

Review of Indonesian broadband development

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1 List of abbreviation

2G	Second generation
3G	Third generation
APBN	Anggaran Pendapatan dan Belanja Negara (Government budget)
APJII	Asosiasi Penyelenggara Jasa Internet Indonesia
ARPU	Average Revenue Per User
ASEAN	Association of South East Asian Nations
Bappenas	Badan Perencanaan Pembangunan Nasional (National Development Planning Agency) Government of Indonesia
BP3TI	Badan Layanan Umum Penyediaan dan Pengelola Pembangunan Telekomunikasi dan Informatika (An agency under the ministry of Communications and Information responsible for conducting USO)
bps	Bytes per second
BPS	Badan Pusat Statistik (Statistics Indonesia)
BUMD	Badan Usaha Milik Daerah (Regional government owned business unit)
Perda	Peraturan daerah (regional/local regulation)
BRTI	Badan Regulasi Telekomunikasi Indonesia (Indonesia's Telecommunication NRA)
BTS	Base transceiver station
CDMA	Code Division Multiple Access
CSO-N	Cincin Serat Optik Nasional
Detiknas	Dewan TIK Nasional/ National Board of ICT sector
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
GSM	Global System for Mobile Communications
HHI	Herfindahl–Hirschman Index
IBP	Indonesian Broadband Plan
ICT	Information and Communications Technology

IIDP	Indonesian Information Development Project
ITU	International Telecommunications Union
Kadin	Kamar dagang dan industri (Indonesia Chambers of Commerce)
KP3EI	Komite Percepatan dan Perluasan Pembangunan Ekonomi Indonesia 2011-2025 (Indonesian Committee on economic development acceleration 2011-2015)
LTE	Long Term Evolutions
MDG	Millennium Development Goals
Mastel	Masyarakat Telematika Indonesia (Indonesian Telematic Society)
MLBOA	Merrill Lynch – Bank of America
MP3EI	The Master Plan for Acceleration and Expansion of Indonesia's Economic Development
MPLIK	Mobil Program Pusat Layanan Internet Kecamatan
NIEs	Newly Industrialized Economies
NRA	National Regulatory Agency NRA
PLIK	Pusat Layanan Internet Kecamatan
Permen	Peraturan Menteri (Ministerial Decree)
PLIK	Program Pusat Layanan Internet Kecamatan
PP	Peraturan Pemerintah (Presidential Decree)
PPP	Public Private Partnership
Puskesmas	Pusat kesehatan masyarakat (community health center (puskesmas),)
RPJMN	Rencana Pembangunan Jangka Menengah Nasional (Middle-term National Development Planning)
RPJPN	Rencana Pembangunan Jangka Panjang Nasional (National Long Term Development Planning)
TVRI	Televisi Republik Indonesia
UKP-PPP/UKP4	Unit Kerja Presiden Bidang Pengawasan dan Pengendalian Pembangunan
USO	Universal Service Obligation
UUD 1945	Undang-Undang Dasar Negara Republik Indonesia 1945 (Indonesia's National Constitution 1945)
YLTI	Yayasan Litbang Telekomunikasi dan Informatika

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1. Executive Summary

With a population of about 237 million¹, Indonesia is a huge market attracting investments from both domestic and foreign telecommunications companies. This aspect is also supported by the fact that compared with other sectors within the economy; telecommunications is one of the most prominent sectors having a growth rate (12% as of 2012) far above the GDP growth.

The Government of Indonesia (cq. The Indonesia National Development Planning Agency/Bappenas) has introduced the Indonesian Broadband Plan (IBP) as an operational policy document to develop the broadband sector in the country with the ultimate goal of increasing the citizens' welfare. This goal is to be achieved through linking broadband with other sectors in the economy.

There are, however, many more questions than answers with this plan. Ultimately, the strength of IBP will influence whether other stakeholders (cross-sectoral coordination and between local and central governments) will follow the guidance. Bappenas is no longer having the power to ensure and monitor the implementation of this project. The document itself is seen as lacking the focus on addressing the ICT ecosystem which subsequently made its targets seems vague. In addition, given the importance of mobile broadband in Asia, IPB does not mention how mobiles can be used to close the digital divide in Indonesia.

The most important flagship of the IBP named the Palapa Ring is an initiative to foster the fiber connectivity between islands in Indonesia both in the western and particularly the eastern area where the broadband infrastructure is currently unavailable. As one of the most important flagships, the Palapa Ring can be seen as a stand-alone chapter with or without the IBP being implemented as a government regulation. Within the Palapa Ring framework, there has been a long commitment of the private sector (PT Telkom) to build the broadband infrastructures.

There are, however, possible problems concerning the synergy and coordination in the Palapa Ring projects. The reason is there might be a different way of measuring and evaluating the projects due to the different nature of private and public infrastructures. Telkom participate in the Palapa Ring project following their long vision on the Nusantara Superhighway. As a business entity, financial and accounting measurements might play as more dominant key performance indicators for Telkom than a more comprehensive socio-economic benefits applied in the typical public infrastructures development by the government. Last but not least, the implementation of the Palapa Ring might face some delays as the government is currently facing the credibility issue with regards to suspicious corruptions cases in some of its USO programs.

The IBP is a step forward in the direction for Indonesia to have a more concrete and detail guideline to develop the ICT sector and broadband in particular as the future engine of growth and general purpose technology (GPT).

2. Introduction

Broadband is now seen as an important enabler supporting socio economic development (Rohman & Bohlin, 2012). As a general purpose technology (GPT), the pervasive uses of broadband technology in a

¹ based on the 2010 national census

wide range of sectors create productivity gains transferred to the rest of the economy. However, with regard to the current development of broadband deployment, the gap between regions and countries, especially between the high-income countries and the lower income countries is still very apparent. The study published in *"Information and Communication Development 2009"* reports a substantial impact of broadband development in developing countries (the World Bank, 2009). The report shows that a 10 percent increase in the broadband penetration rate will boost the Gross Domestic Product (GDP) by 1.38 percent. Not only will broadband improve the level of productivity through remote monitoring, logistics management, and online procurement, it will also allow citizens accessing information to stimulate economic activity and ensure the implementation of good governance (Kelly et al., 2009). Thus, the broadband impact on developing countries is more critical and moves beyond merely the economic impacts. Nevertheless, without accelerating the supply and demand for the broadband access, developing countries, like Indonesia, will require a longer time to close the digital divide.

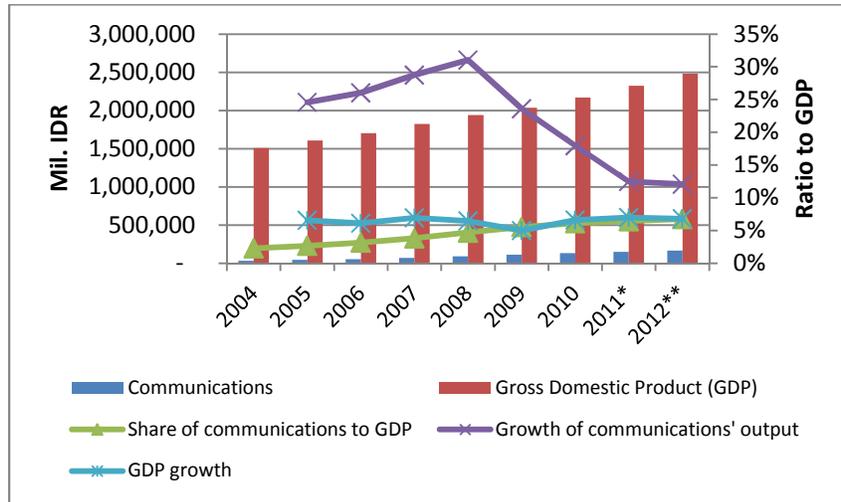
Based on several previous studies, Indonesia is often referred to as a country that failed to reap the benefits of the recent development of ICT sector even though diffusion of ICT devices has been growing. Wong (2002) found that the impact of ICT on the economy in Asia was more visible, particularly in the NIEs, namely Singapore, South Korea, Hong Kong and Malaysia. However, when investigating the South East Asian countries (and Australia), it shows that ICT did not contribute significantly on economic growth in Indonesia during the same period. Similarly, Shih and Chang (2009) conducted a study to identify the four blocks of international technology diffusion. The study classified countries based on the ability to transform ICT potential for increasing the economic development. Based on this classification, Indonesia falls yet again within a group of countries which only absorb technological knowledge without reciprocal exportation. These studies substantiate the need to investigate the broadband development in Indonesia and to understand the current problems and obstacles faced in developing the broadband sector.

This case study elaborates the over-all progress of broadband development in Indonesia, the evolution of the government planning concerning targets and scenario based on the Indonesian Broadband Plan (IBP). This paper also addresses the obstacles and challenges when implementing such policies. After a thorough background analysis on the telecommunications landscape in Indonesia, the structure of the paper is divided into two main parts: the first part presents the understanding on the rationale and purposes stated in the related broadband planning documents (mainly the Indonesian Broadband Plan, Palapa Ring, and related government regulations, etc) whereas the second part is the assessment of these policies and progress so far. The methodology of analysis is a qualitative method where semi-structured interviews with important stakeholders and document analysis were used as the source of justification (Appendix 1).

3. Indonesia telecommunications landscape

The telecommunications sector has contributed significantly to the Indonesian economy, especially in the last decade. In terms of the Added Value, the telecommunications sector is still relatively small compared with the total GDP but it has been growing very rapidly. The proportion of sectoral value added to GDP was less than 3% up to 2008 and peaked up at 5% in 2012. Nevertheless, the growth rate of the sector is and has been far above the GDP growth, indicating a better performance of the sector compared with the rest of the economy. Even though telecommunications sector has been

experiencing a declining growth rate in the last couple of years from around 30% in 2008 to around 12% in 2012, these rates are still outnumbering the growth of the economy which grows around 5-6% annually. The macroeconomic outlook of the sector can be seen in the following Figure 1.



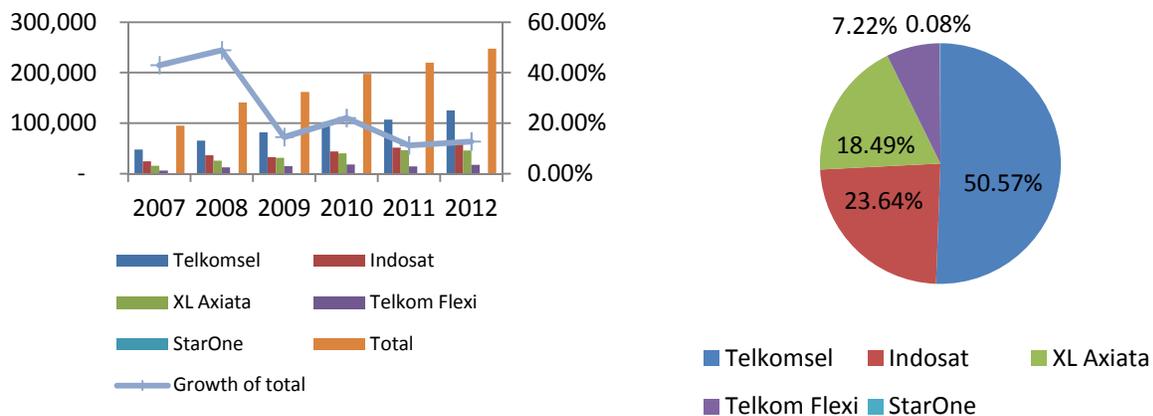
Source: BPS (Indonesia Statistics). Growth is calculated by author.

*, ** denote preliminary and very preliminary figures respectively.

Figure 1 Macroeconomic outlook of telecommunications sector

Atmadja (2006) and Wattagama, Soehardjo and Kapugama (2008) stated that the phenomenon in the telecommunications sector in Indonesia is mainly due to the growth of cellular telephony. Cellular telephony grew rapidly from 18.76 percent penetration rate in 2004 to nearly 63 percent by the middle of 2009 and reached a penetration rate of 91.72% by 2010 (equal to 220 million subscribers). In contrast, the fixed line penetration rate decreased from 3.97 percent in 2004 to 3.82 percent in 2009 and increased at a 6.5 % in 2010 as in rest of the world.

Merrill Lynch – Bank of America (MLBOA) released a quarterly outlook report on the telecommunications sector around the globe and reports the progress in Indonesia by 2012 in the following Figure 2.

