CHAPTER I
INTRODUCTION

1.1 Background

5G network technology is here to provide improved transmission performance and enable advanced communications, with an increase in the key performance index of 4G networks. 5G networks can achieve peak data rates of 20 Gbps / s with a connectivity density of 106 $devices/km2$ [1]. The pricing model in [2] can no longer be used considering that 5G cellular networks support high density for mobile broadband users, Device to Device (D2D) reliability and Massive Machine to machine type communication (MTC) [3]. 5G networks have the same resource characteristics and frequency spectrum and can do network sharing in one base transceiver station (BTS) there are several tenant operators who use network access at the same time, thus allowing changes in 5G network charging that will be paid by operators and changes in tariffs for cellular network users. Due to the changes in the business model that will be deployed on the 5G network and the possibility of many operators and the competitive level of the many services offered, it will cause changes to the new tariff formula scheme.

The value of operator investment will be very crucial when welcoming 5G networks in Indonesia, because every resource, radio access network using the same frequency with a network sharing scheme to be connected with mobile service providers to rent to tenant mobile operators, According to the Ministry of Communication and Information Technology's broadcast on Mobile Mobile Telecommunications network congestion in Non-Rural Areas [4], 10 major cities in Indonesia experienced network congestion conditions including: Jakarta, Yogyakarta, Bodetabek, Bandung, Semarang, Denpasar, Makassar, Medan, Surabaya, and Pontianak. Congestion is a condition of network unavailability to customers when making calls, related to network availability [4].

Based on data or information from cellular operators that the current condition has occurred a situation of cellular network density or called congestion, so that throughput on the customer side has decreased. The government conducted an

evaluation regarding the problem of network congestion in several non-rural cities in Indonesia, one of which is the city of Bandung [1]. Bandung City is one of the urban cities with a population of 2,452,943 million population, this is the basis that the determination of the tariff formula can be defined based on the population market or geographically with the dominant characteristics of population density and the ability of an area's income whether the area has a high and low per capita income, which will affect a revenue from the operator's side.

One way to deal with this problem is to expand the network. With the presence of the 5G-NSA network, it is possible that rural and non-rural cities that experience network congestion will be resolved. In previous research [2] analyzing the techno-economic migration of GSM/UMTS networks to 4G LTE networks, it is known that the calculation for the number of subscribers is based on the value of CAGR, operator market share, and target customer area. However, this research still has shortcomings due to the early involvement of 5G infrastructure that is not yet massive in both provinces so that in this study the strategy of applying the percentage number of subscribers in both provinces by using service tariffs based on speed and capacity.

5G cellular network is the right network infrastructure development to support the integration of 4G and 5G networks, taking into account the utilization of network improvements and profit maximization for mobile network operators on 5G networks needs to be done in Indonesia, using several traditional backhaul network infrastructure schemes and Optical backhaul [4] for LTE Advance and 5G New Radio technologies. In addition to comparing in terms of technology, this study analyzes from the economic side by predicting the development of integrated network usage within 5 years starting in 2020-2025 by calculating economic aspects [5], [6] as well as business feasibility analysis and sensitivity analysis. So that the resulting pricing model can be useful for the ongoing 5G in Indonesia

1.2 Scope of Limitiation

The problem focused in this study to provide customer pricing stragies value in 5G NR network planning, among participant are as follows.

a. This thesis focused on customer pricing, not spectrum pricing (BHP license)

b. 5G business model implemented in Bandung city with B2C (eMBB) and B2B (FWA), cost customer premises only calculated in B2C.
c. UE characteristic including three condition (optimistic 100% migration, moderate 50% migration, pessimistic 25% migration)
d. Investment delivery 5G network depends on result capacity network planning from total sites gNodeB.

1.3 Objectives

The purpose of this research is to provide best pricing model using the total cost ownership (TCO) method. The objectives of the research to be carried out are determined as follows, namely.

a. Obtain network planning resuts based on capacity and coverage planning on 5G networks adapted to the morphological conditions of regions in Indonesia (dense urban), from technical aspect, economic aspect and regulatory aspect.
b. Produce macro economic analysis with total cost ownership (TCO), return on investment (ROI) ?

1.4 Hypothesis

5G network modelling frequency 2.3 GHz west java province in Bandung City has potential feasibility. The characteristic of the 5G Network are different from the previous generation, with renewable technology capabilities allowing some services to change the business model and tariff charging to the user side, the price on enhance mobile broadband services will change, allowing competition between the operator to be tighter, the operator owner does not own the main network. Therefore, this research will hypothesis the customer pricing calculation methods based on the average speed with 3 various ARPU and network capacity, with 3 business condition optimistic, moderate, and pessimistic and as well in 2nd model pricing based on flesxible capacity as the investment in the application of pricing models in 5G network using total cost ownership and return on investment. Which provides feasibility for investment for mobile network operators.

1.5 Schematic Writing

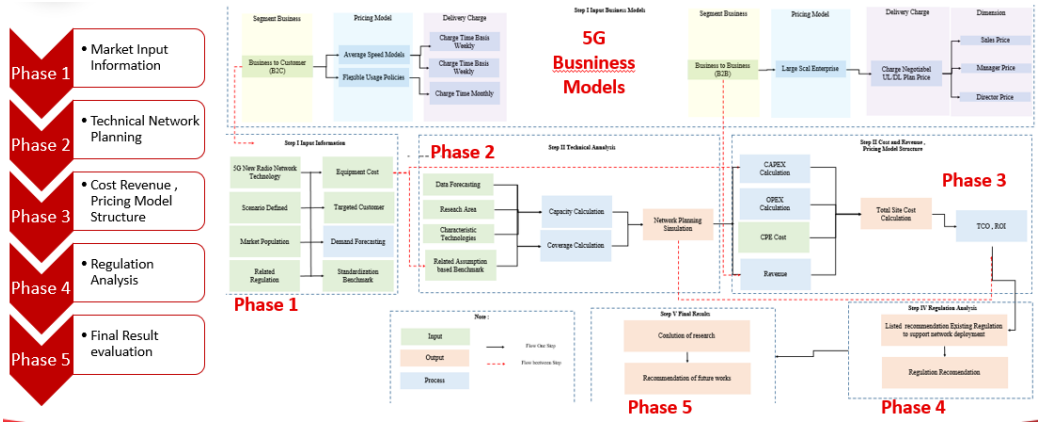

Figure 1.1 Diagram frame work research: details view.

It can be seen in figure 1.1 the systematics of research writing consist of several phase including:

a. Phase I : Market Input Information

The results of information or values in the research used in the research, such as targeted markets, and regulations based on research scenarios.

b. Phase II : Technical Analysis

Analysis related to technical aspects in network planning for bandung city segmentation B2C (eMBB) and B2B FWA) network.

c. Phase III : Cost revenue structure

Estimation of revenue that can be generated from 5G network planning in Bandung city. As well as cost estimates based on pricing model B2C & B2B based on results of technical aspect.

d. Phase IV: Regulation analysis

The results of the feasibility study analysis are concluded to answer the formulation of the problem, so that it will provide recommendations or suggestions for regulators or decision-makers in determining the most suitable and feasible pricing model proposed.

e. Phase V: Final ResultsThe results of this study are explained with conclusions based on technical, economic and regulatory analysis. Then some recommendations from a business and regulatory point of view are considered as the output of the study.