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ICT in Business and the Public Sector

Evidence-Based Approach in Prioritizing Project Location in Indonesia Development Planning Process (Study Case: Telemedicine Project)

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MASTER'S THESIS

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Abstract

The varied geographical conditions and the difficulty of access to reach remote areas are often major problems for the government, especially in developing countries to ensure quality public services. In health services, the high cost of transportation and the unequal distribution of doctors' resources often make health services in remote and rural areas not optimal or even neglected. The existence of ICT is the main driving force for the emergence of the concept of telemedicine in health services, with the main concept changing the pattern of conventional health care business to one based on ICT, so that distance and the presence of doctors in humans are no longer the main problem. Developing countries, such as Indonesia, have also adopted this concept in the development of health services in these countries, especially to reach areas that are considered non-commercial for the private sector. However, in the planning process, the government often treats telemedicine like other projects that do not require the adoption of ICT in it, such as the construction of physical infrastructure (toll roads, irrigation, traditional markets, or schools). This makes the success rate of telemedicine often not optimal. This thesis intends to discuss solutions in the planning process of an ICT-based project using an evidence-based approach. The methodology used is to analyze the main obstacles in implementing telemedicine, assessing the characteristics of the factors that influence the success of telemedicine, and finding data that can be an indicator of the influencing factors in it, and using the concept of evidence-based policy as an alternative that can be used in the ICT-based project planning process.

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1. Introduction

Digitalization has now penetrated almost all sectors, ranging from those carried out by the private sector to those carried out by the government. The role of information and communication technology (ICT), which has been proven to increase the effectiveness and efficiency of a job, is the main reason for public or private stakeholders to adopt the role of ICT in it (Gustafsson, Norlinder, & Rehn, 2018). Since the emergence of fast data communication lines, distance and travel time constraints have been slowly or significantly reduced (Green & Ruhleder, 1995). The human ability to transmit high volumes of data in a short time has enabled a paradigm shift in work (Cascio & Montealegre, 2016). Previously, meetings were often held in person, with the video conferencing feature allowing a person to move from one meeting to another without having to spend energy or money to move locations. This makes the development of communication technology no longer concerned with improving the technology itself, but how ICT can become an enabler for other sectors.

In the case of the COVID-19 pandemic, for example. The readiness of the institution or school in conducting distance learning by utilizing ICT allows processes to continue. However, this readiness must also be supported by the readiness of the actors, both teachers and students, to carry out distance learning activities (Zou, Li, & Jin, 2021). The benefits of ICT adoption are also enjoyed by other relatively modern sectors such as the banking sector. In fact, the banking sector was one of the first sectors to adopt ICT (Pennings & Harianto, 1992). Banking activities, both those that do not or require interaction between customers and officers, are starting to shift from manual to digital. Starting from opening an account via video call to making instant financing decisions through AI, we have found it in the banking sector. The rapid process of IT adoption in the private sector is influenced by the economic motivation behind the use of IT in the private sector which encourages the formulation of more dynamic business strategies and regulations to accommodate the use of IT in the process (David, Bagozzi, & Warshaw, 1992). In the concept of IT maturity, These influences are known as organizational and regulatory factors (Jennett et al, 2003; Jensen et al 2015)

Then, what about other sectors that conventionally rely on the presence of activity actors in their processes? Some ICT observers use the word “digital vortex” in analogizing the speed of ICT adoption in the processes of a sector (Cisco, 2015). Sectors located near the center of the vortex are sectors that are relatively fast in adopting ICT, while sectors far from the center of the vortex are sectors that are relatively slow in adopting ICT. The speed of a sector in adopting

ICT is influenced by the characteristics of the processes in that sector. Sectors such as tourism and energy are two sectors that are considered slow in adopting ICT in their processes. This is due to the characteristics of the tourism sector which until now does require the presence of customers at the tourism location, while the energy sector is considered slow because the changes that can be influenced by ICT are only limited to some parts of the sales and management process, other parts still rely more on conventional business styles.

An understanding of the speed of ICT adoption in the processes of each sector needs to be a consideration and a variable that needs to be considered for the government, if the government wants to intervene in the sector. One sector that is currently a concern is the health sector. The adoption of ICT in the health sector has long been the goal of many countries because it is considered to reduce the cost of health services and can help health services in remote areas (Nyasulu & Chawinga, 2018). The end result is an increase in the quality of human life in the area which has implications for improving the economy and welfare. This is further strengthened by the Covid-19 situation which encourages the government to be able to minimize direct patient contact with doctors (Monaghesh & Hajizadeh, 2020).

In the digital vortex, the health sector is in a fairly external area, or is considered quite slow in adopting ICT. In addition to being interpreted that the health sector may not be able to transform to digital as a whole, this condition can also mean that actors in the health sector need time to adopt ICT or change paradigms in the sector's business processes, especially for health sector actors in developing countries where literacy is digital technology in general, not just health sector players, is still lower compare the developed countries group (Qiang, Pitt, & Ayers, 2004). This condition might affect the success rate of an ICT-based project related to health services.

Previous studies have also confirmed the slow adoption of ICT in the health sector (England, Stewart & Walker, 2000). Previous studies have also confirmed the slow adoption of ICT in the health sector (England, Stewart & Walker, 2000). The results of a survey conducted by Accenture (2021) also revealed that even in developed countries, ICT adoption in the health sector is also still uneven. In only a few areas has there been an increase in ICT adoption in the health sector.

The position of the health sector which is outside the ICT vortex, combined with the fact that ICT support is important in the health care sector, is an interesting thing to study. Several studies have indeed elaborated on ICT support in the health sector, however, the scope of the

discussion often still focuses on how ICTs improve the quality of health services (Nyasulu & Chawinga, 2018; Combi, Pozzani & Pozzi, 2016; Merrell, Cone & Rafiq, 2008; Jagagarpu & Savani, 2021; Gershon-Cohen, et al., 1950) or the factors that influence the success of ICT adoption in the health care sector (Jensen et al, 2015; Dyk, Schutte, & Fortuin, 2012; Jennett et al, 2003; Khoja et al, 2007; Reifegerste, Harst, & Otto, 2021). Meanwhile, the issue of planning the development of ICT support in the health care sector, especially in countries that have a relatively low ICT development index, has not been discussed in depth by previous studies.

1.1 Problem Statement

Indonesia is the largest archipelagic country in the world with the fourth largest population in the world. As a developing country, the Indonesian government has a challenge to ensure that development can be enjoyed by all residents, taking into account the available budget. This is complicated by the distribution of the population in Indonesia. The percentage of the population living in urban areas is only 57 percent (BPS, 2021), which means that the Indonesian government must deal with the condition of many population areas located in scattered rural areas. The Indonesian government often experiences problems in determining the priority location of a development project, especially projects that involve non-physical factors such as human resources. Inaccuracies in determining project locations have resulted in outcomes that are not in accordance with projections and cause waste of the national budget.

The importance of the planning process for a program in a country with complex challenges, such as Indonesia, raises the question: How can we improve the process of locating a program? Improvements in the process of determining project locations in Indonesia are an interesting issue to be discussed, because these findings will not only be useful for the case in Indonesia but can also be used in cases in other developing countries.

Problems in determining project locations are often the result of the approach used in determining priority locations. In the planning process. The process of determining the location of a project is carried out by the Ministry of Planning (Bappenas), the relevant Ministries and if the project will be carried out in the regions, the local government will also be involved. Usually, the central government will issue criteria for locations that can be proposed to be project locations, then local governments will propose these locations through the proposal. Then, taking into account the budget availability factor, the central government will select locations that are priority locations.

The approach that is often used in selecting priority locations is the political approach and the equitable development approach (Bappenas, 2019). The aim is to ensure that all regions receive equal development. However, often due to political interests, the data and evidence presented were inaccurate (Wesselink, Colebatch & Pearce, 2014), the policy making or implementation is not optimal. This is exacerbated by the subjectivity or perspective of policy makers in seeing data or evidence (Head, 2008), and there are still variables that have not been included in the policy making process. Therefore, in the end, the government must face losses due to factors that are not taken into account in the process of determining a project.

