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MSc. ICT in Business and Public Sector

The Contribution of Digital Health Solution to Universal Access to Health in Bontang, East Kalimantan, Indonesia

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MASTER'S THESIS PROPOSAL

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Abstract

In line with the World Health Organization program, the Indonesian government has a target to ensure that everyone can access health services or known as universal health access by 2023. One of the government's strategies that are also supported by businesses is the development of digital health. To ensure the achievement of universal access, it is necessary to know if the community as the one who is accessing health services is willing to accept the digital services provided. However, the current problems such as the inequality of internet infrastructure and digital literacy in Indonesia have become a concern for the development of digital health.

For this reason, this research intends to discuss the willingness of the community (and the influencing factors) to accept digital health systems and provide a high-level solution regarding the approach to digital health services to address the defined issues. This study follows the Theory of Planned Behavior to measure one's intention and behavior based on their attitude, subjective norms and perceived control behavior towards digital health systems. A case study in the Bontang community, East Kalimantan, Indonesia, was conducted to simplify the research.

As many as 24 participants with various backgrounds contributed in this study where 20 of them were people living in Bontang who were the main subjects of this study. The remaining 4 were resource person whose background is health workers in Bontang, and the government is providing supporting information regarding digital health services. From the findings of qualitative analysis, it is known that both health services and the government already have initiatives related to digital health services to a certain extent. However, not everyone is able to receive these services either because of resistance or the inability to access digital services.

Keywords: digital health, universal access, healthcare, theory of planned behavior, digitalization

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1. Introduction

In the past two decades, digital technology has developed rapidly and has given a very significant influence in many sectors, without the exception of the health sector. The implementation of technology (better known as digital health or e-health) to increase the performance and accountability of health services (World Health Organization, 2008) is considered as a promising breakthrough to tackle inherent challenges in the field of health. Moreover, the advancement of mobile technologies, wearables, advanced cameras, and the Internet of Things (Atzori, Iera, & Morabito, 2010) offers the possibility for higher accessibility to healthcare. It is predicted that the advancement of technologies will bring compelling impacts for the healthcare sector, several examples are data analytics for data-driven decision making in health insurance, wearable devices, and mHealth for patient treatment, or even blockchain and artificial intelligence to improve access to medical history (Das, 2019).

Furthermore, the (Broadband Commission Working Group on Digital Health, 2018) mentioned that digital health is potentially to be the most compelling and promising solution for middle to the low-income group to obtain access to healthcare and overcome the increasing burden of non-transmissible diseases such as cardiovascular diseases, cancers, diabetes, asthma, etc. The report also states that the adoption of technology will shift health services from facility-based care where patients must go to health facilities to be admitted to community-based care where patients can get home-care quickly, from reactive care to treat diseases to proactive care to prevent them, and from episodic care to continuous monitoring care to ensure patient's health outside the consultation period (Broadband Commission Working Group on Digital Health, 2018).

However, the swift of technology advancement does not always coincide with consumer acceptance; several aspects can affect this, such as consumer needs, convenience, availability, etc. (Lai, 2017). There have been many studies conducted to analyze the level of public acceptance of the adoption of the improvement of technology (Chin & Ahmad, 2015; Meuter, Ostrom, Roundtree, & Bitner, 2000).

1.1. Problem Statement

Inequality in health services is one of the major problems that occurred in many developing countries, (World Health Organization Regional South East Asia, 2016) and

this issue is listed as one of the 17 UN's main focuses on Sustainable Development Goal (SDG) (United Nations, 2016). This particular phenomenon exists across different socio-economic status and socio-demographic groups (World Health Organization Regional South East Asia, 2016).

As a developing country, Indonesia also suffers from this problem. Indonesia's geographical condition as an archipelago and its extreme topography between regions have become significant challenges for the government in terms of providing equitable access to health services for all of its citizens (Mubasyiroh, Nurhotimah, & Laksono, 2016). The gap is directly proportional to the development gap where regions other than Java and Bali suffer from the disadvantages. According to Indonesia Basic Research 2018 data published by the Ministry of Health of the Republic of Indonesia in 2018, 68.9% of Indonesian people are having difficulties in accessing health services (Kementerian Kesehatan Republik Indonesia, 2018).

The rapid development of ICT promises unlimited potential for human life. With the implementation of ICT in government institutions, the administration will become more transparent, the community can also monitor the decision-making process and fraud can be significantly reduced (Nanthikesan, 2000). In the private sector, ICT can also open opportunities to reach people outside, and without limits, distance becomes meaningless with technology support.

In the latest development of the healthcare industry, ICT also plays an essential role in the form of a digital health system (Sudaryanto & Purwanti, 2008). Digital health is believed to have the potential to overcome geographical barriers (Sudaryanto & Purwanti, 2008) by, for example, providing easily accessed necessary information for less trained health workers to help patients in rural areas or sensors to provide continuous monitoring from afar (Broadband Commission Working Group on Digital Health, 2018). However, to ensure the effectiveness of digitalization of health services, the government also needs to pay attention to one of the fundamental challenges that may arise, which is a digital exclusion.

According to the International Telecommunications Union (2017), there were less than 28% of families in developing countries who had internet connections at home. Also, despite the rapid development of ICT infrastructure throughout the world, it is estimated

that in the next two years there are still around 2 billion people who are not connected to the internet (Expert Group to the Broadband Commission, 2018). In other words, there will always be a large part of the population that does not receive the benefits or only have a role as an observer of global developments (Expert Group to the Broadband Commission, 2018).

In the case of Indonesia in the year 2017, around half of the population uses the internet, with approximately 58% of the total users were dominated by people who live in Java and only less than 8% were from Borneo island (APJII, 2017). This data showed that internet usage in Borneo was still shallow. Furthermore, implementing digital health solutions also not automatically confirm the universal access to health services for the community (Krah & de Kruijf, 2016).

The theory that will be used as the framework in this research is the Theory of Planned Behavior (Ajzen, 1988; Ajzen & Madden, 1986) which is one of the most extensively adopted socio-psychological theories. The basic idea of this theory is that the intentions and behavior of people formed by three determinants: the attitude toward the behavior, subjective social norms, and perceived behavioral control, where each case is also affected by certain beliefs. The theory has been used in various fields to predict behaviors, some examples of topics are recycling intention among households and students (Boldero, 1995), examination of alcohol consumption (Conner, Warren, Close, & Sparks, 1999), intention towards using seat belt (Trafimow & Fishbein, 1994), health-related behaviors (McEachan, Conner, Taylor, & Lawton, 2011) such as cataract patients intention to undergo surgery (Wikamorys & Rochmach, 2017), and marketing impact of halal label in products for Muslim community in Indonesia (Salehudin & Luthfi, 2011). Therefore, to generate insight into the intention of people in Bontang towards digital health, the research and interview questions will be built based on this theory.

1.2. Research Gap

Based on the researches performed previously, it can be argued that the implementation of a digital health system could help in increasing the accessibility to health services. However, to be useful, acceptance from the community is required. Therefore the question remains on whether the community is willing to adopt the digital health system or not to overcome health challenges such as inequality between regions by referring to one of the less developed city in Indonesia, Bontang. The question needs to be answered before the main topic could be explained more deeply.

1.3. Research Question(s)

The following research questions are formulated to describe the impact of digital health implementation on health inequality issue in Indonesia:

"How does the Theory of Planned Behaviour helps to explain the intention of people in Bontang to use digital health system?"

Followed by several sub-questions which need to be taken into account to have a better evaluation of the main question:

- a. What is the attitude of people towards the digital health system?
- b. What is the social acceptability of the digital health system?
- c. What is the accessibility and availability of the digital health system?
- d. Do people in Bontang intent to use the digital health system?
- e. What would be the suitable model of digital health architecture to increase universal access to health in Indonesia reflecting on the challenges identified through the Theory of Planned Behavior?
- 1.4. Objectives

The general objective of this research is to find out whether implementing digital health system would be an effective solution in reducing health inequality issue in Bontang, while the aim of each research questions and sub-questions are explained in below table.

No.	Question	Objective						
1.	What is the attitude of people towards the digital health system?	To understand the personal opinion of the people in Bontang towards digital health system						
2.	What is the social acceptability of the digital health system?	To understand the perception of the social environment of the people in Bontang regarding the digital health system						

Table 1 Research Questions Objective

No.	Question	Objective		
3.	What is the accessibility and availability of the digital health system?	To understand whether the people in Bontang are provided the opportunity to use the digital health system		
4.	Do people in Bontang intent to use the digital health system?	To understand the intention of people to use the digital health system based on the aforementioned aspects (attitude, acceptability, accessibility, and availability).		
5.	What would be the suitable model of digital health architecture to increase universal access to health in Indonesia reflecting on the challenges identified through the Theory of Planned Behavior	To find a high-level digital health architecture to address the challenges that has been identified through the Theory of Planned Behavior		

1.5. Study Relevance

The current development of health services is one of the foci of countries around the world. The industry is experiencing significant developments to manage demand and ensure that health services are accessible to everyone (Oxford Academic Health Science Network, 2017). As a supporting tool that is believed to increase the productivity of health services, digital technology has also received special attention, one of which is demonstrated by the existence of the Global Digital Health Partnership (GDHP) (Work Plan | Global Digital Health Partnership, n.d.).

The Global Digital Health Partnership (GDHP) is an initiative participated by 18 countries and the World Health Organization to support the development and implementation of digital health services, and Indonesia is one of the countries that involved in this collaboration (Work Plan | Global Digital Health Partnership, n.d.). GDHP helps participating countries to formulate work plans in the development of digital health systems that are discussed and agreed upon to achieve their goals of increasing the level of health and welfare of citizens (Work Plan | Global Digital Health Partnership, n.d.).

There are several workstreams which are the focus of GDHP namely cybersecurity, interoperability, evidence and evaluation, environmental policy, and clinical and consumer engagement (Work Plan | Global Digital Health Partnership, n.d.). The flow of work is also mutually agreed based on shared priorities and challenges both locally and internationally which are then collected at the end of the year and used to increase

the delivery of digital health services (Work Plan | Global Digital Health Partnership, n.d.).

Moreover, in early 2018, the governments of Indonesia and Australia held a digital forum in Jakarta to discuss topics related to digitalization ranging from cybersecurity to creative industries, and digital health became one of the discussions in this forum (Randell & Wibowo, 2018). The two countries intend to build partnerships on encouraging the growth of the digital market.

Currently, the digital health market is developing with great potential in Indonesia. Even though currently there are no regulations governing the use of technology in healthcare industry, the results of a study conducted by Deloitte Indonesia, Bahar Law Firm, and Chapters Indonesia states that hospitals and patients in Indonesia have begun to use health-related digital technology (Deloitte, Chapters, dan Bahar Law Firm Berkolaborasi Menggagas Digital Health Roadmap - Tribunnews.com, 2018). Some startups that provide health services such as online doctor consultation or doctor's prescription drug delivery have started to get a place in the community. Furthermore, since 2017, more than 180 million have registered national health insurance, namely the National Health Insurance (JKN), which aims to provide universal access to all Indonesian citizen (Randell & Wibowo, 2018). This can be a big step in supporting the effectiveness of digital health services.

1.6. Research Outline

This research will be divided into seven chapters. Chapter 1 will explain the background of the research, the problems to be answered and research questions. Chapter 2 will discuss existing literature relating to the topic of research as a theoretical framework for answering research questions. Chapter 3 will explain in detail the methodology used to conduct this research relating to data collection and analysis such as explaining the background of respondents, the type of each interview, detail process of conducting a literature review, and analysis method to be carried out. Chapter 4 will explain the interview result and analysis from the residents of Bontang as a basis for answering research questions. While chapter 5 will explain about the interview results and analysis from the resource persons as supporting perspectives. The conclusion of the research

will be carried out in the sixth chapter, which ends with the discussion in the seventh chapter.

1.7. Timeline

This research is planned to be performed in December 2018 until June 2019 with the detail as explained in the below timeline table:

Task/Time	Dec		Jan			Feb			March						
	W3	W4	W1	W2	W3	W4	W5	W1	W2	W3	W4	W1	W2	W3	W4
Chapter 1: Introduction															
Chapter 2: Theoretical															
Framework															
Chapter 3: Research															
Methodology															
Chapter 4: Literature															
Review															
Chapter 5: Result and															
Analysis of Resource															
Person															
Chapter 6: Result and															
Analysis of Community															
Chapter 7: Conclusion															
Chapter 8: Discussion															
Final															

Table 2 Timeline

Task/Time	April			May				June					July		
Task/Time	W1	W2	W3	W1	W2	W3	W4	W5	W4	W1	W2	W3	W4	W5	W1
Chapter 1: Introduction															
Chapter 2: Theoretical															
Framework															
Chapter 3: Research															
Methodology															
Chapter 4: Literature															
Review															
Chapter 5: Result and															
Analysis of Resource															
Person															
Chapter 6: Result and															
Analysts of Community															
Chapter 7: Conclusion															
Chapter 8: Discussion															
Final															

2. Theoretical Framework

This chapter presents theories used as the guideline of the research that is divided into two sections. The first section discusses the Theory of Planned Behaviour (TPB) (Ajzen, 1988; Ajzen & Madden, 1986), which is the basis of the research. The idea of the research is to find out whether people in Bontang have the willingness to use digital health, which is believed to be a powerful solution for universal access to health. Therefore the research questions and interviews are built from the Theory of Planned Behavior (Ajzen, 1988; Ajzen & Madden, 1986). The second section presents the Grounded Theory, which is a method to perform the qualitative analysis to generate findings of interviews.

2.1. The Theory of Planned Behavior

The Theory of Planned Behavior (Ajzen, 1988; Ajzen & Madden, 1986) is one of the most extensively adopted socio-psychological theory. The basic idea of this theory is that the intentions and behavior of people are formed by three determinants: the attitude toward the behavior, subjective norms, and perceived behavioral control, where each case is also affected by certain beliefs (Ajzen, 1988; Ajzen & Madden, 1986).



Figure 1 The Theory of Planned Behavior (Ajzen)

As shown in Figure 1 *The Theory of Planned Behavior (Ajzen)*, the first determinant in TPB is the personal attitude towards the behavior itself. This aspect represents a person's

belief in the consequences of behavior or commonly referred to as behavioral beliefs (Ajzen, 1991; Icek Ajzen, 2005). Allport (1935) explained that a person's attitude is formed from experience which then affects one's response to an object and its environment, and determines whether that particular object is perceived as positive or negative. An example in terms of technology use, people who believe that using technology brings positive outcomes to their life will be more likely to use it than people who believe technology brings no added value to them.

The second determinant is subjective norms. Subjective norms refer to beliefs or reactions from the surrounding environment towards an object or behavior. Two aspects that composed subjective norms are motivations that have to be obeyed by individuals and normative beliefs (Ajzen & Madden, 1986). In other words, approval or disapproval from family, friends, or other people who are considered as significant can influence a person's perception and behavior towards a particular object (Ries, Hein, Pihu, & Armenta, 2012).

The last determinants is perceived behavioral control which can be defined as individuals belief toward their capability to perform a behavior that is determined by their perception of the control they have towards a certain object (locus of control) and the ability to perform the desired tasks related to the object (self-efficacy) (Ajzen, 2002). This aspect is closely related to the availability of the resources needed and the ability to access these resources (Ajzen, 2002). For example, in the use of technology, factors such as the availability of technology and supporting infrastructure, perceived financial capabilities, and perceived difficulties or ease of use of the services could increase or decrease the likeliness of one's using technology.

As explained earlier, these determinants combined specify one's intention towards a particular object, which ultimately reflects on their behavior. In the case of technology, it can be assumed that based on the theory, the more positive attitudes and perceptions of subjective norms, coupled with greater perceived behavioral controls, will increase one's intention regarding the use of technology.

As a matter of facts, the theory has been used in various fields to predict behaviors. Some examples of topics are recycling intention among households and students (Boldero, 1995), examination of alcohol consumption (Conner et al., 1999), intention towards using seat belt (Trafimow & Fishbein, 1994), health-related behaviours (McEachan et al., 2011), behavior towards smoking habit (MOAN & Rise, 2010).

In this study, TPB will be used to gain insight into the behavior of people living in Bontang towards the use of digital health systems. Interviews will be conducted to be able to interact directly with the community and understand their beliefs by referring to every aspect of TPB, namely behavioral beliefs (attitudes), beliefs related to social pressure (subjective norms), and self-efficacy (perceived behavioral control). Furthermore, the perception of the availability of the resources will also be supported by the information from the government perspectives by analyzing whether the infrastructures and policies are sufficient for digital health to be accepted by people.

2.2. Grounded Theory

Grounded theory (Glaser & Strauss, 1967) is an inductive method for qualitative data analysis that firstly coined by two sociologist Barney Glaser and Anselm Strauss. The main idea of the theory is to generate findings and formulate theories by systematically collects data and analyzes them through patterns recognition. This theory is widely used in social studies to understand the phenomenon in a social context. B G Glaser and Holton (2007) defined grounded theory as 'an alternative to positivistic, social constructionist, and interpretive qualitative data method.

In the early stage of its development, Glaser & Strauss (1967) explain that Grounded Theory could only be developed by sociology experts. However, the presumption did not last long because, in 1978, Glaser explained in his study that Grounded Theory could be implemented in various areas such as politics, education, health, anthropology, and business and administration (Glasser, 1978).

Since its first introduction, researchers have been trying to define Grounded Theory in various definitions. According to Charmaz (2006), Grounded Theory is a method that systematically describes data collection and analysis techniques to build a framework that can explain data or information that has been collected. Similarly, (Fernández, 2004) explained that Grounded Theory is a method to generate theory through using the inductive approach that provides the ability of the researcher to construct a theoretical from the general characteristics of certain topics or area while concurrently grounding account by exploring the empirical data. The researchers who introduce the

theory itself specify Grounded Theory in a simple way, which is a method that is intended to build a theory about important issues in people's lives (Glaser, 1978; Glaser & Strauss, 1967; Strauss & Corbin, 1998).

The general assumption of Grounded Theory is that empirical investigations must be carried out by exploring the social phenomenon and understanding how people face or interact with a certain issue or object without having pre-determined assumptions or aiming to find results to prove. Therefore, the important value of Grounded Theory is that it requires an open perspective of human behavior in the social context (Simmons, 2006).

In respect to this research, Grounded Theory will be used to analyze the interviews that are intended to explore the behavior of people in Bontang towards digital health system in addition of the main framework which is the Theory of Planned Behavior (Ajzen, 1988; Ajzen & Madden, 1986). The stages of data collection and analysis that will be carried out will represent the Grounded Theory explained by (Scott, 2009) where the researcher constructs the theory from the evidence and categorize them through several stages of coding which ultimately presents the theory. According to (Scott, 2009), there are eight major aspects that must be noticed to analyze data using Grounded Theory technique:

1. Identifying research area

The earliest stage of performing Grounded Theory is to identify the substantive area in order to define the target population. As an example, to obtain data for research regarding dying in hospitals, the researcher could target nurses as the substantive population (Glaser & Strauss, 1967).

2. Data collection

Grounded theory can be performed in either qualitative and quantitative data or even a combination of the two. The term data itself is not limited to the information from the substantive area. Glaser (2002) mentioned that everything that researcher learn within the research settings could be considered as data. However, the quality, relevancy towards the research, and the usefulness of the data for analysis are varied (Charmaz, 2006).

3. Open coding

Open coding is the stage that is performed at the same time as the data collection. Both stages are carried out simultaneously and continuous until the main category is identified. The purpose of doing both stages concurrently is to provide the researcher guidance to define what data need to be collected next. Charmaz (2006) define open coding as initial coding, which can be done word-by-word or line-byline.

4. Memo-writing

Writing memos or note is an essential step of grounded theory as it explains the development of the theory. During the data collection and analysis, the researcher needs to manage a written note regarding but not limited to the interpretation of categories and their respective labels and record new liaison among labels or categories (Martin & Turner, 1986).

5. Selective coding and theoretical sampling

After the researcher identifies the main category from open coding, selective coding, which is only for the primary and relevant categories needs to be performed. By doing so, the theory will develop and trigger further data to be collected to attain in-depth understanding (Scott, 2009). The ultimate goal of this step is to have saturated categories and explicit theory.

6. Memo-sorting and finding theoretical codes

Sorting memo aims to fill the gap in the data so that the outline of the theory that will be presented is formed. The sorting process will refer to the theoretical code to identify the affinity, relationship, and underlying uniformity, and decide the accurate location of the memo in accordance with the underlying theory (Holton, n.d.). Furthermore, this particular process will also trigger the researcher to find

new ideas (Holton, n.d.). The negligence of sorting memos in theory building can lead to the weak relationships between concepts or categories.

7. Writing the theory

Writing the result or the theory itself is the last step of the Grounded Theory method. In this part, all findings must be presented with the key categories at the center of the discussion (Rennie, 2007). In case of the absence of the core category, major categories need to be presented sequentially. Another way to present the theory is to do it visually in the form of a flowchart, table, or any other visualization that can fully represent the relation of each category.

3. Research Methodology

This section describes the detail of how to conduct this research in term of collecting the required data such as the detail process for performing a literature review, the type of interview and participants, and the detail of how the researcher conduct the analysis to generate findings. Sub-chapters will be as follow:

3.1. Research Approach

In order to get a deeper understanding to answer each research question, two methods, literature review and interviews were conducted. Interviews are useful for filling the literature gap where no study of digital health in perspective of the Bontang community was found. The exploratory approach is carried out to understand the perspectives of the parties concerned with the object of research. Table 3 explaining the approach taken to answer research questions.

No.	Question	Data	Data Collection Method	Chapter
1.	What is the attitude of people towards the digital health system?	Recorded audio, interview transcript, article, research paper, qualitative analysis	Literature review, interview with community	2.1, 5, 6
2.	What is the social acceptability of the digital health system?	Recorded audio, interview transcript, article, research paper, qualitative analysis	Literature review, interview with community	2.1, 5, 6
3.	What is the accessibility and availability of the digital health system?	Recorded audio, interview transcript, article, research paper, qualitative analysis	Literature review, interview with the community, interview with a resource person	2.1, 4.2, 5, 6
4.	Do people in Bontang intent to use the digital health system?	Recorded audio, interview transcript, article, research paper, qualitative analysis	Literature review, interview with community	2.1, 5, 6
5.	What would be the suitable model of digital health architecture to increase universal access to health in Indonesia reflecting on the challenges identified through the Theory of Planned Behavior	Research paper, qualitative analysis (interviews)	Literature review, interview with community, interview with resource person	4.1.2,5,6,7

Table 3 Research Approach

3.2. Research Design

The design used in this research is explorative case study based on qualitative data. This research is focused on collecting qualitative data related to the views of society, the government and healthcare providers and their environment towards digital health. The data is then evaluated through the adaption of grounded theory (Barney G Glaser & Strauss, 1967) method (see Figure 2) explained in Chapter 2 to find the pattern of the answers which then being formulated into findings of this research.



Figure 2 Grounded Theory Methodology. Scott, H. (2009). *What is Grounded Theory? | Grounded Theory Online*. Retrieved from http://www.groundedtheoryonline.com/what-is-grounded-theory

3.3. Target Population

There are two types of respondents in this research; the community as the target users of digital health and healthcare services, and resource persons as the experts who provide more detailed information regarding health and digital services. The population of the people chosen in the category is the people of Bontang city, East Kalimantan.

Case study of the city of Bontang is chosen because this city is located outside Java Island, which is considered as far more developed than other islands. The availability of health services in East Kalimantan Province is also still quite low, there are only 60 health facilities for3,648,835 residents, compared to the capital, Jakarta where 10,467,629 residents have 410 health services (Ministry of Health of the Republic of Indonesia, 2019).

In addition, the gap between telecommunication and internet infrastructure between Java and Kalimantan is also one of the reasons for choosing the city. For this reason, the case study conducted in the city of Bontang is expected to be able to answer the concerns of developing digital health to achieve universal access to health in Indonesia.

3.4. Sample Selection

Two types of sampling methods are carried out in this research. The first, for the community category, a stage sampling method is carried out by combining clusters (community in Bontang) and random sampling method which targeting various community backgrounds such as students, office employees, entrepreneurs, parents, and others. The choice of this method is expected to be able to generate insight from various perspectives without requiring as much time as if the study was conducted by random sampling without determining a particular cluster (Black, 1999).

As for the resource persons, a purposive sampling method was conducted where respondents were chosen based on certain relationships with the development of digital health system in Indonesia. The purposive sampling method is a non-probability method that selects samples that have knowledge or expertise related to the research topic (Palinkas et al., 2015). In other words, the selection of health workers in Bontang is expected to be able to provide insight into the condition of the community and patients in Bontang in the context of the health service sector, and resource persons are expected to be able to provide a deeper understanding of government work plans in digital health services.

3.5. Literature Review

In order to understand the current studies on digital health development and provide context to answer the research question, a literature review is conducted. The method used to search for literature is mostly systematic, with little mixing with the snowballing approach. Literature used includes primary research such as government regulation and strategic plans or research conducted by independent institutions, secondary research in the form of papers and reliable articles, and tertiary research in the form of systematic reviews. Several digital tools that are being used to search the literature are Mendeley, Leiden University Catalogue, Google Scholar, and web browser. Existing publications on the related theories will be screened and analyzed for an in-depth review. Some of the keywords used to search for literature include:

- a. Digital health
- b. e-Health
- c. m-Health
- d. Universal Access to Healthcare
- e. Digital health developing countries
- f. Telemedicine
- 3.6. Semi-structured Interviews

Semi-structured interviews were conducted to answer research questions specifically on the subject matter, the community in Bontang, East Kalimantan, Indonesia. In practice, semi-structured interviews will be conducted to ensure crucial questions to be answered, but do not eliminate the opportunity to develop a deeper question based on interesting statements that arise during the interview. The interviews were conducted face-to-face in order to give the interviewer the benefit to see indirect signals from respondents, such as from body language and intonation, moreover, by conducting faceto-face interviews, the interviewer can also be more easily exploring important information (Opdenakker, 2006). Respondents who are considered suitable for the interview included:

Candidate	Respondent Type	No. of Target Respondent(s)	Objective
Healthcare worker(s)	Resource Person	1	To identify the situation of healthcare services in Bontang and how they perceive digital health solution
Ministry of Communication and Information Technology of the Republic of Indonesia	Resource Person	1	To understand the accessibility and availability of technology as a necessary precondition for digital health solution from the government perspective
Ministry of Health of the Republic of Indonesia	Resource Person	1	To understand the work plan of digital health solution in Indonesia from the government perspective
Residents in the city of Bontang	Community	20	To understand how is the community perceive digital health solution in term of their attitude and acceptability.

Tabla	A List	of Rec	nondante
rable	4 LISU	of Kes	pondents

Resource persons will be approached by email and online text message application while some of the respondents from the residents in Bontang will be both contacted through acquaintances and asking random people from public places to ensure the diversity of the respondents. The language used in the interview is Bahasa Indonesia (Indonesian national language), but the result will be translated into English.

The interview will be opened with the following opening statement:

"Thank you for your willingness to help me to be the respondent for my study. My name is Annisa, and I'm currently doing research on digital health system for my master degree at Leiden University in The Netherlands.

The general objective of this research is to find out whether implementing digital health system would be an effective solution in reducing health inequality issue in Bontang while the results of this interview will help me understand the perspective of the community in terms of their views on digital health systems. I will send you the final report of my research if you would like to know the results.