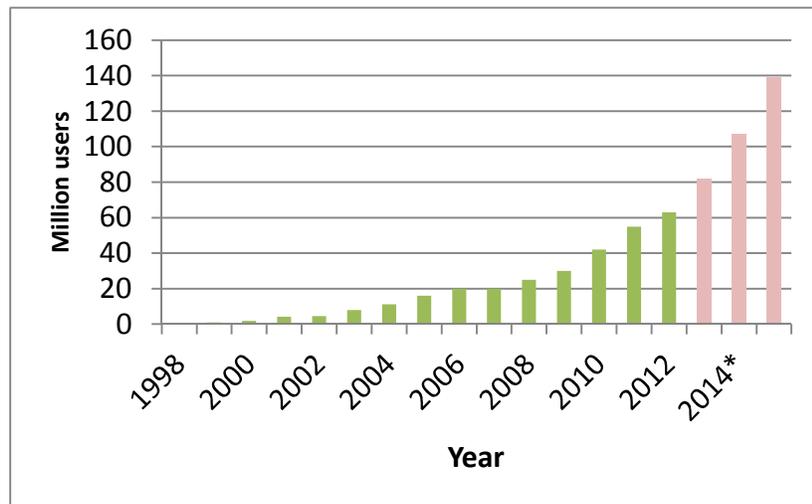


Source: MLBOA

Figure 2 Mobile subscriptions in Indonesia by operator (million subs.) and percentage in 2012

Figure 2 shows the trend of Indonesia's cellular market and the latest Figure in 2012. The Figure shows that the industry is experiencing a lower growth rate of mobile penetration since 2010. The second figure illustrates the dominance of the largest operators in 2012 in the industry; Telkomsel, Indosat and XL Axiata obtaining a more than 90% of market share (Concentration Ratio/CR3) which also indicates that the market is highly concentrated.

Based on the limited source of data for internet users, Indonesia's internet provider association (APJII) reported that the total number of internet users (for both fixed and mobile) is around 60 million by 2012. Moreover, it is predicted that the number will reach 139 million by the end of 2015². The data is presented in Figure 3.

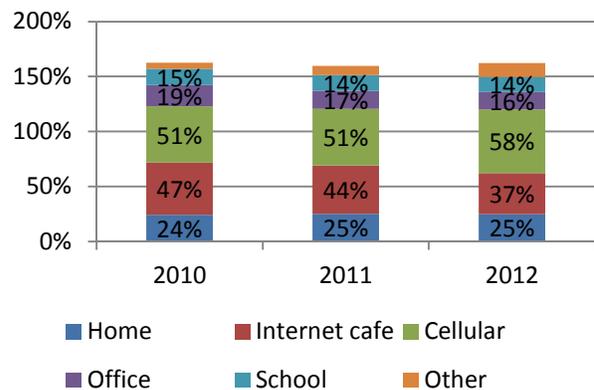
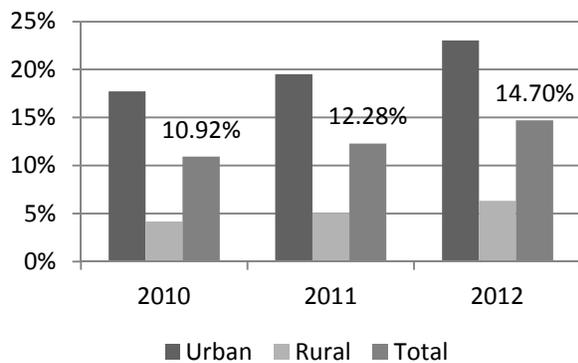


Source: APJII (* prediction)

Figure 3 Internet users in Indonesia

The Statistics of Indonesia (BPS) similarly releases the data on the proportion of population accessing the Internet in the last three months based on its annual survey as shown in Figure 4. The data is classified following the distinction between geographical areas (urban vs. rural) as well as the type of the Internet connections (home, cellular, office, school, etc).

² <http://www.apjii.or.id/v2/read/page/halaman-data/9/statistik.html> (Accessed January 2014)



Source: Statistics Indonesia (BPS)

Figure 4 The internet penetration rate in Indonesia³

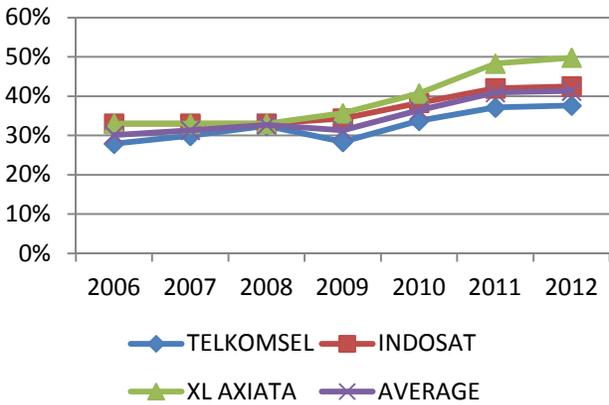
In the first panel on Figure 4, BPS reports that the total Internet penetration rate (urban +rural) is about 14.7% in 2012. From this number, a fraction of 58% is connected to the Internet via cellular. Thus, the number of cellular internet users can be predicted based on these data with the additional data on the number of population and the annual population growth rate.

- The total population in Indonesia was about 237 million based on the national census in 2010 whereas the annual population growth rate is about 1.49%. Thus, it can be predicted that the cellular internet users in Indonesia is around 13 million in 2010, 15 million in 2011 and 21 million in 2012 which equals to a penetration rate of 8.5% by 2012.⁴
- Replicating the same assumption, the fixed internet users is about half of mobile internet.
- APJII updated that the total internet users' by the end of 2013 is about 71.19 million, an increase by 28% from previous figure in 2012 (63 millions).

While the penetration rate of internet users is hypothetical, there is a growing importance of the Internet as revenue generators for mobile operators in Indonesia. Figure 5 depicts the growth of data revenue from the total service revenue of cellular operators in Indonesia.

³ The survey allows multiple answers hence the sum total is more than 100%. Respondents might be connected to the Internet through several modes.

⁴ A previous study by Rohman and Bohlin (2011) also reveals that the penetration rate of the mobile internet users in Indonesia was about 5.2 % by the end of 2009. The calculation was based on the survey conducted by Ericsson Consumer Lab in 2009, comprises 3470 respondents in the four main islands of Indonesia (Java, Sumatera, Kalimantan, and Sulawesi)

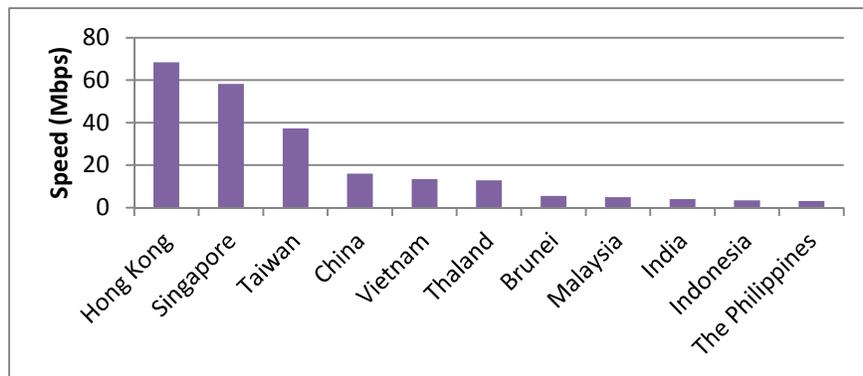


Source: MLBoA

Figure 5 Data revenue (TIDR) as a proportion of total revenue

Figure 5 shows a continual increase in the data revenue generated by mobile operators in Indonesia which equal to 40% of the total mobile service revenue amid the proportions fluctuate over the periods investigated. Comparing three largest operators, XL Axiata seems to grow faster than the other two operators reaching about 10 TIDR by 2012 only second after TELKOMSEL (20 TIDR). However, this achievement is not followed by the better quality of the services, especially measured by the speed and reliability experienced by the users.⁵

While the quality of broadband services, especially through cellular has been a major problem in Indonesia, the service offered by fixed broadband is also limited. The recent broadband quality based on the speed data obtained from Speedtest.net/Ookla ranks countries based on the actual broadband download speed achieved around the globe. The value is the rolling mean throughput in Mbps over the past 30 days where the mean distance between the client and the server is less than 300 miles. The observed data (25/12/2013) also shown that Indonesia is among the countries having a lower rank in ASEAN in terms of broadband speed achieved as shown in the following Figure 6⁶.



Source: Speedtest (calculated by author)

⁵ Based on various interviews with telecom operators, MASTEL and laymen users.

⁶ <http://www.netindex.com/download/allcountries/>. Accessed 25/12/2013

Figure 6 Broadband download speeds between countries in Asia (Mbps)

This finding strengthens the fact that the development of broadband should not only be concerned with the policies to increase the penetration rate (access) but also to ensure the quality of services available for citizens.

4. The documents analysis

This section is written solely based on what the planning documents have elaborated concerning the broadband development in Indonesia. These elaborations include the rationale, targets, aims and the timeframe to implement such plans. While development of good plans is vital (for developing countries), it is more essential to ensure that the gap between planning and implementation is minimized (WHO, 2011).

4.1. The Indonesian Broadband Plan (IBP)

The design of the Indonesian Broadband Plan (IBP) was a mandate given by Komite Percepatan dan Perluasan Pembangunan Ekonomi Indonesia 2011-2025 (the Indonesian Committee on economic development acceleration and expansion 2011-2015/KP3EI)⁷ under the *Connectivity working group*. IBP is prepared in order to boost the development of broadband infrastructure throughout Indonesia. The plan was officially stated during the connectivity working group meeting chaired by Badan Berencanaan Pembangunan Nasional (Bappenas)- National Development Planning Agency on July 31st 2012. The IBP is a collaborative planning document prepared by the government and the private sectors. There are six main stakeholders in the planning process:

1. The coordinating ministry of economic affairs who is responsible for coordinating and regulating the plan.
2. The National Development Planning Agency (Bappenas) who is responsible for the whole planning process and particularly the financing aspects.

⁷ KP3EI is an institution established by the President of the Republic of Indonesia on May 20, 2011. The main task of the committee is to coordinate the implementation of Master Plan for the Acceleration and Expansion of Indonesian Economic Development 2011-2025 (MP3EI). This institution was formed based on the Presidential Decree No. 4 of Article 32 Year 2011. KP3EI tasks are (1) to coordinate the planning and implementation of MP3EI; (2) to monitor and to evaluate of the implementation of MP3EI; and (3) to establish measurement and policies in the context of solving problems and obstacles in MP3EI implementation. The institution is chaired by the President himself.

There are nine working groups in the Committee:

1. Regulations working group;
2. **Connectivity working group;**
3. Human Resources and Science and Technology working group;
4. Working group on Sumatra Economic Corridor;
5. Working group on Java Economic Corridor;
6. Working group on Kalimantan Economic Corridor;
7. Working group Sulawesi Economic Corridor;
8. Working group on Bali and Nusa Tenggara Economic Corridor.
9. Working group on Papua and the Maluku Islands Economic Corridor.

3. The Ministry of Communication and Information who is responsible for the infrastructure development matters.
4. Masyarakat Telematika Indonesia (Mastel) and the Indonesia Chambers of Commerce (Kadin) who are responsible for the stimulation of demand side for broadband development.

The timeline of IBP preparation is shown in the following Table 1.