The great experience of failing government programs implemented in the regions had occurred on a quite large scale in 2014. At that time, the Ministry of Communication and Information Technology distributed mobile telecommunication and internet services to support increasing ICT literacy in the regions, the program known as M-PLIK. However, in reality, the people in almost all areas that became priority could not take advantage of two main causes. The first is financial problems at the project site and the second is the fact that people in the area are not used to managing tools provided by the government - cultural barrier (Yalia, 2013). The problem is simple, the government did not use the right variables to map the locations, so the program worth nearly 100 million USD was totally useless.

Evidence-Based Policy (EBP) might be the right alternative or solution in overcoming the problem of mapping priority locations. Referring to the concept of three lenses of evidence and knowledge, in policy making, evidence is needed to analyze current conditions, both quantitative evidence and qualitative evidence (Head, 2008). Thus, the process of determining the location can be more measurable and reliable. After learning about the evidence-based approach's potential for enhancing the planning process, we arrive at the research's major questions: **How can an evidence-based approach play a role in planning a program, especially in the process of determining project locations?**

In this research, we will discuss the Telemedicine project as the study case. Telemedicine is a project initiated by the Ministry of Health, with the aim of optimizing health services for the community, using ICT support. The Telemedicine project itself has been designed since 2015 and is listed in the Ministry of Health's strategic plan 2015-2019 (Kementerian Kesehatan, 2015), and its implementation targets are mapped in the National Medium-term Development Plan (RPJMN) 2020-2024 (Bappenas, 2019). The Ministry of Health has targeted the development of a telemedicine system in 67 health facilities every year. For additional

information, the total health facilities that have inpatient services and are under the authority of the Ministry of Health are around 3,700 units.

Like other pilot programs, telemedicine programs have an important influence in introducing the concept of telemedicine services to the public. However, the pilot program will be very likely to be improved, especially regarding the effectiveness and level of user satisfaction (Schmidt et al, 2018). Learning from the inaccuracies in the planning of the M-PLIK program, and the concept of an evidence-based approach in policy making, questions arise that become the main content of this research. In this study, we will discuss the potential use of evidence-based policy in determining the location of programs in Indonesia, including how we find relevant evidence that support the implementation of evidence-based policy in determining the location of a program.

1.2 Objective and Research Questions

RQ: How can an evidence-based approach play a role in planning a program, especially in the process of determining project locations?

This study breaks down the primary research question into multiple sub questions. The literature review approach from prior studies was used to answer many subquestions. However, the literature review technique cannot directly address all issues, particularly those pertaining to local situations, where no study has yet been conducted on factors that exist in Indonesia. As a result, the study took a qualitative and exploratory approach to answering the questions.

Table 1 shows the objectives and sub-questions of this research arising from the main research topic.

Table 1. Objective and Research Questions

Objectives	Sub-questions	Method	Chapter
To understand the concept of telemedicine and what are the factor affect the telemedicine implementation process	What are the factors or readiness criteria to implement telemedicine in a specific location?	• Literature Review • Interview • FGD	4
To check the success of the telemedicine program and	How to analyze the key factor of telemedicine	• Literature Review	5

the aspects that caused it success story	implementation in an existing location? What is the most influential factor in Indonesia telemedicine project?	● Interview ● Data collection ● Data Analysis	
To explain how evidence-based policy can be an alternative in determining the location of telemedicine programs.	What is the impact of evidence-based policy in determining location of telemedicine?	● Literature Review	6
To explain the indicators that can be used as a reflection of the evidence as a consideration in determining the location.	Which evidence might indicate readiness of an aspect of telemedicine implementation?	● Literature Review	6

1.3 Research relevance

1.3.1 Academic Relevance

This study explores the use of evidence-based policy in the planning process of a project that requires an adoption stage in it, especially the planning of projects initiated by governments in developing countries, where one of the constraints is the budget. This study is important because currently the mindset of development in developing countries is still dominated by the paradigm of equitable development, without considering the differences in the readiness of the technology adoption process in its implementation. By analyzing the key factors in the process of implementing a project, we can understand what elements or factors from an academic perspective can help develop the planning scheme of the program or project. By knowing these key factors, we can investigate evidence that can be incorporated into an evidence-based approach academically. The evidence intended is evidence that is more measurable and has a correlation with the factors that have been evaluated, so that it can then be used as a reflection of these factors. From an academic perspective, the process of planning an ICT-Based project in the healthcare environment is one area that few researchers can explore. This research project

will provide a new point of view in the planning process related to ICT-based projects, especially in the field of health services by the government.

This research can be an alternative reference in similar studies on the application of the evidence-based approach in developing countries. The problem in research with a case study of an ICT-based project in a developing country is the difficulty of collecting data or data that is less reliable, especially if the data being measured is qualitative data. This constraint is generally caused because the people who are the research sample may have different perceptions about ICT due to different ICT literacy. Therefore, this study tries to use an approach to using quantitative data that is more reliable but can be an appropriate indicator of qualitative data, and how to use program implementation evaluation data in each location as input for formulating further policies.

1.3.2 Business Relevance

This study examines how the existing planning process using only the concept of equity and based on proposals from the local government to the central government has the potential to cause output not to be maximized. Evidence-based decision making is very important not only in the execution process but also in the planning stage. For governments of developed countries, decision-making schemes using an evidence-based approach may have become a natural thing, but this is not the case for governments in developing countries. This condition is caused because it is difficult for the government to obtain evidence or the lack of integration of supporting data. Through this research, we can see how data that at first glance has no relevance to the data to be measured, can actually become more practical and valid data to use.

This study also examines the need for the readiness of all actors to adopt ICT in an ICT-based project. Often technical aspects, such as infrastructure and other technical support, are predicted to be the main problem in the less than optimal output of an ICT-related project. In this study, it will be discussed how the readiness of actors becomes an essential factor in the implementation of ICT projects. Furthermore, the results of this research are expected to be a reference for the government in planning a project that requires the adoption of ICT in it.

1.4 Thesis Outline

This research will begin with an explanation of the theoretical framework regarding the concept of evidence-based policy (EBP). In chapter two we will discuss EBP, starting from what is called evidence, examples of the use of evidence in the simplest context, the history of EBP in

government to how to use EBP and what to pay attention to in its use. Furthermore, in the third chapter, the author will explain the research methodology used. In the fourth chapter, we will discover how ICT is adopted in the health sector through the concept of telemedicine. Here, we will also look at the development of telemedicine from time to time, and the important point in this chapter is what factors influence the success of a telemedicine program. Based on these findings, we will then see how the telemedicine program is implemented in Indonesia in chapter five. This chapter will explore telemedicine programs in Indonesia as a case study and correlate existing theories with the results of telemedicine program evaluations. In the sixth chapter, the findings from the case study are linked back to the theory of evidence-based policy to identify indicators that might be used as evidence in planning the next telemedicine program. In the last chapter we will discuss a model framework that can be used for the planning process of other programs, especially those involving the technology adoption process, for which location readiness data may not be readily available.

2. Literature Review

2.1 Evidence

The character of activities that involve participation basically have three things; Inputs, processes and outputs (Beirele & Crayford, 2002). The purpose of the activity itself is to increase value or produce a certain benefit. So, an activity can be said to be successful if it produces maximum benefits. An input can be claimed to have good quality if the input supports increasing the value of the process carried out. The actors involved in the activity may choose inputs based on their own desires, but this input is not necessarily the most appropriate input. Furthermore, the methodology in executing a process is a choice taken by the designer or planner of the process by considering the inputs comprehensively and the expected outputs. In the end, the evaluation of the success of a process is usually done by comparing the actual results with the projections that have been made by the designers of the activity. The evaluation carried out will usually have implications for improving the quality of inputs and methodologies or process schemes so that they will produce output values that are closest to the desired expectations. In an effort to improve the quality of inputs and process improvements, an indicator is needed that becomes an independent benchmark, not based on the pleasure of the process actors, but something that has information or confirmed conformity with the expected goals. In planning schemes, and analyzing a process, this information is known as evidence.

