkom, Telkomsel, Indosat, IM2, Bakrie Telecom, and XL Axiata. The ministry is optimistic that their ban will make 80% of pornographic sites inaccessible.
September, 2010	Mobile operator Telkomsel has selected Italian incumbent Telecom Italia through an international tender to implement its 2011-2015 Technology Plan. The five-year program involves upgrading Telkomsel's network

	infrastructure along with its service platforms, customer care and computer systems, as well as assessing the impact on investments and costs.
October 16, 2010	In an attempt to consolidate telecommunication and broadcasting sectors, the government has announced a draft for convergence law (Rancangan Undang Undang Konvergensi Telematika in Bahasa Indonesia) that serves as an umbrella regulation for both sectors as well as unify laws governing technology businesses, covering all aspects of 'telematics'. The draft defines telematics as the combination of technology and the value chain of the provision of telecommunication services, information technology, internet protocol based broadcasting, and content.
December 17, 2010	State Owned Company Minister declares that PT Telkom's plan to merge its CDMA unit with that of Bakrie Telecom should bring majority shares portion to the incumbent when such acquisition is made. This is in direct opposition to PT Telkom's Prime Commissary who considers this as consolidation move. PT Telkom'S CDMA has value of IDR 7 Trillion whilst PT Bakrie Telecom has less than IDR 3 Trillion.
December 30, 2010	Government has announced a reduction of interconnection rates starting from January 2011.
January 11, 2011	After months of tension between Ministry of ICT and RIM, the Canadian company has agreed to develop a solution to filter porn in Indonesia, in a bid to stave off a ban on BlackBerry services. RIM has provided its users with service center in Indonesia which has 3 million BlackBerry users. The subsequent move by communications ministry is pressing RIM to enable lawful interception of BlackBerry messages, through the establishment of a local server in Indonesia, in order to comply with local anti-pornography laws.
January 2011	Restructuring the ICT Ministry where DJPT is split into two Directorate Generals.
January 29, 2011	A study has suggested the country's five media regulatory bodies, including BRTI, may not be as independent as they should be, given their dependence on state funding, but the bodies have dismissed any notion they are biased.

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