I have prepared a few questions, but please feel free to share your thoughts if you have any other information that you think might be relevant to this study. In case you are not comfortable with some questions, you do not need to feel obliged to answer. In this interview, there are no right or wrong answers. I will ensure that all interviews are being treated anonymously to ensure your confidentiality."

The questions are divided into five categories based on the Theory of Planned Behaviour (Ajzen, 1988; Ajzen & Madden, 1986) and represented by the color, as explained in Figure 3. Some examples of questions included in the semi-structured interviews are as follows (the complete list can be found in **Error! Reference source not found.**):

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General questions Attitude-related questions Subjective Norm-related questions Perceived Control Behavior-related questions Intention-related questions



No.	Questions					
Openi	Opening Questions					
1	Do you agree if I record the interview in order to have a better analysis of the					
	interview? (In case they do not, notes will be taken during the interview)					

2	Could you tell me a little bit of yourself? (gender, age, occupation, religious				
	affiliation, education level, and marital status)				
3	Do you have children? If yes, how many?				
4	Do you use a mobile phone? If yes, what kind of mobile phone do you have and				
	what do you use it for?				
5	Do you use the internet regularly? If yes, do you think it expensive? Does the				
-	network is good?				
6	How often do you use a healthcare service (e.g., go to a doctor or clinic)?				
7	Have you ever experience difficulty in accessing healthcare service? If you have,				
Main	what was it?				
Main					
8	Are you actively using digital media or technology (e.g., social media, digital news)				
9	Have you ever experience difficulty in accessing digital media or technology in general?				
10	If you have, what system/technology do you use?				
11	Do you know anything about a digital health system? If you do, could you explain what is it or how it works based on your understanding?				
12	Do you/have you ever use any digital health system? Why and why not?				
13	If you do/, have, which digital health system do/have you use?				
14	How do you feel about using digital applications for health? Is that a positive or				
	negative feeling?				
15	In your opinion, what are the advantages of using the digital health system?				
16	And what are the disadvantages?				
17	Do you think people around you want to/already use digital health system? Why				
	or why not?				
18	Who do you think would want to/already use digital health system? Why?				
19	Who do you think would not want to use digital health system? Why?				
20	Do you think it would be difficult for you to use the digital health system to attain healthcare service?				
21	What do you think would be the challenges?				
22	Do you know that when you use digital health system, you will be giving out				
	your health information?				
23	How do you feel about that?				
24	Do you believe the digital health system provides easier access to healthcare?				
	Why or why not?				
25	Is it important to have a digital system to support healthcare service?				
Opening Questions					
26	Do you have any comments or information you want to share regarding this study?				
27	Are you available for follow up question? If you do, may I have your phone				
	number or any other media so I can contact you in the future?				

4. Literature Review

This chapter presents the existing literature on digital health in both global and national context. The sub-sections in the global context is discussing digital health in general, challenges of digital health in developing countries and universal access to health. The national context sub-sections present the situation on health landscape in Indonesia to attain insight on the easiness and difficulty of the community to access health services, ICT landscape in Indonesia to generate insight on the accessibility and availability of ICT particularly for the digital health system in Bontang and digital health from Indonesian government's perspectives.

4.1. Global Context

This section provides information regarding the digital health, the implementation of digital health in developing countries, Universal Health Access and the required elements to generate the idea of what to be measured to define accessibility towards digital health solution.

4.1.1. Digital Health

World Health Organization (2008) defines digital health as a health service that includes monitoring, provider care, health information, research, and health-related literature supported by information and communication technology. The Digital Health & Care Institute in its definition of digital health briefly describes the benefits of the digital health system which are a more accurate predictions about a person's health condition, improving service efficiency, increasing accessibility and quality of health services and minimizing costs of healthcare (Digital Health & Care Institute, n.d.).

Information and communication technology has an important role in digital health as a new interaction channel between service providers such as hospitals, clinics, physicians, caretakers, or other service providers with service recipients (Chandrasekhar & Ghosh, 2001). ICT is considered as a collaboration media that can improve the effectiveness of health services (Idowu, Ogunbodede, & Idowu, 2003; Mechael, 2005). In addition, ICT also has the potential to simplify timeconsuming non-medical processes such as patient referrals (Graham, Bell, & Bullough, 2001).

Moreover, implementing digital technology is also believed to be able to overcome the challenges of health services such as the lack of qualified health workers (PricewaterhouseCoopers, 2005; Young, 2003), demands for technological advancement and research for cope with a more complex diseases, and demands for predictions more accurate and effective (Singh, Naik, Rao, & Petersen, 2008) that are related and cause an increase in health care costs.

Digital health is a term that has a broad meaning, IQVIA Institute of Human Data Science mentions several types of digital health tools developed and used today (Aitken, Clancy, & Nass, 2017), including:

- a. Consumer Mobile Apps
- b. Consumer Wearables
- c. Connected Biometric Sensors
- d. Smartphone Cameras
- e. Clinical Trial Patient Information Collection Tools
- f. In-Home Connected Virtual Assistants
- g. Telemedicine and Virtual Physician Visits
- h. Personal Health Records
- i. Web-based Interactive Programs
- j. Text Messaging or Email
- k. Health System Disease Management Apps

There are currently more than 300,000 health applications in the world (Aitken et al., 2017). Its use is not only to access health services but also to encourage healthy behavior with diet and nutrition control, lifestyle monitoring, stress measurement, or even applications that are supported by digital sensor connections from wearable devices such as smartwatch (Aitken et al., 2017).

The development of digital sensors is very fast, not only measuring the number of steps through motion sensors which feature has become a common feature in smartphones, digital sensors have also expanded its scope to measure alcohol content, stress levels, blood pressure, mood, calories in, calories wasted, and much more (Aitken et al., 2017). In addition, health equipment such as asthma inhalers or insulin pumps has developed into "smart" health devices with sensor support to monitor patient use.

The benefits of Digital Health tools for humans, and the health care system continue to develop. There has been ongoing research from the business and public fields to explore and seek innovations related to digital health

4.1.2. Adoption of Digital Health Solution in Developing Countries

In this digitalization era information and services can travel around the world in a blink of an eye. Even though studies show that the use of cell phone and internet in low to middle-income countries is currently increasing sharply (Kay, Santos, & Takane, 2011; Vital Wave, 2009), they are still facing challenges of health disparity in terms of quality, price, and accessibility (Lewis, Synowiec, Lagomarsino, & Schweitzer, 2012). This triggers both the government and business to innovate to improve the level of public health. As a result, interests to implement technology to support the health sector through digital health is increasing.

Digital health systems are believed to have great potential to reduce health service inefficiencies, expand the delivery of care from areas or countries that have a better quality of health services to areas with limited access to health services, and provide better service (Edworthy, 2001). In fact, some developing countries have implemented digital health, and it is proven to improve their health services.

For instance, the electronic health record called Mosoriot Medical Record in Kenya and Vista system in India has been proven to receive good feedbacks, increase the productivity of health workers and reduce the patient waiting time (Blaya, Fraser, & Holt, 2010). Developing countries are not only utilizing advanced technology in digital health, but Short Message Service (SMS) is also used in several countries to disseminate health information to the public. Africa, Cambodia, and the Philippines use SMS as a medium for disseminating vaccination-related information, malaria prevention, and basic hygiene, while in Bangladesh, pregnant women get a reminder to carry out prenatal checks and

important information such as nutritional guidance via SMS (QS Asia News Network, 2018).

Studies on the use of SMS as a health surveillance system in Uganda and the use of mobile phones during disease outbreaks in rural China prove that the use of technology by health workers can improve health services (Huang, Blaschke, & Lucas, 2017). Furthermore, the patient reminder system used in South Africa is also considered successful in increasing the rate of TB treatment completion (Blaya et al., 2010).

However, technological developments in developing countries also have the potential to increase the marginalization of health for people who do not have access to digital media. The pilot digital health implementation project in Ethiopia shows that the biggest inhibiting factor in digital health adoption is user rejection (Biruk, Yilma, Andualem, & Tilahun, 2014). For this reason, evaluation and further improvement need to be done to ensure optimal utilization of digital health.

4.1.3. Universal Access to Healthcare

The term "universal" in health care refers to the coverage of services that allows everyone to be able to access it without resulting in financial difficulties (World Health Organization, 2010), while access is a complex term that can be explained by many aspects and definitions_(Daniels, 1982; Haddad & Mohindra, 2002). According to Evans, Hsu, & Boerma (2013), access to health services can be defined as a person's ability to obtain health services according to their needs without endangering their financial security. Levesque, Harris, & Russell (2013) formulate the definition of access as the ability of a person to attain health services starting from the phase of identification of service needs, search for services, the ability to achieve and use services, and being offered services that are in accordance with one's needs.

There were several studies explain the concept of access in healthcare industry, one of which formulated these studies and dividing the idea of access into three aspects which are physical accessibility that is defined as a condition where health services are available when and where needed and can be reached within reasonable effort, financial affordability which does not only take into account health care costs that do not cause financial difficulties to service recipients but also indirect surcharges such as transportation costs or fees needed to leave work, and acceptability from service recipients to seek and receive care that can be influenced by social and cultural factors such as religion, ethnicity, age, or even gender (Penchansky & Thomas, 1981; Shengelia, Tandon, Adams, & Murray, 2005; Tanahashi, 1978).

Another similar view of conceptualizing access in healthcare was explained more detail by (Levesque et al., 2013) in five dimensions which cover both the supply and demand side (Figure 4). The dimensions formulated in the framework are not independent of each other (Haddad & Mohindra, 2002), but rather influence each other and responsible at different times during the treatment period.



Figure 4 Accessibility Framework. Levesque, J.-F., Harris, M. F., & Russell, G. (2013). Patient centered access to health care: conceptualizing access at the interface of health systems and populations. Retrieved from International Journal for Equity in Health https://doi.org/10.1186/1475-9276-12-18

The upper part of the elements in the frameworks explains what is needed from the service providers to offer accessibility in health services, while the elements in the lower part of explaining the required capabilities of service recipients to interact with the accessibility elements to obtain the expected access. Both upper and lower parts are required in order to attain the results described in the middle part.

The first dimension is approachability and ability to perceive (Levesque et al., 2013). Approachability describes the elements that can measure the extent to which health services allow people who need health services to identify their whereabouts. This element needs to be in accordance with the ability of the community itself to understand their health problems that are determined by several aspects such as trust, expectations, and health knowledge.

The second dimension is acceptability and ability to seek (Levesque et al., 2013). Acceptability explains the possibility of health services being received by individuals, which can be determined by external factors such as culture and social norms. The ability of the community to seek health services that can be determined by personal and social values also influences how far the level of acceptance of service.

The third dimension is availability and accommodation and the ability to reach. Availability and accommodation refer to the existence of health resources that are capable to meet the demands (Vaughan, 2004) such as sufficient facilities or working hour of the health workers. People who are seeking health service need to be supported by the services that are available and accommodate their needs. Simultaneously, this aspect also affected by their ability to reach the services, which refers to personal mobility, time flexibility, or transportation availability.

The fourth dimension is affordability and the ability to pay (Levesque et al., 2013). Affordability is related to an individual's economic capability to reach access to health services. This results from the price of service itself, and additional cost related to the service (e.g., transportation cost, cost of taking time to leave work). Synchronously, one's ability to pay, which is a commonly used notion within the health services and health economics literature (Salkever, 1976; Yoder, 1989) explains the capability to generate financial resources. Liabilities and poverty are examples of factors that can affect someone's ability to pay for health services.

The last dimension is appropriateness and the ability to engage (Levesque et al., 2013). Appropriateness refers to the conditions in which the services offered meet the service recipient's demand in terms of time and quality. For example, people in remote areas who need a long time to get treatment and recover from minor illnesses and people in urban areas who can easily and quickly, even offered many health care options cannot be claimed to have equally adequate access to health services(Levesque et al., 2013). The ability to engage from the patient perspective relates to the capacity of healthcare service recipients to be involved in health service-related activities. Motivation, commitment, and understanding of the care are required in order to gain the optimal impact of the accessibility of health service.

In conclusion, universal access in healthcare can be defined as allowing everyone to be able to access health service by ensuring its approachability, acceptability, availability and accommodation, affordability, and appropriateness, while concurrently creating the environment for everyone to have the required abilities to access the service.

4.2. National Context

This section provides information regarding the current situation of healthcare and digital health in Indonesia. The discussion covered the gap of healthcare and ICT between regions, the challenges of healthcare service, and digitalization of health service from the perspective of the Indonesian government.

4.2.1. Health Landscape in Indonesia

Indonesia has a National Long Term Development Plan (RPJPN) for 2005-2025, which one of the points in the development of human resources. This development plan places health development as one of the main pillars to improve the quality of human resources, along with improving education and people's purchasing power (Bappenas, 2005). As part of this long-term development plan, the Ministry of Health through the 2015-2019 National Medium-Term Program Plan also has a "Healthy Indonesia" program which aims to improve maternal and child health, disease control, accessibility and quality of health services, universal

health coverage, weaving human health, medicine, and vaccine resources, and increasing the health system's responsiveness (Andrinof A. Chaniago, 2015).

The Ministry of Health continues to improve health facilities at the primary level through the Community Health Center (Puskesmas). Improvement of Puskesmas facilities and its infrastructure is one of the priorities so that Puskesmas are able to deal with more complex diseases that require hospitalization. In 2018, 3,623 out of 6,370 Puskesmas has inpatient facilities (Kementerian Kesehatan Republik Indonesia, 2019). This number has increased from 2017, where there were 3,454 health centers with inpatient facilities from a total of 9,825 (Kementerian Kesehatan Republik Indonesia, 2019).

However, until now, the imbalance number of health facilities between big cities and other regions is still a big problem in the community. For example in DKI Jakarta province which has a total population of nearly 10.5 million, there are 410 health facilities consisting of major clinics and hospitals, while in East Kalimantan province there are only 60 similar facilities to serve more than 3.6 million people (Kementerian Kesehatan Republik Indonesia, 2019). Even the province of South Kalimantan, which has a population of more than 4.1 million, only has 50 main clinics and hospitals (Kementerian Kesehatan Republik Indonesia, 2019).

Island	Sumatera	Java	Bali & Nusa Tenggara	Kalimantan	Sulawesi - Maluku - Papua
Total Population	57,764,462	149,635,784	14,677,360	16,209,810	26,727,897
Total Area (km ²)	480,793	129,438	73,070	544,150	686,127
Number of Main Clinics	158	575	54	34	103
Number of Hospitals	704	1,418	151	182	358

Table 5 Healthcare facility in each province

Average number of residents handled per health facility	67,012	75,080	71,596	75,045	57,978
Average of coverage area by 1 health facility (km ²)	557	64	356	2,519	1,488

Note. Adapted from Kementerian Kesehatan Republik Indonesia. (2019). Data dan Informasi Profil Kesehatan Indonesia 2018.

Therefore, in an effort to face the challenges of public health services such as high cost and distance issues, service quality, quality of health workers, inefficient referral systems and limited supporting infrastructure, the government seeks to develop digital health services. This intention is instructed by the President to the Minister of Health through Presidential Instruction number 9 of 2017 concerning the Acceleration of Welfare Development in Papua Province and West Papua Province (INPRES, 2017). In collaboration with digital health startups, the field of digital health is expected to be able to contribute to increasing community access to health services.

4.2.2. ICT Landscape in Indonesia

The field of Information, Communication, and Technology is growing vastly in the last decade, including in Indonesia. ICT has become inseparable from daily lives, especially in big cities, it has changed the way people communicate, carry out buying and selling activities, conduct daily commutes, seek entertainment, and so on. Connectivity problems and disparities in various fields in Indonesia are caused by the archipelagic form of the region more than 17,000 islands and consist of many mountains and valleys. This has led to the existence of areas in Indonesia that have not been reached by telecommunications infrastructure.

According to the survey conducted by the Indonesian Internet Service Providers Association (APJIII), in 2018 there were around 64.8% or more than 170 million out of a total of more than 264 million Indonesians using the internet. However, as many as 55.7% of this number are people living on Java (APJII, 2019). Sumatra Island ranks second with a contribution of 21.6% (APJII, 2019).
Table 6 Internet user contribution

Island	Regional Internet User Contributions from all Internet Users in Indonesia (%)
Sumatera	21.6
Jawa	55.7
Bali & Nusa Tenggara	5.2
Kalimantan	6.6
Sulawesi - Maluku - Papua	10.9

Note. Adapted from Kementerian Kesehatan Republik Indonesia. (2019). Data dan Informasi Profil Kesehatan Indonesia 2018.

In term of the reason of not using the internet, of the percentage of 35.2% noninternet users, not knowing how to use the internet is the most reason that reaches 12.6% of non-users (APJII, 2019). The second biggest reason is the disinterest on the internet, which is followed by the reason for not having a device, the price of expensive gadgets, high internet prices, no time, and no internet connection (APJII, 2019).

In addition, there are gaps in internet speed between big cities in Java Island and other cities. In 2016, for example, download speeds were felt by people in Maluku and Papua at only 300 kbps while people in Java got around 3500 kbps (Yusuf, 2016). Exceedingly, in Jakarta, the download speed reaches 7000 kbps (Yusuf, 2016). Therefore, at the moment, the government is intensifying to accelerate the increase of internet penetration throughout Indonesia, one of which is through the Palapa Ring mega project.

The Palapa Ring telecommunications infrastructure project is presented as a solution for national connectivity. The 36,000 km national fiber-optic network construction project will reach more than 400 cities and districts throughout Indonesia by integrating the existing telecommunications networks with new

networks in the eastern region of Indonesia or the so-called Palapa Ring-East (Kementerian Komunikasi dan Informatika, n.d.).

The East Palapa Ring-Project builds an underwater telecommunication infrastructure of 3,850 km and on land along 600 km (Kementerian Komunikasi dan Informatika, n.d.). The aim of the program is not only to support the digitalization of the Indonesian people, but also to increase "State Sovereignty" and "National Resilience" through the availability of integrated telecommunications infrastructure.

4.2.3. Digital Health from the Perspective of the Indonesian Government: The Ministry of Communication and Informatics

In term of involvement with digital health, the Ministry of Communication and Informatics (MCIT) does not only act as a regulator but also as a facilitator. Together with digital health startups, which is sheltered by the Indonesia HealthTech Association, the ministry also plays a role in building ecosystems that support digital health services.

So far, there are no specific policies or regulations regarding the system for digital health services. For this reason, MCIT applies the regulatory sandbox method (Financial Conduct Authority & Authority, 2015) to assess innovations that have emerged in this digitalization era (Kementerian Komunikasi dan Informatika, 2018). A regulatory Sandbox is an approach taken by regulators to innovators to assess whether an innovation requires further regulatory action. In this approach, innovators can test the product or service they offer to the real market without worrying about the consequences of the regulations that apply to involvement in the trial activity (Financial Conduct Authority & Authority, 2015).

Although there are no regulations that regulate the implementation of digital health services yet, MCIT has a regulatory basis regarding the implementation of electronic systems which are applied to the digital health system. These regulations include:

 Government Regulation No. 82 on the Implementation of Systems and Electronic Transactions (Peraturan Pemerintah, 2012) This regulation is the primary reference for the implementation of electronic systems. The coverage stipulated in this regulation starts from the registration of electronic systems, hardware and software used, human resources, governance, accountability, security, feasibility assessments, etc. related to the implementation of the overall system.

- Regulation of the Ministry of Communication and Informatics No. 36 (2014) concerning Procedures for Registration of Electronic System Administrators (Kementerian Komunikasi dan Informatika, 2014)
 This regulation describes the conditions required before the digital service operates. This also applies to digital health service providers to avoid illegal applications or illegal features carried out by health care providers.
- iii. Regulation of the Ministry of Communication and Informatics No. 4 (2016)
 concerning Information Security Management Systems (Kementrian Komunikasi dan Informatika, 2016)

This ministerial regulation describes the standardization of information security that must comply with the SNI ISO / IEC 27001 standard. This standard relates to the requirements of the Information Security Management System in an institution which also covers the matter of assessing and handling information security risks (Badan Standarisasi Nasional, n.d.). This is closely related to one of the topics that have become a concern for digital health, which is personal data privacy.

Also, the Ministry of Communication and Informatics included the health sector as one of the strategic areas in the preparation of the Roadmap of Digitalization in strategic sectors (Kementrian Komunikasi dan Informatika, 2018). The general objective of this program is to accelerate digitalization in 7 strategic areas, namely agriculture, creative economy, health, transportation, education, financial inclusion, and tourism (Kementrian Komunikasi dan Informatika, 2018).

4.2.4. Digital Health from the Perspective of the Indonesian Government: The Ministry of Health

As the government authorities to regulate health service activities, the Ministry of Health contributes to developing digital health-related policies. Until now, there are still no regulations regarding health services; the Ministry of Health is still in the stage of identifying potential violations caused. The Ministry of Health itself has started to launch several digital health services, two of which are the Sehat Pedia application and IHeFF (Kementerian Kesehatan, 2018).

Sehat Pedia is an application that facilitates people to get health information quickly and accurately (Kementerian Kesehatan, 2018). This application also provides live chat services for consultation and outpatient registration online (Kementerian Kesehatan, 2018) whereas the IHeFF application functions as a search application for the nearest health facility by providing detailed information for example about the number of beds available (Kementerian Kesehatan, 2018). This application also provides the nearest pharmacy search feature to the user (Kementerian Kesehatan, 2018).

In addition to the applications that have been launched, the government is also developing Telemedicine applications in Indonesia or abbreviated as TEMENIN (TEMENIN, n.d.). The TEMENIN application is a platform that connects hospitals with telemedicine services in 4 fields (TEMENIN, n.d.), namely:

a. Tele-Radiology

Diagnose radiological results remotely by interpreting photos sent online (carried out by a radiologist) to get results and further treatment quickly.

b. Tele-EKG (Electrocardiography)

Tele-EKG is used to support the medical examination of the electrical activity of the heart by sending the electrocardiographic results to a heart disease specialist for rapid diagnosis.

c. Tele-USG (Ultrasonography)

Tele-USG is used to help diagnose pregnant women in remote areas and is associated with ob-gyn specialists to speed up referrals.

d. Tele-Konsultasi

Tele-Konsultasi brings together patients with expert doctors for online consultation, knowing the patient's condition, and making treatment recommendations.

The main objective of this platform is to support health services in remote areas to improve the accessibility of communities, especially in Papua (TEMENIN, n.d.). In addition, Kurniadi & Astuti (2017) developed a web-based portal that integrates patient medical records between health facilities at various levels in which is also connected to the system owned by the Indonesian Ministry of Health called OpenERM. This study states that each health facility already has digital systems that store patients' medical records (Kurniadi & Astuti, 2017). To that end, OpenERM intends to integrate the information system to improve the process of exchanging patient data between health services (Kurniadi & Astuti, 2017).

Not only the government, but business people have also actually begun to develop digital health services. Until now, there have been at least 15 health startups known to the public (Pratama, 2018). One that has the most users is Halodoc (Pratama, 2018). Halodoc is a complete application that provides health consulting services with doctors, buy medicines that have been prescribed after consultation, laboratory check-in services at home, and access to health insurance (Halodoc, n.d.).

Digital transformation of health services has the potential to create conflicts with existing health service policies if it is not immediately anticipated by issuing policies that are explicitly applicable to digital health services. Some regulations that have the potential for policy conflicts include:

i. Law Number 29/2004 concerning Medical Practice (UU RI, 2004)

This law states that medical practice aims to "provide protection to patients; maintain and improve the quality of medical services provided by doctors and dentists; and provide legal certainty to the public, doctors, and dentists" (UU RI, 2004). With the existence of online health services, there are potentials such as malpractice whose accountability mechanism has not been regulated online and medical data privacy fraud because medic records that use online media are threatening the implementation of medical practice according to the objectives stated in the law.

ii. Law Number 36 (2009) concerning Health (UU RI, 2009)

One of the point that this law regulates is the technical implementation of health facilities where online services do not yet have a legal basis. On this basis, in cases of default through online media, the patient faces a weak legal standing because no evidence can measure the achievements given by the doctor.

iii. Regulation of the Ministry of Health 2052/2011 regarding the Permit for Practice and Implementation of Medical Practices (Kementerian Kesehatan, 2011)

One of these regulations states that the standard components in medical practice include "interviewing patients, examining the physical and mental condition of patients, determining investigation, establishing the diagnosis, determining management and treatment of patients" (Kementerian Kesehatan, 2011). Online practice activities are considered not yet in accordance with the standard because doctors do not conduct patient examinations to check their physical and mental condition.

iv. Regulation of the Ministry of Health No. 9/2017 concerning Pharmacy Electronic prescription is a legitimate component in the medical world, which is regulated in this regulation. However, it is necessary to arrange proof of a doctor's approval, for example, in the form of an electronic signature. In addition, prescribing arrangements given by doctors who practice virtually must also be distinguished from doctors in formal health facilities.

In result, to prevent conflicts between the government, health care providers, digital service providers, and the public, the government need to have full understanding of the complexity of potential conflicts that may arise in digital health to formulate the related policy.

5. Result and Analysis of Resource Person

This section explains the interview result and analysis from the resource person; 2 respondents from healthcare workers (doctor and clinic administrator) in Bontang and one respondent for each ministry as a supporting argument for answering research questions.

5.1. Result

a. Attitude

The list of questions that are designed to get an overview related to the attitude of resource persons towards digital health is shown in Table 7.

Respondent	Question		
Healthcare workers	As a healthcare worker, do you think digital health system will		
	help you in any way?		
	In your opinion, what are the advantages of using the digital		
	health system to your patients?		
	And what are the disadvantages?		
Ministry of	How does the Ministry of Communication And Information		
Communication and	Technology view the readiness and willingness of Indonesia as		
Informatics	a developing country in implementing digital health system?		
Ministry of Health	How does the Ministry of Health view the readiness and		
	willingness of Indonesia as a developing country in		
	implementing digital health system?		
	What would be the expected outcomes in implementing digital		
	health system in the perspective of the less developed regions?		

Table 7 Attitude-related resource person question list

In term of attitude towards digital health, all of the three respondents convey both positive and negative views. The first resource person, a doctor who works in Bontang, has been using digital media to interact with patients and provide results of online examinations as he sees the potential of digitization that could increase efficiency and save paper usage.

As a doctor, however, he argued that there would be potential frauds in online platforms since there is no policy or standards issued for this specific matter. As he stated, "there should be a standardization or regulation that ensure that the patients are talking to a real doctor, not a nurse, or someone who just has medical knowledge like a student, I personally don't think we are ready for that.". Other

than that, the clinic administrator also mentioned that a few of the patients are communication with midwives through the clinic's official WhatsApp account called TanyaBidan.

Another view was conveyed by the second speaker. In the development of digital health in Indonesia, the Ministry of Health is responsible for formulating policies related to health services. Many things are taken into consideration; for instance, in the type of digital health services as an online consultation platform, the ministry sees that there is potential for malpractice with no accountability mechanism yet.

Other than that, the number of platforms where doctors can perform their online practice is also seen as potential problems, as explained *"when doctors practiced online on too many platforms then they become too busy to reply to chat and they create a template to answer patient's issues."*. Even so, the ministry is also aware of the benefits of digitalization and starting to catch up on health services in remote areas through telemedicine. With the existence of Presidential Instruction no number 9 of 2017 (INPRES, 2017), Ministry of Health puts the development of telemedicine through TEMENIN site that integrates with local health facilities in all regions to improve people's accessibility to health services into its priority.