The use of evidence is actually not a very academic or complex thing. Basically, humans are used to using evidence as a basis for making decisions, even in personal cases that do not require the involvement of others. For example, a young child who has understood the existence of gravity by watching water drip from an open faucet will be more careful when carrying his drinking glass to avoid potential loss of the drink. Then the use of evidence in the purpose of designing a process can also be easily explained by activities that involve other people. A person who needs the attention of other people who he knows by calling his name, because he has known that the person will most likely turn around when his name is called. The information that water drips from higher to lower, and the information that almost everyone will respond to the call of his name, can be described as evidence.

From the examples above, evidence can be interpreted more specifically as information used to measure the achievement of the process we are doing or to inform possible strategies that we can use to achieve our goals (Parkhust, 2017). Furthermore, the use of evidence then becomes an inevitable thing in almost all development or planning processes in our lives. We can find evidence-based approaches starting from the individual level, the relationship between two individuals, the community level, to more complex levels such as in the government of a country or even in international coordination. In this chapter, we will discuss the application of the evidence-based approach in policies that produce evidence-based policy (EBP), the benefits of EBP in general, the application of EBP in developing countries and the factors that affect the quality of evidence.

2.2 Evidence-Based Policy

If we talk about the evidence-based approach in a public policy, we need to understand that this approach is not something that is completely new. One of the first formal forms of evidence-based policing was detected when American political scientist Harold Lasswell worked to discover the role of research in determining the goals of policy formulation (Wesselink, Colebatch & Pearce, 2014). At that point, research can make an important contribution in measuring the achievement of a policy and detailing the required capital or inputs. This reflects Sherman's (1998) definition of EBP: Evidence based policing is the use of the best available research to support police work to implement guidelines and evaluate agencies, units and all officers using the best research. From this definition we can conclude that the agreed research and research results are in the form of evidence, which is an instrument that has an essential role in the implementation and evaluation of a process or work.

However, the understanding of evidence as a result of research may be wrong. Often data is a form of evidence. In fact, researchers rarely mention data in the definition of EBP itself, even though data is an important part of science, including research to determine evidence. The data is used to build hypotheses and test them through research, and the results of the research are in the form of findings which are accepted as evidence (Mitchel, 2018). However, even if the evidence is the output of a research, it does not mean that the evidence will always be neutral. Evidence often tends to be non-neutral because its definition is part of the policy process and is highly dependent on the context of the objectives of the policy (Wesselink, Colebatch, & Pearce, 2014). Interpretation and analysis of research results requires the ability of practitioners to understand the context, conduct appropriate and actual discourse in an effort to obtain good quality evidence.

2.3 Good Quality Evidence

Good quality evidence will certainly be a positive factor in developing quality policies. With good quality evidence, policy makers will be able to minimize the possibility of errors originating from external factors. This requires that policy makers or actors who use evidence as the foundation of their work need to understand evidence that can be said to be of good quality. Several parameters have been commonly used to measure the quality of evidence. Cash et al (2003) in their writings, use three parameters, namely credibility, salience and legitimacy as the main characters that can reflect the quality of the evidence. Furthermore, the authors explain that credibility is how the scientific adequacy of the evidence or arguments is found, while salience will affect the relevance of the evidence to the needs of policy makers, and legitimacy explains how evidence is found with high objectivity, minimal bias, and using a measurable methodology. These three parameters can be an instrument to produce a 'gold standard' from the evidence itself.

The three parameters that Cash and colleagues are trying to propose lead us to the question of how we can produce evidence that meets the 'gold standard'. The use of evidence in decision making or planning a process is often believed to be adopted, or at least very easily analogous, from the use of evidence in the medical world (Parkhurst, 2017). One of the fundamental principles we can learn from evidence-based medicine is the use of experimental methods, to evaluate the effects of medical interventions on patients. This experiment basically compares two sample clusters, the first cluster is given an intervention from the drug whose effect will be measured, and the second cluster gets a placebo treatment (Bigby, 2009). Then, the changes in these two clusters will be compared to evaluate the success rate, whether the intervention or

drug given has a positive clinical impact or not. In the application in the social field, the cluster that received placebo treatment was the 'control group'. What is meant by 'control group' is a group that is not affected by the policy whose effect will be measured. This method is known as Randomized Controlled Trial (RCT).

Another method commonly used to find quality evidence is a systematic review. This method emphasizes literature review with the aim of getting insights from existing works and getting ideas from these writings that are related to their main objectives. Then from the literature, certain factors and work frames that have a relationship will be identified, then used to choose keywords, or which data is the most effective to get the best information (Gough, Oliver & Thomas, 2012). Another method related to systematic review is meta-analysis. The characteristic of meta-analysis is the collaboration of multiple studies of the same treatment to obtain clarity or a more comprehensive view of the effects that will occur. This method often involves combining data from RCTs with a larger and more varied test population. The goal is to obtain more reliable information from each test conducted (Rudnicka & Owen, 2012).

Previously, we have discussed the parameters of an evidence to be said to have good quality. One of the parameters is legitimacy, and one word that will be the topic that will be discussed in this chapter is 'bias'. The fundamental difference between the use of evidence in medicine and policy making is the different motivations and goals behind the research. In the medical world, research motivation is usually to find out the effect of a particular treatment which then usually becomes the basis for being proposed as a broad treatment. Financial motivation can indeed be involved in medical research. However, when compared to social research that involves political interests in it, of course the possibility of bias will be greater in research that aims to make a policy. Furthermore, we will elaborate further on the bias of evidence that can occur in social research, including examples of any biases that have occurred and the effects of bias of evidence being a key factor in policy-making errors.

2.4 Bias of evidence

To produce good quality evidence, one thing to avoid is bias. In general, bias can be interpreted as an error that is motivated by a person's judgment or subjectivity in choosing or interpreting an information (Kaptchuk, 2003). Subjectivity is difficult to avoid in a study, especially if the research is driven by political goals (Langer, Tripney and Gough, 2016). In fact, bias is not only made by an institution or corporation, but also by individuals. Their background includes career ambitions, financial desires or even certain ideologies goals. In previous research,

Fanelli (2009) found that nearly 2 percent of scientists admitted to having falsified data, and 34 percent did not deny that they had modified their findings to improve the outcomes of their research. This fact shows that bias has the potential to affect the quality of the policies made.

The number of motivations behind the occurrence of bias, and the many ways that bias occurs, makes there is no absolute classification or categorization of bias. But some forms of bias that are often encountered include confirmation bias, rescue bias, auxiliary hypothesis bias, mechanism bias, 'time will tell' bias and orientation bias (Kaptchuk, 2003). Of the several types of bias, confirmation bias is probably the most common form of bias and can end in decision-making errors. Confirmation bias is a form of interpretation bias in which policy makers only evaluate information that supports their personal opinion to the exclusion of conflicting data or evidence. Confirmation bias can ultimately lead to unbalanced and unreliable policies in a variety of different situations.

Even though confirmation bias is driven by one-sided interests, in the process the actors of bias are at least still using the data, because basically confirmation bias is a form of interpretation bias. The form of bias that may have a worse impact is the creation of evidence. What is meant by creation of evidence is a form of data manipulation which is then used as a justification for planning a process or policy making. One example of a popular creation of evidence can be found in the speech of US president George W. Bush who slipped 16 words which in turn became a strong reason for invading Iraq (Parkhurst, 2017). “The British government has learned that Saddam Hussein recently sought significant quantities of uranium from Africa”. Half a year later, George Tenet, the Director of the CIA, regretted having these 16 words about uranium in President Bush's speech. This case shows how strong the evidence is based on political goals, and delivered by people who have the power to make policy. In this context, it clearly reflects that evidence has an influence that cannot be underestimated in policy making.

2.5 Appropriateness of evidence

We have discussed good quality evidence, and we have also seen that evidence is not just about data but includes how the process of finding information, objectivity and interpretation is concerned. Previously, we have talked about bias as one of the factors of legitimacy, one of the parameters of the quality of evidence. So, related to the process of finding evidence and salience parameters, we are led to one word: appropriateness. What is meant by 'appropriateness' is how actors or researchers construct evidence that is contextual, effective, but also covers varied needs (Cash et al, 2003). To find out whether an evidence can meet these

characteristics, we need to understand the factors involved. One approach is to use the description of three disciplinary fields as the basis for the framework of appropriateness (Parkhurst, 2017).

