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## Development of Telecommunication System in Indonesia as Part of Information

Information and Communication Technology (ICT) is a term of the whole scope of technical processes and usage of equipment that leads to the modern information delivery. One of the scopes of ICT is telecommunication. The evolution of telecommunication is influenced by the invention of other technologies beforehand but it evolves rapidly after the invention of telephone in 1876. This telephone invention drove to the evolution of communication network. As the time goes on, the demand of long distance communication service is increasing fast, including the demand of long ranged communication. Because of this demand and requirement increment, the telecommunication started to emigrate from wired technology to wireless technology.

The method of wireless technology has been started in 1864 by James Clerk who postulated wireless propagation which was respectively verified and demonstrated by Heinrich Hertz in 1880 and 1887. After that, Marconi started experiments with the radio-telegraph. He was able to transmit the first telegraph signal and patented a complete wireless system in 1897. In 1901, Marconi received the morse message sent across the Atlantic. The invention of diode by Fleming in 1904, and the invention of triode by Lee de Forest in 1906 made rapid development of long-distance (radio) telephony. After the evolution of Integrated Circuit (IC), the ICT evolved rapidly too.

In Indonesia, cellular communication technology started to be introduced in 1984 by PT. Telkom Indonesia and PT. Rajasa Hazanah Perkasa. The system used NMT 450 technology which is used 450 MHz frequency band. In 1985, the first generation (1G) firstly introduced. Advanced Mobile Phone System (AMPS) used 800 Mhz frequency band. This AMPS technology handled by four operator: PT. Elektrindo Nusantara, PT. Centralindo Panca Sakti, PT. Telekomindo Prima Bakti, and PT. Telkom Indonesia. At that time, the cellular phone was so heavy, around half of kilogram, and very expensive, around ten millions Rupiah.

In 1993, PT Telkom Indonesia started their pilot-project for the second generation (2G). At that time, there were two options, continue the usage of AMPS or change to GSM which used 900 MHz frequency band. B.J. Habibie, as the minister of research and technology at that time, decided to use GSM in Indonesian digital telecommunication system. In 1994, PT. Satelit Palapa Indonesia (Satelindo) came as the first GSM operator in Indonesia. In 1997, the government was ready to give ten regional license to ten new operator which was based GSM 1800, but the monetary crisis in 1998 made the plan failed. In spite of the monetary crisis, the demand of cellular services was not decreased. At the end of 1999, cellular customer in

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Indonesia had reached 3,6 millions people.

In 2005-2008, which is known as reformation era of Indonesian telecommunication, 3G was introduced commercially by Telkomsel, XL, and Indosat. In this generation, number of customer of cellular services increased rapidly, and reached 38 millions customers. This technology provides video calling, streaming, and video conference.

Today, we are in 4G era. It is introduced to public commercially in 2013 by Bolt Super 4G LTE. Actually 4G in Indonesia has been started by Sintra WiMAX which provides 4G Wireless Broadband service. This technology provides HD video calling and streaming. In 2015, the government had done reframing for 1800 MHz frequency band to be used by 4G. However, 4G has not been spread evenly in Indonesia.

Nowadays, ICT is still evolved and becoming more and more advanced in every life aspect. ICT companies competing each other to be the best in this field. One of these largest ICT companies is Huawei. Huawei is very concern about research and their employee development, with 180.000 employees around the world, Huawei is the 83rd in the Fortune 500. This shows us that its achievements come from the greatness in their human resources. Moreover Indonesia has many cooperation with Huawei. It can be said that Huawei plays an important role in Indonesia's ICT development. So, I believe that Seeds for The Future program from Huawei is the golden chance for me to encourage and improve myself so that I can reach my dream and influence my surroundings, moreover my country, to get better and better.

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