In digital health, MCIT as the third respondent is a government representative whose duty is to formulate policies related to the implementation of digital health electronic systems. MCIT also works closely with digital startups and acts as a facilitator who supports startups to develop the technology. Therefore, MCIT shows quite a positive attitude towards the development of technology and specifically for digital health, the respondent stated: *"I think in the digital era we must always be ready, we must quickly prepare the community and government to accept advancements."*.

b. Subjective Norms

The list of questions that are designed to get an overview related to the related to resource person's views of the reaction of the surrounding environment, in this case, society, towards digital health is shown in Table 8.

Respondent	Question		
Healthcare workers	Which group of patients do you think would use the digital		
	health system? Why?		
	Which group of patients do you think would not use the digital		
	health system? Why?		
Ministry of	Does the Ministry of Communication And Information		
Communication and	Technology believe that people who live in a less developed		
Informatics	region willing to accept digital health system? Why or why		
	not?		
Ministry of Health	Does the Ministry of Health believe that people who live in a		
	less developed region willing to accept digital health system?		
	Why or why not?		

Table 8 Subjective norms-related resource person question list

The three respondents shared their own views regarding the reaction of the public to the digitalization of health services. Based on experience with patients, the respondent, who is a doctor in Bontang said, "we offer a paperless way to get some examination results. So instead of coming here to get the result, they can get it through WhatsApp. However, about half of the patients do not want that so we still provide the conventional way (handing out examination result in the paper)". Meanwhile, respondents from the two ministries expressed a more favorable opinion regarding community acceptance of digital health.

Reflecting on the socialization activities to introduce digital media to a rural community that had been carried out, MCIT argues that most people in rural areas will be willing to accept digitalization for health service. As the respondent stated, *"they are not resistance to that; they even seem interested, some people who have never used a smartphone or tablet invited their children who use smartphones."*. Furthermore, respondents from the Ministry of Health expressed his personal views regarding the public acceptance of the digital health system. Seeing the success of today's online platforms, respondents expect that the digital health system in the form of an online platform can also be quickly accepted by the public, as he said *"I believe so (can be quickly accepted), at least I know many people are using Halodoc because it makes buying drugs easier since you don't need to go out. Surely a lot of people will use it. It's my personal opinion"*.

However, considering the spread of the internet in Indonesia where as much as 55% is used by the people who live in Java Island (Annur, n.d.) and one of the leading

online platforms, Go-Jek, states that 30-40% of Go-Jek users are concentrated in Jakarta (Fitriany, n.d.), further explanation on the acceptance of society in rural areas towards the digital health system is needed.

c. Perceived Behavioral Control

The list of questions that are designed to get an overview of the associated entities' perceived behavioral control towards digital health is shown in Table 9.

Respondent	Question		
Healthcare workers	Do you use any digital system in your clinic/hospital? If yes,		
	could you explain briefly how it works?		
	What do you think would be the challenges for your patients?		
	Do you know what the government/healthcare providers have		
	done to tackle the issue?		
	In general, do you think it would be difficult for people in		
	Bontang to use the digital health system?		
	Do you think your patients experience difficulty in accessing		
	healthcare service? Why or why not?		
Ministry of	What do you think would be the challenge of introducing		
Communication and	technology in a less developed region in Indonesia?		
Informatics	Does the Ministry of Communication And Information		
	Technology believe they have sufficient resource to use the		
	digital health system? Why or why not?		
Ministry of Health	What would be the challenges of implementing the digital		
	health system in the less developed regions? And how to tackle		
	these challenges?		

Table 9 Perceived behavioral control-related resource person question list

As mentioned earlier, the doctor has been implementing digitalization as a part of service in his clinic and hospital where he works. However, there are about half of his patients that do not understand or want to use that option due to the lack of digital literacy, as he stated *"there are around half of my patients that cannot use digital system, mostly the elders like over 40 or 50 or even young people with a low education level background"*.

In term of the availability of resources that influence the elements of perceived behavioral control, the doctor feels that the availability of internet networks is sufficiently qualified for people to access digital health services. Additionally, a similar perspective regarding sufficient internet connection (in a remote island) shared by the clinic's administrator that stated: "I think the government provides free internet there (in Tihi-Tihi, a small island in Bontang) so they can communicate better with clinics in here.".

In contrast to the doctor's answer, the two respondents from the ministry thought that the community was ready to accept digitalization, but the existing infrastructure was still less supportive, especially in remote areas. Government's program to provide telecommunications access to all regions is still ongoing. Hospital participation in the Telemedicine program in Indonesia is also not yet optimal, to date there are 101 hospitals and community health centers participating in the program, of which 36 hospitals have roles as supporting hospitals, and 65 hospitals and community health centers are members of the program that are being supported (TEMENIN, n.d.).

d. Intention

The list of questions that are designed to get an insight into the intention of resource person towards digital health is shown in Table 10.

Respondent	Question	
Healthcare workers	Do you think it is important for your patients to have the option	
	to use the digital health system?	
Ministry of	How far is the involvement of Indonesia in the global	
Communication and	development of digital health?	
Informatics		
Ministry of Health	How far is the involvement of Indonesia in the global	
	development of digital health?	

Table 10 Intention-related resource person question list

The three parties seem to agree that digitalization is inevitable so that preparations to face digitalization need to be done. Even hospitals and clinics have begun to implement digital system services as a channel of communication to the public. However, as a doctor who interacts directly with patients, there are still challenges from patients in small towns, especially Bontang, which is the reason for not using digital health services. Some examples of these challenges are the inability of patients to explain health complaints adequately, insufficient knowledge to use these services or even problems from the doctor's side to maintain people's trust in health services through a digital platform.

As for the government, even though there has not been much government involvement in the digital health sector in the international arena, there are developments going on in that direction. The government from the Ministry of Health and the Ministry of Communication and Informatics are still in the early stages of developing digital health. Policy formulation and identification of potential problems are still carried out to determine the extent and type of digital health that will be permitted. The promotion of digital health to the community, especially outside big cities, will also be carried out by the Ministry of Communication and Informatics this year. Meanwhile, the Ministry of Health has also built an application to support the implementation of digital health in Indonesia.

5.2. Analysis

The analytical method used to determine the behavior of respondents to digital health and its affecting factors (labels) from the interviews of the three resource persons is adapting the Grounded Theory method described in Chapter 2. Based on the results obtained from interviews with three resource persons consisting of a doctor who resides and practices in Bontang, staff from the Ministry of Health and Ministry of Communication and Informatics, 80 important labels were found (see **Error! Reference source not found.**). After that, all labels found are grouped into categories and sub-categories according to the properties associated with the elements of the Theory of Planned Behavior (Figure 5). A total of 38 labels are found to be related to the theory and being grouped into 13 categories (see Appendix 1).



Figure 5 TPB Framework on resource person interview analysis

Respondents indicated both positive and negative response to some extent, based on the affecting factors. Respondents that shares a positive attitude by realizing the benefits that can be achieved with the presence of digital health such as increasing efficiency, reducing costs, digital health capabilities to prevent outbreaks in remote areas with faster handling, improved accessibility and maximizing the role of local health workers with support from the experts connected throughout Indonesia or even the world. However, the shortcomings mainly trust issues, the lack of supervision on online consultation platforms must also be considered and resolved to prevent problems that arise and has the potential to be the reason behind the negative response from either the resource person or the community to the digital health system. In general, respondents believed that the digital health system, especially telemedicine developed in the form

of tele-EKG, tele-USG, tele-consultation, and tele-radiology (TEMENIN, n.d.) could reduce the gap in health services between big cities and remote areas in Indonesia.

The acceptance of the community and the entities associated with digital health also varies. Business, in this case, the digital startup responds well to the presence of digital health. There are already more than 15 health service startups that are well-known to the public, some of which have even reached millions of users yet though they have only been established since 2017 (Pratama, 2018).

In addition, hospitals which participated as the members of the Indonesian Hospital Association (PERSI) are also continually discussing the digitalization of hospitals with the Ministry of Health, Ministry of Communication and Information, and health tech.id as the party that oversees healthcare service startups in Indonesia, through seminars and expos ("PERSI Jatim Gelar Seminar Digitalisasi RS dan Hospital Expo," n.d.). However, there are still parts of society that are considered unable or unwilling to accept the digitalization of health services for various reasons.

Judging from the readiness for the implementation of digital health, currently, health facilities are considered still not sufficiently qualified. Difficulties that are experienced by people living in remote areas with minimal health facilities, high costs, and long distances are one of the strong reasons for the government to develop digital health with a note that the difficulties posed by digital health itself can also be overcome. When talking about digital health, health inequalities, and digital inequalities become a whole package. Factors that cause certain groups of people not to use digital health services such as the elderly, people with low education level or who are out of touch by the supporting infrastructure will remain a disadvantaged community in terms of health service disparities.

In the end, despite all the challenges, the results of the interview can be concluded that respondents have the intention to use a digital system for health services. Clinics and hospitals have begun to carry out digital transformation for internal hospitals or integration between hospitals and communication with patients ("PERSI Jatim Gelar Seminar Digitalisasi RS dan Hospital Expo," n.d.). Moreover, the government also has priority on the equalizing telecommunications infrastructure, formulating policies related to digital health, and introducing the public to the digital health system.

6. Result and Analysis of the Community

This section explains the findings and analysis from the interviews of the residents of Bontang as a basis for answering research questions.

6.1. Result

Twenty people participate in the interview, which is chosen randomly. Participant's demographic characteristics are shown in Table 11 *Respondent demographic characteristics*.

Table 11 Respondent demographic characteristics

Respondent	Year(s) of living in Bontang	Age	Occupation	Last Education	Religion	Marital Status	Number of Children
1	4	27	Employee in Pupuk Kaltim (state-owned company)	Bachelor degree	Moslem	Married	1
2	18	18	Shopkeeper	Senior high school	Catholic	Single	0
3	18	18	Student	Senior High School	Moslem	Single	0
4	17	17	Student	Senior High School	Moslem	Single	0
5	3	20	Sales Promotion Girl	Senior high school	Catholic	Single	0
6	18	18	Student	Senior High School	Moslem	Single	0
7	20	24	Employee in a hotel	Vocational School	Christian	Married	0
8	21	21	Administrator in a company	Senior High School	Moslem	Married	1
9	12	41	Housemaid	Elementary school	Moslem	Married	1
10	4	29	Employee in a private company	Bachelor degree	Moslem	Married	1
11	26	30	Employee in a private company (IT field)	Bachelor degree	Moslem	Married	1
12	12	24	Makeup artist	Bachelor degree	Moslem	Single	0
13	6	52	Food stall owner	Senior High School	Moslem	Married	2
14	3	38	Housewife	Bachelor degree	Christian	Married	2
15	16	16	Student	Senior High School	Christian	Single	0
16	5	50	Masseuse	Elementary school	Moslem	Married	3
17	10	40	Housemaid	Elementary school	Moslem	Married	3
18	37	37	Shopkeeper	Senior high school	Catholic	Married	1
19	1	23	Sales Promotion Girl	Senior High School	Moslem	Single	0
20	27	27	Mechanic	Vocational School	Moslem	Single	0

a. Attitude

Questions that are designed in order to obtain insight into someone's attitude towards digital health are:

i. How do you feel about using digital applications for health? Is that a positive or negative feeling?

- ii. In your opinion, what are the advantages of using the digital health system?
- iii. What are the disadvantages?
- iv. How do you feel about that (give health information to a digital system)?
- v. Do you believe the digital health system provides easier access to healthcare? Why or why not?

The questions mentioned developed according to the responses received and followed by the below questions:

- vi. In your opinion, is this kind of system (digital health) helps?
- vii. What do you think about this type of digital health (online consultation)?
- viii. It's quite an interesting answer, why wouldn't you be bothered by that (replacing doctor with a robot in online consultation application)?

Most of the people are still not familiar with digital health systems. Thus the attitude that is expressed is still an estimate. Of the 20 total respondents, only five people knew about this service, 3 of whom used one of the digital health service platforms in the form of online consultation platform and medicine courier. All three respondent shared a positive view of this service because of its simplicity, as one of them stated *"it makes life easy at a certain point, I don't have to go anywhere to ask a doctor if I have something in mind, however, it is a bit tricky for some illness because I can't meet the doctor directly, for example, if I have skin issue, I can only send the picture"* for commenting the online consultation application.

An exciting piece found was one of the respondents said that it is okay to do an online consultation without having to know whether he was talking to a doctor or a robot. The respondent argues that "we (application programmers) need to be able to mimic the current system or process, and sometimes computer program does a better job than a human.". In addition, none of the respondents said that they are a concern with providing personal data regarding their health to digital health platform and one of them mentioned that it is fine, "as long as there are regulations that protect these kinds of data exchange so it won't be used for something bad.".

The answers given by respondents who have never used digital health or digital services, in general, are also varied. There was even a respondent who expressed negative feeling towards the internet by saying "*I don't like it, my children play*

with internet a lot and sometimes it can get annoying because they become ignorant.". Some respondents stated that they did not understand what would be the advantages and disadvantages of this system, but 11 out of 20 stated that systems such as online consulting services are useful when people want to talk to doctor right away, even 2 of them added insightful opinion such as "I can set a goal, and I know the standard as well. How many calories I need to eat and burn every day, how much activities I should do and I have done, these kind of things are important" and "(beneficial) especially for some diseases that cause shame to the patients.". While the disadvantages mentioned are the expensive cost of digital health tools such as a smartwatch, dependency on internet connections, inadequate knowledge to use digital systems, and trust issues.

b. Subjective Norms

Questions that are designed to attain an overview of reaction from one surrounding environment to digital health are:

- Do you think people around you want to/already use digital health system? Why or why not?
- ii. Who do you think would want to/already use digital health system? Why?
- iii. Who do you think would not want to use digital health system? Why?

Ten respondents said that people in their neighborhood who would use this service came from groups of young people or people who are using the internet actively and two respondents stated that people would use such system if they trust it. Interestingly, one of the respondents said:

"people who live quite far from any doctor (might want to use it), it's not easy for them to always go to a doctor, sometimes they just go to a Mantri (traditional health worker)."

Meanwhile, almost half of the respondents (9 out of 10) conveyed that the community groups that are considered unwilling to use this service are elders and people with a severe illness that require urgent treatment. In addition, respectively, three respondents said that people who do not believe in the system and cannot afford to buy a smartphone or other digital health tools would not use it as well. The

exciting thing that was found was that one of the respondents stated that he did not want to use digital health services because the respondent did not trust health services in general, she said "most likely they will just give me a bunch of medicine I don't need, the application won't make much different. I'd rather use a traditional or preventive medicine such as low-sodium salt".

c. Perceived Behavioral Control

Questions designed to get a picture related to the perceived behavioral control of a person towards digital health and internet access as supporting infrastructure in general are:

- i. Do you use the internet regularly? If yes, do you think it expensive? Does the network is good?
- ii. Do you know anything about a digital health system? If you do, could you explain what is it or how it works based on your understanding?
- iii. Do you/have you ever use any digital health system? Why and why not?
- iv. Do you think it would be difficult for you to use the digital health system to attain healthcare service?
- v. What do you think would be the challenges?
- vi. Do you know that when you use digital health system, you will be giving out your health information?

The questions mentioned developed according to the responses received and followed by the below questions:

- vii. Have you ever experience difficulty in accessing healthcare service? If you have, what was it? If not, do you know if people here are experiencing difficulty to access healthcare service?
- viii. Have you ever experience difficulty in accessing digital media or technology in general?
- ix. Do you/have you ever use any digital health system? Why or why not? If you do, have, which digital health system do/have you use?
- x. Could you explain what is it or how it works based on your understanding?
- xi. Are there a lot of options (doctor) in the application?

xii. Do you think it would be difficult for you to use the digital health system to attain healthcare service?

The three respondents who have used digital health services can identify the processes that run the program. Two of them describe the functionalities of digital health in the form of a smartphone application, and another one describes health-related sensors in wearable devices as he explained, *"it detects your movement using sensors. It knows when you are sitting down, standing up, or even resting. It can also measure your sleep quality"*. Respondents also felt that with digitalization, they get the opportunity to choose a doctor, which is not the case with the conventional way because of the limited resources in health facilities in Bontang.

In the perspective of one's perceived control towards internet, nine respondents said there was only one internet provider that offers a good network, and half of the respondents thought that the prices offered by these providers are considered to be expensive.

In terms of difficulty, there are some challenges in accessing healthcare services that are mentioned by 8 respondents in Bontang such as expensive cost, limited number of doctors, long queues, non-permanent doctors, and the low availability of doctors, as *said "it's a bit difficult to find a good doctor here, especially on national holidays*". The rest stated that they have no difficulty in accessing healthcare or no experience with healthcare services.

Furthermore, regarding one's ability to use digital services, only a small percentage (25%) of respondents said they do not want, are not able, or do not use the internet. The reasons stated are the lack of time and the lack of understanding of how to use the internet.

With regards to the challenges of digital health, the majority (12 out of 20) of respondents who not know about the existence of a digital health system cannot measure what challenges the system will cause that can prevent them from using it. However, a respondent explained a problem that was also mentioned by the doctor which is *"explaining your condition to a doctor (is a bit difficult), maybe it could be harder when the doctor cannot examine you."*. Additionally, the other challenges mentioned are the understanding of how it works, an unsatisfying result due to the

lack of direct examination and slow response from doctor to reply to messages in an online consultation.

d. Intention

Questions designed to get insights on one's intention towards the adoption of digital health:

i. Is it important to have a digital system to support healthcare service?

The questions mentioned developed according to the responses received and followed by the below question:

ii. If there is an option for you to have an online consultation with a doctor trough website or your phone, would you like to use it?

Apart from the 3 people who have used digital health services, there are 7 other people who are interested in using the service, but there is one person who is interested in certain conditions, as she stated: *"maybe (I will use it), depends on what kind of illness I am having."*. Although 6 of these ten people were unfamiliar with digital health before, they shared a positive perception of the system and believed that digital health could increase access to health services.

Additionally, the ten are also regularly using the internet even though 7 of them think that the price of the internet in Bontang is high. Interestingly, 4 out of 10 respondents who have the intention to use digital health application felt that the application was not important, but 3 of them felt there is a possibility that digital health would be important in the future.

Consequently, there are also 10 people who do not have the intention to use digital health. 3 of them do not use the internet, the other 2 used the internet occasionally, and the rest used the internet on a regular basis. Interestingly, one of the respondents stated "It's a bit difficult to find a good doctor, especially on national holidays" but then added, *"I prefer to meet a doctor in person (rather than use online application)."*. They feel that digital health choices are currently not important, and one respondent added: *"there are more important things like cheaper and reliable doctors."*.

During the analysis process, six categories were found in relation to the three elements of the Theory of Planned Behavior, namely, attitude, subjective norms, and perceived behavioral control (see Table 12). The overall picture of the theory is displayed in Appendix 2.

Table 12 TPB Framework of	n community analysis
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Attitude	Positive feelings/ advantages:
	- Less hassle
	- 24 hours availability
	- Useful to consult on stigmatized diseases
	- Digital health devices are useful to maintain daily activities to prevent certain
	illnesses
	- Reduce the administrative process
	- Specifically, for online consultation, when a robot or algorithm does it instead
	of doctor, there is a potential for it to be more reliable
	- Increase accessibility
	Nagativa faalings/ disadvantages:
	Cost of digital health devices (a g smortphone smortwatch) can be expansive
	- Cost of digital health devices (e.g., smartphone, smartwatch) can be expensive
	- Dependency on the internet connection Preference to have a face to face examination
	- Preference to have a face-to-face examination
	- Prone to fraud
	- Can cause doctors to lose patients
	- Insufficient digital interacy
	- Distrust towards digital health system of health service providers
	- Internet increases ignorance
Subjective Norms	People who response/might response positively:
	- Young people
	- Young mothers
	- People who are actively using internet/digital media/application
	- People who live far from a doctor
	People who response/might response negatively:
	- Elders
	- People who distrust the system/application
	- People who do not use internet/digital media/application
	- People who are having an urgent health issue
Perceived	Encouraging Factors:
Robertional Controls	- Competence in using digital media/digital health system
Dellavioral Controls	- Limited availability of doctors or specialists (face-to-face)
	- Expensive cost of doctors (face-to-face)
	- Ability to buy the digital health-related device
	Impeding Factors:
	- Lack of internet connection
	- Satisfaction on the current way of accessing health service
	- Inability to express/explain health condition
	- Lack of digital literacy
	- Low personal motivation on accessing healthcare service
	- Lack of awareness on the digital health existence

The positive or negative response which forms the attitude shown by respondents was influenced by how respondents understood or saw the advantages and disadvantages of digital health systems based on personal experience (Allport, 1935). For example, in general, and based on experience given by online platforms that respondents have used, the purpose of developing digital media is to streamline the process and make it easier for users to attain services. This was then considered by most respondents to be the case of digital health as well.

Another example is the awareness of providing personal data to services. The European Commission (2014) revealed that one of the biggest reasons people don't want to use digital health applications is the privacy issue. Therefore, the European Commission sets out guidelines to ensure that all digital health application developers follow the rules which are complying with the current General Data Protection Regulations (European Commission, 2016).

However, none of the respondents involved are concern about this matter. Respondents are more concerned about the possibility of fraud in the application. A study on one of the leading online transportation platforms in Indonesia, Go-Jek, said that approximately 30% of orders received by Go-Jek indicated fraud and around 60% of drivers claimed to have committed fraud to increase their order to get the daily bonus ("Lembaga riset Jepang ungkap dugaan kecurangan Gojek dan Grab - LensaIndonesia.com," n.d.).

This kind of experience can trigger negative feelings for the online platform although there was one respondent, who stated that it did not matter if the health consultation was conducted not with a doctor, but there were some respondents who expressed concern about it and even prefer to do a face-to-face consultation due to this issue.

In relation to the environment around the respondents, the most answer related to the people around who are considered not willing to use digital health services is elder. This can be seen from 3 respondents who did not use internet services, all of which were over 40 years old. In addition, research also states that the majority of internet users are in the age range of 15-19 years where the percentage of users and non-users sequentially are 91% and 9%, while at the age of 40-44 years, 48.6% do not use the internet (APJII, 2019). Older age range shows a higher percentage of non-internet users.

The factors that influence a person's attitude towards their ability to carry out action are divided into two groups, namely the encouraging factors and the impeding factors. Encouraging factors can be the ability of a person to do an action or the inability of someone to do another action which ultimately forces them to choose certain actions.

For instance, the high cost to access healthcare services which can be caused by the long distances to reach health facility or limited availability of doctors, making the choice to use digital health be a solution. However, based on the results of the interview, there are also respondents who think that not everyone can afford to buy the equipment needed for digital health, especially the type of digital health, such as applications that require smartphones or health-tracking sensors embedded on a smartwatch.

7. Digital Health National Architecture to Increase Universal Access to Healthcare

With regard to the general purpose of this study, which is to find out whether the application of digital health will reduce health inequality in Indonesia, there needs to be an understanding of a particular model or approach to the digital health system by looking at existing problems. According to Wyatt (2005), groups of people who do not use a system or technology can be divided into 4 parts; the resisters – people who are not used because they do not want, the rejecters – people who consciously stop using a system for certain reasons, the excluded – groups of people who have never use but would like to use it, and the expelled – people who are forced to lose access to an object or system. By reflecting on the results of the analysis shown in Table 12, there are several reasons from the Bontang community not to use digital health systems that can be grouped into 3 of the 4 groups:

- 1. The resisters
 - Preference to have a face-to-face examination
 - Prone to fraud
 - Distrust towards digital health system or health service providers
 - Satisfaction on the current way of accessing health service
 - Internet increases ignorance
- 2. The rejecters
 - Cost of digital health devices (e.g., smartphone, smartwatch) can be expensive
- 3. The excluded
 - Insufficient digital literacy
 - Lack of internet connection
 - Lack of awareness on the digital health existence

Factors such as inability (rejecters and excluded) or unwillingness (rejecters and resisters) of someone using digital health can be overcome by maximizing the potential of digital health not only limited to applications or telemedicine, but also as a whole system of health care support. By adopting a digital health system architecture in Zambia (Gregory & Tembo, 2017), a high-level architecture in Figure 6 could be considered as appropriate to address the problems that have been identified.



Figure 6 Digital health high-level national architecture. Adapted from Gregory, M., & Tembo, S. (2017). Implementation of E-health in Developing Countries Challenges and Opportunities: A Case of Zambia. *Science and Technology*. https://doi.org/10.5923/j.scit.20170702.02

There are three levels included in the high-level architecture of the integrated digital health system:

1. Independent Level

In this level, the system or application works silo and obtains data either directly or indirectly from the user. Researchers divide users into three types; non-cellphone users which is a group of people who do not use a cellphone at all, even only for a communication tool, non-internet users who are using cellphones or smartphones as a communication device but do not use the internet, and internet users that use the internet regularly. In this context, community groups that are likely to be separated because of the presence of digital health in the form of applications are non-cellphone users.

For this reason, emphasis on maximizing digital health by health care providers in the form of physician knowledge bases (diagnosis, interaction with patients), physician support systems (clinical therapy such as physiotherapy and psychology), and diagnostic-based information systems (e.g. laboratory data, EEG, EKG, USG) (Gregory & Tembo, 2017) could be beneficial to minimize exclusivity.

Meanwhile, non-internet users still get other choices in obtaining health services other than through formal health facilities, namely the existence of basic m-Health tools, for example, health information, reminders of pregnant women checkups, or registration of health services through mobile phones. More advanced devices and applications such as online consultation with doctors, online health information, and health wearable sensors open more channels for internet users. Furthermore, in addition to health data obtained from formal health facilities, public health information either through basic m-Health or advanced digital health tools in the form of the Mobile Health Information System can also be the supporting data managed by the centralized e-health system.

2. Integration Level

This level manages the overall system interoperability and creates a centralized digital health service platform with systems at independent level function as modules that provide patient's or community's health information in general. The core purpose of integration level is not only to operates on patient data but also for general public information such as birth, death, or congenital health conditions which will provide the

required information for the national registration system and palliative care, as well as the systems in the dependent level.

Integration level in the context of this research also acts as a bridge between health facilities; for example, TEMENIN telemedicine platform which is developed by the Ministry of Health to improve health facility services in areas that are difficult to reach (TEMENIN, n.d.). In addition, interoperability at this level can also be achieved through a platform that integrates patient medical records (that are currently owned silo by each community health center, clinics, and hospitals) and connected with citizen identity number to improve the exchange of medical records system between health facilities (Kurniadi & Astuti, 2017).

3. Dependent Level

The systems in this level manage patient and citizen data obtained from independent or integrated levels which will be the basis of the health information and workflow infrastructure to process and generate a comprehensive view of patient care management. The purpose of this level is to separate the information needed regarding certain digital health technologies to form an optimal computerized health system. The required system at the dependent/national level included:

- a. Health Management Information System that supports the management and planning of health agendas and assists the provision of care in order to control the quality of health services in various levels and consequently improve patient's satisfaction (Shaikh & Rabbani, 2005)
- b. Surveillance Information System to monitor health-related data on an ongoing basis and function as an early warning system for health emergencies, monitoring the results of interventions and assisting decision making in public health strategies ("WHO | Public health surveillance," 2017)
- c. Logistic Management which helps to monitor the situation of health service logistics at various service levels (e.g., stock management, logistics transport) to improve the quality of health facilities and mitigate emergencies (Ageron, Benzidia, & Bourlakis, 2018)

 d. Education and Research to improve the quality of resources and care for health services on an ongoing basis and reach all levels of health services (Gregory & Tembo, 2017)

With the support of an integrated system on a national level, it will improve coordination among stakeholders. Therefore healthcare provider will be able to respond quickly to problems such as outbreaks in the remote areas, shortages of specialist health workers, expensive costs, and lengthy administrative processes (e.g., patient transfers).