The first factor is how evidence may address the policy concern accurately. This factor is a derivation from a sociological perspective. Policy which is a social product (Krieger, 1992) must involve complex knowledge including social norms, ideology and relationship strength, so that the evidence used must be able to reflect culture and social environment. The actors or researchers who construct the evidence may produce a lot of good quality evidence, but not all of the evidence formed can address the policy concerns accurately.

The perspective used next is the perspective of the philosophy of science. In addition to being able to address the policy concerns accurately, the evidence developed must also be truly useful in responding to policy concerns. This usability factor is in accordance with the scientific philosophy of causality and generality. The point is, the evidence that is built must be able to be used in the context of the policy of concern. Cartwright (2011) says: 'For policy and practice we do not need to know "it works somewhere". We need evidence that works for us'. This perspective also influences a third factor: Reach to the local context. Previously, evidence must be able to work in the context of the researcher himself, in this case, evidence must also be able to be applied in a local context. The point is that the evidence can be applied to local conditions with constraints that may be more specific and different from general conditions.

2.6 Policy Capacity

It has previously been explained that 'appropriateness' has a close relationship with the ability of researchers, or policy makers in the context of government, to elaborate contextually and effectively evidence. This emphasizes that there are two sides that are equally important in the use of evidence: the quality side of the evidence and the ability to use the existing evidence. In the context of policy making, this capability is often referred to as policy capacity. In general, the term policy capacity can be interpreted into two understandings (Newman et al., 2017). The first is how the government is able to make policies that are in line with its objectives. This capability also includes the freedom of policy makers in choosing the methods, instruments and resources needed in policy making (Gleeson et al, 2011). The second understanding is policy capacity as the ability of policy makers to access, process and interpret information in the policy formulation process (Newman et al. 2017). In this perspective, the level of policy capacity reflects the level of expertise of a policy maker in managing information and the level

of ICT support in facilitating the flow of information to policy makers. Basically, these two perspectives do not contradict each other. The ability of policy makers to use and obtain all sources of information ultimately supports the ability to formulate policies that accommodate their ultimate goals.

As already mentioned, one of the factors in policy capacity is ICT support in sending information to policy makers. The use of ICT has now become something that is almost certainly found everywhere. One of the things that is the result of the widespread use of ICT is the large volume and complexity of the available data, otherwise known as 'big data' (Giest, 2017). The availability of such large data and the complexity of the variety of data has the potential to improve the quality of policy making to be more effective and predictive in dealing with issues that may occur. Linking the potential of big data with policy capacity, the ability of a policy maker to access and use big data as a decision-making instrument is a strategic factor, especially in the formulation of evidence-based policies that require more comprehensive data (Howlett, 2011).

In making evidence-based policy, there are individual factors that affect the level of need of a policy maker for evidence. This includes critical thinking framework and analytical skills, ability to understand evidence, knowledge of the sector being handled and its professional network (Newman et al., 2012). These four internal factors will shape the characteristics of the use of evidence by a policy maker. In addition, Jackson et al. (2018), adds organizational influence to the need for evidence by a policy maker. This organizational influence includes the quality of data, organizational systems and processes and the culture for using evidence. In the end, these two forms of influence will determine the quality of the policy-making process and the reliability of the policy itself as an output from the use of evidence in it.

After knowing about good quality evidence, and how policy makers should compile the evidence themselves, in the next chapter we will discuss the use of EBP in government in general and Indonesia, as well as the use of EBP in the planning stage, especially planning a pilot project in a government program that requires ICT adoption process.

2.7 Location Decision

No country has an unlimited budget. Therefore, in implementing a program or project, the government needs to adjust the budget with the program plan. In the budget design process, which is a part of the planning process, the government will prioritize scale. The priority scale will generally cover priority programs or projects, priority users, and priority locations. In fact,

there is no methodology that becomes a standard in carrying out priorities (Macharis, Turcksin, & Lebeau, 2012). Several methods that are often used in prioritization are cost benefit analysis (CBA), cost-effectiveness analysis (CEA) and economic impact analysis (EIA). Another method that is often used, especially in programs that involve social elements, is the social cost benefit analysis (SCBA). All methods are essentially a form of a systematic approach to assist policy makers in conducting analysis (Walker, 2000).

In this research, the discussion area is how the government prioritizes the program locations. Determining the location of the program is important, not only because of budget constraints, but also how the program can produce the maximum outcome, have sustainability and minimize the possibility of the program's failure (Marovic & Hanak, 2017). Choosing the wrong location will affect the risk factors that can lead to the failure of a program, especially at the execution stage. Several dimensions that may differ from one location to another are readiness to implement, technical problems, natural disasters. (Taherdoost & Keshavarzsaleh, 2015). In a program or project that involves a new technology, different social factors between program locations will have an effect. Digital literacy differences between the people on each program location will affect the potential for failure at the program implementation stage.

In addition to the influence of digital literacy factors from users, the success of digital transformation in a sector is also strongly influenced by the technical support that is available at the program location (Van Veldhoven & Vanthienen, 2021) and the characteristics of the organizational culture of each unit that implements it (Hartl & Hess, 2017). In countries that have very large areas, technical readiness in each area is possible, and cultural values in each implementing unit may be found to be very diverse. This is what makes location determination an essential factor in the implementation of digital transformation programs.

2.8 ICT adoption factor

To find out which indicators can be recommended to be used as parameters for regional readiness, we need to understand the factors that affect the speed of ICT adoption. One suitable model for this study is the Unified Theory of Acceptance and Use of Technology (UTAUT). This model is formulated to look at the main factors that influence individuals to try and apply new technologies in their activities (Venkatesh et al., 2003). The factors proposed in this theory are performance expectancy, effort expectancy, social influence and facilitating conditions.

Performance expectancy can be defined as how an individual believes that the new technology or system that will be adopted can help improve their performance in completing their work.

In other studies, this factor is known as perceived benefits (Davis, 1989). In the Technology Acceptance Model (TAM) theory, perceived benefit is defined as the benefits obtained by the user in improving their work performance, including cost benefits. There are several conditions that affect performance expectancy such as culture to use technology and demographic factors (Muriithi et al., 2016). The culture of using technology is one of the barriers to increasing performance expectancy. This is because by not being accustomed to using the technology, individuals or groups who are in an environment do not understand the benefits of the technology itself, so they do not have expectations of the benefits they can get by using the technology. The influence of demographic factors was also found to affect performance expectancy. Education level and gender are attributes that influence technology adoption (Muriithi, 2016; Muinde, 2009). The higher the level of education, the higher the level of confidence that technology will support their performance. As for gender, men are found to be easier to believe in the benefits of technology in their work (Muinde, 2009).

Effort expectancy is defined as the perception of the level of ease in using the technology or the system itself (Venkatesh et al., 2003). This factor is also said by Davis (1989) in TAM theory as "Perceived Ease of Use". Both found that the more complex a system, and the more time and effort spent studying it, the slower the adoption process required. The habit of using similar technology or the basic ability to use technology that has the same framework is believed to affect the increase in effort expectancy (Muriithi et al., 2016). In the case of ICT adoption in a sector, basic skills or habits of using ICT for everyday purposes will increase the level of individual confidence to be able to implement ICT in other jobs.

Social Influences are defined as the influence around to convince individuals about the importance of using the new system (Venkatesh et al., 2003). This factor highlights how the surrounding environment can trigger someone to use a technology. The environmental context here does not mean that it must have a close distance but can be interpreted as an environment that is connected by the same interests. One example is how a person installs and uses Skype because his relatives in other parts of the world use Skype to communicate (Muriithi et al., 2016). This example illustrates how a person's comfort in using technology can be influenced by the need to be similar to the people in his circle.

