

CHAPTER I INTRODUCTION

1.1 Background

Under the Constitution of the Republic of Indonesia 1945, Article 28F states: *setiap orang berhak untuk berkomunikasi dan memperoleh informasi untuk mengembangkan pribadi dan lingkungan sosial, serta berhak untuk mencari, memperoleh, memiliki, menyimpan, mengolah, dan menyampaikan informasi dengan menggunakan segala jenis saluran yang tersedia* (each person has the right to communicate and obtain information to develop personal and social environment, and has the right to seek, obtain, possess, store, process, and convey information using all types of available channels).

Telecommunications is the right of every person as stated in the Constitution, so it is regulated by the State to guarantee the right to communicate and obtain information. Spectrum is important for providing wireless telecommunications and broadcasting services [1]. From an economic perspective, a spectrum is a scarce resource at a particular place or time, meaning that only a number of the spectrum can be used. The radio frequency spectrum belongs to the State so it belongs to the State's public domain, the spectrum must be managed for the benefit of the national community as a whole. The main purpose of management is to secure spectrum occupancy to be optimal and effective frequency utilization [2].

The future of telecom companies forecasted deteriorate as they have reached the peak of their revenue, this is stated in Telecom Application Developer Summit 2015. One solution for this situation is to start improving the game by devising a new strategy especially coupled with the coming era of the Internet of Things (IoT) in the form of billions of devices and exponential data growth [3], another solution is to maximize the cost. In addition to data growth, cellular subscriber growth also triggers a larger capacity requirement and requires additional investment costs. In Indonesia, the number of cellular subscribers from 2011 to 2016 incremented annually with a non-linear growth percentage [4].

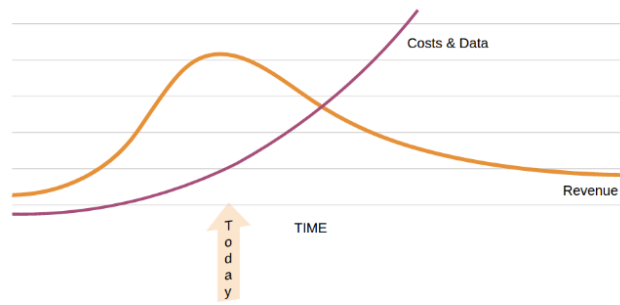


Figure 1.1 The Future of Telecommunication Companies [3]

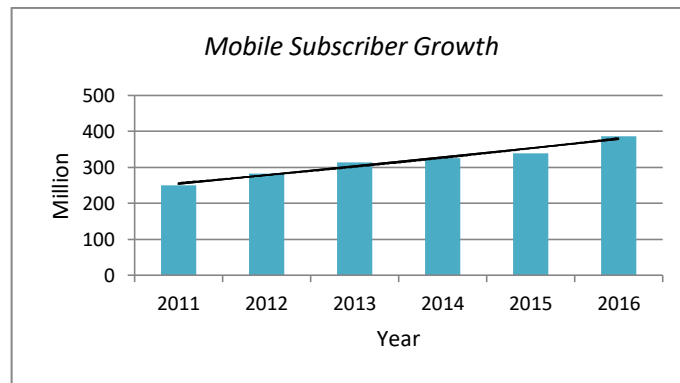


Figure 1.2 Mobile Cellular Customer Growths

ITU has released the Facts and Figures of ICT in 2017, one fact that delivered is international bandwidth increased but telecom revenue decreased. International Bandwidth grew by 32% from 2015 to 2016 and global telecommunications revenues in 2014 to 2015 fell by 4%, developing countries (including Indonesia) accounted for 83% of total population but generate only 39% of total revenue [5].

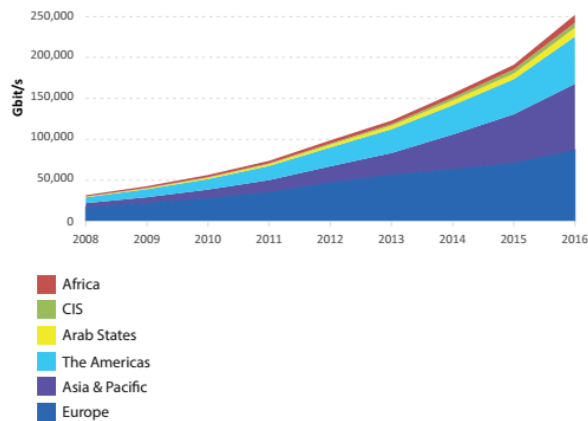


Figure 1.3 International Bandwidth [5]