8. Findings

This chapter summarizes the whole findings (from the literature review and interviews) to formulate an answer to the research questions. The main research question is:

"How does the Theory of Planned Behaviour helps to explain the intention of people in Bontang to use digital health system?"

In order to answer the main question, it is necessary to elaborate on the answers of the subquestions that explain more specifically each element of the Theory of Planned Behavior.

a. What is the attitude of people towards the digital health system?

In a time when everything can be accessed in a blink of an eye, people living in the midst of complete facilities supported by technology have strong reasons to have a positive attitude on innovation. However, different realities occur in society living in small cities in developing countries where gaps are still a frequent occurrence. Slow technological advancement and low levels of education make it difficult for everyone to be familiar with the technology.

Digital literacy is not a natural human ability; it requires the ability to process information that is quite complex, and the ability to buy tools to access digital technology. Because of this, not all people in Bontang show a positive attitude towards the digital health system. Although some argue that technology will be very useful for accelerating health services, obstacles such as the inability of patients to access the digital system or the inability to explain health complaints can be an issue that causes a person to avoid digital health system.

b. What is the social acceptability of the digital health system?

Based on the interviews from both community and resource person, it can be concluded that there is not much negative sentiment towards digital health. A refusal that is related to a negative sentiment found in this research is only for the reason that a specific type of technology which is a smartphone make someone become ignorant, there is no specific reason for the rejection of digital health. However, the findings and the literature studies show that people in certain age groups and educational levels are still victims of the digitalization gap. This indicates that there is a possibility of rejection towards digital health services and endanger the purpose of digital health that is to achieve universal access to health.

c. What is the accessibility and availability of the digital health system?

Based on interviews with resource persons and literature studies conducted, it can be concluded that the accessibility and availability of the digital health system itself are quite high. Services that are accommodated by internet technology allow several types of digital health services always to be available. However, a stable supporting infrastructure and the appropriate digital health technology are needed to ensure the optimal implementation of digital health and improve its accessibility and availability to people living in rural areas.

d. Do people in Bontang intent to use the digital health system?

To a certain extent, yes. However, there are still groups of people who have a high chance of being marginalized. There are still many reasons for people to become non-internet users. Digital literacy is the main reason. Therefore, human resource development in education and health must be treated as a single entity to complement each other.

e. What would be the suitable model of digital health architecture to increase universal access to health in Indonesia reflecting on the challenges identified through the Theory of Planned Behavior?

Based on the challenges that has been identified, a high-level architecture model inspired by digital health in Zambia (Gregory & Tembo, 2017) was modified to fit the current situation in Indonesia (Figure 6). Solution provided through the Digital Health National Architecture will accommodate people who cannot access digital health by providing indirect access through health services from various levels (community health center, clinics, and hospitals).

In conclusion, the Theory of Planned behavior describes the elements that influence a person in doing or responding to an action. In relation to the digital application in the city of Bontang, the Theory of Planned Behavior provides insight to understand what would be the factor of people in the Bontang to use digital health system and what would be the barrier.

From this research, it was also found that there are still certain groups of people who have the potential to be unaffected or even disadvantaged by technological developments in the health sector. The fact that the majority of people are not familiar with the term 'digital health' also shows that the development of digital health in Indonesia is currently still limited in large cities on Java Island.

There needs to be an understanding of the type of digital health that can help to reduce the gap between big cities and other regions. There is also a need for comprehensive cooperation between government institutions and related institutions so that the appropriate technological developments in order to achieve universal access to health can be prioritized, not only targeting urban communities who are considered to have high access to health services.

Furthermore, the experience of other developing countries that develop digital health systems with the aim of supporting communication between health workers such as telemedicine which is currently being developed by the Ministry of Health or the dissemination of information with simple technology (SMS) can be a lesson for Indonesia to start introducing digital health to rural areas.

9. Discussion

Digitalization in the healthcare sector is currently being carried out by the government and technology startups in Indonesia, but only a few research has been done to find out whether people can accept the system or not. Therefore, this study provides a different perspective on the development of health digital in Indonesia. This approach is also known as *fuzzy front-end* or *front-end innovation*, which is a series of activities conducted before the formal and structured process of developing innovation is carried out (Koen et al., 2001).

This research is the first, to our knowledge, that studied the acceptance of digital health services in Indonesia through a qualitative approach using the Theory of Planned Behavior. By reflecting on the findings, it can be concluded that this theory is able to describe the factors that influence a person to carry out a certain behavior through the elements; attitude, subjective norms, and perceived control behavior that builds intention and leads to a particular behavior.

It is important to know that Bontang is not part of cities that are the main target of technology startups to expand their business (Widartanto, 2016). This is shown by the small number of respondents who knew (5 out of 20) and have used (3 out of 20) digital health services which are widely used in Jakarta (Primary, 2018). Therefore, the answers given by respondents who are not aware of digital health systems can be biased because respondents refer to digitalization or other digital applications in general.

Subsequently, understanding of the types of digital health services and their benefits is needed. The statement from one of the respondents who argued that there were still problems with health services (expensive costs and unreliable doctors) that were more important to solve rather than developing digital health showed that people were not aware of the benefits of developing digital health services. However, information related to healthcare services, internet services, and the behavior of the people of Bontang towards the delivery of services is sufficient to identify existing problems and formulate a solution with the appropriate approach.

10. Conclusion

This chapter explains about the limitation of the research, recommendation of what would the researcher do differently (lesson-learned), and the possible idea for future research.

10.1. Limitation

The Theory of Planned Behavior is suitable for explaining someone's intention towards an object or action. However, there are some limitations which provide room for improvement for this research. Time and resources constraint for conducting this research are one of the most significant limitations. Lengthy procedures and bureaucracy make it difficult for researchers to find more and varied sources.

Interviews with several other speakers such as the Directorate of Health Services at the Ministry of Health are needed, which implements TEMENIN and Sehat Pedia digital health services to know the development of these services. It requires networks to correspond with bureaucracy since the formal procedure to request an interview was nowhere to be found. Fortunately, further information related to digital health developments in Indonesia can be obtained through articles, websites, and government regulations and work plan on the internet and shared by the resource persons.

In addition, there are also limitations in reaching people in a more remote area. As stated by health workers in the city of Bontang, there are areas in Bontang that can only be accessed by ships or private vehicles in a considerable amount of time, but researchers do not have enough budget and time to perform research in these areas. Furthermore, although it's not a major limitation, the absence of related regulations and the lack of qualified article availability that discuss the development of digital health for rural areas in Indonesia were also considered as an obstacle.

10.2. Recommendation for Future Research

Continuation of research can focus on the experimental approach to get answers that are not limited to one's perspective but able to see the fact after using digital health services. In addition, further research on evaluating digital services to assess the most appropriate digital health solution to be implemented in other communities also needs to be done considering that innovation without acceptance from the public means high-cost without equal results.

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Purpose	Category	Sub-Category	Label	Number
			#digital_health_increase_efficiency	1
			#telemedicine_to_prevent_outbreak	2
			#telemedicine_increase_accessibility_on_doctors	3
		Advantage of digital health	#telemedicine_maximalized_local_health_worker_role	4
			#digital_health_ease_of_use	5
			#digital_health_simplify_patient_registration	6
	Attitude		#digital_health_beneficial_consultation_non- urgent_matters	7
			#online_consultation_trust_challenge	8
			#digital_health_potential_problem_provider_integrity	9
		Disadvantage of digital health	#digital_health_potential_problem_doctor_register_in_t oo many platforms	10
			#digital_health_potential_problem_doctor_use_template in consultation	11
			#disadvantage_of_digital_health_slow_respon_consultat ion	12
The		Expected outcomes of digital health	#telemedicine_for_health_equity	13
element of The		Common illness differences	#difference_of_patients_topical_infectious_diseases	14
Theory of Planned		Cultural differences in community	#difference_of_patients_culture	15
Behavior		Global involvement	#not_much_global_involvement_digital_health	16
			<pre>#ministry_of_health_analyze_cross- ministry_strategic_issue</pre>	17
			#ministry_health_scope_work	18
		Government scope of work	#ministry_communication_and_informatics_role_facilita tor	19
	General		<pre>#ministry_communication_and_informatics_pave_way_ business_enter_rural_area</pre>	20
	General		#type_of_digital_health	21
			<pre>#ministry_of_health_application_health_information_pl atform</pre>	22
			#telemedicine_using_video_call	23
		Type of digital health	#telemedicine_type_tele-ekg	24
			#telemedicine_type_tele-consultation	25
			#telemedicine_type_tele-radiology	26
			#telemedicine_type_tele-usg	27
	Intention	Government priority	<pre>#presidential_instruction_to_prioritize_telemedicine_de velopment</pre>	28

Purpose	Category	Sub-Category	Label	Number
			<pre>#policy_formulation_on_digital_health_government_pri ority</pre>	29
			#ministry_of_health_identify_potential_problem_digital _health	30
			#MCIT_plan_this_year_introduce_digital_health	31
		Government work phase on	<pre>#ministry_of_health_still_in_the_earliest_stage _digital_health_development</pre>	32
		digital health	#MCIT_developing_stage_digital_health	33
			#clinic_offers_paperless_examination_result	34
			<pre>#clinic_provides_online_communication_channel_for_n on-medical_purpose</pre>	35
			#digitalization_internal_hospital	36
		Health provider intention	<pre>#clinic_provides_online_communication_channel _non- medical purpose</pre>	37
			#clinic_provides_online_communication_channel_pregn ancy_questions	38
			<pre>#clinic _communication_channel _online_third_party_chat_messenger</pre>	39
			#clinic_provides_online_communication_channel_with_ midwives	40
		Capability of health service	<pre>#health_facility_not_yet_ready_for_digital_health</pre>	41
			#health_facility_concentrated_in_Java	42
			#difficulty_to_access_healthcare_long_distance	43
			#difficulty_to_access_healthcare_transportation_access	44
			#difficulty_to_access_healthcare_high_cost	45
		Factor that encourage to use	#insufficient_health_facility	46
		digital health	<pre>#inpatient_facility_community_health_centre_rural_area s_for_less_serious_illness</pre>	47
	Perceived		#people_in_rural_area_enthusiat_to_accept_technology	48
	Control		#difficulty_to_access_healthcare_remote_island	49
	Denavior		#difficulty_to_access_healthcare_transportation_access	50
			#insufficient_health_facility	51
			#digital_divide	52
			#digital_divide_elders	53
		Factor that impede to use digital	#digital_divide_people_low_education_background	54
		health	#digital_divide_digital_literacy	55
			#patients_inability_to_explain_illness	56
			#patients_need_direct_examination	57

Purpose	Category	Sub-Category	Label	Number
			#people_in_rural_area_inadequate_network	58
			#use_of_digital_media_concentrated_in_big_cities	59
			<pre>#palapa_ring _internet_coverage_all_Indonesia</pre>	60
		Factor that support digitalization	#government_big_task_to_provide_network_for_all	61
			#online_consultation_regulation_to_protect_patients	62
			#no_policy _on_digital_health_yet	63
			#policy_factor_to_consider_business_needs	64
			#policy_factor_to_consider_business_challenges	65
			<pre>#policy_factor_to_consider_government_requirement</pre>	66
		Regulation	<pre>#policy_factor_to_consider_citizen_needs</pre>	67
	Regulatio		<pre>#policy_for_specific_type_of_digital_health</pre>	68
	'n		<pre>#non-face-to- face_consultation_not_yet_permitted_nor_banned</pre>	69
			#responsibility_on_online_consultation_malpractice	70
			#online_drugs_prescription_biggest_concern	71
			#MCIT_policy	72
			#digital_health_government_regulation	73
			#ministerial_regulation_digital	74
			#government_give_free_internet_remote_area_support_ digitalization	75
		Collaboration with other organizations	#collaboration_with_PDPERSI	76
		Negative response towards	#half_of_patients_not_use_digital_media	77
	Subjective Norms	digitalization	#small_scale_resistance_towards_technology	78
		Positive response towards	#digital_health_useful_in_big_city	79
		digitalization	#digitalization_change_people_expectation	80

Attitude

Positive feelings/ advantages:

- Less hassle
- 24 hours availability
- Useful to consult on stigmatized diseases
- Digital health devices are useful to maintain daily activities to prevent certain illnesses
- Reduce administrative process
- Specifically for online consultation, when robot or algorithm does it instead of doctor, there is a potential for it to be more reliable

Negative feelings/ disadvantages:

- Cost of digital health devices (e.g. smartphone, smartwatch) can be expensive
- Dependency on internet connection
- Preference to have a face-to-face examination
- Prone to fraud
- Can cause doctors to lose patients
- Insufficient digital
- Distrust towards digital health system or health service providers

Subjective Norms

People who response/might response positively:

- Young people
- Young mothers
- People who are actively using internet/digital media/application
- People who live far from doctor

People who response/might response negatively:

- Elders
- People who distrust the system/application
- People who do not use internet/digital media/application
- People who are having urgent health issue

Perceived Behavioral Controls

Factors that facilitate:

- Competence in using digital media/digital health system
- Limited availability of doctors or specialists (face-to-face)
- Expensive cost of doctors (face-to-face)
- Ability to buy digital health-related device

Factors that impede:

- Lack of internet connection
- Satisfaction on the current way of accessing health service
- Lack of digital literacy
- Low personal motivation on accessing healthcare service
- Lack of awareness on the digital health existence

Intention Behavior

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General questions Attitude-related questions Subjective Norm-related questions Perceived Behavioral Control-related questions

Intention-related questions

Respondent	Type of Interview	Recorded	Period of living in Bontang	Age	Occupation	Last Education	Religion	Marital Status	Number of Children	Use of mobile phone (Yes/No)	Type of mobile phone (Smartphone/Cell phone)	Purpose of using mobile phone
1	Face-to-Face	Yes	I've been living here since 2015	27	Employee in Pupuk Kaltim (state-owned company)	Bachelor degree	Moslem	Married	1	Yes	Smartphone	For googling, browsing, using social media
2	Face-to-Face	Yes	I've been living here since I was born	18	Shopkeeper	Senior high school	Catholic	Single	0	Yes	Smartphone	Just for information
3	Face-to-Face	Yes	Since I was born	18	Student	Senior High School	Moslem	Single	0	Yes	Smartphone	For social media, information sharing
4	Face-to-Face	Yes	Since I was born	17	Student	Senior High School	Moslem	Single	0	Yes	Smartphone	For communication and social media
5	Face-to-Face	No	Since the last 3 years	20	Sales Promotion Girl	Senior high school	Catholic	Single	0	Yes	Smartphone	For social media, communication and games
6	Face-to-Face	Yes	Since I was born	18	Student	Senior High School	Moslem	Single	0	Yes	Smartphone	To call or text someone, social media
7	Face-to-Face	Yes	Around 20 years	24	Employee in a hotel	Vocational School	Christian	Married	0	Yes	Smartphone	Mostly social media and games
8	Face-to-Face	No	Since I was born	21	Administrator in a company	Senior High School	Moslem	Married	1	Yes	Smartphone	For communication, googling, social media
9	Face-to-Face	Yes	I moved here at 2007, so it's 12 years	41	Housemaid	Elementary school	Moslem	Married	1	Yes	Smartphone	For WhatsApps and calls
10	Face-to-Face	Yes	I've been living here for 4 years	29	Employee in a private company	Bachelor degree	Moslem	Married	1	Yes	Smartphone	For social media and communicating with my family
11	Face-to-Face	Yes	I've been living here since I was born, but I spent 4 years in another city for my Bachelor study	30	Employee in a private company (IT field)	Bachelor degree	Moslem	Married	1	Yes	Smartphone	For communication, reading news and for work. I am a mobile application developer.
12	Face-to-Face	Yes	Around 12 years	24	Makeup artist	Bachelor degree	Moslem	Single	0	Yes	Smartphone	I use it for a lot things like browsing, reading news, instagram, and of course communication
13	Face-to-Face	No	I've been living here since the last 6 years	52	Food stall owner	Senior High School	Moslem	Married	2	Yes	Cell phone	To call my children, my friends, customers, just for communication
14	Face-to-Face	Yes	This is my third year	38	Housewife	Bachelor degree	Christian	Married	2	Yes	Smartphone	I use it for a lot of things like social media, google, taking pictures and videos, and many more
15	Face-to-Face	No	Since I was born	16	Student	Senior High School	Christian	Single	0	Yes	Smartphone	For chatting, doing homework, and social media

Respondent	Type of Interview	Recorded	Period of living in Bontang	Age	Occupation	Last Education	Religion	Marital Status	Number of Children	Use of mobile phone (Yes/No)	Type of mobile phone (Smartphone/Cell phone)	Purpose of using mobile phone
16	Face-to-Face	Yes	5 years	50	Masseuse	Elementary school	Moslem	Married	3	Yes	Cell phone	For calling my family and customers
17	Face-to-Face	No	10 years	40	Housemaid	Elementary school	Moslem	Married	3	Yes	Smartphone	Just for communicarion, call my children and husband
18	Face-to-Face	No	Since I was born	37	Shopkeeper	Senior high school	Catholic	Married	1	Yes	Smartphone	I use it for many things, browsing, social media, online delivery
19	Face-to-Face	No	I just moved here last year	23	Sales Promotion Girl	Senior High School	Moslem	Single	0	Yes	Smartphone	Mostly for social media
20	Face-to-Face	No	Since I was born	27	Mechanic	Vocational School	Moslem	Single	0	Yes	Smartphone	For WhatsApp, Facebook, and taking pictures

Respondent	Use of internet on a regular basis	Impression towards the cost of internet	Impression towards internet quality	How often do you use a healthcare service (e.g. go to a doctor or clinic)?	But do you know if people in here are experiencing diificulty to access healthcare service?	Have you ever experience difficulty in accessing healthcare service? If you have, what was it?	Are you in general satisfied with the service the provide?
1	Yes	Not really	Well, there is only 1 internet provider who offers a sufficient service, but others are not good at all	Quite often, especially since I was pregnant		Not really, but we don't have much option in here.	
2	Not very often	I use wifi at work	Sometimes it's good sometimes it's not	I never go to a doctor			
3	Yes	It depends on the provider, I use Telkomsel, it is expensive, but it's the best one	If you use Telkomsel then yes, it's the best, but IM3 and the others are not good	The last time I went to a doctor was when I was in elementary school I think, I don't even remember it		I never heard such things, we have hospitals in here. Maybe that's the case for specialists, I know my uncle needs to go to Jakarta for some surgery but I am not sure why	
4	Yes I use it everyday	The one that I use yes, but I also use wifi, I don't know how much it cost since my parents pay for it	Sometimes the wifi is not good, but the trouble isn't occur often	Not often, but I had an appendectomy last year		No, I live near a hospital, the service is good as well	
5	Yes	Not really	Not always, but mostly good	I've never been to doctor for a long time	I don't think so, there are some hospital in here		
6	Yes	Yes it's a bit expensive	Yes, it is fine, I use Telkomsel so I rarely have issue with the network	Not often. I have ulcer though, I went to a doctor several months ago, but since that I just took unprescription medication.		No I haven't, we have some hospitals and clinics in here	
7	Yes	Not really, it's not cheap but not that expensive either	It depends, if you use Telkomsel then yes, but sometimes there are issues	Not often, not even once a year		Yes, if you are going to a government's hospital, the doctors are rarely available, if you come half an hour before the lunch break they are already gone. Maybe private hospital is better.	
8	Yes	It's a bit expensive, but I can still afford it so it's okay	Yes it is okay, not all the providers are good though.	Quite often but for my son		Not really, we have a pediatrician, we always go to that one and my wife doesn't seem to have a problem	

Respondent	Use of internet on a regular basis	Impression towards the cost of internet	Impression towards internet quality	How often do you use a healthcare service (e.g. go to a doctor or clinic)?	But do you know if people in here are experiencing diificulty to access healthcare service?	Have you ever experier accessing healthcare se what was it?
9	Only when I have nothing to do	Yeah it is, I use Telkomsel, it's expensive	Yes it's good	Not often. A while ago when I started to have hypertetion, I went to a clinic regularly but not now		Maybe just a long queu difficulty but it's a bit ir
10	Yes I do	I use Telkomsel, the price depends on the zone. In Kalimantan the price is more expensive than Java.	As far as I know, in here, people only use 1 internet provider. I rarely know someone who use other providers because they don't have a good service. The one that I use has a good network.	Very often, especially since I have a daughter. I got full cover health insurance for my company so everytime I have a health issue I will go to a doctor		Well if I compare here the option of the docto In fact, many of the doc not permanent, they ar months or even weeks because when I started doctor and they got rel adapt to a new doctor Other than that I have the service.
11	Yes	No, I don't think it is expensive	Well, since there is a very limited option of internet provider, there is only one provider that gives a good service. However, there are still more problems in here compare to other big cities.	I have a 5 months old daughter so very often		Not really
12	Yes	Not really. It was expensive like 2 years ago, but the price is getting lower now.	Yes it is	Quite often. I have asthma , so everytime I got asthma attack I'll go to a doctor		Maybe the cost, it is ve
13	No, I don't have time and I don't understand either			No, but my husband does		No I haven't, there is a house, we always go th
14	Yes I do	Yes, everything in Bontang is more expensive than Java	Not really, but it's okay	I often take my children to a doctor		It's a bit difficult to find here, especially on nati
15	Yes	Yeah it is expensive	For Telkomsel yes but IM3 and XI are not good	I rarely go to a doctor	I think it's quite easy, my parents work in PT. Badak, they have their own hospital and it's free	
16	No			I rarely go to a doctor, the last time is a long time ago. My daugther is a nurse, if I have health issue she will treat me	There is a clinic not far from my house, but it only has one doctor. That is why I am too lazy to go to a doctor, it's a long queue	
17	No, I don't like it. My children play with internet a lot and sometimes it can get			Not often		I usually go to a local he need a doctor. There is there, it's just sometim quite long.

nce difficulty in Prvice? If you have,	Are you in general satisfied with the service the provide?
e, it's not a iconvenience	
with big cities than rs are very limited. ctors that I like are re here for several It's a bit difficult to get used to a ocated I need to all over again. no problem with	
ry expensive.	
clinic near my ere	Yes I think, maybe my husband knows more about this
a good doctor onal holidays	
ealth centre when I not much problem es the queue is	It could be better

Respondent	Use of internet on a regular basis	Impression towards the cost of internet	Impression towards internet quality	How often do you use a healthcare service (e.g. go to a doctor or clinic)?	But do you know if people in here are experiencing diificulty to access healthcare service?	Have you ever experience difficulty in accessing healthcare service? If you have, what was it?	Are you in general satisfied with the service the provide?
	annoying because they become ignorant.						
18	Yes	Yeah it's quite expensive	Depends which provider you are using and where you are. In my shop, there are some spots that doesn't have network at all, I don't know why	I haven't been to a doctor for a long time	l don't know		
19	Yes	A bit expensive	Not as good as in Purwokerto, and there is only one good provider in here which is the most expensive one. There are more option in Purwokerto	Quite often, but I only went to a local health centre once in here		There is only one doctor for so many patients	No
20	Yes	No	Yes	Very rare	I never heard anything		

Respondent	Are you actively using digital media or technology (e.g. social media, digital news)	Have you ever experience difficulty in accessing digital media or technology in general?	What kind of technology/application do you use?	Do you know anything about a digital health system?	Well digital health system could be a general term of technology that supports healthcare service, but what mostly people know in Indonesia is like an online platform, could be a website or application to discuss about health issues with doctors. Other than that, DHS could also means digital support between health providers. In your opinion, is this kind of system helps?	If there is an option for you to have an online consultation with a doctor trough website or your phone, would you like to use it?
1		Not at all		Yes, I do know about digital health a little bit		
2	I use WhatsApp and Facebook but not that often, maybe half an hour a day	No, it's quite easy		I don't know that		I am not sure yet
3	Yes	No	Mostly I use social media like Instagram and Facebook or messaging apps like WhatsApp and Line	I don't know, what is that?	Might be, especially for some diseases that cause shame to the patients	Yes sure if I need it I will use it
4	Yes	No, I use it often so it's easy	Just application in my phone or tablet	No		I am not sure
5	Yes	No	I use Facebook and WhatsApp	No, I don't		Yeah maybe, if it helps, why not use it
6	Yes	No, I use it everyday, it's easy for me	I use Instagram, WhatsApp, Line, Snapchat, and many more	No, what is that?	I don't know, maybe, but if you have an ulcer, you just need medication which can be bought in supermarkets. Maybe it depends on the illness.	I think it's better to just go to a doctor
7	Yes I am	Not really	Social media, detik.com to read news, Instagram, many things	No	Yes sure, it faster the process to consult with doctors	Yeah I would, as long as the problem can be

Respondent	Are you actively using digital media or technology (e.g. social media, digital news)	Have you ever experience difficulty in accessing digital media or technology in general?	What kind of technology/application do you use?	Do you know anything about a digital health system?	Well digital health system could be a general term of technology that supports healthcare service, but what mostly people know in Indonesia is like an online platform, could be a website or application to discuss about health issues with doctors. Other than that, DHS could also means digital support between health providers. In your opinion, is this kind of system helps?	If there is an option for you to have an online consultation with a doctor trough website or your phone, would you like to use it?
						answered through online
8	Yes	No	I use Facebook, Line, Grab and Google	No		No I won't, I don't really believe it. It could be anyone on the other side and I can't tell.
9	Yes	No I don't	l just use Facebook and WhatsApp	No		I don't think so, I don't like going to doctor, most likely they will just give me a bunch of medicine I don't need, application won't make much different. I'd rather use a traditional or preventive medicine such as low-sodium salt
10	Yes	Not at all	I mostly use Instagram, Twitter, and WhatsApp	Yes I know some, like the online consultation platform or health information website		
11	Yes, everyday	No	I work with my smartphone a lot so I need to understand many things. I utilize almost everything in my phone.	Yes I know it		
12	Yes	Not at all		Can you explain to me what that means? I might know it but not familiar with the term.		
13						
14		No it's relatively easy		I've heard of it		1 think I would profer to
15	Yes	No	WhatsApp, Line, Instagram	What is that?	I have no idea	meet a doctor
16				l don't know		I don't think so, it's troublesome
17						No, I don't want to
18		No		No I don't		Maybe, I use online delivery for food, it's easy, maybe digital help could be a new trend in several years
19	Yes	No	Instagram, WhatsApp and Grab for motorcycle taxi	No, what is that?		Maybe it depends on what kind of illness I am having
20	Yes	No		No I don't		Yeah maybe, it sounds interesting

Respondent	Do you/have you ever use any digital health system? Why or why not? If you do/have, which digital health system system do/have you use?	Could you explain about what is it or how it works based on your understanding?	Are those doctors from hospital?	Are there a lot of options (doctor) in the application?	How do you feel about using digital applications for health ?	Is that a positive or negative feeling?	In you of usi
1	I have used Halodoc application when I lived in Malang (East Java)	Filling out patient data, date of birth, age, gender, and other basic data, and the we can choose the doctor we want based on their list	l guess so	Yeah, they have a long list of doctors, but I think it is only used by young doctors.	I like it		It mak anywł Howe can't i skin is is we the ap
2							
3							I don'
4							Mayb
5							Mayb go to
6							It's ea
7							It's fas
8							I don'i replac
9							If we j
10	Not yet. I don't need it so far.						The ad need to comm long a a lot. '
11	Yes, I use Apple Watch to track my activities, I read health articles in Alodokter, sometimes I also measure my health condition with my phone. I don't know if it is valid but I do that. I like to maintain my health, and with these kind of tools, at least I know if I have done enough activities or not today.	For Apple Watch, it detects your movement using sensor. It knows when you are sitting down, standing up, or even resting. It can also measure your sleep quality.			I like it. I can set a goal for myself.		As I w standa and b and I l
12	Yes, I did use one called Halodoc. I used it to buy a medicine for my friend.	You can talk to a doctor through the application, or just buying a medicine without prescription. After you buy it, someone will pick up your order and deliver it to your house.	I don't know, I never try to consult	Yes there ae quite a lot	It's easy if you want to buy a medicine, but for consultation I don't think it can replace the conventional way, especially if your problem is asthma	Just normal	lt will with a know
13							

r opinion, what are/would be the advantages ng the digital health system?

kes life easy at a certain point. I don't have to go where to ask a doctor if I have something in mind. ever, it is a bit tricky for some illness because I meet the doctor directly, for example if I have ssue, I can only send the picture. The good thing can also buy medicine as prescripted through pplication and later be delivered by a courier.