Facilitating conditions can be interpreted as a person's belief that there is an organizational framework and technical infrastructure that supports the use of the system or technology to be adopted (Venkatesh et al., 2003). What is meant by organizational framework is how a system

already has policies and regulatory support in its use so that an individual is sure to use a new system or technology. In the context of ICT adoption, the scope of technical infrastructure is not only the availability of hardware but includes supporting systems such as telecommunications networks, data interoperability and other technical support (Duque et al., 2005; Muriithi et al., 2016; Venkatesh et al., 2003). The availability of different types of technology or platforms also influences this factor. Rogers (2003) found that the use of diverse interpersonal channels will increase the ability to use more complex technologies. The more alternative platforms or applications that a person uses as a forum to represent himself, the individual tends to be faster in adopting ICT in his work.

2.9 ICT Development Index

Currently, the use of ICT is identical to the use of the internet (Gerpott & Ahmadi, 2015). This is also reflected in the indicators used to measure the ICT Development Index in a country (ITU, 2020). Every year, the International Telecommunication Union (ITU), a specialized agency of the United Nations responsible for all matters related to ICT, publishes a report on the results of measuring ICT development in a country. In 2020, ITU proposed changes to new indicators in accordance with the dynamics of ICT changes. The last adjustment submitted in 2020, was made based on statistical coherence research and data availability (ITU, 2020). Thus, it can be interpreted that the indicators used are good indicators to reflect digital developments in a location and have data availability.

Table 2. ICT Development Index Comparison

Sub Index	IDI Indicator (2009 - 2017)	IDI Indicator (2018 - 2019)	IDI Indicator (2020)
Access	Percentage of households with a computer	Percentage of households with a computer	Percentage of households with a computer
	Percentage of households with internet access	Percentage of households with internet access	Percentage of households with internet access
	International bandwidth (bit/s) per internet access	International bandwidth (bit/s) per internet access	International bandwidth (bit/s) per internet access
	Fixed telephone subscriptions per 100 pop.		
	Mobile cellular subscriptions per 100 pop.		
		Percentage of the population covered by mobile networks (at least 3G/LTE/WiMax)	Percentage of the population covered by mobile networks (at least 3G/LTE/WiMax)

		Fixed-broadband subscriptions by speed, as % of total fixed-broadband subscriptions	Fixed-broadband subscriptions (weighted by speed) per 100 pop.
Use	Percentage of Individuals using the internet	Percentage of Individuals using the internet	Percentage of Individuals using the internet
	Fixed-broadband subscriptions per 100 pop.		
	Active mobile-broadband subscription per 100 pop.	Active mobile broadband subscription per 100 pop.	Active mobile-broadband subscription per 100 pop.
		Mobile broadband internet traffic per mobile broadband subscription	Mobile broadband internet traffic per mobile broadband subscription
		Fixed-broadband internet traffic per fixed broadband subscription	
		Percentage of individuals who own a mobile phone	
Skills	Mean years of schooling	Mean years of schooling	Mean years of schooling
	Secondary gross enrollment ratio	Secondary gross enrollment ratio	Secondary gross enrollment ratio
	Tertiary gross enrollment ratio	Tertiary gross enrollment ratio	Tertiary gross enrollment ratio
		Proportion of individuals with ICT skill	

From the indicators used to measure the ICT development index, it can be seen that the data related to internet usage and telecommunication data have a remarkable contribution. 3 out of 4 indicators in the access sub-index and even all indicators have a use sub-index related to internet use. This fact confirms that internet use has a strong correlation with the ICT adoption rate. These findings lead us to look for data on the intensity of internet use in an area as an indicator that can support three parameters of telemedicine readiness which vary between regions.

When an individual uses the internet, regardless of the medium, it takes data transmission to bring information to its users. The concept of data flow can be analogous to the flow of vehicles. The more vehicles that pass at a monitoring point in a certain time indicates high traffic activity towards the area around the monitoring point. Similar to data flow, the higher the internet activity in an area, the higher the data traffic in the connecting media. Data transmission, according to the connecting medium, is divided into two: Fixed-line and mobile. Fixed-line means end-users will be able to access data at a specific location. The advantages of

fixed-line lines are relatively better speeds than mobile broadband (Srinuan, Srinuan, & Bohlin, 2010) and relatively unaffected by the weather as is often found in mobile broadband signal problems in bad weather (Austin & Omatahunde, 2018). While mobile broadband is an internet service that can be accessed via mobile devices. The advantage, this method is clearly more flexibility to its users. In addition, for the government, currently the cost of building a mobile network is relatively more affordable compared to the construction of a fiber optic-based fixed broadband network, especially if the area has a low population density. This is caused by the fiber optic network topology which requires a large investment to reach an area, so it will be inefficient if the area does not have many end users (Auriol & Fanfalone, 2014).

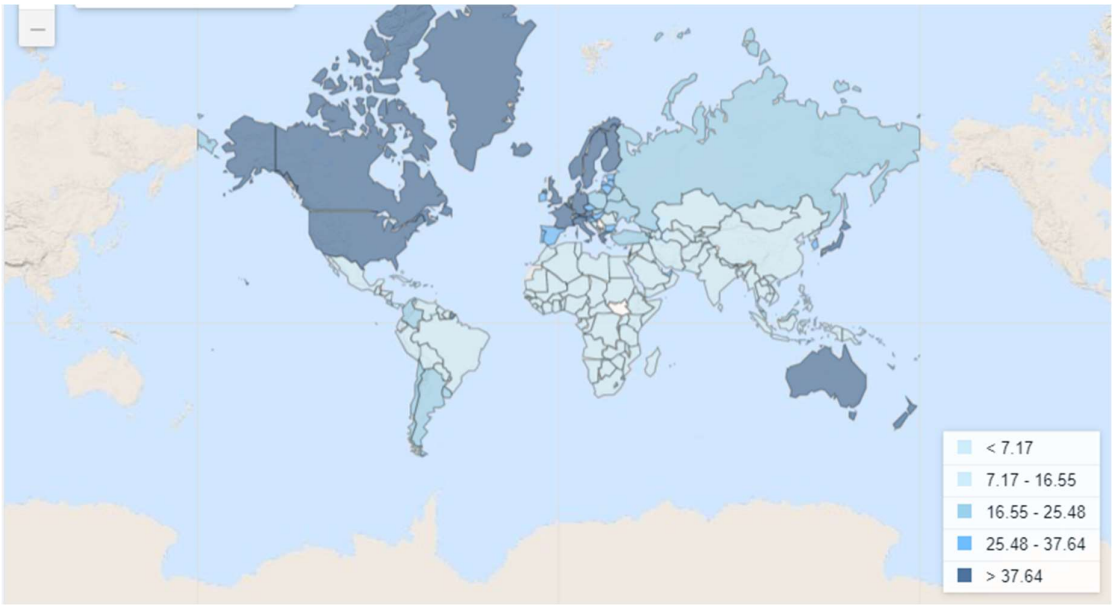

Figure 1.Fixed-telephone subscriptions (per 100 people) by country in 1998 (Worldbank, 2021)

From the characteristics of the two data communication lines, mobile-broadband is more popularly used in developing countries. This is not only influenced by the cost factor, but also influenced by the history of telecommunications network development in a country. Fixed broadband itself is a form of upgrade from the fixed-line network to conventional telephone technology. In most developed countries, before internet technology developed rapidly and could be accessed by mobile, telephone networks via fixed-line were already widely distributed as shown in the world fixed telephony subscription map in 1998. Thus, to upgrade the existing network to a fixed-line network broadband is not as difficult and expensive as in developing countries which need to build a network from scratch. This can be seen from the difference in penetration between fixed broadband and mobile broadband in Indonesia. Fixed broadband

penetration in Indonesia until 2020 was recorded at only 3.92 percent, which is far below mobile broadband penetration that reached 89.07 percent in the same year (ITU, 2021).