Table 1 The timeline of IBP preparation

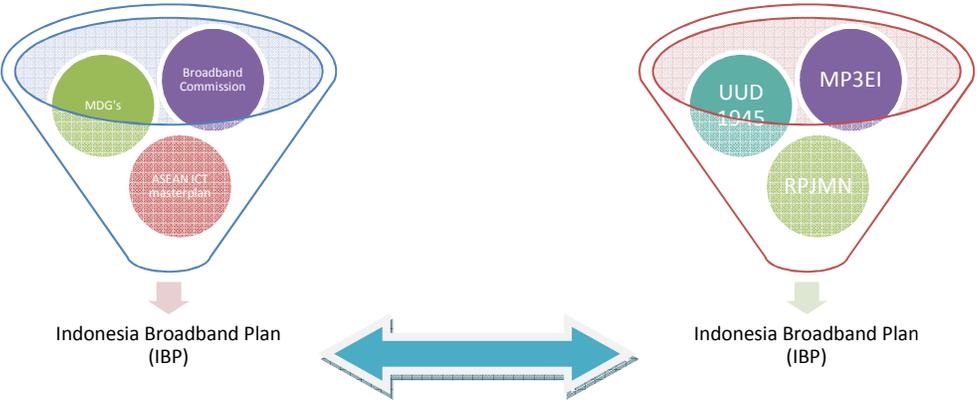
Date	Process
July 2012	The kick of meeting of IBP chaired by the vice Head of Bappenas as the lead actor for the Connectivity working team (KP3EI)
Aug-Dec 2012	Stakeholders meeting on the initial problems mapping and current state of the broadband development.
Jan-May 2013	The IBP drafting process.
Jun-July 2013	Public Consultation led by Bappenas (June 20 th 2013). Online public consultation through the Bappenas website (June 20-July 2013) where public/citizens are given the opportunities to share their ideas and comments on the plan.
Aug-Oct 2013	The discussion between IBP team with eight ministries related to the utilization of ICT: e-government, e-education, e-health, e-logistics and e-procurement.
Nov-Dec 2013	Finalization of the IBP document.
January 2014	Launching ⁸

The Indonesia Broadband Plan (IBP) aims to promote broadband as an engine for growth and to increase the quality of life of Indonesian citizens in the long term as the ultimate goal. The IBP is influenced by both internal and external factors. The plan is an integrated part of the national development plan stated in the National Middle term plan (RPJMN) and the master plan of development acceleration (MP3EI) as the operational tool of UUD 1945 (the Indonesia's National Constitution 1945). As stated in the Presidential Decree, PP No. 28/2008 about the National Industrial Policy, the ICT sector has been recognized as a future core industry in Indonesia. ICT is seen as a meta-infrastructure to achieve a sustainable economic growth, national competitiveness and to reach the knowledge-based economy. One of the measured targets is aimed at transforming Indonesia from a USD 700 billion economy in 2010 to that of USD 4.5 trillion in 2025. Such transformation will not be feasible without ICT and the broadband support.

From the external factors, the recent global shift of development planning at the international level also plays an important role necessitating the plan. It is believed that the more widespread adoption of the broadband and related technologies has generated a significant economic dividend. ITU (2010) considers broadband a catalyst for growth, stressing that the access is the next tipping point for generating jobs, driving growth and productivity. Broadband availability also underpins long-term economic competitiveness, as well as the most powerful tool to meet the MDGs targets. Subsequently,

⁸Bappenas failed to accomplish the plan to propose the Indonesian Broadband Plan (IBP) as a Government Regulation (Peraturan Pemerintah) (Koesmarihati, personal communication). On the good side, the government had appointed the new Detiknas (Dewan TIK Nasional/Board of National ICT) in 2013/2014 (Presidential decree 1/2014) giving a new hope for a better coordination between ministries, sectors and regional-local links.. The previous Detiknas appointed in 2006 has long been inactive.

the Broadband Commission then mandated countries to prepare a national broadband plan in each country by 2015 at the latest. Based on this background, the design of IBP can be seen in the following Figure 7.



Source: IBP document (Bappenas)

Figure 7 Design of Indonesia Broadband Plan (IBP)

4.1.1. Broadband definition

The IBP has clearly defined that broadband is an internet connection which provides an always on connection allowing the user to connect to more innovative services such as triple play. It mentions that the minimum speed should be at least **2 Mbps**. The IBP has set out the broadband targets based on the type of the broadband connection. The targets are also divided based geographical areas: urban and rural. The following Tables 2 and 3 elaborate these targets.

Table 1 The IBP’s target on speed based on type of broadband connection

Broadband	2014 target	2019 target
Households connected to the fixed broadband in urban area	38% at 3 Mbps	71% at 20 Mbps
Buildings connected to the fixed broadband in urban area	40% at 100 Mbps	100% at 1 Gbps
Penetration rate of fixed broadband in urban area	16%	30%
Penetration rate of mobile broadband in urban area	93% at 128 kbps	100% at 1 Mbps
Households connected to the fixed broadband in rural area	26% at 1 Mbps	10% at 20 Mbps

Penetration rate of fixed broadband in rural area	3%	6%
Penetration rate of mobile broadband in rural area	27% at 128 kbps	52% at 1 Mbps

Table 3 The IBP’s target on broadband connection on specific years (in percent)

Definitions	Urban area		Rural area	
	2014	2019	2014	2019
Access to housing	38	71	26	49
Access to building	40	100	20	80
Access to school	40	100	25	100
Access to hotel	55	100	50	100
Access to hospital	50	100	40	100
Access to community health center	30	100	30	100
Access to local government offices	75	100	65	100
Access to public spaces (airport, shopping center, etc)	50	100	60	100
Police office	55	100	55	100

Table 3 shows that the IBP aims at achieving 100% of connection on all public infrastructures by the end of 2019. These include school, hotel, hospital, community health center, government offices, and public spaces and police offices. These targets are set equal between urban and rural areas.

4.1.2. The flagships of IBP

To achieve these targets, there are several flagships to be implemented by central and local governments as well as all related stakeholders. The flagships are consisted of five aspects; infrastructure, funding, human capital, and two specific guidelines on the Universal Service Obligation (USO) fund.

- Infrastructure: developing the backbone network of fiber optic **Palapa Ring** throughout the nation particularly by linking the eastern part of Indonesia (Papua and Maluku).
- Funding: restructuring the USO fund for broadband. This aspect relates closely with two initiatives on USO:
 - Redefining the mandates and objectives of USO fund.

- Modifying the institutional framework of USO fund.
- Human capital: capacity building program to accelerate the adoption of broadband technology in organizational and individual level.

While all these areas are important, this report goes deeper on, firstly, discussing the Palapa Ring as part of infrastructure and, secondly, touching upon the funding aspect.

4.2. The Palapa Ring

Once upon a time, there was a history of the Kingdom of Majapahit, a large archipelagic empire centered in the Java Island during the periods from 1293 to around 1500. The empire reached its peak of glory during the era of King Hayam Wuruk from 1350 to 1389. The scintillating story was then marked by series of conquests extending the kingdom territory as large as the current size of the Southeast Asia region. The prime minister, Gajah Mada, was the main person made the successful of the conquests when he once swore in a so famously known as the **“Palapa Oath”**:

“If I am not able to unite Nusantara, I would never taste Palapa (fruits). Hence, I will subdue Gurun Island, Seram Island, Tanjungpura, Haru Island, Pahang Island, Bali, Dompoo, Sunda, Palembang and Tumasik (Singapore)” (1336 M)

This ancient oath has signified many attempts to unify Indonesia; an archipelago country geographically consisting of over 17,000 of islands. It has influenced the founding fathers of the country building some important milestones before and after the Independence Day on August 17th 1945. Among others, it was the Sumpah Pemoeda in 1928, a meeting between young leaders of Indonesia, agreed upon the conception of *“one motherland, one nation and one language”*. In relation to the information and communication, the spirit taken from this oath was denoted by the launching of the Palapa satellite as a modern mean to unify the Indonesian archipelago by way of telecommunications. The name was chosen by President Suharto in February 1975.

Thus, the Palapa Ring project as one of IBP flagship has a long history of the process of planning and implementation. Nonetheless, socio-economic and political aspects are believed to influence the trajectory of the agenda to be finally and officially launched in January 2005. The summary of the story is presented in Appendix 1.

The Palapa Ring is a project to deploy a fiber optic backhaul network connecting all cities in Indonesia thus allowing citizens to have the broadband access. Following this plan, there will be 497 cities to be connected. In addition, 51 cities located in non-commercial areas (mainly in the Eastern part of Indonesia) will be connected by the government themselves where BP3TI will be responsible to conduct the tender⁹. The infrastructure development in 446 remaining cities will be deployed by PT. Telkom through a multi-year project up to 2015. The scheme of the Palapa Ring is shown in the following Figure 8.

⁹ Last mile cable to connect to the end users will be developed by the operators.

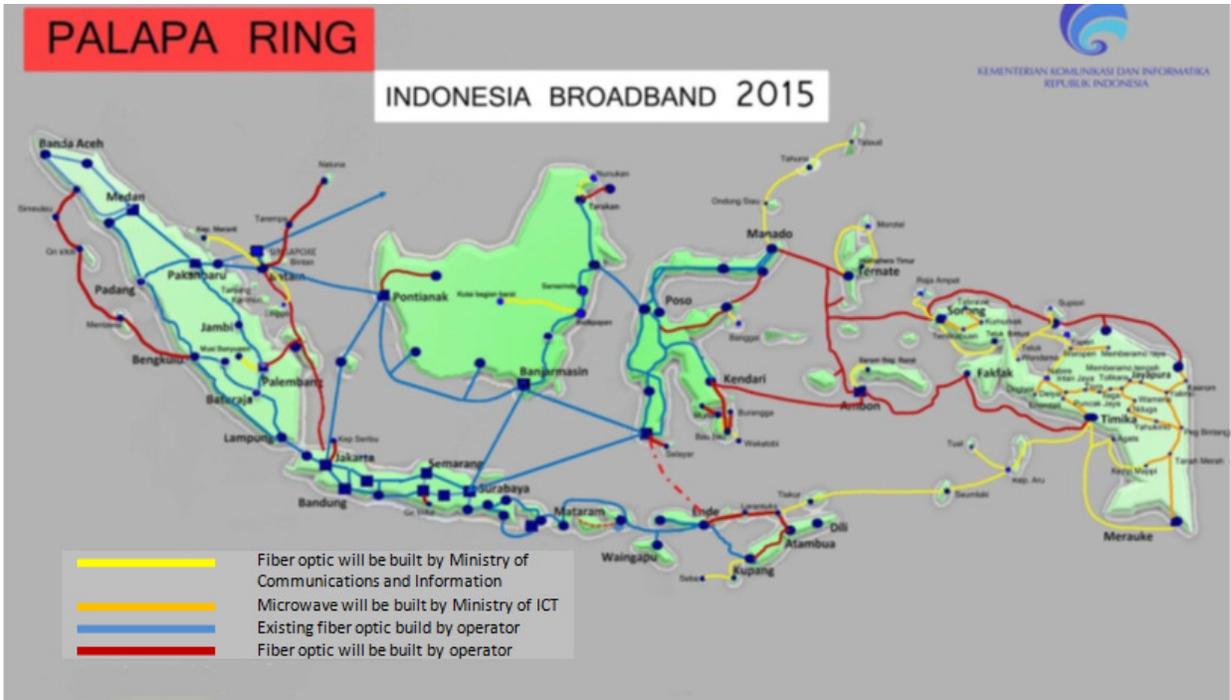


Figure 8 Palapa Ring Project

From Figure 8, it can be seen that there are two stages of connection plan following the scheme of Palapa Ring. The first stage has been deployed mainly in the western part of Indonesia where 90% are owned by private companies (Santosa, private communication, 2013). The second stage consists of the microwave connection that will be built by government (MCI), the fiber optic which will also be deployed by the government in the non commercial areas mostly in Papua and Maluku and the rest will be built by PT TELKOM. Figure 9 shows the current fiber connection in Indonesia.

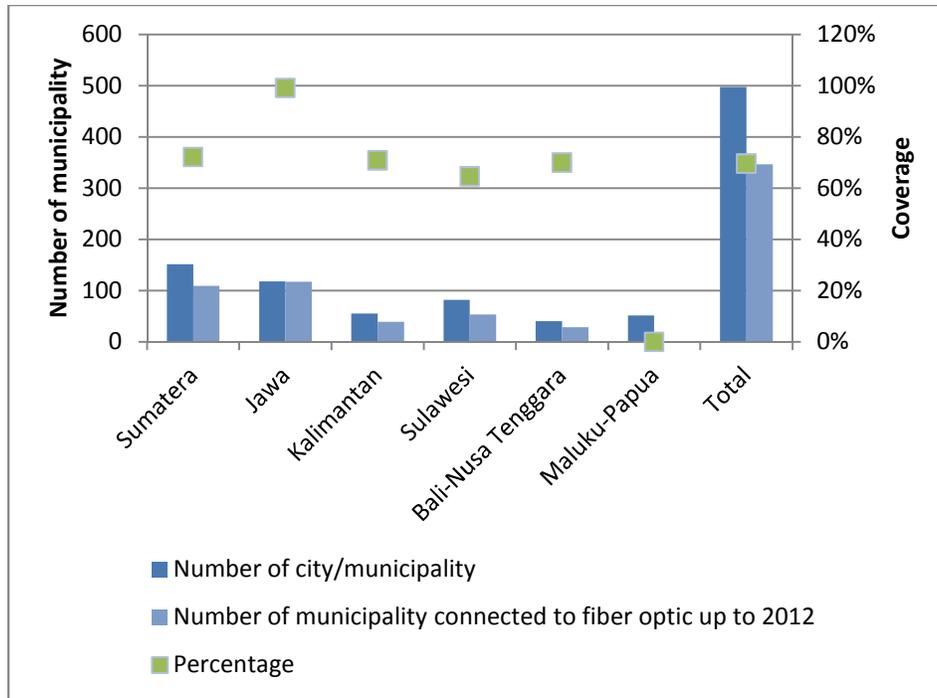


Figure 9 The existing fiber connection

The fiber connection, as shown in Figure 9, has generally been available in the western part of Indonesia namely Java and Sumatera covering 70% and 100% respectively. However, moving towards the eastern part, the fiber availability decreases where Maluku and Papua, particularly, are not connected at all by the fiber connection until 2012. Therefore, based on this recent progress, the future target of broadband connectivity is set out in the following Figure 10.