't know, just keep up with the trend I think

be it becomes easier to talk with doctors

be with that kind of application we don't have to the hospital, I don't know how it works though

asy, you can talk to a doctor anywhere

ster

t know, I think health service should not be ced by online service

just need to chat with a doctor then it's easier

advantages would be the simplicity, we don't to bother to go to a hospital. Eventhough the nunication is done through online platform, as as the issue is deliverd well I think it would help We don't always have time to go to the doctor ell.

vas saying, I can set a goal, and I know the lard as well. How many calories I need to eat ourn everyday, how much activities I should do have done, these kind of things are important.

I help it you have a problem you need to discuss a doctor in the middle on the night, so you'll y what to do in the morning

Respondent	Do you/have you ever use any digital health system? Why or why not? If you do/have, which digital health system system do/have you use?	Could you explain about what is it or how it works based on your understanding?	Are those doctors from hospital?	Are there a lot of options (doctor) in the application?	How do you feel about using digital applications for health ?	Is that a positive or negative feeling?	In you of usir
14	No, I prefer to meet a doctor in person						Maybo a doct friend our ch
15							
16							
17							
18							I don'i it's ea taxi. B
19					It's okay if it helps		It help
20							I don'i it wou happe

Respondent	And what are the disadvantages?	Do you think people around you want to/already use digital health system? Why or why not?	Who do you think would want to/already use digital health system? Why?	Who do you think would not want to us digital health system? Why?
1		Not that I know of. Maybe because it's not well- known yet.	Maybe young mothers	Maybe elders, it can be a bit of a hassle
2				
3	Not everyone use smartphone, especially this kind of application	No	Maybe young people, almost all the young people I know are using smartphone, it is more likely for them to use digital health system.	Elders, even my mom doesn't use smartphone
4	It can be challenging because not everyone can use it, there are some areas in Bontang here that are not connected to internet. I have been to a small island, it's 2 hours from here and I need to use a boat. In there, some parts are totally disconnected from internet	Maybe if it is popular	Young people, it's easy for them	Elders, there are many elders that I kno don't use smartphone
5	l am not sure		Young people who are using smartphones	Everyone who doesn't use smartphone

ur opinion, what are/would be the advantages ng the digital health system?

be with digital health application, reaching out to stor would be easier. Currently me and my ds have a chat group to share or discuss about hildren's health issues.

t know maybe it reduces some processes and sy, like online delivery or online motorcycle But it makes you lazy sometimes.

os people who can't go to a doctor right away

t really understand the way it works but I guess uld be similar as the other application that are ening now, it makes our life easier

e	There are many kinds of digital health such as telemedicine, telehealth, electronic health record, and the one that is quite popular in Jakarta now is online consultation. In your opinion as a person who works in IT or as a potential consumer of healthcare in general, what do you think about these type of digital health?
w	

Respondent	And what are the disadvantages?	Do you think people around you want to/already use digital health system? Why or why not?	Who do you think would want to/already use digital health system? Why?	Who do you think would not want to us digital health system? Why?
6	For me, I prefer to get an examination. Just go to a clinic and meet the doctor.		Maybe young people	Maybe elders
7	Not every problem can be solved online	I don't think so	If it becomes popular I think almost everyone will use it, like WhatsApp	Elders, or people who live in jungles, the don't usually use phone
8	One thing for sure, you won't know if you are talking to a doctor or not. I won't risk such thing especially for my child	I don't know, I never heard of it	People who believe it	People who don't believe it
9	I don't know		People who live quite far from any doctor, it's not easy for them to always go to a doctor, sometimes they just go to a Mantri (traditional health worker in Indonesia)	Many people, I don't want to use that
10	It is prone to fraud. There is no way we can tell if they really are a doctor and in Indonesia, fraud happens a lot.	Yes, a few of my friends use it	Millennial moms who are easily gets panick when there's something unfamiliar with their baby and don't have much time. I actually interested with digital health application, maybe after this I will try to explore further	Maybe the elders who don't use smartphone
11	It is expensive	My colleagues yeah. In fact, we got the device (smartwatch) from the company so everyone in my team use it.	Millennials maybe	Well, people who can't afford it
12	I don't know, I need to dig a little deeper about digital health to know the disadvantages. But maybe for online consultation, you can't really know if you're talking with a real doctor or not.	Maybe, I know some people who are using Halodoc, not in this city though	Young people who are actively using the internet	People who don't believe the applicatio
13				
14	l am not sure, I never use it	I don't know about that either	I don't know maybe people who believe it, I personally prefer to talk to a doctor directly.	People who don't believe such system
15		I don't think so, I never heard of it	I don't know, I don't even think I would	Elders probably, and people who are
16				prefer to meet doctors in person like m
17				
±/				

e	There are many kinds of digital health such as telemedicine, telehealth, electronic health record, and the one that is quite popular in Jakarta now is online consultation. In your opinion as a person who works in IT or as a potential consumer of healthcare in general, what do you think about these type of digital health?
έγ	
	I think these kind of system would help to reduce administrative steps by a lot.
n	
9	

Respondent	And what are the disadvantages?	Do you think people around you want to/already use digital health system? Why or why not?	Who do you think would want to/already use digital health system? Why?	Who do you think would not want to use digital health system? Why?	There are many kinds of digital health such as telemedicine, telehealth, electronic health record, and the one that is quite popular in Jakarta now is online consultation. In your opinion as a person who works in IT or as a potential consumer of healthcare in general, what do you think about these type of digital health?
19	I am not sure	Maybe, many people are using Grab or Go-Jek	Everyone who uses smartphone I guess	Maybe elders who are not using	
10		now, if it is useful then people will use it	and who are aware of the application	smartphone	
10	It maybe works for some	I den't know	People who have minor health issue I	Elders and people who are having an	
19	illness but not all		think.	urgent health issue	
			Some people who are familiar with		
	Maybe some doctors will		technology, but I do know many people	Many people who cannot afford	
20	lose their ich	I don't think so, I think it's not well-known yet	who are not even using social media or	smartphone, they won't use this kind of	
			smartphone, so it will be better to have	thing	
			it when everyone use smartphone		

Respondent	For specifically online consultation where you can talk to doctor through your phone without meeting in person, what do you think about?	It's quite an intersting answer, why wouldn't you be bother by that?	And what do you feel about sharing you health information? For example when you are using the smartwatch, there will be data related to your daily activities or even habits, are you worried about that?	Do you think it would be difficult for you to use the digital health system to attain healthcare service?	What do you think would be the challenges?	But when your turn comes, will they stay with you until finish?
1				No	Waiting for the reply because they are not only for me, it could take a while to wait for the doctor to be available	Yes, until until they ask "is there anymore question" and we say no, they will say thank you for trusting them etc.
2						
3				I am not sure	I never see one so I don't know	
4				Maybe not	I don't know, I can't think of anything	
5				Maybe a little, in the beginning	I don't know yet	
6				If it is just like social media then no	I really don't know how it works	
7				l think no	Maybe if the result we got from digital system is not satisfying, it could be annoying since we still need to do the conventional way all over again	
8						
9				I don't know		
10				It would be a challenge at first. But once I understand the system it should be fine.	Maybe just understanding how it works, first time setup and these kind of things	

Respondent	For specifically online consultation where you can talk to doctor through your phone without meeting in person, what do you think about?	It's quite an intersting answer, why wouldn't you be bother by that?	And what do you feel about sharing you health information? For example when you are using the smartwatch, there will be data related to your daily activities or even habits, are you worried about that?	Do you think it would be difficult for you to use the digital health system to attain healthcare service?	What do you think wou challenges?
11	I think it's a good idea. In fact, if the one we talk to is not a doctor, a robot for example, I wouldn't mind as well	Well, as a person who works in IT, I think we need to be able to mimic the current system or process and sometimes computer program does a better job than human	No, the point of IT is open data, I am not worried as long as there are regulations that protects these kind of data exchange so it won't be used for something bad		
12				I am not sure	I am not sure either
13					
14				I don't think so	
15					
16					
17					
18				I don't know, I never see such application/system	l don't know either
19				I am not sure	I don't know
20				Maybe at first yes, but we can adapt	Explaining your conditi doctor is a bit difficult, could be harder when cannot examine you

Respondent	Do you know that when you use digital health system, you will be giving out your health information?	How do you feel about giving out your health information to an application?	Do you believe the digital health system provides easier access to healthcare? Why or why not?	Imp
1	Yes of course	I have no problem with that	Yes of course, as I mentioned before, this kind of application is easy to use and you don't need to go anywhere to get health service. They also provide 24 hours service, unlike specialized doctors in hospital	Yes
2				
3		I don't think it would be a problem	Maybe yes, if you can talk to a doctor like when you're chatting with a friend then it's more convenient	l th wit
4	Maybe	I am okay with that	Maybe, I don't know but usually technology makes life easier	For
5		I don't have a problem with that	Yes for those people who are using smartphones, for the people who aren't won't make any difference	Not

ld be the	But when your turn comes, will they stay with you until finish?
on to a maybe it he doctor	

portance of digital health to support healthcare

s, it's nice to have many options

nink so. This is digital era, so we need to keep up th digitalization

r now I think it's not important yet

t really I think

	Respondent	Do you know that when you use digital health system, you will be giving out your health information?	How do you feel about giving out your health information to an application?	Do you believe the digital health system provides easier access to healthcare? Why or why not?	Im
-	6		I don't mind, they need that information anyway	If the question is easier then yes, maybe. But I don't know if it will help the patients the same way as if I go to a doctor in person.	No
	7	Yeah that make sense	It's okay	Yes of course, well that's the purpose of making the digital system isn't it?	Ma tin
-	8		It's fine but the problem is, will it benefit you?	If it is used for administration like patient registration or for reserve queue then yes maybe, but if it is for consultation then no	No che
	9		It's okay I guess		No
	10		It's okay, if we don't give it to the application then how the doctors know our condition?	Yes, as I said, it is easier, we don't need to go anywhere, but there must be some regulation to reduce the frauds as well.	Ye
	11				Ye
	12	Yes I supposed	No problem	Maybe, but I don't think I can't believe such system completely	۱d
	13				
	14		I don't think I would trust it, and I don't think it will help either	I don't think so	No
	15				
	16				
	17				
	18	Yes maybe	It's fine	Maybe, technology are supposed to enhance the current process	l d fut ha
	19		It's okay	It should be, it is easier to contact doctor through smartphone	Ma co
	20		I don't have a problem with that	Maybe, I can't know for sure now	Ye

nportance of digital health to support healthcare

aybe for not it's not that important, but over me I think it will get more important

ot teally, there are more important things like leaper cost and reliable doctors

o, it's not

es it is important

es of course, I think it's quite important

lon't it is important right now.

ot yet, maybe in several years, but not now

don't know if it is important or not, maybe in the ture things will change then it can be crucial to ave that, but I am not sure about now laybe yes, for some people and some illness, it build be helpful

es I guess

Residents in the city of Bontang

a. Interview Protocol

The interview will be conducted face-to-face with 20 respondents which are living in Bontang city. The researcher will go to Bontang and conduct the interview by contacting some of her acquaintances who live there by text message and also asking random people from public places to ensure the diversity of the respondents. The language used in the interview is Bahasa Indonesia (Indonesian national language) but the result (transcript) will be translated to English.

b. Opening Statement

Thank you for your willingness to help me to be the respondent for my study. My name is Annisa and I'm currently doing a research on digital health system for my master degree at Leiden University in The Netherlands.

The general objective of this research is to find out whether implementing digital health system would be an effective solution in reducing health inequality issue in Bontang while the results of this interview will help me understand the perspective of the community in terms of their views on digital health systems. I will send you the final report of my research if you would like to know the results.

I have prepared a few questions, but please feel free to share your thoughts if you have any other information that you think might be relevant to this study. In case you are not comfortable with some questions you do not need to feel obliged to answer. In this interview there are no right or wrong answers. I will ensure that all interviews are being treated anonymously to ensure your confidentiality.

c. Question List

The questions for this part are divided into 5 categories based on the Theory of Planned Behaviour (Ajzen, 1988; Ajzen & Madden, 1986) and represented by the color as explained in **Error! Reference source not found.**



No.QuestionsOpening Questions1Do you agree if I record the interview in order to have better analysis of the
interview? (In case they do not, notes will be taken during the interview)22Could you tell me a little bit of yourself? (gender, age, occupation, religious
affiliation, education level, and marital status)

No.	Questions
3	Do you have children? If yes, how many?
4	Do you use mobile phone? If yes, what kind of mobile phone do you have and what do you use it for?
5	Do you use internet regularly? If yes, do you think it expensive? Does the network is good?
6	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
7	Have you ever experience difficulty in accessing healthcare service? If you have, what was it?
Main	Questions
8	Are you actively using digital media or technology (e.g. social media, digital news)
9	Have you ever experience difficulty in accessing digital media or technology in general?
10	If you have, what system/technology do you use?
11	Do you know anything about a digital health system? If you do, could you explain about what is it or how it works based on your understanding?
12	Do you/have you ever use any digital health system? Why and why not?
13	If you do/have, which digital health system system do/have you use?
14	How do you feel about using digital applications for health ? Is that a positive or negative feeling?
15	In your opinion, what are the advantages of using the digital health system?
16	And what are the disadvantages?
17	Do you think people around you want to/already use digital health system? Why or why not?
18	Who do you think would want to/already use digital health system? Why?
19	Who do you think would not want to use digital health system? Why?
20	Do you think it would be difficult for you to use the digital health system to attain healthcare service?
21	What do you think would be the challenges?
22	Do you know that when you use digital health system, you will be giving out your health information?
23	How do you feel about that?
24	Do you believe the digital health system provides easier access to healthcare? Why or why not?
25	Is it important to have digital system to support healthcare service?
Openi	ng Questions
26	Do you have any comments or information you want to share regarding this study?
27	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?

Healthcare worker(s) in Bontang

a. Interview Protocol

The interview will be conducted face-to-face with one of the government officers in the Ministry of Communication and Information Technology of the Republic of Indonesia. The researcher will approach the respondent by email and online text message application. The language used in the interview is Bahasa Indonesia (Indonesian national language) but the result (transcript) will be translated to English. The respondent will be informed in advance regarding the objective of the interview by email or text message.

b. Opening Statement

Thank you for your willingness to help me to be the respondent for my study. My name is Annisa and I'm currently doing a research on digital health systems for my master degree at Leiden University in The Netherlands.

The general objective of this research is to find out whether implementing digital health systems would potentially provide a solution in reducing health inequality issues in Bontang while the purpose of this interview is to give the context of the situation of healthcare providers in Bontang and how the provider perceives the implementation of digital health systems to generate insights on the availability of digital health system. I will send you the final report of my research if you wish.

I have prepared a few questions, but please feel free to share your thoughts if you have any other information that you think might be relevant to this study. In case you are not comfortable with some questions you also have the right not to answer. I will ensure that all interviews are being treated anonymously to ensure your confidentiality.

c. Question List

The questions for this part are divided into 5 categories based on the Theory of Planned Behaviour (Ajzen, 1988; Ajzen & Madden, 1986) and represented by the color as explained in **Error! Reference source not found.**

No.	Questions				
Open	Opening Questions				
1	Do you agree if I record the interview in order to have better analysis of the interview? (In case they do not, notes will be taken during the interview)				
2	How long have you been a doctor/healthcare worker in Bontang?				
3	Have you ever worked in a big city in Indonesia (e.g. Jakarta, Bandung, Surabaya, Semarang, etc.)? If you have, what are the differences in term of the patients (behavior/demographic)?				
4	Do you think your patients are actively using digital media or technology (e.g. social media, digital news, smartphone)				
Main	Main Questions				
5	What do you know about digital health?				
6	Do you use any digital system in your clinic/hospital? If yes, could you explain briefly about how it works?				

No.	Questions		
7	As a healthcare worker, do you think digital health system will help you in any way?		
10	Which group of patients do you think would use the digital health system? Why?		
11	Which group of patients do you think would not use the digital health system? Why?		
12	Do you think your patients experience difficulty in accessing healthcare service? Why or why not?		
13	If yes, do you know what the government/healthcare providers have done to tackle the issue?		
14	In general, do you think it would be difficult for people in Bontang to use the digital health system?		
15	What do you think would be the challenges for your patients?		
16	Do you think the digital health system will help to increase the accessibility of people to healthcare service? Why or why not?		
17	In your opinion, what are the advantages of using the digital health system to your patients?		
18	And what are the disadvantages?		
19	Do you think it is important for your patients to have the option to use the digital health system?		
Closi	Closing Questions		
20	Do you have any comments or information you want to share regarding this study?		
21	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?		

The Ministry of Communication and Information Technology of the Republic of Indonesia

a. Interview Protocol

The interview will be conducted face-to-face with one of the government officer in the Ministry of Communication and Information Technology of the Republic of Indonesia. The researcher will approach the respondent by email and online text message application. The language used in the interview is Bahasa Indonesia (Indonesian national language) but the result (transcript) will be translated to English. The respondent has been informed in advance regarding the objective of the interview by email or text message.

b. Opening Statement

Thank you for your willingness to help me to be the respondent for my study. My name is Annisa and I'm currently doing a research on digital health system for my master degree at Leiden University in The Netherlands.

The general objective of this research is to find out whether implementing digital health system would be an effective solution in reducing health inequality issue in Bontang While the purpose of this interview is to understand the situation on the development of digital health solution from the perspective of the Ministry of Communication And Information Technology to generate ideas regarding the accessibility of the system itself. I will send you the final report of my research if you wish.

I have prepared a few questions, but please feel free to share your thoughts if you have any other information that you think might be relevant to this study. In case you are not comfortable with some questions you also have the right not to answer. I will ensure that all interviews are being treated anonymously to ensure your confidentiality.

c. Question List

The questions for this part are divided into 5 categories based on the Theory of Planned Behaviour (Ajzen, 1988; Ajzen & Madden, 1986) and represented by the color as explained in **Error! Reference source not found.**

No.	Questions			
Open	Dening Questions			
1	Do you agree if I record the interview in order to have better analysis of the			
	interview? (In case they do not, notes will be taken during the interview)			
2	What is the scope of The Ministry of Communication and Information			
	Technology in the development digital health solution in Indonesia?			
3	How long have you been involved in the digital health bureau/division in the			
	Ministry Of Communication And Information Technology?			
Main	Questions			
4	How far is the involvement of Indonesia in the global development of digital			
	health?			
5	How does the Ministry of Communication And Information Technology view the			
	readiness and willingness of Indonesia as a developing country in implementing			
	digital health system?			
6	What are the targets of the government related to the development of digital			
	health and its supporting infrastructure?			
7	What do you think would be the challenge of introducing technology in a less			
	developed region in Indonesia?			
8	Does the Ministry of Communication And Information Technology believe that			
	people who lives in a less developed region willing to accept digital health			
0	system? Why or why not?			
9	Does the Ministry of Communication And Information Technology believe they			
10	have sufficient resource to use the digital health system? Why or why not?			
10	Does the Ministry of Communication And Information Technology collaborates			
11	with health-related startups? If yes, now are the collaboration?			
11	Does the Ministry of Communication And Information Technology knows any			
	nearth-related startups that targeting the less developed area as their market? If			
	yes, could you please elaborate (what the company does, which digital health			
Closi	ng Questions			
12	Do you have any comments or information you want to share recording this			
12	study?			
13	Are you available for follow up question? If you do may I have your phone			
15	number or any other media so I can contact you in the future?			
	number of any other media so I can contact you in the future?			

The Ministry of Health of the Republic of Indonesia

a. Interview Protocol

The interview will be conducted face-to-face with one of the government officer in the Ministry of Health. The researcher will approach the respondent by email and online text message application. The language used in the interview is Bahasa Indonesia (Indonesian national language) but the result (transcript) will be translated to English. The respondent has been informed in advance regarding the objective of the interview by email or text message.

b. Opening Statement

Thank you for your willingness to help me to be the respondent for my study. My name is Annisa and I'm currently doing a research on digital health system for my master degree at Leiden University in The Netherlands.

The general objective of this research is to find out whether implementing digital health system would be an effective solution in reducing health inequality issue in Bontang while the purpose of this interview is to understand the situation on the development of digital health solution from the perspective of the Ministry of Health to generate ideas regarding the availability of the system itself. I will send you the final report of my research if you wish.

I have prepared a few questions, but please feel free to share your thoughts if you have any other information that you think might be relevant to this study. In case you are not comfortable with some questions you also have the right not to answer. I will ensure that all interviews are being treated anonymously to ensure your confidentiality.

c. Question List

The questions for this part are divided into 5 categories based on the Theory of Planned Behaviour (Ajzen, 1988; Ajzen & Madden, 1986) and represented by the color as explained in **Error! Reference source not found.**

No.	Questions		
Open	Opening Questions		
1	Do you agree if I record the interview in order to have better analysis of the		
	interview? (In case they do not, notes will be taken during the interview)		
2	Would you tell me a little bit of your profile in the Ministry of Health?		
3	What is the scope of the Ministry of Health in the development digital health		
	solution in Indonesia?		
4	How long have you been involved in the digital health bureau/division in the		
	Ministry of Health?		
Open	ing Questions		
5	How far is the involvement of Indonesia in the global development of digital		
	health?		
6	How does the Ministry of Health view the readiness and willingness of Indonesia		
	as a developing country in implementing digital health system?		

No.	Questions		
7	Do we have policy/regulation regarding the implementation of digital health		
	solution in Indonesia? If yes, could you explain further?		
8	According the Ministry of Health's perspective, what are the priorities/workplan		
	of the development of the digital health solution?		
9	What are the current challenges of healthcare in the less developed regions in		
	Indonesia?		
10	What would be the challenges of implementing the digital health system in the		
	less developed regions? And how to tackle these challenges?		
11	Does the Ministry of Health believe that people who lives in a less developed		
	region willing to accept digital health system? Why or why not?		
12	What would be the expected outcomes in implementing digital health system in		
	the perspective of the less developed regions?		
Closi	Closing Questions		
13	Do you have any comments or information you want to share regarding this		
	study?		
14	Are you available for follow up question? If you do, may I have your phone		
	number or any other media so I can contact you in the future?		

Transcript - Healthcare workers in Bontang

Doctor		
Annisa	:	How long have you been a doctor in Bontang?
Respondent	:	Around 8 years
Annisa	:	Have you ever worked in a big city?
Respondent	:	Yes, I have worked in Bandung for about 2 years
Annisa	:	Is there any differences in term of the patients
Respondent	:	The cases or illness are similar, the difference would be in the topical infectious diseases. For example malaria is more common in here rather than in Bandung, but the rest are pretty much similar. #difference_of_patients_topical_infectious_diseases
Annisa	:	What about the behavior or the demographic of the patients?
Respondent	:	I guess the differences from in term of patients are in their culture, patients in Bandung are friendlier than here, they don't have much demands compare to patients in here. #difference_of_patients_culture
Annisa	:	Where do you come from?
Respondent	:	I am from Bandung
Annisa	:	Do you think your patients are actively using digital media or technology?
Respondent	:	Around half of them yes but there are still some people who do not use digital media at all. #half_of_patients_not_use_digital_media Because in here, we offer a paperless way to get some examination results. #clinic_offers_paperless_examination_result So instead of coming here to get the result they can get it through WhatsApp. However, about half of the patients do not want that so we still provide the conventional way.
Annisa	:	Are you familiar with digital health?
Respondent	:	I know a little bit
Annisa	:	Do you use any digital system in your clinic or the hospital you are working at?
Respondent	:	As I explained before, in this clinic we give option for patient to receive their examination result in a digital format. We also allowed patients especially pregnant women to ask non-medical questions to our midwife through WhatsApp but the consultation still needs to be face-to-face. #clinic_provides_online_communication_channel_for_non-medical_purpose Is that the type of digital health you are talking about?
Annisa	:	Yeah sure, those are part of digital health. Well the term itself is quite broad, it could be many things in healthcare that are supported by technology. Do you know about the

		digital health startups in Jakarta, Bandung, or Surabaya that provides online consultations, health information on websites, or even drug couriers?
Respondent	:	Yeah I've heard of it
Annisa	:	Is there any patients you know or doctors in here that are using these kind of platforms?
Respondent	:	I don't think so. As far as I know, digitalization in here happens internally, in the hospital itself, such as using digital system for medical records, pharmacy, radiology laboratory or USG. #digitalization_internal_hospital
Annisa	:	As a doctor, do you think digital health system, any kind of digital health, will help you in any way?
Respondent	:	If we're talking about the internal system then yes, definitely. But for the online platform I would say maybe, I don't have much information about it but I think there should be a standardization or regulation that ensure that the patients are talking to a real doctor, not a nurse, or someone who just has medical knowledge like a student. #online_consultation_regulation_to_protect_patients I personally don't think we are ready for that, it needs high integrity and honesty from the healthcare provider. #online_consultation_trust_challenge
Annisa	:	From the perspective of patients, in your opinion, will digital health help them? Do you think they will use it?
Respondent	•••	Well maybe it's not for everyone. #digital_divide Especially in here, as I mentioned before there are around half of my patients that cannot use digital system. Mostly the elders like over 40 or 50 or even young people with a low education level background. #digital_divide_elders #digital_divide_people_low_education_background But for the ones that come from middle and high education background will surely use it if it is easy and trustworthy.
Annisa	:	Do you think your patients experience difficulty in accessing healthcare service?
Respondent	:	Well I don't think it is difficult for the people who live in the city area but there are villages around which are quite far and the access to go there is difficult. #difficulty_to_access_healthcare_long_distance #difficulty_to_access_healthcare_transportation_access
Annisa	:	But do you have patients coming from those area?
Respondent	:	Yeah I do. I have patients from Perangat, it's 1.5 hours from here by car if you travel during the day. They need to rent a car as well to come to this clinic because there is no public transportation. In some villages, midwives have a weekly schedule to go there because the transportation are challenging, you need to rent a boat so not many people can afford it. #difficulty_to_access_healthcare_high_cost
Annisa	:	Is there any local health facility in there?