3. Research Methodology

3.1 Research Design

This research will be carried out qualitatively and exploratory because the nature of the research only focuses on certain analytical cases and seeks to understand a particular phenomenon in more depth. In case selection, the researcher tried to use a case relevance approach and data availability. In terms of relevance, Telemedicine was chosen for three reasons. The first is the large role of the government in providing health services in non-commercial areas in rural areas which are considered unattractive to the private sector. The second reason is the fact that the telemedicine program in Indonesia is currently still in the pilot project stage, so there is still room for improvement in the future. The last factor is the importance of telemedicine in the context of handling health problems during a pandemic. In terms of data availability, since the researcher is a planner working for the Indonesian government, data related to telemedicine and other supporting data are relatively easier to obtain.

The case study of Telemedicine in Indonesia was chosen as research material to explore the application of an evidence-based approach and compare the factors of readiness in running Telemedicine to propose the best model for planning a program or project that requires the adoption of ICT in it by using reliable evidence. A case study is a data collection method that includes the process of collecting, organizing, analyzing, and presenting comprehensive descriptive information about a particular individual or case that can be studied using the theoretical basis possessed (Marrelli, 2007).

The first objective of this study is to determine the implementation of the telemedicine program in Indonesia and the governance of the telemedicine program planning process in Indonesia. The second objective is to determine the factors that influence the success of the telemedicine program in Indonesia. The next objective is to determine the potential use of an evidence-based approach in policy-making related to telemedicine, especially in the planning process and determining the location of telemedicine programs. The methods used to obtain qualitative data are literature analysis, evaluation of findings, interviews with policy makers and surveys of telemedicine actors. The study of this phenomenon provides insight into the development of a model using an evidence-based approach in the planning process.

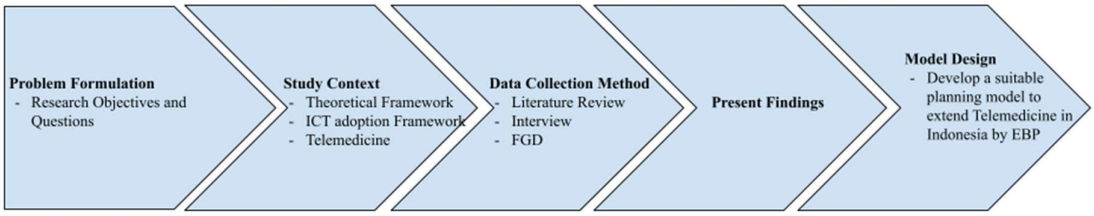

Figure 2. Research Process

3.2 Data Collection

3.2.1 Literature Review

The literature review is used to identify information and theories regarding the evidence-based approach, the concept of telemedicine, telemedicine programs organized by the Indonesian government and the concept of ICT literacy in its application to the ICT adoption process in the public service sector. The use of literature is divided into three types, the first is primary research such as program evaluation results, government policies and technical guidelines. The literature review of this type mainly supports discussion of the case studies taken. Other types of literature are secondary research in the form of credible and reliable publications and journals, and tertiary research in the form of systematic reviews. To get journals or papers related to the topics discussed, the author uses structures and snowball strategies.

The Ministry of Health of the Republic of Indonesia is the main source for obtaining data and information related to case studies, Telemedicine. This is of course because the Telemedicine program is initiated, implemented and evaluated, mostly by the ministry of health. To develop the main theory related to the Evidence-based approach, and the theory supporting its application to telemedicine, especially regarding ICT adoption, the snowball search strategy from one paper to another related paper is more effective than using a direct search via Google scholars which often encounters access restrictions. The search for supporting papers and books is also mostly through the Leiden University catalog search engine.

3.2.2 Interviews

In this study, the authors chose to use the semi-structured interview method. Broadly speaking, interviews were conducted to gain insight into two things. The first is about the telemedicine program organized by the Indonesian government. Regarding this data, all of them were carried out on the staff of the ministry of health. The interviews were carried out in stages, starting with exploring the big picture first, then continuing with interviews with key persons who evaluated the telemedicine program that had been running, and finally with the telemedicine

PIC in the health unit that organized it. The second thing is about the planning process in Indonesia, the aim is to know the planning process for the Telemedicine program and the scheme for determining the priority locations. Regarding this, the interview was conducted using the Focus Group Discussion (FGD) method by inviting stakeholders involved in the telemedicine planning process: the Ministry of National Development Planning (Bappenas) and the Ministry of Health. FGDs were conducted three times, the first and second involving three directorates at Bappenas: Directorate of Health. Directorate of Electricity, Telecommunications and Information Technology and Directorate of Sectoral Evaluation. These three directorates are units involved in the planning, development, monitoring and evaluation of telemedicine programs in Indonesia. The third FGD involved the three directorates of Bappenas and units within the Ministry of Health.

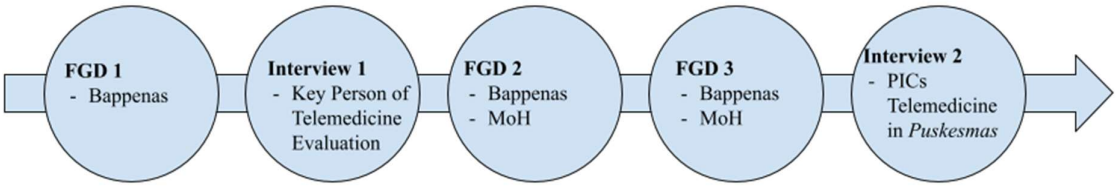

Figure 3. Discussion Sequences

The order of discussion is carried out as shown above. This series of interviews was made that way to find out the main points of the general discussion first and then narrow it down to a more technical level. The aim is to understand the context of the case study in more detail with a stronger foundation. The first FGD was conducted online using the WhatsApp platform. This FGD was conducted to explore the general condition of the latest update regarding the telemedicine program, issues that need to be discussed, and to determine the key person who will be the next interviewee.

Table 3. FGD 1 participants

Number of Participants	4 participants
Duration	60 minutes
Purpose	As a preliminary discussion to know the concept of telemedicine, current condition, and the stakeholders involved

	and understand the technical planning of telemedicine
Participants	- Researcher - Directorate of public health and nutrition, Bappenas (2) - Directorate of electricity, telecommunication and Informatics, Bappenas (1)
Background	● Telemedicine project is coordinated by Ministry of Health and involving Ministry of Communication and Informatics as organizer of technical affairs related to ICT ● The Directorate of Public Health and Nutrition in Bappenas has the task of coordinating, synchronizing and evaluating the work program of the Ministry of Health with overall development goals, including the telemedicine program planning process. ● The Directorate of electricity, telecommunication and Informatics in Bappenas has the task of coordinating, synchronizing and evaluating the work program of the Ministry of Communication and Informatics, including to orchestrate the ICT utilization in the public sector.

The second interview was conducted via WhatsApp call and lasted for 40 minutes. The purpose of the interview and the scope of the discussion were discussed via WhatsApp chat before the interview was conducted. The results of this interview are an outline of the results of the evaluation of the telemedicine program in Indonesia and the responsibilities of other work units in the Ministry of Health regarding this program.

Table 4. Interview 1 Participant

Purpose	Understand the history of telemedicine programs in Indonesia, the obstacles that occur, and the latest conditions of the program that has been implemented as a pilot project
Participant	- Head of the telemedicine program evaluation team

	(Ministry of Health)
Duration	80 minutes
Background	• The participant is a researcher at the research and development center of the ministry of health • The participant leads the evaluation team for the implementation of telemedicine which is the pilot project. • The participant is a senior policy analyst who is known to understand the strategies and methods of policy making in the ministry of health

Table 5. Interview Questions for Telemedicine Key Person

No	Interview Question
1	Could you tell me a little bit about yourself and your background? (Gender, Working Unit, Position in the office, background education)
2	Are you involved in the Telemedicine Project in Indonesia?
3	What is your role in this project?
4	When did you start participating in this project?
5	What is the general purpose of the Telemedicine program in Indonesia?
6	Could you explain further more about Telemedicine in Indonesia?
7	When was this program starting?
8	What are the regulations to support this program?
9	What institutions are also involved in running this program?
10	What are the considerations to choose a location as the implementing agency?
11	What are the features of the Telemedicine program?
12	What are the requirements of the Health Service Center to run this program?