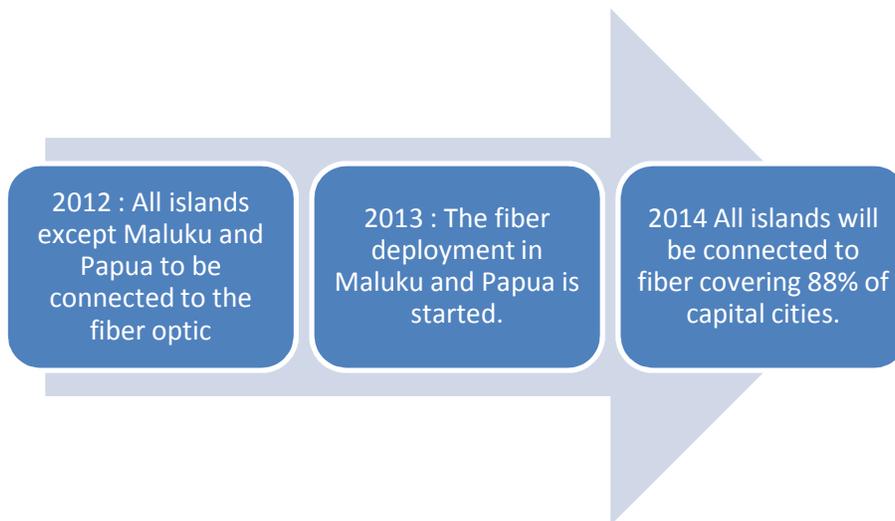


Figure 10 The target mandated in the medium development

From Figure 10, it can be inferred that the major problem of fixed broadband connectivity in Indonesia is the access availability in the eastern part of Indonesia, namely Maluku and Papua. The next plan of broadband development will, thus, mainly ensure the connection between these islands. In addition, more detailed targets of broadband connection are shown Figure 11.

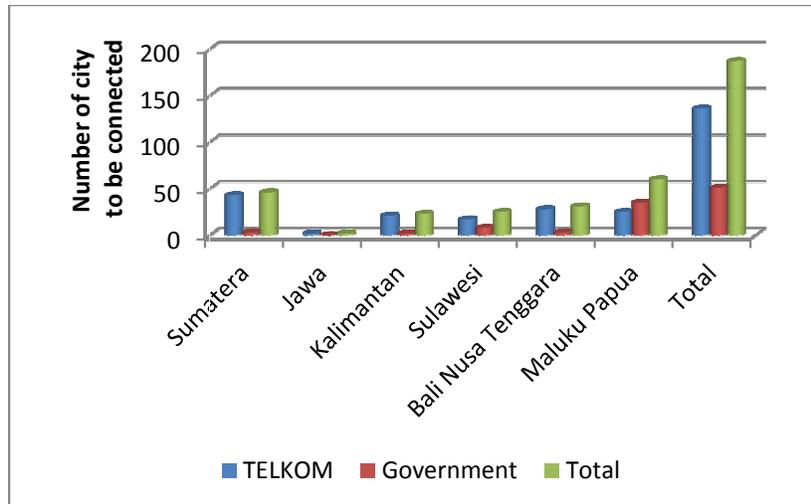


Figure 11 The plan of fiber optic deployment (number of cities and municipalities)

As shown in Figure 11, the deployment of the fiber through the unconnected areas will be taken by government and TELKOM as a state owned company. While the portion of TELKOM is quite dominant in other part of Indonesia, the deployment of fiber in Maluku and Papua will be mainly undertaken by the government.

The existing fiber rings that have been deployed in Indonesia are predominantly owned by the private companies as shown in Table 5.

Table 5 The existing fiber rings in Indonesia

Operators	Ring
Telkom Ring	Sumatera, Jawa, Kalimantan, Sulawesi, Bali , Nusa Tenggara, Maluku Papua
Indosat	Jakabare (Jawa, Kalimantan, Batam, Singapore) Jakasusi (Jawa, Kalimantan, Sulawesi) Jasuraus (Jawa, Surabaya, Australia)
XL	Jawa, Sumatera, Batam, Bangka Belitung, NTB, Sulawesi, Kalimantan
Comnet Plus	Jawa – Bali – NTB, Sumatera, Sulawesi
Moratel	Jawa Sumatera Bali
PGASCom	Batam, Jambi, Prabumulih, Bandar Lampung, Kalianda, Anyer, Cilegon, Jakarta

Source: Rauf (2012)¹⁰

¹⁰http://academy.itu.int/moodle/pluginfile.php/63398/mod_resource/content/2/Presentasi%20Indonesia%20for%20Training%20ITU%20in%20Bangkok.%20Final.pdf

4.3. The financing aspects of IBP

The future broadband development is designed as activities linking the government and private sectors. There are four basic principles stated as the guidelines for the IBP financing:

- Investment will be mainly financed from the non-tax revenue generated from ICT sectors namely the USO fund and the sharing fund from the frequency fees.¹¹
- Government intervention should avoid market failure and hence the broadband infrastructure development should be provided by the government and the private sectors through a Public Private Partnership (PPP).
 - With the exception in the non-commercial area, the deployment of the broadband infrastructure will be tendered by the government where the winner will be the one needing the least subsidy from the government.
 - In this regards, PT TELKOM has expressed their plan to cover all provincial capital and cities except 51 municipalities that will be handled by the Ministry of Communication and Information (c.q. BP3TI) through the USO fund.

To substantiate this principle and based on Act No 36 year 1999 on Telecommunications, the main activities on broadband financing will be borne by telecommunication private companies reducing the role of government as the agent of development. Bappenas stated that the government will spend the budget to deploy the fiber optic network using the Universal Service Obligation (USO) fund in non commercial areas in 51 municipalities and cities in Indonesia whereas the rest of the areas will be covered by PT TELKOM. The projection of USO fund is explained in Table 6.

Table 6 The USO fund projection

Fiscal year	Initial fund (BIDR)	Revenue realization	Expenditure	Final balance (BIDR)	in MUSD ¹²
2006	547.7	0.1		547.8	60
2007	547.8	543.2	11.3	1,079.7	118
2008	1,079.7	501.2	10.3	1,570.6	162
2009	1,570.5	1,067.8	124.5	2,513.8	242
2010	2,513.8	1,530.5	960.0	3,084.3	339
2011	3,084.4	1,707.4	1,081.0	3,710.8	423
2012	3,710.8	1,742.6	1,196.0	4,257.4	454

¹¹ The largest contribution of the IBP's financing will be generated from USO fund calculated as 1.25% of operators' gross revenue. Bappenas and the government body have also allocated spectrum fee (Biaya Hak Penggunaan) around 10% from 11 TIDR for the USO fund (Koesmarihati, private communication and emails, 25 November 2013).

¹²The annual exchange rate is based on the data provided by the World Bank. <http://data.worldbank.org/indicator/PA.NUS.FCRF> (Accessed, April 18th 2014)

2013	4,257.0	1,947.0	1,216.0	4,988.0	531
2014*	4,987.6	2,291.2	1,802.0	5,476.8	583
2015*	5,476.7	1,642.1	1,642.1	5,476.7	583

5. Assessment of broadband development

This section describes Broadband development in Indonesia and compares it with what has been stated in the IBP.

5.1. Indonesian Broadband Plan (IBP)

The IBP document is prepared as an umbrella for the broadband development plan in Indonesia. While the existence of the plan is important¹³, there are several aspects worth addressing.

5.1.1. How strong is the document?

The IBP document is mainly prepared by Bappenas. Even though IBP has brought substantial policies to achieve the future of knowledge society, the institution no longer has power to control and monitor the implementation of such policies at the project level. At the level of project, other government institutions, ministries and other related stakeholders are more responsible. Thus, a continuous coordination between Bappenas and ministry of ICT is needed. Currently, the implementation of IBP will be monitored by Detiknas (Dewan TIK Nasional/ National Board of ICT sector) under Bappenas.¹⁴

5.1.2. What ecosystem?

The document explains the ultimate goal of the broadband development is to achieve citizens' welfare. In doing so, that broadband should contribute to other industries within the economy. Several parts of the IBP document stated the terminology of ICT and broadband **ecosystem** but the individual elements of the ecosystem have not been clearly stated. For instance it is stated that:

The development of national broadband should be oriented towards achieving an ecosystem covering all aspects of both the infrastructure provision, usage and adoption, as well as the development of human resources in a comprehensive and integrated use of resources, the spectrum, rights of entry (right of way), and funding efficiently.

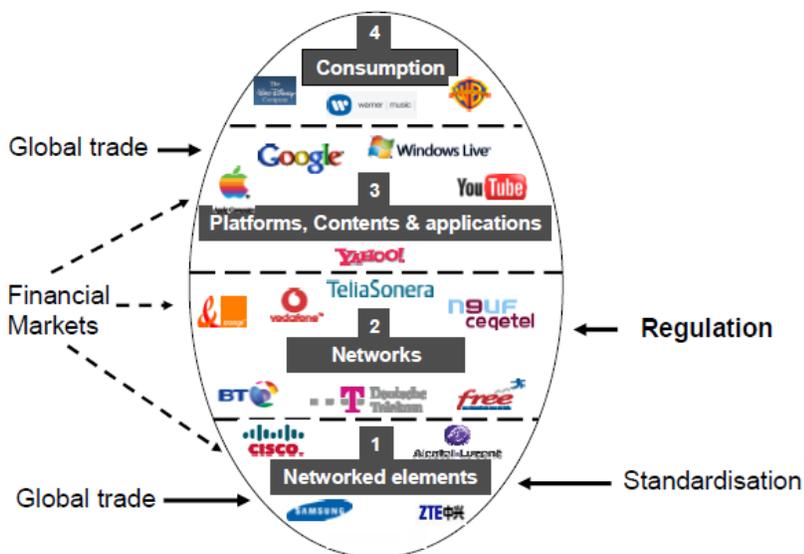
On the other part of the document, it is also explained that:

¹³ The discussion on the broadband development plan has been for the first time mentioned in the national midterm planning (RPJMN) in 2005-2010. There were about several paragraphs in the planning document discussing about how broadband will be developed and what targets to achieve (e.g. 15% of large cities in Indonesia will have the broadband access at least by 2010). Upon preparing the draft, Bappenas has asked Mastel to fill up these targets. However, there were little justification on how these targets were stated on RPJMN and what strategies were prepared (Santosa, personal communication).

¹⁴ Based on various stakeholder interviews

By strengthening the ICT industry ecosystem supported by the broadband connectivity, the country might expect to meet the additional 4.5 million employments from the civil service, 50 million students, three million teachers/lectures and 60 million households with the Internet users.

According to Fransman (2007) an ecosystem refers to a number of organisms that interact within an environment. Hence, using the ecosystem metaphor for ICT economy, four groups of interacting ICT players can be identified as : element providers (who supply elements such as PCs and their operating systems, servers, routers, network equipment and phones); network operators (who construct and operate telecoms, cable and satellite networks); content and applications providers; and consumers. These players interact within an environment that is shaped by institutions (including financial institutions, regulators, competition authorities, standardization bodies and universities). These interactions determine the rules of the game and influence the players' activities. The ICT ecosystem can be mapped in the following Figure 12:



Source: Fransman (2007)

Figure 12 ICT Ecosystem

Based on Figure 12 it seems that the IBP does not describe how the ICT ecosystem will be improved. The Ministry of Trade and Ministry of Industry, for instance, are not part of direct stakeholders when the document was in the making. Hence, there is a tendency of a lack of discussion concerning this industry ecosystem. There is also no explanation on how the local ICT industries will be engaged within the framework of IBP.