Respondent	:	Yeah but it's not sufficient, they are not able to treat serious illness. #insufficient_health_facility
Annisa	:	Do you know what the government/healthcare providers have done to tackle the issue?
Respondent	:	As far as I know, the government tries to provide inpatient facility for community health centre in these rural areas, even though they still need to refer patients to hospitals in the cities for serious cases, at least they can manage the less serious illness that need intensive treatment. #inpatient_facility_community_health_centre_rural_areas_for_less_serious_illness
Annisa	:	In general, do you think it would be difficult for people in Bontang to use the digital health system?
Respondent	:	In my opinion and in here, yes. I don't know how this system operates but there are quite some challenges in implementing technology in here.
Annisa	:	What do you think would be the challenge?
Respondent	:	Not everyone can use it. Even in here people get confused when we say we can provide their USG result online. #digital_divide_digital_literacy
Annisa	:	Do you think the digital health system will help to increase the accessibility of people to healthcare service?
Respondent	:	In general maybe, but if we're talking about people in here or in the area around Bontang, I don't think so, accessing digital system requires a certain knowledge that many people do not have it. #digital_divide_digital_literacy
Annisa	:	In your opinion, what are the advantages of using the digital health system to your patients?
Respondent	:	It's efficient, we can save printing cost and people get their examination result faster #digital_health_increase_efficiency
Annisa	:	And what are the disadvantages?
Respondent	:	As I said, not everyone understand it
Annisa	:	Do you think it is important for your patients to have the option to use the digital health system?
Respondent	:	I don't think so, at least not for now and not in here. Because there are many things that cannot be assessed online, direct interaction between health workers and patients is still needed. Maybe when the patient doesn't feel anything but the doctor can see something, not all problems can be detected from an online consultation. Here also sometimes many patients find it difficult to describe their complaints, unlike patients in big cities who can straightforwardly describe their complaints. #patients_inability_to_explain_illness #patients_need_direct_examination For such cases we have to dig deeper to know what the disease is. But maybe if in a big city digital health can be useful. #digital_health_useful_in_big_city

Clinic's administrator

Annisa	:	What is your role in this clinic?
Respondent	:	I am an administrator
Annisa	:	What does it mean?
Respondent	:	I work in the front desk, taking care of patient's registration, payment, etc.
Annisa	:	How long have you been working as an administrator in a clinic in Bontang?
Respondent	:	This is my third year
Annisa	:	Have you ever worked in a big city?
Respondent	:	No, only here, in this clinic
Annisa	:	Do you think your patients are actively using digital media or technology?
Respondent	:	Sometimes patients communicate through WhatsApp, like for asking doctor's schedule or ask something about pregnancy #clinic_provides_online_communication_channel _non-medical_purpose #clinic_provides_online_communication_channel_pregnancy_questions
Annisa	:	So this clinic provide online communication channel through WhatsApp? #clinic _communication_channel _online_third_party_chat_messenger
Respondent	:	Yes, we have WhatsApps account called TanyaBidan, patients can communicate through this but not with doctor, only midwives. #clinic_provides_online_communication_channel_with_midwives
Annisa	:	Are you familiar with digital health?
Respondent	:	No
Annisa	:	Do you think that providing communication through WhatsApp helps patients?
Respondent	:	Yes I think so
Annisa	:	Do all patients use it?
Respondent	:	Not all of them, just a few
Annisa	:	Do you think people in Bontang experience difficulty in accessing healthcare service?
Respondent	:	In the city not really, but some areas do
Annisa	:	Which areas?
Respondent	:	For example in Tihi-Tihi, it's a small island, around 1 hour by boat #difficulty_to_access_healthcare_remote_island #difficulty_to_access_healthcare_transportation_access
Annisa	:	Is there any local health facility in there?
Respondent	:	There is one community health center there but there is no doctor. The doctors and midwives come once a week as far as I know.

		#insufficient_health_facility
Annisa	:	Do you know what the government/healthcare providers have done to tackle the issue?
Respondent	••	I think the government provide free internet there so they can communicate better with clinics in here, but I am not entirely sure, I never go there. #government_free_internet_support_digitalization
Annisa	:	What do you think is the advantage of TanyaBidan?
Respondent	••	Well, it helps patient to register or maybe ask something about their baby if it is not urgent #digital_health_simplify_patient_registration #digital_health_beneficial_consultation_non-urgent_matters
Annisa	:	And what are the disadvantages?
Respondent	:	We are quite slow in responding the message in there #disadvantage_of_digital_health_slow_respon_consultation
Annisa	:	Do you think the digital health system will help to increase the accessibility of people to healthcare service?
Respondent	:	I am not sure
Annisa	:	Do you think it is important for your patients to have the option to use the digital health system?
Respondent	:	Yes I supposed

Appendix 6 Transcript – The Ministry of Health

Annisa	:	Would you tell me a little bit of your profile in the Ministry of Health?
Respondent		I work in The Centre of Analysis of Health Determinant Directorate, what we are doing in here is analyzing strategic issues related to health, for example e-health, village funding, medical tourism and cross-ministry matters such as to define the health-related minimum service standards in the Ministry of Home Affairs. #ministry_of_health_analyze_cross-ministry_strategic_issue So we analyze these kinds of things which would later be submitted as policy recommendations to the Minister of Health to be examined whether these recommendations could be issued as policies. If they are valid to be issued then we will escalate the recommendation to the Directorate of Health Service.
Annisa	:	What is the scope of the Ministry of Health in the development digital health solution in Indonesia?
Respondent		Well, there are various types of digital health, such as conveying information, consultation with identifying diseases and prescribing drugs online, and others. #type_of_digital_health Our scope is not to develop such application; this is the area of digital startups. #ministry_health_scope_work However, there is one application that is owned by the Ministry of Health, from another directorate, and I do not know in detail, but the name is Sehatpedia. This application conveys health information and can be consulted, but has not been consulted to identify diseases #ministry_of_health_application_health_information_platform
Annisa	:	So the scope of the Ministry of Health in the development of digital health is to formulate and issue policies?
Respondent	:	Yes, but until now we haven't issue any policy yet. We are not finish in assessing to what extent or what type of digital health that can be allowed to operate. #no_policy _on_digital_health_yet
Annisa	:	But currently these kind of applications are already exist, isn't it?
Respondent	:	Yes. The same thing happened with Go-Jek, there is no policy to regulate it but it exists. We are trying to prepare the policy as fast as possible to prevent the same thing happens.
Annisa	:	How long have you been involved in the digital health bureau/division in the Ministry of Health?
Respondent	:	Technically this is the field of the Directorate of Health Services, they have been discussing digital health for quite a long timebecause they see the market trends. That is why Sehatpedia website. I am starting at the Determinant Analysis Center from the last 2 years, there are a number of policy recommendations that have been produced. One that just started this year is digital health.
Annisa	:	How far is the involvement of Indonesia in the global development of digital health?
Respondent	:	I am not sure about that, it's not the scope of this directorate.

Annisa	:	How does the Ministry of Health view the readiness and willingness of Indonesia as a developing country in implementing digital health system?
Respondent	:	Well, now digitalization has changed the way people live, they want to be fast and easy, so we also have to try to accommodate quickly. #digitalization_change_people_expectation Private sector has started a few years ago as we can see Halodoc or Alodokter that had been around for a long time, but Schatpedia had just been released last year. For the policy, we need to take everything that matters into account. We need sometime to evaluate, to embrace all parties, and hear the challenges, what they want and what we requires. #policy_factor_to_consider_business_needs #policy_factor_to_consider_business_challenges #policy_factor_to_consider_business_challenges #policy_factor_to_consider_government_requirement An example that occurred in Schatpedia, there is no response yet from the community, perhaps because of the platform is only for advocacy and information. #policy_factor_to_consider_citizen_needs In addition, we also have not determined the extent to which digital health services will be permitted. #policy_for_specific_type_of_digital_health We have not yet arranged whether the consultation through other media besides face to face will be permitted or not. #non-face-to-face_consultation_not_yet_permitted_nor_banned There are problems that are still being discussed such as if there is a malpractice, who will be responsible for it. #responsibility_on_online_consultation_malpractice Well, we are still at the stage of analyzing these things, so for the readiness itself I would say it is still being analyzed for each type of e-health as I mentioned like the health information platform, consultation, online drugs prescription which is the biggest concern, or telemedicine. #online_drugs_prescription_biggest_concern
Annisa	:	A while ago when there was a measles outbreak that infected the Asmat tribe. Is there any government initiative related to telemedicine to prevent such issues?
Respondent	:	Yes, of course. #telemedicine_to_prevent_outbreak Actually, to this day telemedicine called TEMENIN is still being developed. The latest information is that there are around 200 health facilities that have responded. You can check that there is a Presidential Instruction to develop telemedicine, especially in Papua. #presidential_instruction_to_prioritize_telemedicine_development Currently we have the Palapa Ring project for network-related infrastructure, through this project we hope that all parts of Indonesia including Papua will be connected to the internet, which will also support telemedicine program. #palapa_ring_internet_coverage_all_Indonesia The telemedicine devices from the Ministry of Health itself is developed by the Directorate of Health Services.
Annisa	:	Could you explain further about the telemedicine?
Respondent	:	As far as I know, one of the telemedicine program is preparing or helping health facilities in rural areas through video call technology. #telemedicine_using_video_call
		The expectation is that the health facility has a sufficient medical equipment and then they can be connected with doctors and expertises from anywhere. #telemedicine_increase_accessibility_on_doctors It will maximalized the role of local doctor or health worker. #telemedicine_maximalized_local_health_worker_role There are 4 types of telemedicine in TEMENIN application which are Tele-EKG, Tele- Consultation, Tele-Radiology and Tele-USG. #telemedicine_type_tele-ekg #telemedicine_type_tele-consultation #telemedicine_type_tele-radiology #telemedicine_type_tele-usg
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Annisa	:	And what about startup companies? Do they have plan to expand to that area?
Respondent	:	As far as I know, not yet. If startups want to enter rural area, they need the infrastructure, which are not ready. But the government is preparing for this. #startups_not_yet_enter_rural_area
Annisa	:	According the Ministry of Health's perspective, what are the priorities/work plan of the development of the digital health solution?
Respondent	:	One of the priorities is policy formulation. #policy_formulation_on_digital_health_government_priority The number of digital health startups are growing fast and potential problems have begun to appear. For this reason, the Ministry of Health must issue regulations immediately to protect all parties, especially the public as service users to prevent the occurrence of chaos as happened in Go-Jek or Grab.
Annisa	:	What would be the challenges of implementing the digital health system in the less developed regions? And how to tackle these challenges?
Respondent	:	The challenge that is quite a concern for us is the change in the perspective of society and professionals in the health sector. There has been a lot of changes happen due to digitalization, if previously people need to meet doctor in person in order to identify their health issue, now it can be done using online platform. However, changes cause problems. One example that I mentioned before, in case there is a diagnostic error, or maybe consultations carried out by doctors or health workers who did not have practice permits, or other examples when doctors practiced online on too many platforms then they become too busy to reply to chat and they create a template to answer patient's issues. #digital_health_potential_problem_provider_integrity #digital_health_potential_problem_doctor_register_in_too_many_platforms #digital_health_potential_problem_doctor_use_template_in_consultation Things like those are the challenges in developing digital health and its policy formulation. There are many things to consider. Nevertheless, we are totally aware that telemedicine programs will support health equity. #telemedicine_for _health_equity
Annisa	:	Does the Ministry of Health believe that people who live in a less developed region willing to accept digital health system? Why or why not?
Respondent	:	I believe so, at least I know many people are using Halodoc because it makes buying drugs easier since you don't need to go out. Surely a lot of people will use it. It's my personal opinion. #digital_health_ease_of_use

Annisa	:	What would be the expected outcomes in implementing digital health system in the perspective of the less developed regions?
Respondent	:	Surely the purpose of developing this telemedicine is for health equity because in the eastern regions doctors have to travel a considerable distance to go from from one health center to another. We are hoping by using telemedicine doctors can help patients from anywhere. #telemedicine_for_health_equity
Annisa	:	Do you have any comments or information you want to share regarding this study?
Respondent	•	Yes, actually we are still in the earliest stages of identifying problems that might arise from digital health by arranging discussions with startups and comparing applications. #ministry_of_health_still_in_the_earliest_stage _digital_health_development #ministry_of_health_identify_potential_problem_digital_health For example how long the response on each platform, how can the application ensure that one doctor does not register on too many platforms just like online motorcycle taxi nowadays. Maybe for more information, check the TEMENIN or Sehatpedia application and the Ministry of Health website.
Annisa	:	Sure I will check that, thank you for the suggestion. And last question, are you available for follow up question?
Respondent	:	Yes sure. You can contact me through WhatsApp. I will share some documents that might help your research as well.

Appendix 7	
Transcript – The Ministry of Communication and Informatics	

Annisa	:	What is the scope of The Ministry of Communication and Information Technology in the development digital health solution in Indonesia?
Respondent	:	All matters relating to digital health on the Communication and Informatics are managed under the Directorate General of Information Applications. In here we act as facilitators to support digital health startups doing their business. #MCIT_role_facilitator Our focus is to formulate and implement policies, for example the Government Regulation No. 82 regarding ITE Law and Ministerial Regulation of The Ministry of Communication and Informatics No. 4, 2016. #MCIT_policy
Annisa	:	How long have you been involved in the digital health bureau/division in the Ministry Of Communication And Information Technology?
Respondent	:	I joined this directorate since 2017, but the discussion regarding digital health has just started from September 2018
Annisa	••	How far is the involvement of Indonesia in the global development of digital health?
Respondent	:	We have not been much involved on a global scale, because we are still in the development phase of digital health. #not_much_global_involvement_digital_health There are 4 stages of maturity level that we use, first is the initialization stage, second is the developing stage, third is mature stage and the last is leading stage. Because we are still in the second stage, so there has not been much collaboration with other countries. #MCIT_developing_stage_digital_health There was one collaboration that was carried out several months ago in the form of Focus Group Discussion with Indonesian Hospital Association Data & Information Center (PDPERSI) but it was only for national scale. #collaboration_with_PDPERSI
Annisa	••	How does the Ministry of Communication And Information Technology view the readiness and willingness of Indonesia as a developing country in implementing digital health system?
Respondent	••	For my readiness, I think in the digital era we must always be ready, we must quickly prepare the community and government to accept advancements. But so far the government still has not finish the big task which is to provide networks to all parts of Indonesia. #government_big_task_tp_provide_network_for_all In terms of policy, regarding e-health we have PP No 46 Th. 2017. #digital_health_government_regulation
Annisa	:	But do you think people are willing to accept the system?
Respondent	•	Well, from what I see, people are quite enthusiast to accept technology. I have been to remote Kalimantan to meet fishermen there and introduce an application called "Smart Fisherman". They are not resistance to that, they even seem interested. Some people who have never used a smartphone or tablet invite their children who use smartphones. They are quite enthusiastic about using technology, especially those that are useful for

		their work, but on the other hand, the networks in these areas are still inadequate. That is our big problem right now. #people_in_rural_area_enthusiat_to_accept_technology #people_in_rural_area_inadequate_network
Annisa	:	What are the targets of the government related to the development of digital health and its supporting infrastructure?
Respondent	:	So far the target of the startup company itself is certainly still a big city because the use of digital media is still being concentrated in Jakarta, Bandung, Surabaya and several other big cities. #use_of_digital_media_concentrated_in_big_cities But the government has always encouraged companies to reach less developed areas and support them with the Palapa Ring project to ensure the network reaches remote areas. #palapa_ring_internet_coverage_all_Indonesia
Annisa	:	What do you think would be the challenge of introducing technology in a less developed region in Indonesia?
Respondent	:	Until now the constraints are still on the network or internet connection in areas outside Java, especially in remote areas.
Annisa	:	Does the Ministry of Communication And Information Technology believe that people who lives in a less developed region willing to accept digital health system? Why or why not?
Respondent	:	Yes, as I said they were quite enthusiastic and willing to accept. As far as I see, there is not much resistance to technological developments, maybe there are, but not large scale #MCIT_small_scale_resistance_towards_technology
Annisa	:	Does the Ministry of Communication And Information Technology believe they have sufficient resource to use the digital health system?
Respondent	:	In terms of the community itself, most of them already use digital media even though the level of use is different. But from our own health facilities we feel that we are not ready yet, the government is still working on providing adequate network for health facilities and until now there are still around 9900 health facilities operating offline. #health_facility_not_yet_ready_for_digital_health For those in remote areas there still needs to be a lot of development, because even the health facilities themselves are around 50% in Jakarta, West Java, and Central Java, so equity needs to be pursued to support the implementation of digital health. #health_facility_concentrated_in_Java
Annisa	:	Does the Ministry of Communication And Information Technology knows any health- related startups that targeting the less developed area as their market? If yes, could you please elaborate (what the company does, which digital health system they are working on, etc.)?
Respondent	:	Until now there hasn't been one. But there are plans in that direction, especially for the development of digital health in Papua. The scope of work of Kominfo itself is only as a facilitator, we pave the way for businesses to go to the regions. #MCIT_pave_the_way_for_business_to_enter_rural_area
Annisa	:	Do you have any comments or information you want to share regarding this study?

Respondent	:	The government's plan for digital health is gradual, from the review phase in 2017, then facilitating startups in 2018 to start the development of digital health. This year our plan is to introduce digital health to the regions through roadshows and in collaboration with the local health office and of course startups as the digital health service provider. #MCIT_plan_this_year_introduce_digital_health I had a discussion with the people in the Ministry of Health about this and they have an application named TEMENIN. I don't know the details but you can try to check. We also need to ensure that startups that engaged in digital health run in accordance with the existing legal corridors, one of which refers to Ministerial Regulation No. 36, 2014. #ministerial_regulation_digital
Annisa	:	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?
Respondent	:	Yes

Appendix 8

Transcripts - Residents in Bontang

Respondent 1		
Annisa	:	How long have you been living in Bontang?
Respondent	:	I've been living here since 2015
Annisa	:	May I know how old you are?
Respondent	:	27 years old
Annisa	:	What is your occupation?
Respondent	:	I am an employee in Pupuk Kaltim
Annisa	:	May I know about your last education?
Respondent	:	Bachelor degree
Annisa	:	What about religion?
Respondent	:	I am a Moslem
Annisa	:	Are you married?
Respondent	:	Yes
Annisa	:	Do you have children? If yes, how many?
Respondent	:	Yes, I have 1 son
Annisa	:	Do you use mobile phone?
Respondent	:	Yes, very often
Annisa	:	Is it a smartphone?
Respondent	:	Yes
Annisa	:	What do you use it for?
Respondent	:	For googling, browsing, using social media
Annisa	:	Do you use internet regularly?
Respondent	:	Yes
Annisa	:	Do you think the cost for internet is expensive?
Respondent	:	Not really
Annisa	:	Does the network is good?
Respondent	:	Well, there is only 1 internet provider who offers a sufficient service, but others are not good at all
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	Quite often, especially since I was pregnant
Annisa	:	Have you ever experience difficulty in accessing healthcare service? If you have, what was it?
Respondent	:	Not really, but we don't have much option in here.
Annisa	:	Have you ever experience difficulty in accessing digital media or technology in general?
Respondent	:	Not at all
Annisa	:	Do you know anything about a digital health system?
Respondent	:	Yes, I do know about digital health a little bit
Annisa	:	Do you/have you ever use any digital health system? Why or why not? If you do/have, which digital health system system do/have you use?
Respondent	:	I have used Halodoc application when I lived in Malang (East Java)

Annisa	:	Could you explain about what is it or how it works based on your understanding?
Respondent	:	Filling out patient data, date of birth, age, gender, and other basic data, and the we can choose the doctor we want based on their list
Annisa	:	Are those doctors from hospital?
Respondent	•••	I guess so
Annisa	:	Are there a lot of options (doctor) in the application?
Respondent	:	Yeah, they have a long list of doctors, but I think it is only used by young doctors.
Annisa	•••	How do you feel about using digital applications for health ?
Respondent	•••	I like it
Annisa	•••	In your opinion, what are/would be the advantages of using the digital health system?
Respondent	:	It makes life easy at a certain point. I don't have to go anywhere to ask a doctor if I have something in mind. However, it is a bit tricky for some illness because I can't meet the doctor directly, for example if I have skin issue, I can only send the picture. The good thing is we can also buy medicine as prescripted through the application and later be delivered by a courier.
Annisa	:	Do you think people around you want to/already use digital health system? Why or why not?
Respondent	:	Not that I know of. Maybe because it's not well-known yet.
Annica	•	Who do you think would want to/already use digital health system? Why?
Annisa	•	who do you unink would want to/aneady use digital health system? why:
Respondent	•	Maybe young mothers
Respondent Annisa	•	Who do you think would want to/ancady use digital health system? Why? Maybe young mothers Who do you think would not want to use digital health system? Why?
Respondent Annisa Respondent	•	Maybe young mothers Who do you think would not want to use digital health system? Why? Maybe elders, it can be a bit of a hassle
Respondent Annisa Respondent Annisa	•	Maybe young mothers Who do you think would not want to use digital health system? Why? Maybe elders, it can be a bit of a hassle Do you think it would be difficult for you to use the digital health system to attain healthcare service?
Respondent Annisa Respondent Annisa Respondent	· · ·	Maybe young mothers Who do you think would not want to use digital health system? Why? Maybe elders, it can be a bit of a hassle Do you think it would be difficult for you to use the digital health system to attain healthcare service? No
Respondent Annisa Respondent Annisa Respondent Annisa	· · ·	Maybe young mothers Who do you think would not want to use digital health system? Why? Maybe elders, it can be a bit of a hassle Do you think it would be difficult for you to use the digital health system to attain healthcare service? No What do you think would be the challenges?
Respondent Annisa Respondent Annisa Respondent Annisa Respondent		Maybe young mothers Who do you think would not want to use digital health system? Why? Maybe elders, it can be a bit of a hassle Do you think it would be difficult for you to use the digital health system to attain healthcare service? No What do you think would be the challenges? Waiting for the reply because they are not only for me, it could take a while to wait for the doctor to be available
Respondent Annisa Respondent Annisa Respondent Annisa Respondent Annisa		 Maybe young mothers Maybe young mothers Who do you think would not want to use digital health system? Why? Maybe elders, it can be a bit of a hassle Do you think it would be difficult for you to use the digital health system to attain healthcare service? No What do you think would be the challenges? Waiting for the reply because they are not only for me, it could take a while to wait for the doctor to be available But when your turn comes, will they stay with you until finish?
Respondent Annisa Respondent Annisa Respondent Annisa Respondent Annisa Respondent		 Maybe young mothers Who do you think would not want to use digital health system? Why? Maybe elders, it can be a bit of a hassle Do you think it would be difficult for you to use the digital health system to attain healthcare service? No What do you think would be the challenges? Waiting for the reply because they are not only for me, it could take a while to wait for the doctor to be available But when your turn comes, will they stay with you until finish? Yes, until until they ask "is there anymore question" and we say no, they will say thank you for trusting them etc.
Respondent Annisa Respondent Annisa Respondent Annisa Respondent Annisa Respondent Annisa		 Maybe young mothers Who do you think would not want to use digital health system? Why? Maybe elders, it can be a bit of a hassle Do you think it would be difficult for you to use the digital health system to attain healthcare service? No What do you think would be the challenges? Waiting for the reply because they are not only for me, it could take a while to wait for the doctor to be available But when your turn comes, will they stay with you until finish? Yes, until until they ask "is there anymore question" and we say no, they will say thank you for trusting them etc. Do you know that when you use digital health system, you will be giving out your health information?
Respondent Annisa Respondent Annisa Respondent Annisa Respondent Annisa Respondent Annisa Respondent		 Maybe young mothers Maybe elders, it can be a bit of a hassle Do you think it would be difficult for you to use the digital health system? Why? Maybe elders, it can be a bit of a hassle Do you think it would be difficult for you to use the digital health system to attain healthcare service? No What do you think would be the challenges? Waiting for the reply because they are not only for me, it could take a while to wait for the doctor to be available But when your turn comes, will they stay with you until finish? Yes, until until they ask "is there anymore question" and we say no, they will say thank you for trusting them etc. Do you know that when you use digital health system, you will be giving out your health information? Yes of course
Respondent Annisa Respondent Annisa Respondent Annisa Respondent Annisa Respondent Annisa Respondent Annisa		 Maybe young mothers Who do you think would not want to use digital health system? Why? Maybe elders, it can be a bit of a hassle Do you think it would be difficult for you to use the digital health system to attain healthcare service? No What do you think would be the challenges? Waiting for the reply because they are not only for me, it could take a while to wait for the doctor to be available But when your turn comes, will they stay with you until finish? Yes, until until they ask "is there anymore question" and we say no, they will say thank you for trusting them etc. Do you know that when you use digital health system, you will be giving out your health information? Yes of course How do you feel about giving out your health information to an application?
Respondent Annisa Respondent Annisa Respondent Annisa Respondent Annisa Respondent Annisa Respondent Annisa Respondent Annisa		 Maybe young mothers Who do you think would not want to use digital health system? Why? Maybe elders, it can be a bit of a hassle Do you think it would be difficult for you to use the digital health system to attain healthcare service? No What do you think would be the challenges? Waiting for the reply because they are not only for me, it could take a while to wait for the doctor to be available But when your turn comes, will they stay with you until finish? Yes, until until they ask "is there anymore question" and we say no, they will say thank you for trusting them etc. Do you know that when you use digital health system, you will be giving out your health information? Yes of course How do you feel about giving out your health information to an application? I have no problem with that

Respondent	:	Yes of course, as I mentioned before, this kind of application is easy to use and you don't need to go anywhere to get health service. They also provide 24 hours service, unlike specialized doctors in hospital
Annisa	:	Is it important to have digital system to support healthcare service?
Respondent	:	Yes, it's nice to have many options
Annisa	:	Do you have any comments or information you want to share regarding this study?
Respondent	:	No
Annisa	:	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?
Respondent	:	Yes sure

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Annisa	:	How long have you been living in Bontang?
Respondent	:	I've been living here since I was born
Annisa	:	May I know how old you are?
Respondent	:	18 years old
Annisa	:	What is your occupation?
Respondent	:	I am a shopkeeper
Annisa	:	May I know about your last education?
Respondent	:	Senior high school
Annisa	:	What about religion?
Respondent	:	I am a Catholic
Annisa	:	Are you married?
Respondent	:	Not yet, I just graduated
Annisa	:	Do you have children? If yes, how many?
Respondent	:	No I don't
Annisa	:	Do you use mobile phone?
Respondent	:	Yes
Annisa	:	Is it a smartphone?
Respondent	:	Yes
Annisa	:	What do you use it for?
Respondent	:	Just for information
Annisa	:	Do you use internet regularly?
Respondent	:	Not very often
Annisa	:	Do you think the cost for internet is expensive?
Respondent	:	I use wifi at work
Annisa	:	Does the network is good?
Respondent	:	Sometimes it's good sometimes it's not
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	I never go to a doctor
Annisa	:	Are you actively using digital media or technology (e.g. social media, digital
Description	-	news)
Respondent	:	I use whatsApp and Facebook but not that often, maybe half an hour a day

Annisa	:	Have you ever experience difficulty in accessing digital media or technology in general?
Respondent	:	No, it's quite easy
Annisa	:	Do you know anything about a digital health system?
Respondent	:	I don't know that
Annisa	:	If there is an option for you to have an online consultation with a doctor trough website or your phone, would you like to use it?
Respondent	:	I am not sure yet
Annisa	:	Do you have any comments or information you want to share regarding this study?
Respondent	:	No
Annisa	:	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?
Respondent	:	Yes

Annisa	:	How long have you been living in Bontang?
Respondent	:	Since I was born
Annisa	:	May I know how old you are?
Respondent	:	18 years old
Annisa	:	What is your occupation?
Respondent	:	Senior high school student
Annisa	:	What about religion?
Respondent	:	Moslem
Annisa	:	Are you married?
Respondent	:	Not yet
Annisa	:	Do you have children? If yes, how many?
Respondent	:	No
Annisa	:	Do you use mobile phone?
Respondent	:	Yes everyday
Annisa	:	Is it a smartphone?
Respondent	:	Yes
Annisa	:	What do you use it for?
Respondent	:	For social media, information sharing
Annisa	:	Do you use internet regularly?
Respondent	:	Yes
Annisa	:	Do you think the cost for internet is expensive?
Respondent	:	It depends on the provider, I use Telkomsel, it is expensive, but it's the best one
Annisa	:	Does the network is good?
Respondent	:	If you use Telkomsel then yes, it's the best, but IM3 and the others are not good
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	The last time I went to a doctor was when I was in elementary school I think, I don't even remember it
Annisa	:	Have you ever experience difficulty in accessing healthcare service? If you have, what was it?