13	How do you measure the success of implementing a telemedicine program? is there a difference in success at each implementation site?
14	Are there any specific problems that have been reported by the implementing health care center?
15	What kind of program improvement or what problem that should have been done in the next implementation?

Furthermore, other work units were invited in the next two FGD sessions to obtain more detailed information. The second FGD was conducted to understand the telemedicine program more comprehensively, so the FGD invited more participants from various institutions.

Table 6. FGD 2 Participants

Number of Participants	12 participants
Duration	150 minutes & 90 minutes
Purpose	Dig deeper and more detailed information about telemedicine. Covering technical aspects, policies and development of telemedicine programs in the future.
Participants	- Researcher - Directorate of public health and nutrition, Bappenas (2) - Directorate of electricity, telecommunication and Informatics, Bappenas (2) - Directorate of sectoral development evaluation, Bappenas (1) - Policy and performance analysis center, Bappenas (1) - Directorate of referral health services, Ministry of Health (3) - Research and development center of the ministry of health (2)
Background	● All participants were involved in the technical and policy development process of telemedicine, as well as in the policy development process, based on the evaluation results.

The second series of interviews was conducted one by one with several telemedicine PICs at the puskesmas that provide telemedicine services.

Table 7. Interview 2 Participants

Purpose	Understand the history of telemedicine programs in Indonesia, the obstacles that occur, and the latest conditions of the program that has been implemented as a pilot project
Participants	- PIC of Telemedicine Program in selected locations (Ministry of Health)
Duration	30-45 minutes
Background	● Participants are PICs who are responsible for the performance of the telemedicine program at their health centers (puskesmas) ● The participants are responsible for reporting the performance of the telemedicine program in their work unit to the evaluation team from the ministry of health.

Table 8. Interview Questions for PIC in local health care center (Puskesmas)

No	Interview Question
1	Could you tell me a little bit about yourself and your background? (Gender, Working Unit, Position in the office, background education)
2	Are you involved in the Telemedicine Project in Indonesia?
3	What is your role in this project?
4	When did you start participating in this project?
5	What is the general purpose of Telemedicine in your location?
6	Do all team members in your unit understand the telemedicine process flow?

7	Do all team members understand how to technically operate equipment related to telemedicine?
8	Do you think the telemedicine program has given positive results to the services in your unit?
9	Are the facilities and infrastructure in your location supportive? (24 hours electricity, reliable internet connection, etc.)
10	Do local people understand about telemedicine services? If so, do they agree to do extra care through telemedicine?
11	Do you often provide informal education to patients who do not know about telemedicine services?
12	How do you explain the situation or daily activity of the people in the surrounding area?
13	How often do you use the internet for daily purposes?
14	In general, are the people in your area used to using the internet? How complex is internet usage there?
15	What kind of program improvement or what problem that should have been done in the next implementation?

3.3 Data Analysis

After all data has been successfully collected, content analysis was carried out to extract information from the data contained in the documents and interview transcripts. Content analysis is one of the most commonly used ways to understand and study written, verbal, or visual messages (Cole, 1988). This method can explain and measure nuances in a structured and objective manner (Krippendorff, 2004). Content analysis supports the author to examine theoretical issues obtained from the literature review, to strengthen understanding of the data obtained through research (Elo & Kyngäs, 2008). Several words, sentences, or dictions that have equivalent meanings are grouped into the same category so that they are more concise through content analysis (Cavanagh, 1997). This aims to make it easier for readers to understand the main idea delivered by the author, and one of the important steps in content analysis is coding. (Gibbs, 2007) This process is carried out by identifying and finding connections in text or other data, then tagging or coded, and continuing to identify related concepts from the content.

The coding process in this study was mainly carried out during the transcription process of interviews with Telemedicine key persons and PICs in local health units, as well as in analyzing

documents containing explanations of the success factors of telemedicine. The first stage is to label or tag important and unique information on the results of interviews and documents, this process is called open coding. Next, axial coding is carried out. That is the correlation process between the data that has been carried out by the open coding process so that we can understand the relationship between the data and the relationship between the data and the topic that is the core of the discussion. The last step, data that is relevant and supports further understanding on the topic of discussion is selected to determine the success factors for implementing Telemedicine and indicators that have the potential to become evidence in the next policy-making process.

This study also analyzed the results of the evaluation of the implementation of telemedicine that has been running in each location. The data was obtained through coordination with the ministry of health and communicating directly with the PIC of each location. The analysis was carried out on 47 samples from a total of 67 locations of telemedicine programs that had been running. The data from this sample was obtained through filling out a google form which was coordinated by the evaluation team from the Ministry of Health. Some of the key information obtained is the number of uses of telemedicine applications in each location, the number of trained staff, regulatory readiness, infrastructure and also incentive schemes related to telemedicine at that location.

The information obtained through this survey is then supplemented with other information, which is based on a theoretical basis, has a relationship such as mobile broadband signal coverage, and classification. Information on mobile broadband signal coverage is obtained from data from the Ministry of Communication and Information which is coordinated by Bappenas. Meanwhile, data on the classification of the location of health service centers was obtained from data from the Ministry of Health.

Then the findings will be processed using Microsoft Excel software to analyze the correlation between variables. The method used is the regression method. Researchers used two types of regression models. First, the multiple regression model will be used to determine the factors that most influence the frequency of telemedicine use, and followed by using a single linear regression model to determine the significance of the correlation between an independent variable and the dependent variable, which in this case is the frequency of telemedicine use (Bingham, Fry, & SpringerLink, 2010).

4. Context : Telemedicine

4.1 Telemedicine: Definition and History

The word “telemedicine” can be interpreted easily by just looking at parts of the word. The combination of the word "tele", which means remotely, and the word "medicine" which is derived from the word "medical", can be interpreted as a concept of medical services or health services that can be carried out remotely. The establishment of telemedicine is believed to be the best potential answer to the challenge of providing appropriate medical services to patients who have distance from medical service providers (Combi, Pozzani & Pozzi, 2016). In addition, WHO (World Health Organization) in 2009 also emphasized that the scope of telemedicine is starting from the delivery of health services when distance is an important factor by professional medical service providers using information and communication technology as a medium for exchanging information for diagnosis, treatment and preventive measures. of outbreaks and injuries, research and evaluation, and for continuing education of health care providers with the ultimate goal of improving the quality of individual and community health.

From the definition explained by WHO, we can find that the use of information and communication technology (ICT) can be analogized as a vehicle or weapon in its implementation, or in other words Telemedicine can be interpreted as the use of ICT in health services. At this time we may think that the ICT in question is the internet. This view is not entirely wrong, and indeed the internet is currently one of the key factors in the application of telemedicine (Merrell, Cone & Rafiq, 2008). However, to find out the conditions and needs in the current application of telemedicine, perhaps we need to know the early innovations that led to the formation of the current telemedicine concept.

One of the earliest recorded uses of ICT was during the civil war in the 1860's. At that time medics used the telegraph to transmit messages about soldiers who were injured and needed the help of the medical team (Jagagarpu & Savani. 2021). At that time, the use of Morse code-based ICT was still limited to sending general data information. Then, in 1905, William Einthoven was noted as one of the first people to develop the first electrocardiogram and successfully transmit ECG data and heartbeat sounds between his laboratory and academic centers. The use of radio waves was then explored for medical purposes. Medical consultation began to be developed in European countries, Australia and North America in the 1920s' era, thanks to the invention of the telephone which made this possible.

The ancestor of teleradiology can be found when Gerson-Cohen succeeded in transmitting radiographs from a clinic in Atlantic City to a hospital in Philadelphia 60 miles away using radio or telephone (Gershon-Cohen, et al., 1950). He explained his aim was to train young radiologists without losing supervision from experts and also to ensure experts could provide services to small, remote hospitals. Furthermore, the popularity of television in the 1960s' era encouraged the use of television as a means of medical education and medical service procedures. One example is the “blue baby operation” at Johns Hopkins Hospital with dr. Alfred Blalock was the performer and was televised to hundreds of surgeons.

