

Chapter 1

Introduction

1.1 Information networks in rural area

Internet technology has evolved as a major need for human life aspect. It transforms the humanity into the information age in which can provide knowledge instantly. People can study through the Internet, access the digital content, and collaborate with college remotely in all around the world. Refer to the world internet statistic [10], 46.5% population in the world enjoying Internet facilities, the higher region is in the North America as 87.9%, Europe as 73.5%, and Oceania/Australia as 73.3%. On the other hand, as a developing region, Asia and Africa has a lower population that connected to the Internet, as 40.2% and 28.6% respectively.

Some areas in developing region are classified by a rural area due it lack of supporting infrastructure (road and electricity) and geographical condition (remote island). These are the reason why the penetration of Internet in the developing regions is very low compared with the developed regions. Furthermore, the cost to provide Internet communication in a rural area became very expensive as the user is very small. The location of some area with the lack of proper roads or located on the remote island that makes them difficult to reach affected the instability and deficiency infrastructure, maintenance and operational costs is

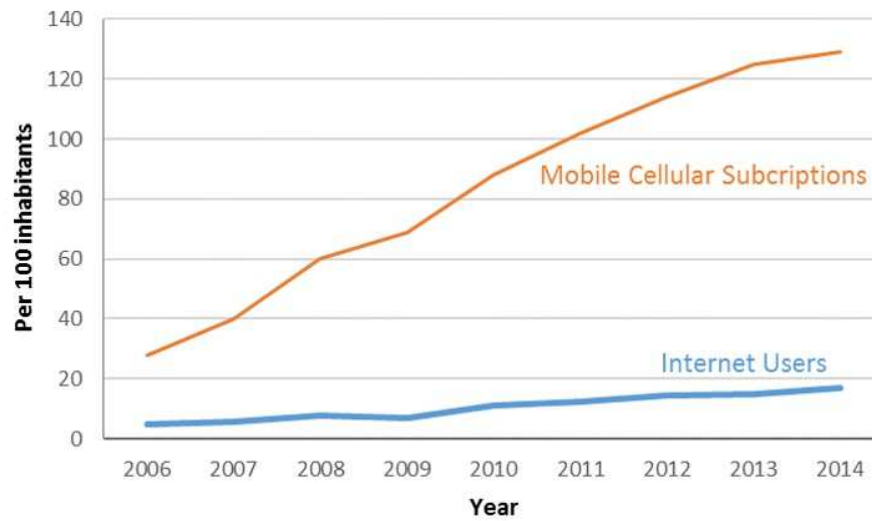


Figure 1.1: Indonesian Internet penetration and mobile subscriptions per 100 inhabitants

also expensive.

As the largest archipelago country in the world, Indonesia has many islands among which some are small, some are remote, and some do not have a high-speed data communication infrastructure due to its high-cost for deployment. Figure 1.1 shows Indonesian Internet user and mobile subscriptions per 100 inhabitants. In comparison with Mobile-cellular telephone subscriptions, the increasing of Internet penetration in Indonesia is relatively low, at the end of 2014, Internet user was 17 million more [11]. This indicated that some cellular communication infrastructure does not provide sufficient data communications.

This dissertation proposed two solutions to provide low-cost communications in the rural area. By considered to use some existing infrastructure over the region as a backbone of wireless information networking for the rural area. Depending on cases (conditions, applications) as follows: (i) Stationary multi-hop wireless networking on static facilities; (ii) store-carry-and-forward-based ad-hoc multi-hop wireless networking on the vehicle. These networks may provide a promising solution for data communication in rural areas by ex-