Respondent	:	I never heard such things, we have hospitals in here. Maybe that's the case for specialists, I know my uncle needs to go to Jakarta for some surgery but I am not sure why
Annisa	:	Are you actively using digital media or technology (e.g. social media, digital news)
Respondent	:	Yes
Annisa	:	Have you ever experience difficulty in accessing digital media or technology in general?
Respondent	:	No
Annisa	:	What kind of technology/application do you use?
Respondent	:	Mostly I use social media like Instagram and Facebook or messaging apps like WhatsApp and Line
Annisa	:	Do you know anything about a digital health system?
Respondent	:	I don't know, what is that?
Annisa	:	Well digital health system could be a general term of technology that supports healthcare service, but what mostly people know in Indonesia is like an online platform, could be a website or application to discuss about health issues with doctors. Other than that, DHS could also means digital support between health providers. In your opinion, is this kind of system helps?
Respondent	:	Might be, especially for some diseases that cause shame to the patients
Annisa	:	If there is an option for you to have an online consultation with a doctor trough
D 1 (website or your phone, would you like to use it?
Respondent	:	Yes sure if I need it I will use it
Annisa	:	In your opinion, what are/would be the advantages of using the digital health system?
Respondent	:	I don't know, just keep up with the trend I think
Annisa	:	And what are the disadvantages?
Respondent	:	Not everyone use smartphone, especially this kind of application
Annisa	:	Do you think people around you want to/already use digital health system? Why or why not?
Respondent	:	No
Annisa	:	Who do you think would want to/already use digital health system? Why?
Respondent	:	Maybe young people, almost all the young people I know are using smartphone, it is more likely for them to use digital health system.
Annisa	:	Who do you think would not want to use digital health system? Why?
Respondent	:	Elders, even my mom doesn't use smartphone
Annisa	:	Do you think it would be difficult for you to use the digital health system to attain healthcare service?
Respondent	:	I am not sure
Annisa	:	What do you think would be the challenges?
Respondent	:	I never see one so I don't know
Annisa	:	How do you feel about giving out your health information to an application?
Respondent	:	I don't think it would be a problem
Annisa	:	Do you believe the digital health system provides easier access to healthcare? Why or why not?
Respondent	:	Maybe yes, if you can talk to a doctor like when you're chatting with a friend then it's more convenient
Annisa	:	Is it important to have digital system to support healthcare service?
Respondent	:	I think so. This is digital era, so we need to keep up with digitalization

Annisa	:	Do you have any comments or information you want to share regarding this
		study?
Respondent	:	No
Annisa	:	Are you available for follow up question? If you do, may I have your phone
		number or any other media so I can contact you in the future?
Respondent	:	Yes

Annisa	:	How long have you been living in Bontang?
Respondent	:	Since I was born
Annisa	:	May I know how old you are?
Respondent	:	17 years old
Annisa	:	What is your occupation?
Respondent	:	Senior high school student
Annisa	:	What about religion?
Respondent	:	Moslem
Annisa	:	Are you married?
Respondent	:	Not yet
Annisa	:	Do you have children? If yes, how many?
Respondent	:	No
Annisa	:	Do you use mobile phone?
Respondent	:	Yes
Annisa	:	Is it a smartphone?
Respondent	:	Yes
Annisa	:	What do you use it for?
Respondent	:	For communication and social media
Annisa	:	Do you use internet regularly?
Respondent	:	Yes I use it everyday
Annisa	:	Do you think the cost for internet is expensive?
Respondent	:	The one that I use yes, but I also use wifi, I don't know how much it cost since my parents pay for it
Annisa	:	Does the network is good?
Respondent	:	Sometimes the wifi is not good, but the trouble isn't occur often
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	Not often, but I had an appendectomy last year
Annisa	:	Have you ever experience difficulty in accessing healthcare service? If you have, what was it?
Respondent	:	No, I live near a hospital, the service is good as well
Annisa	:	Are you actively using digital media or technology (e.g. social media, digital news)
Respondent	:	Yes
Annisa	:	Have you ever experience difficulty in accessing digital media or technology in general?
Respondent	:	No, I use it often so it's easy
Annisa	:	What kind of technology/application do you use?
Respondent	:	Just application in my phone or tablet

Annisa	:	Do you know anything about a digital health system?
Respondent	:	No
Annisa	:	If there is an option for you to have an online consultation with a doctor trough
		website or your phone, would you like to use it?
Respondent	:	I am not sure
Annisa	:	In your opinion, what are/would be the advantages of using the digital health system?
Respondent	•••	Maybe it becomes easier to talk with doctors
Annisa	:	And what are the disadvantages?
Respondent	••	It can be challenging because not everyone can use it, there are some areas in Bontang here that are not connected to internet. I have been to a small island, it's 2 hours from here and I need to use a boat. In there, some parts are totally disconnected from internet
Annisa	:	Do you think people around you want to/already use digital health system? Why or why not?
Respondent	••	Maybe if it is popular
Annisa	:	Who do you think would want to/already use digital health system? Why?
Respondent	:	Young people, it's easy for them
Annisa	:	Who do you think would not want to use digital health system? Why?
Respondent	:	Elders, there are many elders that I know don't use smartphone
Annisa	:	Do you think it would be difficult for you to use the digital health system to attain healthcare service?
Respondent	:	Maybe not
Annisa	:	What do you think would be the challenges?
Respondent	:	I don't know, I can't think of anything
Annisa	:	Do you know that when you use digital health system, you will be giving out your health information?
Respondent	:	Maybe
Annisa	:	How do you feel about giving out your health information to an application?
Respondent	:	I am okay with that
Annisa	:	Do you believe the digital health system provides easier access to healthcare? Why or why not?
Respondent	:	Maybe, I don't know but usually technology makes life easier
Annisa	:	Is it important to have digital system to support healthcare service?
Respondent	:	For now I think it's not important yet
Annisa	:	Do you have any comments or information you want to share regarding this study?
Respondent	:	No
Annisa	:	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?
Respondent	:	Yes

Annisa	:	May I know how old you are?
Respondent	:	20 years old
Annisa	:	What is your occupation?
Respondent	:	I am a sales promotion girl
Annisa	:	May I know about your last education?

Respondent	:	Senior high school
Annisa	:	What about religion?
Respondent	:	Catholic
Annisa	:	Are you married?
Respondent	:	No
Annisa	:	Do you have children? If yes, how many?
Respondent	:	No
Annisa	:	Do you use mobile phone?
Respondent	:	Yes
Annisa	:	Is it a smartphone?
Respondent	:	Yes
Annisa	:	What do you use it for?
Respondent	:	For social media, communication and games
Annisa	:	Do you use internet regularly?
Respondent	:	Yes
Annisa	:	Do you think the cost for internet is expensive?
Respondent	:	Not really
Annisa	:	Does the network is good?
Respondent	:	Not always, but mostly good
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	I've never been to doctor for a long time
Annisa	:	But do you know if people in here are experiencing difficulty to access healthcare service?
Respondent	:	I don't think so, there are some hospital in here
Annisa	:	Are you actively using digital media or technology (e.g. social media, digital news)
Respondent	:	Yes
Annisa	:	Have you ever experience difficulty in accessing digital media or technology in general?
Respondent	:	No
Annisa	:	What kind of technology/application do you use?
Respondent	:	I use Facebook and WhatsApp
Annisa	:	Do you know anything about a digital health system?
Respondent	:	No, I don't
Annisa	:	If there is an option for you to have an online consultation with a doctor trough
		website or your phone, would you like to use it?
Respondent	:	Yeah maybe, if it helps, why not use it
Annisa	:	In your opinion, what are/would be the advantages of using the digital health system?
Respondent	:	Maybe with that kind of application we don't have to go to the hospital, I don't know how it works though
Annisa	:	And what are the disadvantages?
Respondent	:	I am not sure
Annisa	:	Who do you think would want to/already use digital health system? Why?
Respondent	:	Young people who are using smartphones
Annisa	:	Who do you think would not want to use digital health system? Why?
Respondent	:	Everyone who doesn't use smartphone

Annisa	:	Do you think it would be difficult for you to use the digital health system to attain healthcare service?
Respondent	:	Maybe a little, in the beginning
Annisa	:	What do you think would be the challenges?
Respondent	:	I don't know yet
Annisa	:	How do you feel about giving out your health information to an application?
Respondent	:	I don't have a problem with that
Annisa	:	Do you believe the digital health system provides easier access to healthcare? Why or why not?
Respondent	:	Yes for those people who are using smartphones, for the people who aren't won't make any difference
Annisa	:	Is it important to have digital system to support healthcare service?
Respondent	:	Not really I think
Annisa	:	Do you have any comments or information you want to share regarding this study?
Respondent	:	No
Annisa	:	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?
Respondent	:	Yes

Annisa	:	May I know how old you are?
Respondent	:	18 years old
Annisa	:	What is your occupation?
Respondent	:	I am a student
Annisa	:	May I know about your last education?
Respondent	:	Senior High School
Annisa	:	What about religion?
Respondent	:	Moslem
Annisa	:	Are you married?
Respondent	:	No
Annisa	:	Do you have children? If yes, how many?
Respondent	:	No
Annisa	:	Do you use mobile phone?
Respondent	:	Yes, I use it everyday
Annisa	:	Is it a smartphone?
Respondent	:	Yes
Annisa	:	What do you use it for?
Respondent	:	To call or text someone, social media
Annisa	:	Do you use internet regularly?
Respondent	:	Yes
Annisa	:	Do you think the cost for internet is expensive?
Respondent	:	Yes it's a bit expensive
Annisa	:	Does the network is good?
Respondent	:	Yes, it is fine, I use Telkomsel so I rarely have issue with the network
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?

Respondent	:	Not often. I have ulcer though, I went to a doctor several months ago, but since that I just took unprescription medication.
Annisa	:	Have you ever experience difficulty in accessing healthcare service? If you have, what was it?
Respondent	:	No I haven't, we have some hospitals and clinics in here
Annisa	:	Are you actively using digital media or technology (e.g. social media, digital news)
Respondent	:	Yes
Annisa	:	Have you ever experience difficulty in accessing digital media or technology in general?
Respondent	:	No, I use it everyday, it's easy for me
Annisa	:	What kind of technology/application do you use?
Respondent	:	I use Instagram, WhatsApp, Line, Snapchat, and many more
Annisa	:	Do you know anything about a digital health system?
Respondent	:	No, what is that?
Annisa	:	Well digital health system could be a general term of technology that supports healthcare service, but what mostly people know in Indonesia is like an online platform, could be a website or application to discuss about health issues with doctors. Other than that, DHS could also means digital support between health providers. In your opinion, is this kind of system helps?
Respondent	:	I don't know, maybe, but if you have an ulcer, you just need medication which can be bought in supermarkets. Maybe it depends on the illness.
Annisa	:	If there is an option for you to have an online consultation with a doctor trough website or your phone, would you like to use it?
Respondent	:	I think it's better to just go to a doctor
Annisa	:	In your opinion, what are/would be the advantages of using the digital health system?
Respondent	:	It's easy, you can talk to a doctor anywhere
Annisa	:	And what are the disadvantages?
Respondent	:	For me, I prefer to get an examination. Just go to a clinic and meet the doctor.
Annisa	:	Who do you think would want to/already use digital health system? Why?
Respondent	:	Maybe young people
Annisa	:	Who do you think would not want to use digital health system? Why?
Respondent	:	Maybe elders
Annisa	:	Do you think it would be difficult for you to use the digital health system to attain healthcare service?
Respondent	:	If it is just like social media then no
Annisa	:	What do you think would be the challenges?
Respondent	:	I really don't know how it works
Annisa	:	How do you feel about giving out your health information to an application?
Respondent	:	I don't mind, they need that information anyway
Annisa	:	Do you believe the digital health system provides easier access to healthcare? Why or why not?
Respondent	:	If the question is easier then yes, maybe. But I don't know if it will help the patients the same way as if I go to a doctor in person.
Annisa	:	Is it important to have digital system to support healthcare service?
Respondent	:	No
Annisa	:	Do you have any comments or information you want to share regarding this study?
Respondent	:	No

Annisa	:	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?
Respondent	:	Yes

Annisa	:	How long have you been living in Bontang?
Respondent	:	Around 20 years
Annisa	:	May I know how old you are?
Respondent	:	24 years old
Annisa	:	What is your occupation?
Respondent	:	I work in a hotel
Annisa	:	May I know about your last education?
Respondent	:	Vocational School
Annisa	:	What about religion?
Respondent	:	Christian
Annisa	:	Are you married?
Respondent	:	Yes
Annisa	:	Do you have children? If yes, how many?
Respondent	:	No, I just got married several months ago
Annisa	:	Do you use mobile phone?
Respondent	:	Yes of course
Annisa	:	Is it a smartphone?
Respondent	:	Yes
Annisa	:	What do you use it for?
Respondent	:	Mostly social media and games
Annisa	:	Do you use internet regularly?
Respondent	:	Yes
Annisa	:	Do you think the cost for internet is expensive?
Respondent	:	Not really, it's not cheap but not that expensive either
Annisa	:	Does the network is good?
Respondent	:	It depends, if you use Telkomsel then yes, but sometimes there are issues
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	Not often, not even once a year
Annisa	:	Have you ever experience difficulty in accessing healthcare service? If you have, what was it?
Respondent	:	Yes, if you are going to a government's hospital, the doctors are rarely available, if you come half an hour before the lunch break they are already gone. Maybe private hospital is better.
Annisa	:	Are you actively using digital media or technology (e.g. social media, digital news)
Respondent	:	Yes I am
Annisa	:	Have you ever experience difficulty in accessing digital media or technology in general?
Respondent	:	Not really
Annisa	:	What kind of technology/application do you use?
Respondent	:	Social media, detik.com to read news, Instagram, many things

Annisa	:	Do you know anything about a digital health system?
Respondent	:	No
Annisa	•	Well digital health system could be a general term of technology that supports healthcare service, but what mostly people know in Indonesia is like an online platform, could be a website or application to discuss about health issues with doctors. Other than that, DHS could also means digital support between health providers. In your opinion, is this kind of system helps?
Respondent	:	Yes sure, it faster the process to consult with doctors
Annisa	:	If there is an option for you to have an online consultation with a doctor trough website or your phone, would you like to use it?
Respondent	:	Yeah I would, as long as the problem can be answered through online platform
Annisa	:	In your opinion, what are/would be the advantages of using the digital health system?
Respondent	:	It's faster
Annisa	:	And what are the disadvantages?
Respondent	:	Not every problem can be solved online
Annisa	:	Do you think people around you want to/already use digital health system? Why or why not?
Respondent	:	I don't think so
Annisa	:	Who do you think would want to/already use digital health system? Why?
Respondent	••	If it becomes popular I think almost everyone will use it, like WhatsApp
Annisa	••	Who do you think would not want to use digital health system? Why?
Respondent	:	Elders, or people who live in jungles, they don't usually use phone
Annisa	••	Do you think it would be difficult for you to use the digital health system to attain healthcare service?
Respondent	:	I think no
Annisa	:	What do you think would be the challenges?
Respondent	:	Maybe if the result we got from digital system is not satisfying, it could be annoying since we still need to do the conventional way all over again
Annisa	••	Do you know that when you use digital health system, you will be giving out your health information?
Respondent	:	Yeah that make sense
Annisa	•••	How do you feel about giving out your health information to an application?
Respondent	:	It's okay
Annisa	:	Do you believe the digital health system provides easier access to healthcare? Why or why not?
Respondent	:	Yes of course, well that's the purpose of making the digital system isn't it?
Annisa	:	Is it important to have digital system to support healthcare service?
Respondent	:	Maybe for not it's not that important, but over time I think it will get more important
Annisa	:	Do you have any comments or information you want to share regarding this study?
Respondent	:	No
Annisa	:	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?
Respondent	:	Yes

Respondent 8			
Annisa	:	How long have you been living in Bontang?	
Respondent	:	Since I was born	
Annisa	:	May I know how old you are?	
Respondent	:	21 years old	
Annisa	:	What is your occupation?	
Respondent	:	Administrator in a company	
Annisa	:	May I know about your last education?	
Respondent	:	Senior High School	
Annisa	:	What about religion?	
Respondent	:	Moslem	
Annisa	:	Are you married?	
Respondent	:	Yes	
Annisa	:	Do you have children? If yes, how many?	
Respondent	:	Just one	
Annisa	:	Do you use mobile phone?	
Respondent	:	Yes	
Annisa	:	Is it a smartphone?	
Respondent	:	Yes	
Annisa	:	What do you use it for?	
Respondent	:	For communication, googling, social media	
Annisa	:	Do you use internet regularly?	
Respondent	:	Yes	
Annisa	:	Do you think the cost for internet is expensive?	
Respondent	:	It's a bit expensive, but I can still afford it so it's okay	
Annisa	:	Does the network is good?	
Respondent	:	Yes it is okay, not all the providers are good though.	
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?	
Respondent	:	Quite often but for my son	
Annisa	:	Have you ever experience difficulty in accessing healthcare service? If you have, what was it?	
Respondent	:	Not really, we have a pediatrician, we always go to that one and my wife doesn't seem to have a problem	
Annisa	:	Are you actively using digital media or technology (e.g. social media, digital news)	
Respondent	:	Yes	
Annisa	:	Have you ever experience difficulty in accessing digital media or technology in general?	
Respondent	:	No	
Annisa	:	What kind of technology/application do you use?	
Respondent	:	I use Facebook, Line, Grab and Google	
Annisa	:	Do you know anything about a digital health system?	
Respondent	:	No	

Annisa	:	If there is an option for you to have an online consultation with a doctor trough website or your phone, would you like to use it?
Respondent	:	No I won't, I don't really believe it. It could be anyone on the other side and I can't tell.
Annisa	:	In your opinion, what are/would be the advantages of using the digital health system?
Respondent	:	I don't know, I think health service should not be replaced by online service
Annisa	:	And what are the disadvantages?
Respondent	:	One thing for sure, you won't know if you are talking to a doctor or not. I won't risk such thing especially for my child
Annisa	:	Do you think people around you want to/already use digital health system? Why or why not?
Respondent	:	I don't know, I never heard of it
Annisa	:	Who do you think would want to/already use digital health system? Why?
Respondent	:	People who believe it
Annisa	:	Who do you think would not want to use digital health system? Why?
Respondent	:	People who don't believe it
Annisa	:	How do you feel about giving out your health information to an application?
Respondent	:	It's fine but the problem is, will it benefit you?
Annisa	:	Do you believe the digital health system provides easier access to healthcare? Why or why not?
Respondent	:	If it is used for administration like patient registration or for reserve queue then yes maybe, but if it is for consultation then no
Annisa	:	Is it important to have digital system to support healthcare service?
Respondent	:	Not teally, there are more important things like cheaper cost and reliable doctors
Annisa	:	Do you have any comments or information you want to share regarding this study?
Respondent	:	No
Annisa	:	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?
Respondent	:	Yes

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Annisa	:	How long have you been living in Bontang?
Respondent	:	I moved here at 2007, so it's 12 years
Annisa	:	May I know how old you are?
Respondent	:	41 years old
Annisa	:	What is your occupation?
Respondent	:	I am a housemaid
Annisa	:	May I know about your last education?
Respondent	:	Elementary school
Annisa	:	What about religion?
Respondent	:	I am Moslem
Annisa	:	Are you married?
Respondent	:	Yes
Annisa	:	Do you have children? If yes, how many?

Respondent	:	Yes, I have a 16 years old son
Annisa	:	Do you use mobile phone?
Respondent	:	Yes I use a phone
Annisa	:	Is it a smartphone?
Respondent	:	Yes
Annisa	:	What do you use it for?
Respondent	:	For WhatsApps and calls
Annisa	:	Do you use internet regularly?
Respondent	:	Only when I have nothing to do
Annisa	:	Do you think the cost for internet is expensive?
Respondent	:	Yeah it is, I use Telkomsel, it's expensive
Annisa	:	Does the network is good?
Respondent	:	Yes it's good
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	Not often. A while ago when I started to have hypertetion, I went to a clinic
Annisa	:	Have you ever experience difficulty in accessing healthcare service? If you have, what was it?
Respondent	:	Maybe just a long queue, it's not a difficulty but it's a bit inconvenience
Annisa	:	Are you actively using digital media or technology (e.g. social media, digital news)
Respondent	:	Yes
Annisa	:	Have you ever experience difficulty in accessing digital media or technology in general?
Respondent	:	No I don't
Annisa	:	What kind of technology/application do you use?
Respondent	:	I just use Facebook and WhatsApp
Annisa	:	Do you know anything about a digital health system?
Respondent	:	No
Annisa	:	If there is an option for you to have an online consultation with a doctor trough website or your phone, would you like to use it?
Respondent	:	I don't think so, I don't like going to doctot, most likely they will just give me a bunch of medicine I don't need, application won't make much different. I'd rather use a traditional or preventive medicine such as low-sodium salt

Annisa	:	How long have you been living in Bontang?
Respondent	:	I've been living here for 4 years
Annisa	:	May I know how old you are?
Respondent	:	29 years old
Annisa	:	What is your occupation?
Respondent	:	I am an employee in a private company
Annisa	:	May I know about your last education?
Respondent	:	Bachelor degree
Annisa	:	What about religion?
Respondent	:	Moslem

Annisa	:	Are you married?
Respondent	:	Yes I am
Annisa	:	Do you have children? If yes, how many?
Respondent	:	Yes, I have a daughter
Annisa	:	Do you use mobile phone?
Respondent	:	Yes
Annisa	:	Is it a smartphone?
Respondent	:	Yes it is a smartphone
Annisa	:	What do you use it for?
Respondent	:	For social media and communicating with my family
Annisa	:	Do you use internet regularly?
Respondent	:	Yes I do
Annisa	:	Do you think the cost for internet is expensive?
Respondent	:	I use Telkomsel, the price depends on the zone. In Kalimantan the price is more expensive than Java.
Annisa	:	Does the network is good?
Respondent	:	As far as I know, in here, people only use 1 internet provider. I rarely know someone who use other providers because they don't have a good service. The one that I use has a good network.
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	Very often, especially since I have a daughter. I got full cover health insurance for my company so everytime I have a health issue I will go to a doctor
Annisa	:	Have you ever experience difficulty in accessing healthcare service? If you have, what was it?
Respondent	:	Well if I compare here with big cities than the option of the doctors are very limited. In fact, many of the doctors that I like are not permanent, they are here for several months or even weeks. It's a bit difficult because when I started to get used to a doctor and they got relocated I need to adapt to a new doctor all over again. Other than that I have no problem with the service
Annisa	:	Are you actively using digital media or technology (e.g. social media, digital news)
Respondent	:	Yes
Annisa	:	Have you ever experience difficulty in accessing digital media or technology in general?
Respondent	:	Not at all
Annisa	:	What kind of technology/application do you use?
Respondent	:	I mostly use Instagram, Twitter, and WhatsApp
Annisa	:	Do you know anything about a digital health system?
Respondent	:	Yes I know some, like the online consultation platform or health information website
Annisa	:	Do you/have you ever use any digital health system? Why or why not? If you do/have, which digital health system system do/have you use?
Respondent	:	Not yet. I don't need it so far.
Annisa	:	In your opinion, what are/would be the advantages of using the digital health system?
Respondent	:	The advantages would be the simplicity, we don't need to bother to go to a hospital. Eventhough the communication is done through online platform, as long as the issue is deliverd well I think it would help a lot. We don't always have time to go to the doctor as well.