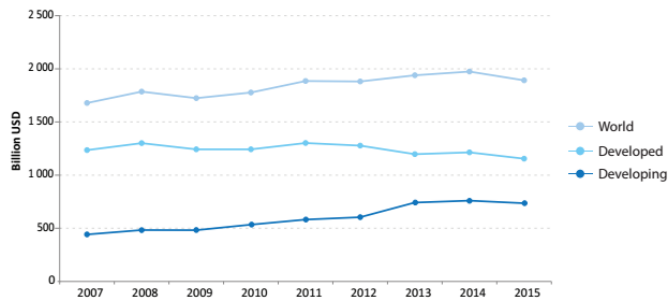


Figure 1.4 Revenue of Telecommunication Company [5]

Over 60% of mobile network operators in the world are done with Radio Access Network - Sharing (RAN-Sharing) to maximize cost savings. One of RAN-Sharing is Multi Operator Core Network (MOCN) that performs sharing up to the frequency spectrum. There are some things that drive this sharing; pressure from Earning Before Interest Taxes Depreciation and Amortization (EBITDA), the scarcity of the frequency spectrum and government policy [6].

Figure 1.5 commonly called as scissor effect, this figure explains the entry of era data and declining voice communications make the growth of operators revenue decreased. In the data age, network costs will increase but it is not worth the revenue. As can be seen in the expenses chart of the operator in Indonesia, growth of expenses costs tend to increase. This graph is processed from several annual report mobile network operators in Indonesia.

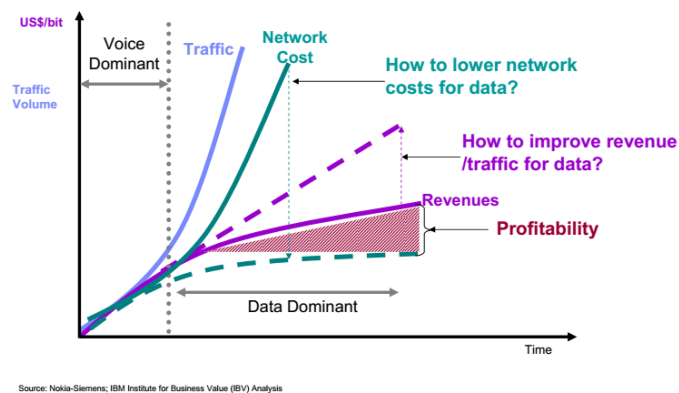


Figure 1.5 Scissor Effect [7]

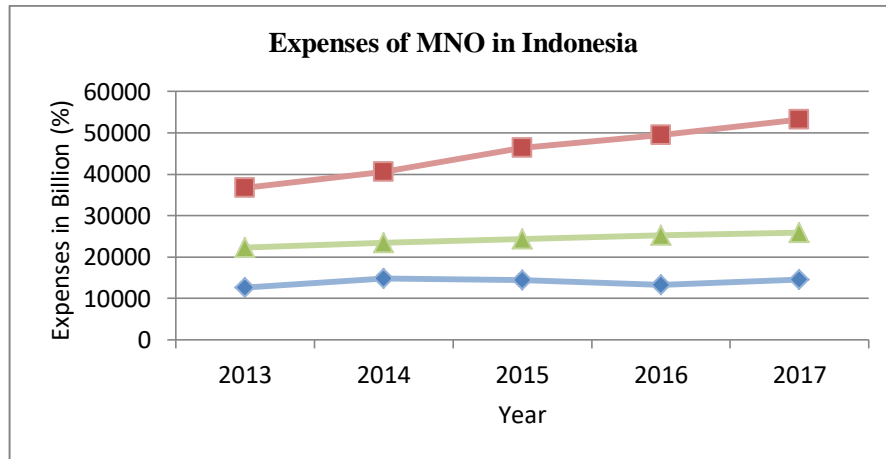
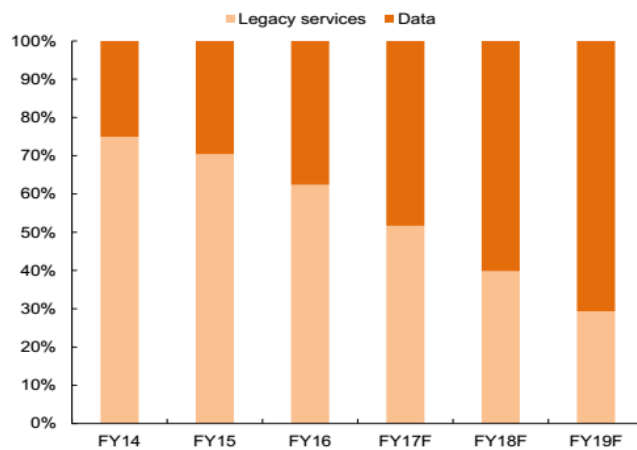