5.1.3. Mobile broadband technology

While the future targets of broadband development are well presented distinguishing between urban and rural areas as well as different types of premises and public facilities; fixed broadband has been mainly focused upon in the proposed policies and strategies. The IBP document has a target on the progress of mobile broadband but a very little detail has been given on how this will be achieved. It

contradicts with the recent state of broadband development and the fact that mobile broadband is more popular in developing countries. In the context of Indonesia's case where fixed broadband penetration is relatively low, a terrestrial wireless broadband becomes an optimal solution in many areas. It is especially when looking at the distribution of population which is very scattered in the eastern part of the country. Taking this aspect into context, the short term and long term goal of IBP should also resemble the transition between mobile and fixed broadband. To connect the municipalities within the Papua Island and between municipalities in the island, the fiber to the premises (FTTx) is seen as a less feasible technology since there are about 20 cities in the inner island with a population of 2.9 million. Consequently, there are only 100,000 inhabitants in each municipality separated by a 200-500 km distance in between. Therefore, the market is too small to be served with fiber¹⁵.

Several Public consultations have been held on IBP with a similar conclusion on suggesting the importance of the technology neutrality on broadband. From mobile operators' point of view, it is important to optimize the digital dividend of 700 MHz which can be used for further developing the wireless with LTE. Qualcomm, for instance, also sees the importance of technology neutrality to be explicitly elaborated in the IBP document. Thus, for an archipelago country, like Indonesia, a combination of technology is an important prerequisite. Mobile broadband also has some potential to deliver broadband at a relatively high speed shown in the following Figure 13.

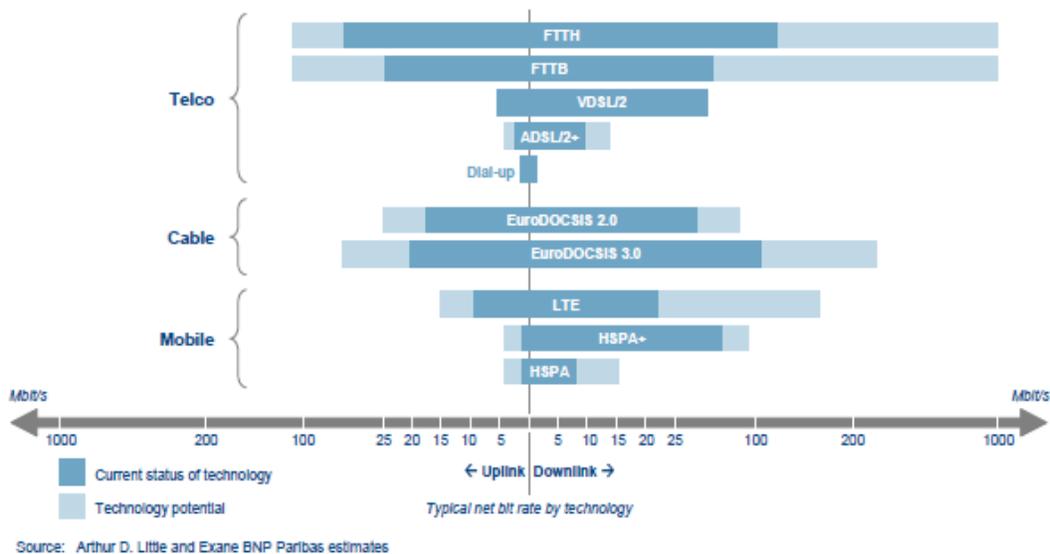


Figure 13 Various type of broadband technology

The current quality of the broadband access in Indonesia is still very low (Figure 6) but from Figure 13, it can be seen that the future mobile technology (together with fixed broadband) is capable of delivering the broadband service up to 80 Mbps. Therefore, the IBP should also look into this possibility, hence, to engage more closely with the mobile broadband operators.

5.2. The Palapa Ring project

The Palapa Ring project is the main fiber network development project in Indonesia. However, right after the launch of the consortium, the preparation of the project did not go very well. The project finally left PT Telkom as the only private stakeholder with the timeline presented in Table 7.

¹⁵ Indosat has expressed their interest to acquire the 850 MHz frequency owned by Starone (CDMA) to be used for strengthening the wireless internet services.

Table 7 The Palapa Ring consortium timeline

Time	Development
January 2005	The idea of <i>Palapa Ring</i> was introduced.
July 2007	The first consortium of Palapa Ring was formed consisting of several committed members: PT Telkom, Bakrie Telekom, Excelcomindo Pratama (XL), Infokom Elektrindo, Indosat, and Powertek Utama Internusa. This consortium agreed on the initial value of the project as much as USD 225 million. The main activity of the project was to deploy 35.280 km of <i>submarine cable</i> and 21.708 km of <i>inland cables</i> with the main objective of connecting the eastern islands in Indonesia. Since Telkom planned to contribute no less than 40% of the project, they will be entitled the greatest capacity, 4 λ (equivalent to 40 Gbps) from the total capacity at 8,44 λ. ¹⁶
July 2008 and October 2008	A member of the consortium, Elektrindo decided to withdraw its participation in July 2008. The second member Powertek Utama Internusa was leaving the consortium on October 2008. ^{17,18} The withdrawals were mainly due to the failures to provide minimum contributions as agreed.
Early 2009	With these resignations, the value of the project has gone further down from USD 225 million (IDR 2,7 trillion) to USD 180 million (IDR 2, 1 trillion). Additionally, the global financial crisis has also lowered the value of the project to USD 150 million (IDR 1,7 trillion) mainly due to the currency depreciation.
May 2009	XL withdrawn from the consortium citing financial reason ^{19,20} . The value of the project again shrank by USD 30 million to USD 120 million. Before quitting the consortium, XL agreed to pledge the project with a USD 30 million. The global financial crisis has affected the ability of the company to participate in the project (Yusuf Iskandar, DG Postel told to the media).
November 30 2009	Despite being somewhat deviated from the plan before in terms of the number of companies committed to the project, President Yudhoyono symbolically launched the Palapa Ring project having an interactive teleconference with local citizens in West Nusa Tenggara (NTB) and West Kalimantan.
December 2009	The first phase of Palapa Ring project was developed. It was planned that PT Telkom, PT Indosat, dan PT Bakrie Telecom, the remaining three members of consortium, will conduct the

¹⁶ <http://www.telkom.co.id/proyek-palapa-ring-percepat-pertumbuhan-ekonomi-kawasan-indonesia-timur.html>
(Accessed, April 13th 2014)

¹⁷ <http://www.tempo.co/read/news/2008/08/11/056130425/Konsorsium-Palapa-Ring-Desak-Powertek>

¹⁸ <http://inet.detik.com/read/2008/10/28/093812/1026991/328/konsorsium-lega-powertek-mundur-dari-palapa-ring>

¹⁹ <http://idang2008.blogspot.com.es/2009/05/xl-mundur-dari-palapa-ring.html>

²⁰ http://us.teknologi.news.viva.co.id/news/read/60604-xl_keluar__telkom_tinjau_ulang

	<p>project. Later, Telkom decided to invest the project using their internal fund.</p> <p>For the first phase of the project, they did the tender and assigned Huawei Marine to deploy the infrastructure to connect Mataram dan Kupang. The project's value was USD 50 million with 1.041 km length. Telkom will also seek the possibility to work with Alcatel-Lucent for future work projects.²¹ The project with Alcatel Lucent is for Maluku Cable System whereas another project is with NEC (Papua Cable System)²².</p>
September-October 2013	<p>This was a period where the second phase of Palapa Ring was to be auctioned. This phase will consist of several fiber constructions in 66 non-commercial areas. The project is financed through USO fund from 2009-2012 as much as 2.9 TIDR. However, there were many delays to implement the tender.²³</p>
2014	<p>The second stage of Palapa Ring tender has been delayed until the end of 2014 or early 2015.</p>

Source: Based on various interviews with stakeholders

5.2.1. Dichotomy

As was discussed earlier, there are two types of Palapa Ring projects under the umbrella of IBP; (1) the one prepared by the government in non commercial areas mainly in the eastern part of Indonesia and (2) the other one developed by PT Telkom. In practice, there is a similarity that even though the rings are developed by the government (BP3TI) and Telkom, at the end (foreign) private sectors will build these infrastructure projects through a tender process. Thus, the distribution of works between the government and private sectors does not seem to be a real investment sharing (Hutabarat, personal communication). Indosat who never officially quit the consortium of Palapa Ring project, for instance, expressed their interest to participate in the tender process on the projects to be conducted by BP3TI.²⁴ The infrastructure development also left a smaller engagement from the local vendors.

5.2.2. Synergy²⁵

The potential problem also concerns with the different nature of private and public infrastructure development. While Telkom is the most important player in the Palapa Ring, they have their own "interpretation" based on the company's long term vision which they called "**Nusantara Super Highway**". The platform is a continuation of Telkom's vision of "Archipelago 21" which has been initiated in 2001 in which the vision was supported by satellite -based technology. Since then the Nusantara super highway is being implemented through the deployment of fiber in six rings in line with the guideline of the "*Six Economic Corridors*" by the Government Republic of Indonesia. The rings are:

²¹ <http://www.alcatel-lucent.com/press/2013/002875>

²² The reason for appointing the foreign companies is Telkom could get Supplier Credit from them

²³ From this amount 900 BIDR has been disbursed for the development of rural internet center (Pusat Layanan Internet Kecamatan/PLIK).

²⁴ <http://www.ift.co.id/posts/tender-palapa-ring-tahap-ii-dibuka-desember>

²⁵ <http://www.telkom.co.id/telkom-merealisasikan-nusantara-super-highway.html>

1. *Sumatra Ring* with the length 9,981 km, stretching from the city of Banda Aceh to Bandar Lampung;
2. *Java Ring* with the length 11,524 km, stretching from Merak to Banyuwangi;
3. *Borneo Ring* along 6,664 km, stretching from Pontianak to Tarakan;
4. *Sulawesi and North Maluku Ring* along 7,233 km, stretching from the city of Makassar, Manado, Ternate to Sanana.
5. *Ring Bali and Nusa Tenggara Ring* along 3,444 km, stretching from the city of Denpasar, Mataram , Kupang to Atambua .
6. *Maluku Islands and Papua Ring* along 8,254 km, stretching from the city of Ambon, Fak - Fak, Sorong, Jayapura, Manokwarin and Merauke.

Part of these projects have been completed in 2010 covering the Aceh Ring, JaKa2LaDeMa ring (Java - Kalimantan - Sulawesi - Denpasar - Mataram), and MKCS ring (Mataram - Kupang Cable System). All of these projects were funded by the development fund of Telkom itself. The estimated budget for the whole corridors is presented in the following Table 8. This budget is prepared to develop what Telkom mentioned as the *true broadband development access* 2011-2015 allowing the user to access a 20 Mbps to 100 Mbps broadband speed.

Table 8 Estimated budget for the Nusantara Highway of PT Telkom²⁶

Corridor	2014	2015
I	563	392
II	2,011	1,441
III	167	120
IV	119	85
V	112	80
VI	27	30
Total (BIDR)	3,000	2,150
M USD	319,625	229,065

Source: PT Telkom

It can be inferred that while any endeavors made by the private sectors should be fully supported by the government, it might also create some overlaps with the project mandated by the IBP and Palapa Ring as the tool of operationalization. For instance, the targets set out by Telkom in terms of quality of service are much higher than the one set by the IBP. The Government of Republic Indonesia through Unit Kerja Presiden Bidang Pengawasan dan Pengendalian Pembangunan (UKP-PPP/UKP4 -Presidential Work Unit for Development Monitoring and Control) chaired by Mr. Kuntoro Mangkusubroto is

²⁶ <http://www.mastel.or.id/files/Nusantara%20Super%20Highway%20Mastel%20Seminar%2029-11-2011.pdf>

monitoring the participation and the commitment of Telkom towards the Palapa Ring project (Koesmarihati, personal communication).