Annisa	:	And what are the disadvantages?
Respondent	:	It is prone to fraud. There is no way we can tell if they really are a doctor and in Indonesia, fraud happens a lot.
Annisa	:	Do you think people around you want to/already use digital health system? Why or why not?
Respondent	:	Yes, a few of my friends use it
Annisa	:	Who do you think would want to/already use digital health system? Why?
Respondent	:	Millennial moms who are easily gets panick when there's something unfamiliar with their baby and don't have much time. I actually interested with digital health application, maybe after this I will try to explore further
Annisa	:	Who do you think would not want to use digital health system? Why?
Respondent	:	Maybe the elders who don't use smartphone
Annisa	:	Do you think it would be difficult for you to use the digital health system to attain healthcare service?
Respondent	:	It would be a challenge at first. But once I understand the system it should be fine.
Annisa	:	What do you think would be the challenges?
Respondent	:	Maybe just understanding how it works, first time setup and these kind of things
Annisa	:	How do you feel about giving out your health information to an application?
Respondent	:	It's okay, if we don't give it to the application then how the doctors know our condition?
Annisa	:	Do you believe the digital health system provides easier access to healthcare? Why or why not?
Respondent	:	Yes, as I said, it is easier, we don't need to go anywhere, but there must be some regulation to reduce the frauds as well.
Annisa	:	Is it important to have digital system to support healthcare service?
Respondent	:	Yes it is important
Annisa	:	Do you have any comments or information you want to share regarding this study?
Respondent	:	I feel like not many people knows this kind of application or system. Making sure that people aware of such technology is important as well.
Annisa	:	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?
Respondent	:	Yes

Annico		How long have you have living in Dontong?
Annisa	•	How long have you been hving in bontang?
Respondent	:	I've been living here since I was born, but I spent 4 years in another city for my
		Bachelor study
Annisa	:	May I know how old you are?
Respondent	:	30 years old
Annisa	:	What is your occupation?
Respondent	:	I work in IT field, in a private company
Annisa	:	May I know about your last education?
Respondent	:	Bachelor degree
Annisa	:	What about religion?
Respondent	:	I am a Moslem
Annisa	:	Are you married?
Respondent	:	Yes

Annisa	:	Do you have children? If yes, how many?
Respondent	:	I have a daughter
Annisa	:	Do you use mobile phone?
Respondent	:	Yes
Annisa	:	What do you use it for?
Respondent	:	For communication, reading news and for work. I am a mobile application developer.
Annisa	:	Do you use internet regularly?
Respondent	:	Yes
Annisa	:	Do you think the cost for internet is expensive?
Respondent	:	No, I don't think it is expensive
Annisa	:	Does the network is good?
Respondent	:	Well, since there is a very limited option of internet provider, there is only one provider that gives a good service. However, there are still more problems in here compare to other big cities.
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	I have a 5 months old daughter so very often
Annisa	:	Have you ever experience difficulty in accessing healthcare service? If you have, what was it?
Respondent	:	Not really
Annisa	:	Are you actively using digital media or technology (e.g. social media, digital news)
Respondent	:	Yes, everyday
Annisa	:	Have you ever experience difficulty in accessing digital media or technology in general?
Respondent	:	No
Annisa	:	What kind of technology/application do you use?
Respondent	:	I work with my smartphone a lot so I need to understand many things. I utilize almost everything in my phone.
Annisa	:	Do you know anything about a digital health system?
Respondent	:	Yes I know it
Annisa	:	Do you/have you ever use any digital health system? Why or why not? If you do/have, which digital health system system do/have you use?
Respondent	:	Yes, I use Apple Watch to track my activities, I read health articles in Alodokter, sometimes I also measure my health condition with my phone. I don't know if it is valid but I do that. I like to maintain my health, and with these kind of tools, at least I know if I have done enough activities or not today.
Annisa	:	Could you explain about what is it or how it works based on your understanding?
Respondent	:	For Apple Watch, it detects your movement using sensor. It knows when you are sitting down, standing up, or even resting. It can also measure your sleep quality.
Annisa	:	How do you feel about using digital applications for health ?
Respondent	:	I like it. I can set a goal for myself.
Annisa	:	In your opinion, what are/would be the advantages of using the digital health system?
Respondent	:	As I was saying, I can set a goal, and I know the standard as well. How many calories I need to eat and burn everyday, how much activities I should do and I have done, these kind of things are important.
Annisa	:	And what are the disadvantages?
Respondent	:	It is expensive

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Annisa	:	Do you think people around you want to/already use digital health system? Why or why not?
Respondent	:	My colleagues yeah. In fact, we got the device (smartwatch) from the company so everyone in my team use it
Annisa	:	Who do you think would want to/already use digital health system? Why?
Respondent	:	Millennials maybe
Annisa	:	Who do you think would not want to use digital health system? Why?
Respondent	:	Well, people who can't afford it
Annisa	:	There are many kinds of digital health such as telemedicine, telehealth, electronic
		health record, and the one that is quite popular in Jakarta now is online
		consultation. In your opinion as a person who works in IT or as a potential
		consumer of healthcare in general, what do you think about these type of digital
Description		health?
Respondent	:	I think these kind of system would help to reduce administrative steps by a lot.
Annisa	:	For specifically online consultation where you can talk to doctor throught your
Respondent		I think it's a good idea. In fact, if the one we talk to is not a doctor, a robot for
Respondent	•	example. I wouldn't mind as well
Annisa	:	It's quite an intersting answer, why wouldn't you be bother by that?
Respondent	:	Well, as a person who works in IT, I think we need to be able to mimic the current
-		system or process and sometimes computer program does a better job than human
Annisa	:	And what do you feel about sharing you health information? For example when
		you are using the smartwatch, there will be data related to your daily activities or
		even habits, are you worried about that?
Respondent	:	No, the point of IT is open data, I am not worried as long as there are regulations
Annico		that protects these kind of data exchange so it won't be used for something bad
Annisa	•	healthcare service?
Respondent	:	No
Annisa	:	What do you think would be the challenges?
Respondent	:	I think the challenge would be to have the system fully available in Indonesia, and
		especially in Bontang
Annisa	:	Do you believe the digital health system provides easier access to healthcare?
D 1 (Why or why not?
Respondent	:	Yes I do believe it would be a big neip for people to have easier access not only to hospitals but also have their personal health consultant
Annisa		Is it important to have digital system to support healthcare service?
Respondent	•	Yes of course. I think it's quite important
Annisa		Do you have any comments or information you want to share regarding this
7 mmbu	•	study?
Respondent	:	No
Annisa	:	Are you available for follow up question? If you do, may I have your phone
		number or any other media so I can contact you in the future?
Respondent	:	Yes

Annisa	:	How long have you been living in Bontang?
Respondent	:	Around 12 years
Annisa	:	May I know how old you are?
Respondent	:	24 years old

Annisa	:	What is your occupation?
Respondent	:	Make up artist
Annisa	:	May I know about your last education?
Respondent	:	Bachelor degree
Annisa	:	What about religion?
Respondent	:	I am a Moslem
Annisa	:	Are you married?
Respondent	:	No
Annisa	:	Do you have children? If yes, how many?
Respondent	:	No
Annisa	:	Do you use mobile phone?
Respondent	:	Yes
Annisa	:	Is it a smartphone?
Respondent	:	Yes
Annisa	:	What do you use it for?
Respondent	:	I use it for a lot things like browsing, reading news, instagram, and of course
Annisa		communication
Ramandant	•	Voc
Appiso	•	Tes Do you think the cost for internet is expansive?
Annisa	•	Not really. It was expansive like 2 years ago, but the price is getting lower new
Appia	•	Not really. It was expensive like 2 years ago, but the price is getting lower now.
Allilisa	•	Vos it is
Appia	•	Tes It is
Annisa	•	Note often Lhave asthma, as avertime Last asthma attack I'll as to a dector
Appia	<u> </u>	Unite often. I have astinina, so everytime I got astinina attack I ii go to a doctor
Annisa	•	what was it?
Respondent	:	Maybe the cost, it is very expensive.
Annisa	:	Are you actively using digital media or technology (e.g. social media, digital
		news)
Respondent	:	
Annisa	:	Have you ever experience difficulty in accessing digital media or technology in general?
Respondent	:	Not at all
Annisa	:	Do you know anything about a digital health system?
Respondent	:	Can you explain to me what that means? I might know it but not familiar with the
Annisa	•	Do you/have you ever use any digital health system? Why or why not? If you
		do/have, which digital health system system do/have you use?
Respondent	:	Yes, I did use one called Halodoc. I used it to buy a medicine for my friend.
Annisa	:	Could you explain about what is it or how it works based on your understanding?
Respondent	:	You can talk to a doctor through the application, or just buying a medicine
		without prescription. After you buy it, someone will pick up your order and
Annisa		Are those doctors from hospital?
Respondent	•	I don't know. I never try to consult
Annico	•	Are there a lot of options (degter) in the application?
Annisa	·	Are more a lot of options (doctor) in the application?

Respondent	:	Yes there as quite a lot
Annisa	:	How do you feel about using digital applications for health ?
Respondent	:	It's easy if you want to buy a medicine, but for consultation I don't think it can replace the conventional way, especially if your problem is asthma
Annisa	:	Is that a positive or negative feeling?
Respondent	:	Just normal
Annisa	:	In your opinion, what are/would be the advantages of using the digital health system?
Respondent	:	It will help it you have a problem you need to discuss with a doctor in the middle on the night, so you'll know what to do in the morning
Annisa	:	And what are the disadvantages?
Respondent	:	I don't know, I need to dig a little deeper about digital health to know the disadvantages. But maybe for online consultation, you can't really know if you're talking with a real doctor or not.
Annisa	:	Do you think people around you want to/already use digital health system? Why or why not?
Respondent	:	Maybe, I know some people who are using Halodoc, not in this city though
Annisa	:	Who do you think would want to/already use digital health system? Why?
Respondent	:	Young people who are actively using the internet
Annisa	:	Who do you think would not want to use digital health system? Why?
Respondent	:	People who don't believe the application
Annisa	:	Do you think it would be difficult for you to use the digital health system to attain healthcare service?
Respondent	:	I am not sure
Annisa	:	What do you think would be the challenges?
Respondent	:	I am not sure either
Annisa	:	Do you know that when you use digital health system, you will be giving out your health information?
Respondent	:	Yes I supposed
Annisa	:	How do you feel about giving out your health information to an application?
Respondent	:	No problem
Annisa	:	Do you believe the digital health system provides easier access to healthcare? Why or why not?
Respondent	:	Maybe, but I don't think I can't believe such system completely
Annisa	:	Is it important to have digital system to support healthcare service?
Respondent	:	I don't it is important right now.
Annisa	:	Do you have any comments or information you want to share regarding this study?
Respondent	:	No
Annisa	:	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?
Respondent	:	Yes

Annisa	:	How long have you been living in Bontang?
Respondent	:	I've been living here since the last 6 years
Annisa	:	May I know how old you are?
Respondent	:	52 years old

Annisa	:	What is your occupation?
Respondent	:	I have a small food stalls
Annisa	:	May I know about your last education?
Respondent	:	Senior High School
Annisa	:	What about religion?
Respondent	:	I am a Moslem
Annisa	:	Are you married?
Respondent	:	Yes
Annisa	:	Do you have children? If yes, how many?
Respondent	:	I have 2 children, both are wokring already
Annisa	:	Do you use mobile phone?
Respondent	:	Yes
Annisa	:	Is it a smartphone?
Respondent	:	No, it's just a cellphone
Annisa	:	What do you use it for?
Respondent	:	To call my children, my friends, customers, just for communication
Annisa	:	Do you use internet regularly?
Respondent	:	No, I don't have time and I don't understand either
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	No, but my husband does
Annisa	:	Have you ever experience difficulty in accessing healthcare service? If you have, what was it?
Respondent	:	No I haven't, there is a clinic near my house, we always go there
Annisa	:	Are you in general satisfied with the service the provide?
Respondent	:	Yes I think, maybe my husband knows more about this
Annisa	:	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?
Respondent	:	Yes

Annisa	:	How long have you been living in Bontang?
Respondent	:	This is my third year
Annisa	:	May I know how old you are?
Respondent	:	I am 38 years old
Annisa	:	What is your occupation?
Respondent	:	Houswife
Annisa	:	May I know about your last education?
Respondent	:	Bachelor degree
Annisa	:	What about religion?
Respondent	:	I am a Christian
Annisa	:	Are you married?
Respondent	:	Yes
Annisa	:	Do you have children? If yes, how many?
Respondent	:	I have 2 children
Annisa	:	Do you use mobile phone?

Respondent	:	Yes everyday
Annisa	:	Is it a smartphone?
Respondent	:	Yes
Annisa	:	What do you use it for?
Respondent	:	I use it for a lot of things like social media, google, taking pictures and videos,
		and many more
Annisa	:	Do you use internet regularly?
Respondent	:	Yes I do
Annisa	:	Do you think the cost for internet is expensive?
Respondent	:	Yes, everything in Bontang is more expensive than Java
Annisa	:	Does the network is good?
Respondent	:	Not really, but it's okay
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	I often take my children to a doctor
Annisa	:	Have you ever experience difficulty in accessing healthcare service? If you have,
D 1		what was it?
Respondent	:	It's a bit difficult to find a good doctor here, especially on national holidays
Annisa	:	Have you ever experience difficulty in accessing digital media or technology in general?
Respondent	:	No it's relatively easy
Annisa	:	Do you know anything about a digital health system?
Respondent	:	I've heard of it
Annisa	:	Do you/have you ever use any digital health system? Why or why not? If you
		do/have, which digital health system system do/have you use?
Respondent	:	No, I prefer to meet a doctor in person
Annisa	:	In your opinion, what are/would be the advantages of using the digital health system?
Respondent	:	Maybe with digital health application, reaching out to a doctor would be easier.
_		Currently me and my friends have a chat group to share or discuss about our
		children's health issues.
Annisa	:	And what are the disadvantages?
Respondent	:	I am not sure, I never use it

Annisa	:	How long have you been living in Bontang?
Respondent	:	Since I was born
Annisa	:	May I know how old you are?
Respondent	:	16 years old
Annisa	:	What is your occupation?
Respondent	:	I am a student
Annisa	:	May I know about your last education?
Respondent	:	I am currently in Senior High School
Annisa	:	What about religion?
Respondent	:	I am Christian
Annisa	:	Are you married?
Respondent	:	Not yet

Annisa	:	Do you have children? If yes, how many?
Respondent	:	No
Annisa	:	Do you use mobile phone?
Respondent	:	Yes
Annisa	:	Is it a smartphone?
Respondent	:	Yes it is a smartphone
Annisa	:	What do you use it for?
Respondent	:	For chatting, doing homework, and social media
Annisa	:	Do you think the cost for internet is expensive?
Respondent	:	Yeah it is expensive
Annisa	:	Does the network is good?
Respondent	:	For Telkomsel yes but IM3 and X1 are not good
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	I rarely go to a doctor
Annisa	:	But do you know if people in here are experiencing difficulty to access healthcare service?
Respondent	:	I think it's quite easy, my parents work in PT. Badak, they have their own hospital and it's free
Annisa	:	Are you actively using digital media or technology (e.g. social media, digital news)
Respondent	:	Yes
Annisa	:	Have you ever experience difficulty in accessing digital media or technology in general?
Respondent	:	No
Annisa	:	What kind of technology/application do you use?
Respondent	:	I use applications like WhatsApp, Line, Instagram
Annisa	:	Do you know anything about a digital health system?
Respondent	:	What is that?
Annisa	:	Well digital health system could be a general term of technology that supports healthcare service, but what mostly people know in Indonesia is like an online platform, could be a website or application to discuss about health issues with doctors. Other than that, DHS could also means digital support between health providers. In your opinion, is this kind of system helps?
Respondent	:	I have no idea
Annisa	:	If there is an option for you to have an online consultation with a doctor trough website or your phone, would you like to use it?
Respondent	:	I think I would prefer to meet a doctor

Annisa	:	How long have you been living in Bontang?
Respondent	:	5 years
Annisa	:	So you have lived in other city before?
Respondent	:	Yes, I lived in Tasikmalaya, Lampung, and Sangatta
Annisa	:	May I know how old you are?
Respondent	:	I am 50 years old
Annisa	:	What is your occupation?
Respondent	:	A masseuse

Annisa	:	May I know about your last education?
Respondent	:	Elementary school
Annisa	:	What about religion?
Respondent	:	I am a Moslem
Annisa	:	Are you married?
Respondent	:	Yes
Annisa	:	Do you have children? If yes, how many?
Respondent	:	I have 3 children
Annisa	:	Do you use mobile phone?
Respondent	:	Yes
Annisa	:	Is it a smartphone?
Respondent	:	No
Annisa	:	What do you use it for?
Respondent	:	For calling my family and customers
Annisa	:	Do you use internet regularly?
Respondent	:	No
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	I rarely go to a doctor, the last time is a long time ago. My daugther is a nurse, if I
		have health issue she will treat me
Annisa	:	But do you know if people in here are experiencing difficulty to access healthcare service?
Respondent	:	There is a clinic not far from my house, but it only has one doctor. That is why I am too lazy to go to a doctor, it's a long queue
Annisa	:	Do you know anything about a digital health system?
Respondent	:	I don't know
Annisa	:	If there is an option for you to have an online consultation with a doctor trough website or your phone, would you like to use it?
Respondent	:	I don't think so, it's troublesome
Annisa	:	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?
Respondent	:	Yes

:	How long have you been living in Bontang?
:	10 years
:	So you have lived in other city before?
:	Yes, I am from Jember, East Java
:	May I know how old you are?
:	40 years old
:	What is your occupation?
:	I am a housemaid
:	May I know about your last education?
:	Elementary school
:	What about religion?
:	Moslem
:	Are you married?
	: : : : : : : :

Respondent	:	Yes I am
Annisa	:	Do you have children? If yes, how many?
Respondent	:	I have 3 children
Annisa	:	Do you use mobile phone?
Respondent	:	Yes
Annisa	:	Is it a smartphone?
Respondent	:	Yes
Annisa	:	What do you use it for?
Respondent	:	Just for communicarion, call my children and husband
Annisa	:	Do you use internet regularly?
Respondent	:	No, I don't like it. My children play with internet a lot and sometimes it can get
		annoying because they become ignorant.
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	Not often
Annisa	:	Have you ever experience difficulty in accessing healthcare service? If you have, what was it?
Respondent	:	I usually go to a local health centre when I need a doctor. There is not much problem there, it's just sometimes the queue is quite long.
Annisa	:	Are you in general satisfied with the service the provide?
Respondent	:	It could be better
Annisa	:	If there is an option for you to have an online consultation with a doctor trough website or your phone, would you like to use it?
Respondent	:	No, I don't want to
Annisa	:	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?
Respondent	:	Yes

Annisa	:	How long have you been living in Bontang?
Respondent	:	Since I was born
Annisa	:	May I know how old you are?
Respondent	:	37 years old
Annisa	:	What is your occupation?
Respondent	:	I am a shopkeeper
Annisa	:	May I know about your last education?
Respondent	:	Senior high school
Annisa	:	What about religion?
Respondent	:	I am a Catholic
Annisa	:	Are you married?
Respondent	:	Yes
Annisa	:	Do you have children? If yes, how many?
Respondent	:	Yes I have son
Annisa	:	Do you use mobile phone?
Respondent	:	Yes
Annisa	:	Is it a smartphone?
Respondent	:	Yes it is

Annisa	:	What do you use it for?
Respondent	:	I use it for many things, browsing, social media, online delivery
Annisa	:	Do you think the cost for internet is expensive?
Respondent	:	Yeah it's quite expensive
Annisa	:	Does the network is good?
Respondent	:	Depends which provider you are using and where you are. In my shop, there are some spots that doesn't have network at all, I don't know why
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	I haven't been to a doctor for a long time
Annisa	:	But do you know if people in here are experiencing difficulty to access healthcare service?
Respondent	:	I don't know
Annisa	:	Have you ever experience difficulty in accessing digital media or technology in general?
Respondent	:	No
Annisa	:	Do you know anything about a digital health system?
Respondent	:	No I don't
Annisa	:	If there is an option for you to have an online consultation with a doctor trough website or your phone, would you like to use it?
Respondent	:	Maybe, I use online delivery for food, it's easy, maybe digital help could be a new trend in several years
Annisa	:	In your opinion, what are/would be the advantages of using the digital health system?
Respondent	:	I don't know maybe it reduces some processes and it's easy, like online delivery or online motorcycle taxi. But it makes you lazy sometimes.
Annisa	:	And what are the disadvantages?
Respondent	:	I am not sure
Annisa	:	Do you think people around you want to/already use digital health system? Why or why not?
Respondent	:	Maybe, many people are using Grab or Go-Jek now, if it is useful then people will use it

Annisa	:	How long have you been living in Bontang?
Respondent	:	I just moved here last year
Annisa	:	So you have lived in other city before?
Respondent	:	Yes, in Purwokerto
Annisa	:	May I know how old you are?
Respondent	:	23 years old
Annisa	:	What is your occupation?
Respondent	:	Sales Promotion Girl
Annisa	:	May I know about your last education?
Respondent	:	Senior High School
Annisa	:	What about religion?
Respondent	:	Moslem
Annisa	:	Are you married?
Respondent	:	No

Annisa	:	Do you have children? If yes, how many?
Respondent	•	No
Annisa	•	Do you use mobile phone?
Respondent	•	Yes
Annisa	•	Is it a smartphone?
Respondent	•	Vec
Annisa	•	What do you use it for?
Respondent	•	Mostly for social media
Annisa	•	Do you use internet regularly?
Respondent	•	Vec
Annisa	•	Do you think the cost for internet is expensive?
Respondent	•	A bit expensive
Appigo	•	Does the network is good?
Allinsa	·	Does the network is good?
Respondent	:	Not as good as in Purwokerto, and there is only one good provider in here which is the most expensive one. There are more option in Purwokerto.
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	Ouite often, but I only went to a local health centre once in here
Annisa	:	Have you ever experience difficulty in accessing healthcare service? If you have,
		what was it?
Respondent	:	There is only one doctor for so many patients
Annisa	:	Are you in general satisfied with the service the provide?
Respondent	:	No
Annisa	:	Are you actively using digital media or technology (e.g. social media, digital
		news)
Respondent	:	Yes
Annisa	:	Have you ever experience difficulty in accessing digital media or technology in
		general?
Respondent	:	No
Annisa	:	What kind of technology/application do you use?
Respondent	:	Instagram, WhatsApp and Grab for motorcycle taxi

Annisa	:	How long have you been living in Bontang?
Respondent	:	Since I was born
Annisa	:	May I know how old you are?
Respondent	:	27 years old
Annisa	:	What is your occupation?
Respondent	:	Mechanic
Annisa	:	May I know about your last education?
Respondent	:	Vocational School
Annisa	:	What about religion?
Respondent	:	Moslem
Annisa	:	Are you married?
Respondent	:	No
Annisa	:	Do you have children? If yes, how many?
Respondent	:	No

Annisa	:	Do you use mobile phone?
Respondent	:	Yes
Annisa	:	Is it a smartphone?
Respondent	:	Yes
Annisa	:	What do you use it for?
Respondent	:	For WhatsApp, Facebook, and taking pictures
Annisa	:	Do you use internet regularly?
Respondent	:	Yes
Annisa	:	Do you think the cost for internet is expensive?
Respondent	:	No
Annisa	:	Does the network is good?
Respondent	:	Yes
Annisa	:	How often do you use a healthcare service (e.g. go to a doctor or clinic)?
Respondent	:	Very rare
Annisa	:	But do you know if people in here are experiencing difficulty to access healthcare service?
Respondent	:	I never heard anything
Annisa	:	Are you actively using digital media or technology (e.g. social media, digital news)
Respondent	:	Yes
Annisa	:	Have you ever experience difficulty in accessing digital media or technology in general?
Respondent	:	No
Annisa	:	Do you know anything about a digital health system?
Respondent	:	No I don't
Annisa	:	If there is an option for you to have an online consultation with a doctor trough website or your phone, would you like to use it?
Respondent	:	Yeah maybe, it sounds interesting
Annisa	:	In your opinion, what are/would be the advantages of using the digital health system?
Respondent	:	I don't really understand the way it works but I guess it would be similar as the other application that are happening now, it makes our life easier

Appendix 9



Residents in the city of Bontang

No.	Questions	
Openi	Opening Questions	
1	Do you agree if I record the interview in order to have better analysis of the interview? (In case they do not, notes will be taken during the interview)	
2	Could you tell me a little bit of yourself? (gender, age, occupation, religious affiliation, education level, and marital status)	
3	Do you have children? If yes, how many?	
4	Do you use mobile phone? If yes, what kind of mobile phone do you have and what do you use it for?	
5	Do you use internet regularly? If yes, do you think it expensive? Does the network is good?	
6	How often do you use a healthcare service (e.g. go to a doctor or clinic)?	
7	Have you ever experience difficulty in accessing healthcare service? If you have, what was it?	
Main	Questions	
8	Are you actively using digital media or technology (e.g. social media, digital news)	
9	Have you ever experience difficulty in accessing digital media or technology in general?	
10	If you have, what system/technology do you use?	
11	Do you know anything about a digital health system? If you do, could you explain about what is it or how it works based on your understanding?	
12	Do you/have you ever use any digital health system? Why and why not?	
13	If you do/have, which digital health system system do/have you use?	
14	How do you feel about using digital applications for health ? Is that a positive or negative feeling?	
15	In your opinion, what are the advantages of using the digital health system?	

16	And what are the disadvantages?
17	Do you think people around you want to/already use digital health system? Why or why not?
18	Who do you think would want to/already use digital health system? Why?
19	Who do you think would not want to use digital health system? Why?
20	Do you think it would be difficult for you to use the digital health system to attain healthcare service?
21	What do you think would be the challenges?
22	Do you know that when you use digital health system, you will be giving out your health information?
23	How do you feel about that?
24	Do you believe the digital health system provides easier access to healthcare? Why or why not?
25	Is it important to have digital system to support healthcare service?
Openi	ng Questions
26	Do you have any comments or information you want to share regarding this study?
27	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?

Healthcare worker(s) in Bontang

No.	Questions	
Open	ing Questions	
1	Do you agree if I record the interview in order to have better analysis of the interview? (In case they do not, notes will be taken during the interview)	
2	How long have you been a doctor/healthcare worker in Bontang?	
3	Have you ever worked in a big city in Indonesia (e.g. Jakarta, Bandung, Surabaya, Semarang, etc.)? If you have, what are the differences in term of the patients (behavior/demographic)?	
4	Do you think your patients are actively using digital media or technology (e.g. social media, digital news, smartphone)	
Main Questions		
5	What do you know about digital health?	
6	Do you use any digital system in your clinic/hospital? If yes, could you explain briefly about how it works?	
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7	As a healthcare worker, do you think digital health system will help you in any way?	
10	Which group of patients do you think would use the digital health system? Why?	
11	Which group of patients do you think would not use the digital health system? Why?	
12	Do you think your patients experience difficulty in accessing healthcare service? Why or why not?	
13	If yes, do you know what the government/healthcare providers have done to tackle the issue?	
14	In general, do you think it would be difficult for people in Bontang to use the digital health system?	
15	What do you think would be the challenges for your patients?	
16	Do you think the digital health system will help to increase the accessibility of people to healthcare service? Why or why not?	
17	In your opinion, what are the advantages of using the digital health system to your patients?	
18	And what are the disadvantages?	
19	Do you think it is important for your patients to have the option to use the digital health system?	
Closi	ng Questions	
20	Do you have any comments or information you want to share regarding this study?	
21	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?	

The Ministry of Communication and Information Technology of the Republic of Indonesia

No.	Questions	
Opening Questions		
1	Do you agree if I record the interview in order to have better analysis of the	
	interview? (In case they do not, notes will be taken during the interview)	
2	What is the scope of The Ministry of Communication and Information	
	Technology in the development digital health solution in Indonesia?	
3	How long have you been involved in the digital health bureau/division in the	
	Ministry Of Communication And Information Technology?	
Main Questions		

4	How far is the involvement of Indonesia in the global development of digital health?
5	How does the Ministry of Communication And Information Technology view the readiness and willingness of Indonesia as a developing country in implementing digital health system?
6	What are the targets of the government related to the development of digital health and its supporting infrastructure?
7	What do you think would be the challenge of introducing technology in a less developed region in Indonesia?
8	Does the Ministry of Communication And Information Technology believe that people who lives in a less developed region willing to accept digital health system? Why or why not?
9	Does the Ministry of Communication And Information Technology believe they have sufficient resource to use the digital health system? Why or why not?
10	Does the Ministry of Communication And Information Technology collaborates with health-related startups? If yes, how are the collaboration?
11	Does the Ministry of Communication And Information Technology knows any health-related startups that targeting the less developed area as their market? If yes, could you please elaborate (what the company does, which digital health system they are working on, etc.)?
Closi	ng Questions
12	Do you have any comments or information you want to share regarding this study?
13	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?

The Ministry of Health of the Republic of Indonesia

No.	Questions	
Opening Questions		
1	Do you agree if I record the interview in order to have better analysis of the interview? (In case they do not, notes will be taken during the interview)	
2	Would you tell me a little bit of your profile in the Ministry of Health?	
3	What is the scope of the Ministry of Health in the development digital health solution in Indonesia?	
4	How long have you been involved in the digital health bureau/division in the Ministry of Health?	
Opening Questions		

5	How far is the involvement of Indonesia in the global development of digital health?
6	How does the Ministry of Health view the readiness and willingness of Indonesia as a developing country in implementing digital health system?
7	Do we have policy/regulation regarding the implementation of digital health solution in Indonesia? If yes, could you explain further?
8	According the Ministry of Health's perspective, what are the priorities/workplan of the development of the digital health solution?
9	What are the current challenges of healthcare in the less developed regions in Indonesia?
10	What would be the challenges of implementing the digital health system in the less developed regions? And how to tackle these challenges?
11	Does the Ministry of Health believe that people who lives in a less developed region willing to accept digital health system? Why or why not?
12	What would be the expected outcomes in implementing digital health system in the perspective of the less developed regions?
Closing Questions	
13	Do you have any comments or information you want to share regarding this study?
14	Are you available for follow up question? If you do, may I have your phone number or any other media so I can contact you in the future?