Figure 1.6 Expenses of MNO in Indonesia

The percentage of MNO revenue from legacy services (voice and text services) and data can be seen in Figure 1.7. It appears that the percentage of revenues from data began to increase in contrast to legacy services, indicating that Indonesia is currently entering the data age. Cellular data traffic in Indonesia reached 1.517 PB in final year 16, representing a 200% increase in just two years [8]. Currently, data demand is driven by the growing over-the-top (OTT) ecosystem. For telecommunication companies, the rise of OTT is a double-edged sword. Slowly but surely this could be the end of the legacy service, but on the other hand, it provides a new revenue stream. OTT content refers to audio, video, and other media that are sent over the Internet as stand-alone products, without operators that control or distribute content. The emergence of OTT raises questions about competition with legacy services. OTT services are cheaper and many argue, better than inheritance services. Historically, legacy services have advantages over OTT competitors, in terms of quality, convenience, and reliability. However, the pace of innovation in OTT is very fast and the digital ecosystem facilitates it. OTT is designed for smartphones and tablets, while old services are not. This makes it difficult for legacy services to keep running, especially with regard to ease of use and integration with other services.

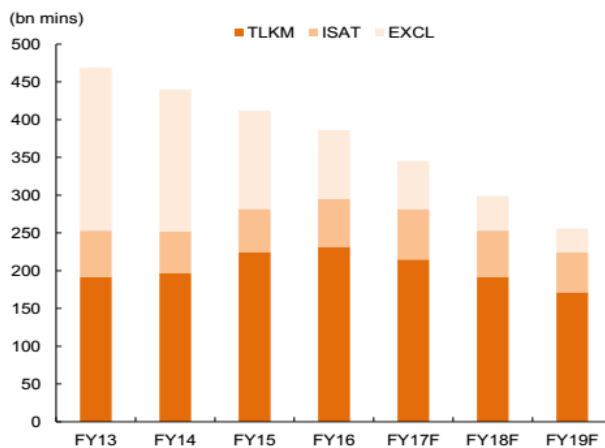
Deloitte predicts that more than 26% of smartphone users in developed markets will not make any traditional phone calls in a given week [8]. While legacy services have been declining, instant messaging, voice calls, and video

calls through OTT have become more popular. The growth of OTT does not only usurp private voice conversations. Popular OTT applications, like Uber, Gojek, and Grab, are also replacing the calls that were formerly made to order foods, request taxis, and book appointments. The increasing penetration of mobile and smartphone users with the inclusion of the data age makes legacy services start to be abandoned because it can be replaced by OTT voice service. And because of it, network capabilities provided by MNO should be even greater to meet customer needs so as to raise costs. However, because the main services or legacy services provide by MNO are being abandoned, especially competition with OTT services capable of serving voice, operator revenue is decreasing.



Source: Company data, Mirae Asset Sekuritas Indonesia Research

Figure 1.7 Industry’s Data Revenue [8] (with forced data)



Source: Company data, Mirae Asset Sekuritas Indonesia Research

Figure 1.8 Declining Voice Traffic Trend [8] (with forced data)

Previously, ITU-R estimated the spectrum requirements for IMT documented in the ITU-R Report M.2078. It is stated that by 2020 the spectrum needs from 1.280 MHz to 1.720 MHz [9]. Because there have been significant advances in IMT technology and IMT network deployment. The estimated spectrum requirements for IMT are updated in the ITU-R M.2290-0 Report that produces approximate spectrum requirements from 1.340 MHz to 1.960 MHz by 2020 [10]. Based on reference [6], in many emerging markets with more than four mobile and fixed wireless operators, limited spectrum availability is causing operators to evaluate MOCN sharing or consolidation and their direction choose to be dependent on government competition policy, shareholder objectives and the business case.

The study from World Bank 2009 concludes that a 10 percentage point increase in fixed broadband penetration would increase GDP growth by 1.21% in developed economies and 1.38% in developing ones. From the OECD study, broadband penetration has a significant impact on GDP growth ranging from 0.26% to 0.85% for each ten percentage point of increase [11]. The total area of Indonesia is 1,899,753 km² with a percentage of the 2G signal is 59.07%, 3G signal is 33.50% and 4G signal is 14.15%. However, if the size of the settlement area in Indonesia is 44,565 km², then the percentage of the 2G signal is 98.13%, 3G signal is 92.91%, and 4G signal is 74.09% [4]. The cost reduction in each operator with RAN-Sharing, especially Multi Operator Core Network (MOCN) that share radio access up to spectrum frequency can encourage operators to build into areas with low demand [12]. And based on data from APJII 2017, penetration of internet usage, Java island dominates that is equal to 58.08%. Therefore, one way to be able to reduce network cost, answer the needs of the spectrum, and encourage network distribution to the regions can be done by doing spectrum sharing.