Thus, the impact assessment of these two different Palapa Ring projects might also be problematic. The government spending on USO would aim at increasing the connectivity where the “social benefit” –not necessarily financial and accounting profit--is the main key performance indicator. This is a normal measurement applied in any public policies. But for the other part of the Palapa Ring projects which are conducted by Telkom, the key performance indicator might be solely calculated from the financial aspect and profit and loss calculation instead of the whole socio-economic benefits. We portray this possible overlap shown in the following Figure 14.

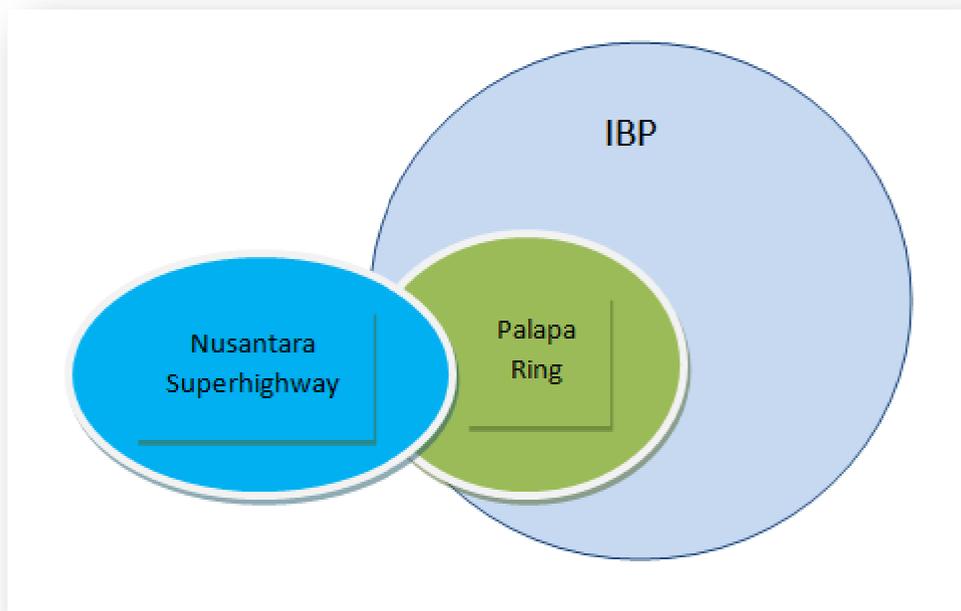


Figure 14 Possible overlap between Palapa Ring and the Nusantara Superhighway by Telkom

5.2.3. Transparency²⁷

The second phase of the Palapa Ring project will be mainly provided by the government through BP3TI (MCI). However BP3TI itself is currently under scrutiny following some suspicion on corruption concerning the procurement of the internet service center/internet car. The projects called MPLIK and PLIK (Internet Service Center provided at the Subdistrict level) are the USO programs of the Ministry of Communications and Information managed by BP3TI. The programs aimed at increasing the Internet penetration in the rural areas. The subsequent impact is the delay on the second phase of the Palapa Ring tender. As these cases are currently being investigated by the court, the ministry of ICT also

²⁷ <http://news.detik.com/read/2013/07/19/192341/2308457/10/kasus-dugaan-korupsi-internet-kecamatan-kejaksaa-geledah-kemenkominfo-dan-bp3ti>

decided to reassess the program. The ministry invited the local governments to be more actively engaged in the monitoring and evaluation of such USO programs.²⁸

5.3. Palapa Ring and IBP

Summarizing points (5.1) to 5.2) we can infer some potential problems on the implementation of IBP.

1. Problem 1: Existing and new deployment

The Palapa Ring projects is not an integrated national broadband network as in other countries (e.g. Australia) but an accumulation of number of private and government infrastructure development projects. The IBP through Palapa Ring aims at increasing the national welfare as the ultimate goal, but the synchronization between the existing projects and new projects may face problems.

2. Problem 2: Different market structure

Using the framework of ICT ecosystem; there are certainly two market structures in the third layer of network infrastructure. In some part of the country where the deployment of broadband infrastructure have been made long before IBP was initiated, there were several owners of the fiber. However, following the Palapa Ring projects, Telkom might have complete control over the new infrastructure development.

3. Problem 3: BP3EI

The whole Palapa Ring project from the government will be provided by Ministry of ICT through BP3TI using the USO fund. The institution is relatively new since it was formed in 2009²⁹. Having had some recent issues concerning the transparency of the project implementation, the ministry needs to do some efforts to rectify the credibility of BP3TI.

4. Problem 4: Implementation

The implementation of the project is conducted by the private sector. However the engagement of the project with the local vendor should have been stronger.

²⁸

http://kominfo.go.id/index.php/content/detail/3716/Kemkominfo+Evaluasi+PLIK+dan+MPLIK+/0/berita_satker#.U1N1kfmSzTU

²⁹ http://kominfonewscenter.com/index.php?option=com_content&view=article&id=2992:bp3ti-selenggarakan-journalist-award-2013&catid=44:nasional-kesra&Itemid=53

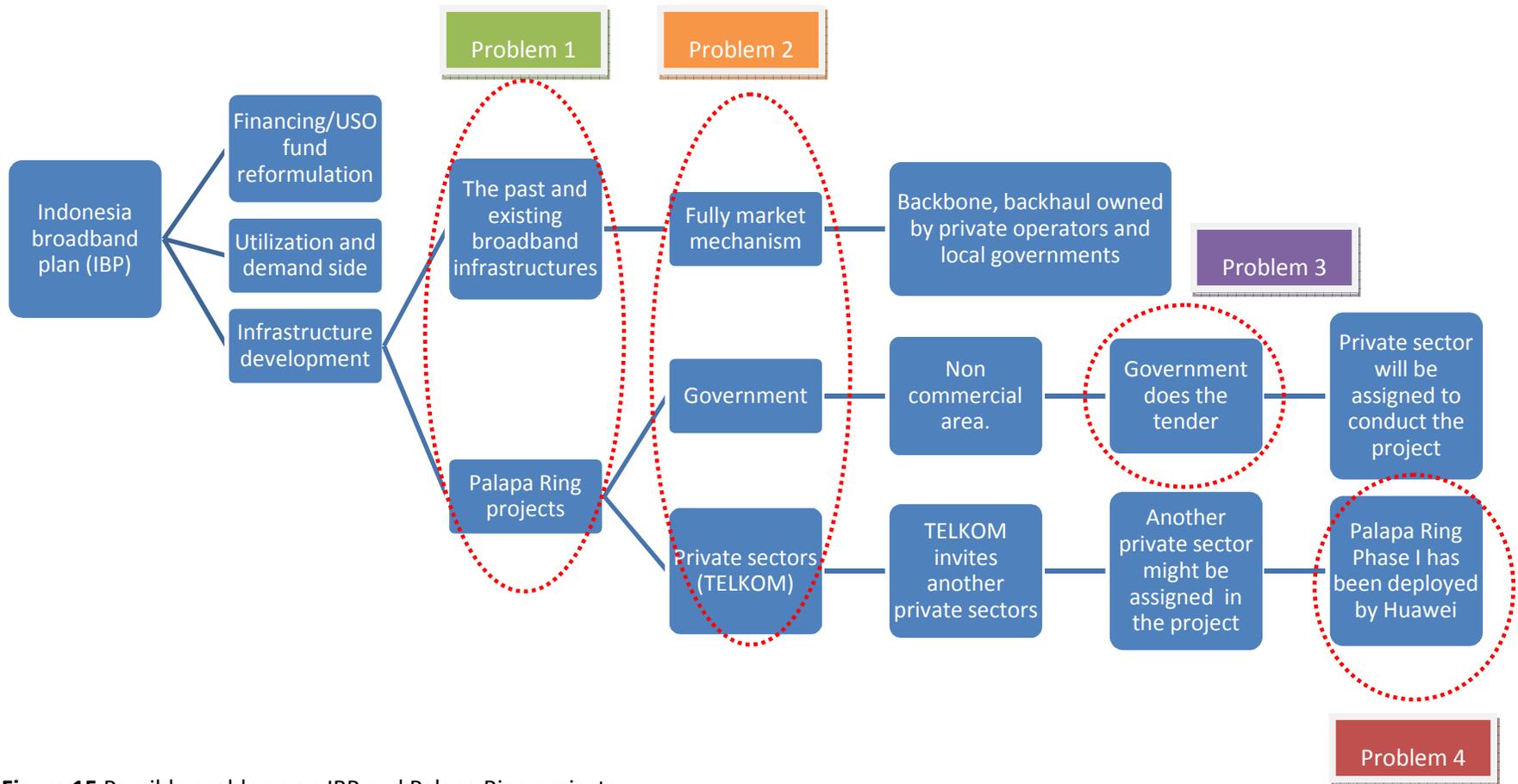


Figure 15 Possible problems on IBP and Palapa Ring projects

5.4. Broadband development issues

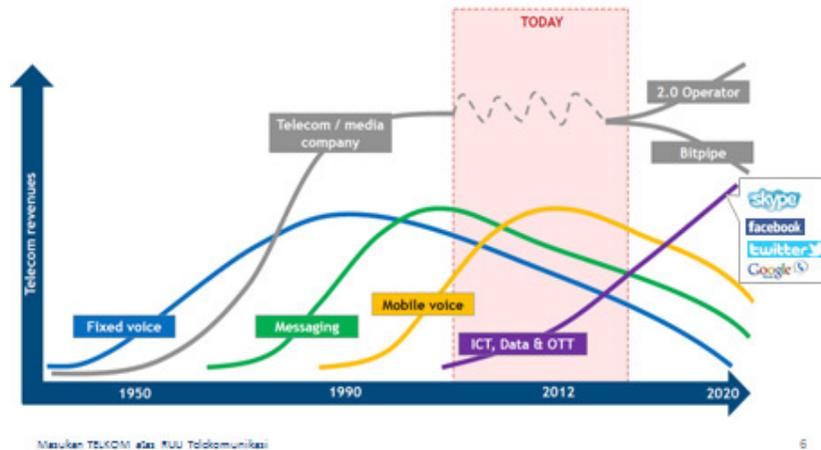
5.4.1. Infrastructure challenges

The current broadband deployment is relying more on the role of the private sector whereas the role of government is only to cover unserved and underserved areas (non commercial area). In this regard, the availability of meta-infrastructure is still a huge problem where electricity is an utmost crucial one. Without a decent level of availability of electricity power, the implementation of the broadband development is facing great obstacles. The World Bank dataset (the World Development Indicator), for instance, shows that by 2010 only 73% of the population has access to electricity.

While generally access to electricity seems to have been fulfilled especially in the urban areas, several rural areas are still lacking this basic need. Just less than 60% of rural areas have been covered with electricity in some less-developed provinces outside Java (Riau and Kepulauan Riau, Nusa Tenggara Timur, Kalimantan Tengah, Sulawesi Barat, Papua Barat and Papua). Likewise, the road development is also another obstacle. The density (km per 100 km sq) grows quite slowly from 21% in 2005 to 25% in 2009. From this number, only 59% of the road is paved by the end of 2009. Not only will the lack of infrastructure development prevent further broadband upgrades, it will reduce the effectiveness of monitoring and evaluation of the projects and programs. Therefore, at the operational level, MCI who acts as an institution responsible to conduct USO had found these aspects (road and electricity) as major problems to foster the diffusion of broadband in Indonesia (Hutabarat, Widiastuti and Pujiyanto, personal communication).

5.4.2. Global trend of revenue declining

A recent phenomenon should also be taken into account is the continual trend of revenue and profit declining in the telecommunications industry. The following Figure 17 shows the global trend in this industry.

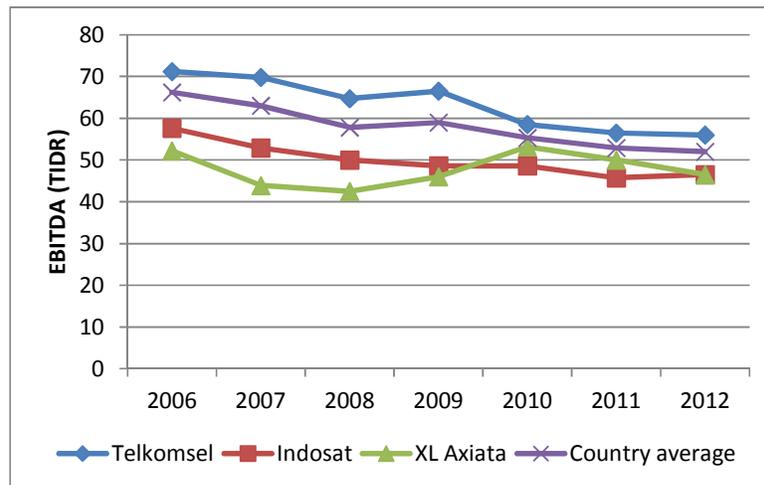


Source: TELKOM

Figure 17 Global trend of revenue

As shown in Figure 17, the current era is witnessing a decline of the conventional telecommunication services' revenue ranging from fixed voice, messaging and mobile voice. The only promising source of revenue for (mobile) telecommunications operators might

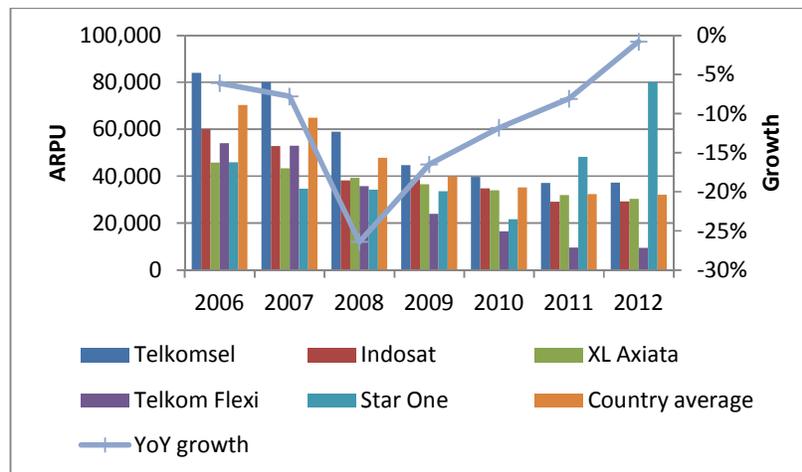
come from data the services. This global trend also put the Over-the-top content (OTT) that delivers video and audio over the Internet-- as the ultimate gainer. Nonetheless, it is not clear whether telecommunications operators are playing at the same market definition or having benefits from the emergence of OTT. However, it might be a coincidence that the growth of OTT's revenue is at the same time with the trend of saturation in telecommunications market. Telecommunications operators are now carefully examining this issue . Telecommunications' revenue in Indonesia has declined overtime driven by the market saturation and a stiffer competition as shown in the following Figure 18.



Source: MLBOA (2012)

Figure 18 EBITDA of Indonesia's operators (TIDR)

The global trend of revenue declining in Figure 17 is resembled with the data reported by MLBOA showing continues reduction of EBITDA for all operators in Indonesia and for the country average. On average, nearly 70 TIDR of revenue was generated in 2006 by Indonesia mobile operators or a 40% higher the average revenue for each operator in 2012. The declining of EBITDA also corresponds to a decline in ARPU which happened since mid 2000 shown in the following Figure 19.



Source: MLBOA (2012)

Figure 19 ARPU of Indonesia's operators

The ARPU of Indonesia's operators declined significantly from 2006-2012 as shown in Figure 19. Telkomsel, for instance, once generated about 80.000 IDR in 2006 more than double of what they are making today. Consequently, the y-o-y growth of ARPU is always negative since 2006 with only a positive rebound made in 2008. In addition, the only operator gaining higher ARPU during these periods investigated is StarOne. However, with a very tiny market share, their contribution to the country average is not visible. From Figure 19, it can also be concluded that telecom operators in Indonesia are no longer generating a lot of profit. Hence, putting the whole burden of infrastructure development on private sectors based on the IBP initiative is seen as a less relevant idea. Not surprisingly that during the storyline of the Palapa Ring projects, private operators quit the consortium one after another. The big question is: **will the investment be implemented as the one planned on the IBP?** Telkom is the only one committing to build the backbone connection based on IBP document. However with the recent macro economic turbulence (weaker exchange rate) and the fact that the vast majority of Telkom's revenue is generated from Telkomsel (60%-70%)³⁰, the punctuality of the project schedule is highly unlikely to be met.

5.4.3. Quality of services

For the operators changing the business model and moving towards data services is also very challenging. The recent prices are already very low because operators competing in a fierce price competition on voice and text (Rohman & Stork, 2013) leaving the data served at a lower quality. To exemplify, the 3G technology in Indonesia introduced in early 2000 has not yet generated enough profit for the operators (Santosa, private communication). Not surprisingly, the supply side of this industry concerning the provision of 3G technology is still very limited

as shown in the following Figures 20 and 21.

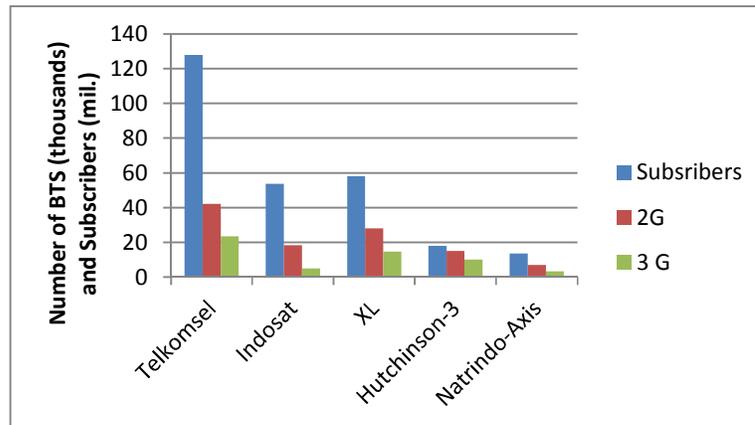


Figure 20 Number of subscribers (million) and BTS station (thousands), GSM technology in 2012

³⁰ <http://swa.co.id/ceo-interview/strategi-telkom-genjot-pertumbuhan-bisnis-tahun-2014>

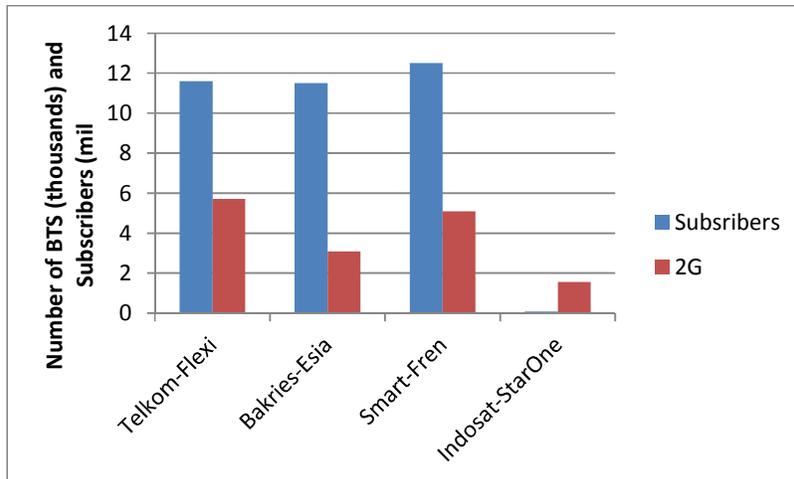


Figure 21 Number of subscribers (million) and BTS station (thousands), CDMA technology in 2012.

As shown in Figure 20 and 21, a base transceiver station (BTS) is a piece of equipment that facilitates wireless communication between user equipment and a network. While the 3G technology has been rolled-out in Indonesia since early 2000, the number of BTS with 3G technologies is still very limited for GSM and does not even exist yet for CDMA. This raises an important question: ***Are Indonesians really ready for having a faster and more reliable internet connection from the demand side perspective?*** This is a rather provocative question Indonesian citizens do not like to hear about but the operators have to take into consideration.

In a statement (I assume as a rhetorical question), the minister of ICT (Tifatul Sembiring) wrote in his social media³¹ “*emang kalau internet cepat buat apa?*”—(why government should offer a faster internet connection) what would you do if you have a faster internet connection anyway? This infamous statement, of course, attracted many people to comment, most of them with anger blaming that government and operators have both failed to respond on the need of better quality of internet service. However, Indrawati, Murugesan, and Raman (2010) found the reason which might support the minister’s statement. From the demand side perspective, users are aware of the 3G technology to enable them a greater variety of services that might relate to their work. However, only 47% of respondents use 3G mobile multimedia services with only limited use. Rohman (2014) found the same conclusion based on the survey among the Bottom of Pyramid (BOP) users in Indonesia conducted by LIRNEAsia in 2011. The usability of the device for productive purposes (when the users access at least one of the following functionalities; information services, banking, government information, health and the payment system) is very low, only 15%.

In general, Indonesia is still lacking policies to foster the demand side initiative especially on how to use and benefit from the ubiquity of the mobile telephony.³² The utilization of ICT at

³¹

<http://tekno.kompas.com/read/2014/01/30/1512510/menkominfo.kalau.internetnya.cepat.mau.dipakai.buat.apa>

³² In a personal communication with Meijer (former director of Indosat), there is no way that operators should educate citizens because that is out of the scope from the operators’ business purposes.

regional level is also still limited because the benefit from using the devices is not widely understood. When ICT is introduced at regional level (e.g. computer and the Internet at public administration local government offices), it often becomes a burden for learning and getting started (Hutabarat, M., personal communication, interview, November, 28, 2013) rather than an enabler.³³

5.4.4. Regional disparities

The statistics Indonesia, BPS (2004) reported that the distribution of the population over the 32 provinces is not even. Almost 59 percent of the total population inhabits Java, an island with an area covering only 7 percent of the total land area of the country. The rest, 41 percent, inhabits the other islands. In contrast, Papua with an area covering about 19 percent of the total land area is inhabited by only one percent from the total population. With this disparity, the market is not equally distributed making a further digital divide. The development of infrastructure (broadband among others) is always slower in eastern part of the countries as private sectors find it difficult to forecast the potential profits.

The government is aware of this disparity. Therefore, they introduce an implementation of “ICT Pura” index calculated as a weighted index showing the performance of ICT development in each region in Indonesia. The index is built from four main components³⁴:

- *Usability* shows the role of government in supporting the development of ICT sector in each region.
- *Readiness* denotes the level of infrastructure availability
- *Capability* denotes the potential of community to actively get involved in the ICT usages
- *Impact* measures the benefit for society thanks to ICT connectivity

The results are shown in the following Figure 22

³³ On the other hand, the trend might shift in the near future, as one of the largest telecommunications vendor in the world; Ericsson stated that Indonesia is becoming more important market. Not surprisingly that many consumer studies in Indonesia show positive trends in terms of broadband usage, both in the confidence in using the technology as well as the ownership of connected devices. (Syintiawati, H., personal communication, interview, November, 27, 2013). Ericsson is the major supplier for mobile broadband solutions for Telkomsel, XL Axiata, Indosat and Axis.

³⁴ The ICT Pura index is calculated based on the survey in 165 cities and municipalities in Indonesia in 2011. The scale ranges from 0-5.

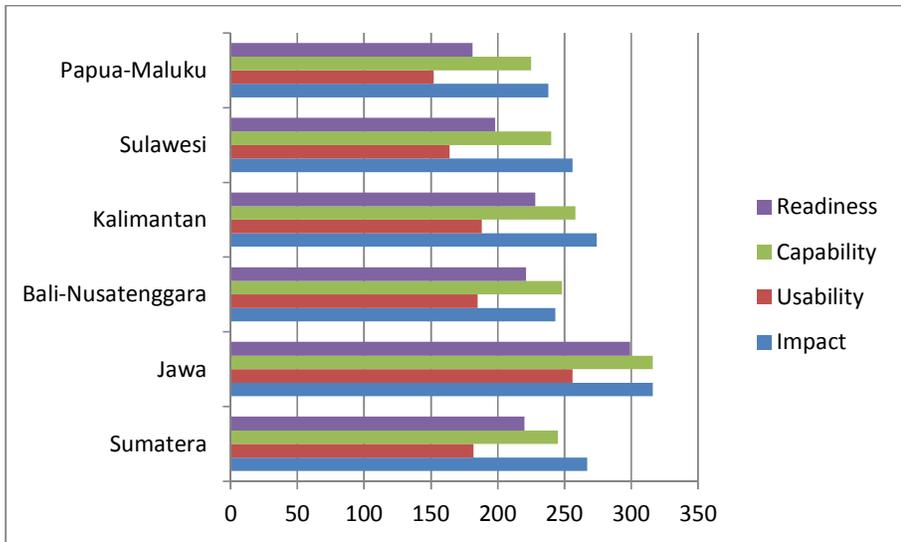


Figure 22 The ICT Pura index in Indonesia (2011)

Figure 22 clearly displays that the achievement of ICT development varies between region where again the majority of Western Part of Indonesia (Jawa and Sumatera) perform better than the eastern part. Each region is also facing different obstacles concerning ICT development meaning the infrastructure availability (readiness) is not always as the major inhibitor. The next question will be: **why do most endeavors put on the broadband planning more focused on the supply side?** Utilizing further this self-report assessment, it will be a better policy to distinguish the need of each region based on the ICT pura ranking. The regions needing an urgent infrastructure development will be fulfilled at earlier stage than the other which also make a better sequential and multi years project. This sequential process will also be more efficient to establish a proper monitoring and evaluation.