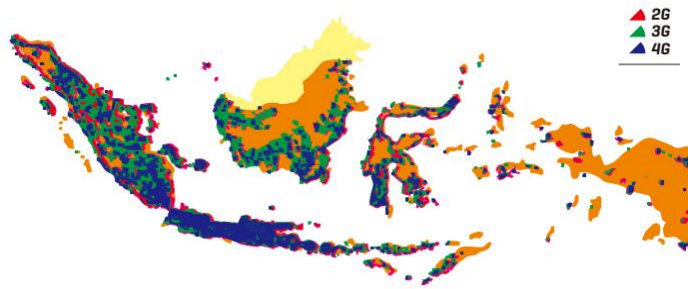


Figure 1.9 Map of Site Distribution in Indonesia [4]

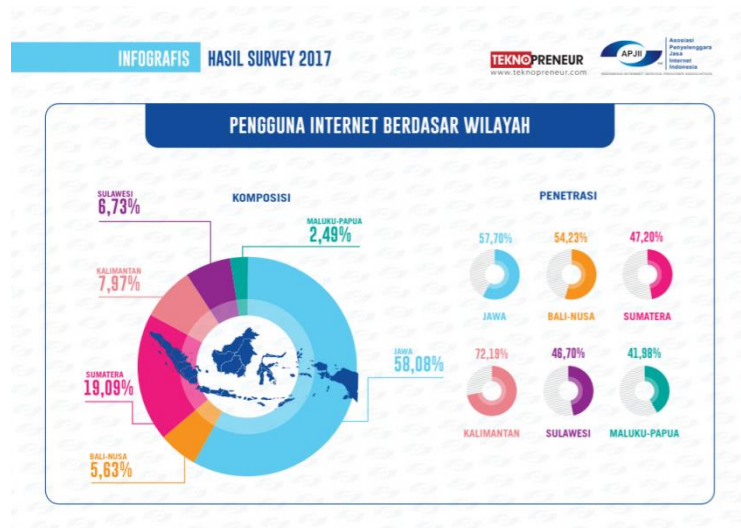


Figure 1.10 Penetration of Internet Users

1.2 Problem Identification

Telecommunications is a sector regulated by the State, because it has an interest in guaranteeing the right of everyone to communicate and obtain information. While telecommunications companies are forecast to deteriorate, the solution offered is saving and develop new business. The focus of this research is to make savings. In the world, more than 60% of mobile network operator (MNO) done with RAN-Sharing to maximize cost. One form of sharing that is used up to the spectrum is Multi Operator Core Network (MOCN). Spectrum sharing also can be one solution to address spectrum shortages and promote development across the region in Indonesia.

Based on the background, problems discussed in this research are the needs of telecommunications network infrastructure in urban and rural areas, the economic

aspect of developing spectrum sharing and regulation related to spectrum sharing in Indonesia.

1.3 Objectives

This research will focus on techno-economic analysis on MOCN implementation for mobile network operators in Indonesia. The final result of this research is to provide recommendations for its implementation in Indonesia.

1.4 Problem Limitation

Some assumptions and limitations of the problems used in this thesis research are as follows:

1. The spectrum sharing model discussed in this research is Multi Operator Core Network (MOCN).
2. The access network of mobile technology in sharing is LTE / 4G network (1800 MHz), this band is used because it is allocated for 4G/LTE.
3. Areas to be taken are rural (Sukabumi) and urban (Bandung City) area.
4. The object of research on this thesis is Mobile Network Operator (MNO) in Indonesia.
5. The techno-economic calculation is done the feasibility of NPV so that it can be determined the range of benefits for Market Leader (ML), competitor 1 (C1) and competitor 2 (C2) if the market leader to do frequency sharing and not do frequency sharing.
6. BHP is paid by the frequency owner in accordance with the planned revision of government regulation No. 53/2000.

1.5 Research Methodology

The research methodology used in this research is as follows:

1. Literature Study

Literature study is done by searching data in the form of papers, journals, textbooks and various other studies that support this research.

2. Collecting Data

Data collection includes existing data on infrastructure, market share, number of subscribers and some things owned by operators. In addition,

several things that need to be collected are regarding the currently applicable regulations and revision plans related to this research.

3. Calculating and Analysis of Techno-Economic

Conducting calculations and techno-economic analysis by looking at the market, asset and matters relating to the MOCN case from the operator side.

4. Conclusion

The conclusions contain the results of the analyze that have been summarized from the research that will be conducted along with the suggestions for the operators that are expected to be useful.

1.6 Hypothesis

Implementation of spectrum sharing with MOCN model will be able to depress the expense of operator expenses and can be implemented in Indonesia based on related laws. But in some case, it will influence telecommunication industry competition in Indonesia.