5.4.5. Competition

The government regulation related to competition consists of two aspects: in what degree is the competition needed and under what circumstances government intervention is required (Thakur, 2012). In a typical ICT industry, a greater degree of competition is believed to play an important role to increase the level of adoption and market potentials (Islam & Meade, 2012).

These facts cannot, on the other hand, ignore the importance of an asymmetric government intervention. The policy is needed to provide a level playing field for both incumbent and new entrants (Fuentelsaz, Maicas, & Polo, 2012). On mobile industry, Baranes and Vuong (2012), for instance, mentioned that an asymmetric regulation might allow a network operator to set a higher termination rates than that of set by the incumbent operator enabling a consumer to gaining net utilities and social welfare. Chen, Hu, and Chan (2011) also emphasize, in the case of Taiwan market, an asymmetric regulation can give a privilege for new entrant allowing them having longer term investment planning in the market that has been reaching at saturation level.

In Indonesia, the United Nations Conference on Trade and Development (UNCTD) in a very extensive report in 2009 titled *Voluntary Per Review on Competition Policy: Indonesia*, concluded that the telecommunication industry, especially on the mobile industry, has been categorized as “very concentrated” or at the market structure of “oligopoly” especially during the period 2002 to 2006. As per the 2006 report, Telkomsel owned the highest

market concentration (68.08%) followed by Indosat (21.55%) which tallied together an enormous concentration of 89.63% of the relevant market³⁵. The following Figure 20 compares the recent level of competition in Indonesia with selected Asia Pacific countries in terms of Herfindahl–Hirschman Index, (HHI).

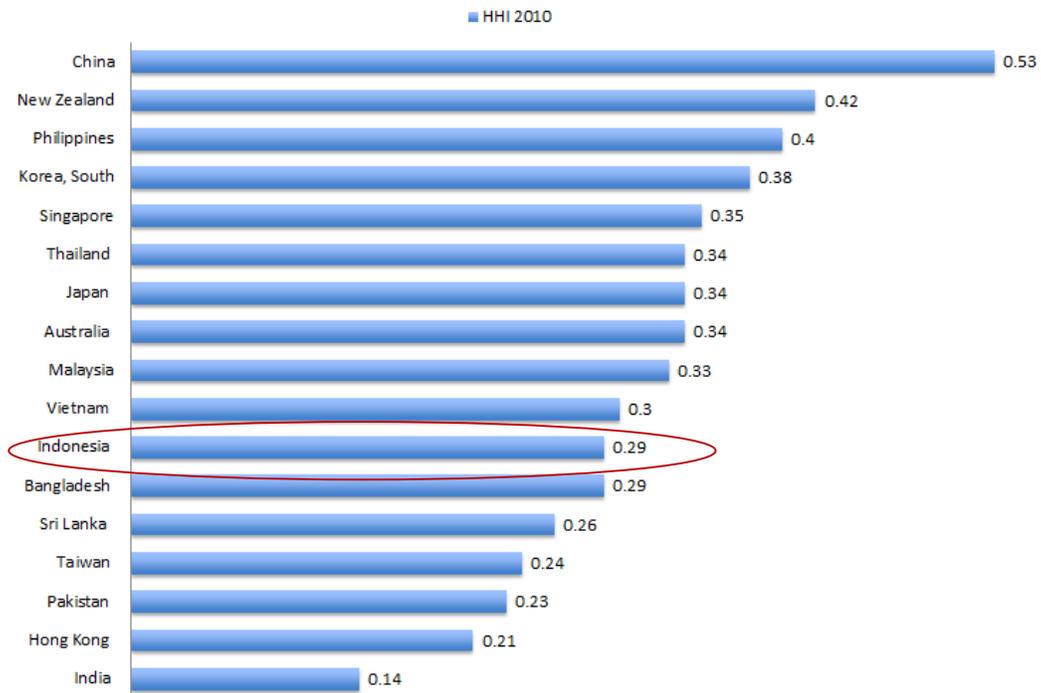


Figure 20 HHI in selected Asia Pacific countries (GSMA, 2011)

In relation to the calculation of HHI index, the U.S. Department of Justice considers a market with a result of less than 0.1 to be a competitive marketplace; a result of 0.1-0.18 to be a moderately concentrated marketplace; and a result of 0.18 or greater to be a highly concentrated marketplace. Subsequently, as a general rule, mergers that increase the HHI by more than 0.01 points in concentrated markets raise antitrust concerns. From Figure 20, it can be ascertained that, Indonesia is among the country which has a greater degree of competition denoted by a lower HHI. In 2010, the HHI in Indonesia was 0.29 lower than other ASEAN countries in the sample. However, with the absence of a strong regulatory body, the enforcement of the completion law seems to be out of discussion denoted by, for instance, a recent merger between XL and Axiata.

TELKOM is the only player develops the broadband connection in following the IBP, how the infrastructure sharing be ensured and who will monitor this?

Using the ICT ecosystem framework, we can conclude that at layer 2, the telecommunications and mobile industry is concentrated. However, there is still more than one player at that layer competing fiercely. At layer 1 (network infrastructure) the network industry was also quite competitive previously. However as Telkom is the only one developing the infrastructure in large networks, it might change the whole structure of market structure at the layer 1 which might affect layer 2 as well in the medium and long term. An urgent policy need to be introduced concerning the access regulation. The regulator has to release the Open Access regulation for the Cable built to avoid TELKOM

monopoly. To compensate, TELKOM might ask government for subsidy by opening these accesses for other companies (Koesmarihati, personal communication).

6. Conclusion

This paper elaborates the current state of the broadband development, targets and scenario based on the Indonesian Broadband Plan (IBP) and possible problems surrounding the implementation of the plan that should be anticipated. The analysis is divided into two main parts: the document analysis of the existing documents and the assessment of these policy initiatives. The paper found the following conclusions:

- There is a clear indication of the growth of the internet development in Indonesia. It is denoted by an increase in the total internet users' by the end of 2013 about 71.19 million, from 63 million in 2012. The penetration rate of the cellular internet users in Indonesia is about 8.5% by 2012 where the fixed internet is about half of cellular.
- The Indonesian Broadband Plan (IBP) is a national agenda guiding the policies on how the broadband should be developed in the country following specific running targets based on various criteria. It is targeted that by the end of 2019, all public sector facilities (health centers, government offices, and school) will be covered by the internet connection. Fixed broadband penetration rate will be set out to reach a 30% in urban area and 6% in rural area by the end of 2019.
- A flagship on the IBP related to the Palapa Ring brings the detail on the continuation of the existing fiber deployment in the western part of Indonesia with the eastern part of the country which is still currently unavailable. The deployment is divided into two main parts: the one conducted by Telkom about 229 MUSD and the other will be provided by government with the budget around 583 MUSD.
- There are, however, many more questions than answers with this plan:
 1. How strong will this document prepared by Bappenas influence other stakeholders (cross-sectoral coordination and between local and central government) to follow the guidance. Bappenas is no longer having a power to ensure and to monitor the implementation of such planning at the project level.
 2. The IBP is seen as lacking focus on the way the document addressing the ICT ecosystem
 3. Given the importance of the recent mobile telecommunication, the IBP paid little attention in strategizing further utilization of mobile technology to closing broadband gap.
 4. The synergy and coordination problem might become an issue in the Palapa Ring project. The infrastructure built by Telkom seems to follow their long vision on Nusantara Super Highway without necessarily in line with the IBP.
 5. There might be different way of measuring and evaluate the success of the two types of Palapa Ring projects driven by different natures of private and public infrastructure developments.
 6. The implementation of the Palapa Ring might face some delays as the government is facing the credibility issue with regards to suspicious corruptions cases.

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8. Appendix 1

History of Palapa Ring

Time	History
July 8th 1976	The first Indonesia's geo-stationer satellite (Palapa) was launched. This launch established the position of Indonesia as one of the leading developing country dating back in 1980's in terms of having a modern telecommunication technology. The satellite allowed all citizens (from Sumatera to Papua) to view Televisi Republik Indonesia (TVRI) as the only broadcasting television in the country until 1989 ³⁶ . Later on, it was then believed that the satellite technology will not be able to cover the increasing demand of telecommunications and broadcasting thus needing a terrestrial cable deployment throughout the country.
May 1998	The plan to unify Indonesia in a one-link of cable has been initiated as the Nusantara 21 . The plan consisted of three parallel activities aim at transforming Indonesia from traditional societies to knowledge based societies. The coverage of the plan were (i) activities funded by Yayasan Litbang Telekomunikasi dan Informatika (YLTI/Research and development of ICT foundation), (ii) activities funded by the government based on the Presidential decree 30/1997, and (iii) activities conducted through the Indonesian Information Development Project (IIDP) funded by the World Bank. This document has thoroughly identified the need to propose a comprehensive ICT development from both the demand and supply sides (Purbo, 1998). To operationalize this plan, Nusantara 21 has introduced 11 flagships of ICT development agenda –similar to the current IBP plan. Among others: physical infrastructure, software industry, and several initiatives to link ICT with other sectors (education, health, tourism, banking, finance, manufacturing industry, e-commerce, and post and public communication).
From mid 1998	As the country was hit by a severe financial crisis, the Nusantara 21 plan was never been implemented.
December 2004	The idea to prepare a comprehensive national developing planning on the broadband infrastructure networks in Indonesia was re-introduced. The plan is now called as Cincin Serat Optik Nasional (CSO-N). There are two options of funding scheme that government will fund the whole projects or it will be partially collaborated with the private sectors.
January 2005	During the Infrastructure Summit I in January 2005, the national fiber optic ring project was discussed. The initial plan was to deploy the fiber from North Sumatera to Papua with an approximate length of 25.000 km. It will then connect each and every municipality in Indonesia allowing a high speed broadband access with the capacity ranging from 300 Gbps to 1000 Gbps. The CSO-N was renamed as Palapa O2 Ring which later was shortened to Palapa Ring since O2 refers to one of a private telecommunications company.

³⁶ Afterwards, among the private operators in satellite business are PT. Telkom, PT. Satelindo, PT. Pasifik Satelit Nusantara and PT. Media Citra Indostar.

9. Appendix 2

List of respondents for the case study in Indonesia

No	Name of respondent	Institution	Involvement
1.	Setyanto Santosa	MASTEL (Chairman)	Interview and review of the report
2.	Koesmarihati	BP3TI, Ministry of ICT	Interview and review of the report
3.	Woro Indah Widiastuti	Ministry of ICT (Director of Universal Service Obligation)	Interview
4.	Mesdin Cornelis Simarmata	Bappenas (Director for industry, science and technology and state owned company)	Interview
5.	Freddy Bain	PT TELKOM On behalf of Indra Utoyo (Director of Innovation and Strategic Portfolio)	Interview and review the report
6.	Hardyana Syintawati	Ericsson Indonesia (Head of Marketing & Communications,)	Interview
7.	Juni Soehardjo	Kadin and Mastel	Review the report
8.	Denny Setyawan	Ministry of ICT (Spectrum frequency)	Review the report
9.	Bonifasius Wahyu Pudjianto	Ministry of ICT (Utilization)	Interview and review of the report
10	Heru Sutadi	Former BRTI (Telecommunication analyst)	Interview
11.	Mervin Hutabarat	Center of ICT, Bandung Institute of Technology	Interview
12	Sulstyo Wimbo Hardjito	Director Indoneia railways (formerly Director of Corporate Services PT Indosat).	Interview