One of the moments that became the birth of modern telemedicine was when “Telediagnosis" was successfully performed on 1000 patients in 1974 (Murphy & Bird, 1974). This telediagnosis was performed using a two-way audio-visual microwave circuit between Massachusetts General Hospital and Logan International Airport Medical Station. Interestingly, in their implementation, they also evaluated the satisfaction level of their patients and found that 64.5 percent of patients were satisfied with telediagnosis services, compared to 96.5 percent satisfaction with direct observation. Realizing that ICT can answer distance challenges in healthcare in rural areas, prompted the National Aeronautics and Space Administration (NASA) to create a project known as STARPAHC (Space Technology Applied to Rural Papago Advance Health Care) (Simpson, Doarn, & Garber, 2020). This project aims to provide healthcare services in Indian reservations using radio television connections and remote telemetry. The results of the evaluation of this program found that health care providers acknowledged that the program increased access to health services for the Indian community, but on the one hand also encountered challenges related to the use of technology itself and the time required to conduct teleconsultation.

A big leap in the application of telemedicine was inevitable when the internet became ubiquitous and mobile phone technology developed rapidly. If previously the implementation of telemedicine required a centralized location and required a "fixed-line", with the internet and mobile networks, telemedicine can be done anywhere by requiring only three main points: user capabilities, availability of mobile or fixed networks, and availability of hardware and software. software. The ability of ICT to deliver high-resolution video enables telemedicine features that require more detailed and real-time interaction between users. From the development of telemedicine that has been reviewed above, we know that from the beginning telemedicine has a goal to provide long-distance services, not limited to the technology used,

and the story of telemedicine services development also provides an overview of the features that can be provided and the readiness needs of telemedicine users themselves.

4.2 Telemedicine in Global South Countries

The concept of telemedicine is the application of ICT in remote health services. Telemedicine development, as in the example of NASA's STARPAHC project, indicates assistance from a point with more complete or better resources, to a point or area that does not have adequate resources or information. The assistance in question can be in the form of consultation, analysis or recommendations in response to the information received. In other words, Telemedicine enables equal distribution of the quality of health services in each region. If previously a community health service center in an area that was not equipped by an expert doctor was unable to carry out diagnostic services for a particular case, with the presence of telemedicine, the case can be forwarded to a hospital that has an expert doctor who understands the problem.

This benefit has attracted developing countries to join as telemedicine services implementers, especially for countries that have extra topography constraints such as the need for aeroplane or maritime transportation if they want to provide medical services throughout their territory (Combi, Pozzani, & Pozzi, 2016). This benefit means not only more efficient time, but also a reduction in health care costs. With telemedicine, transportation costs for doctors and experts to find out health issues that occur are no longer needed. In the example of its application in Bhutan, Telemedicine has become a solution for the government which previously was not able to provide health services evenly due to the geographical conditions in the form of mountains which made it difficult to build transportation facilities between regions (Gurung et al, 2019).

Financial goals are of course a special interest for the government, especially in developing global south countries. The financial benefit in question is how telemedicine can cut the cost of providing health services. One of them is the cost associated with the frequency of physical visits by doctors to their patients. (Akiyama & Yoo, 2016). The experience of the success of developed countries in reducing the cost of health services through telemedicine programs has become a trigger for developing countries to make telemedicine a priority program (Bali, 2018). Malaysia, a neighboring country directly adjacent to Indonesia, in 1996 had drafted a telehealth law and created the “Multimedia Super Corridor" initiative. This big step is based on the government's belief that ICT will play a major role in improving public health services (Scott & Mars, 2015). African countries that already have adequate internet and mobile network coverage have also capitalized on these two factors as support for medical services.

One of them is the development of telemedicine in Egypt. For information, Egypt is a country that has a GDP per capita that is almost the same as Indonesia, and an urbanization rate that is also similar to Indonesia. In Egypt, Telemedicine has covered health services such as radiology, electronic stethoscope, tele-pathology and ECG. In addition, the Pan African Project has also provided video-conference-based online consultation services between health institutions in Alexandria (Egypt) and 12 hospitals in India since 2009 (Combi, Pozzani, & Pozzi, 2016).

It was previously mentioned that, as in the example of application in Bhutan, Telemedicine is able to overcome barriers to health services in the region caused by geographical conditions. Countries that have mountainous or archipelagic geographical conditions have great potential to implement telemedicine in their medical service development strategy, considering that in countries with such topography, the cost of transportation or the cost of building transportation facilities is not small, especially if these countries have GDP. which is relatively low as in countries in the Micronesia Region, so it requires a strategy to cut these costs. (Scott et al, 1996). The telemedicine program in the Pacific Region was recorded as starting in January 1993. Video conference between Tripler Army Medical Center and Kwajalein Army Base was used for teleconsultation by Tripler specialists. The success of this telemedicine program was followed by a meeting in Honolulu, Hawaii in 1994 to continue the coordination of telecommunications programs, one of the main goals of which is to improve the quality of health services in the Pacific. Furthermore, the program initiated and driven by the US is known as PEACE-SAT (Pan-Pacific Education and Communication by Satellite). The program continues to expand and reaches out to medical support and other health goals in a wider area including Fiji, Solomon Islands, Palau and Guam. This continuously upgraded system enables real-time interaction with healthcare facilities in developed Pacific countries such as New Zealand and Hawaii (Bice et al, 1996).

The examples mentioned above are a reflection of several uses of Telemedicine in countries that have similarities with Indonesia, both geographically, economically, and demographically. This shows that Telemedicine has become one of the priority programs in various countries and needs to be developed in a measured and planned manner in Indonesia. One thing that can be improved is how the telemedicine program is implemented in the right location so that it has a significant impact both on service quality and in the context of financial benefits.

4.3 Covid-19 Disease and Telemedicine

The Covid-19 pandemic is definitely something that is being highlighted around the world. It can be said that the COVID-19 pandemic is one of the biggest triggers for changes in human lifestyles (Zhang et al, 2021; Ling, 2021). This change cannot be separated from the restrictions imposed in all countries, especially after WHO on March 11, 2020 declared the novel coronavirus (Covid-19) as a global pandemic (WHO, 2020). People who previously had easy and free access to their daily needs have turned into having to comply with the rules that are applied. Social distancing policies and other health measurements, which aim to reduce the number of outbreaks, have forced people to change their lifestyles (Nakajima et al, 2021).

The limited human movement demands changes in human habits to be able to continue to access needs without being constrained. The health sector, as the main sector in the context of the Covid-19 pandemic, is the one that most requires adaptation of its processes. Experts and all stakeholders in the health sector not only focus on dealing with the pandemic, but also must ensure that other health services are not neglected (Ahmed, Sanghvi & Yeo, 2021), and one of the most popular efforts is using Telemedicine. Health services using telemedicine allow communication between patients and doctors, as well as doctors and other health workers in a contactless manner. This advantage makes telemedicine an effort to prevent the transmission of viruses that are very likely to occur in health service centers. The application of telemedicine as a weapon to continue to be able to provide health services during a pandemic is not new. Previously, telemedicine has also been discussed for the treatment of dangerous infections outbreaks such as Ebola and MERS (Enfield et al, 2015). In his study, Enfield found that the use of telemedicine can help patients recover not only by medical monitoring, but also by enabling patients to receive moral support from their families through video conferencing. One form of advance telemedicine as a response to the Covid-19 pandemic is the collaboration between Hospital of Sichuan University with ZTE and China Telecom which has succeeded in providing 5G-based medical services (Keshvardoost, Bahaadinbeigy, & Fatehi, 2020). 5G technology, which has high data transfer speeds, allows health workers to transfer documents or high-resolution video calls so that they get more accurate analysis from experts.

Advanced telecommunications technology is not the only factor influencing the popularity of telemedicine during the Covid-19 pandemic. If previously we have discussed how the development of telecommunications in telemedicine which started from the telegraph form and continues to grow to the form of real time video, we also need to highlight the development of social media media platforms. Telemedicine cannot be defined as a stand-alone platform, but

rather as a method that can use various avenues in its implementation. Teleconsultation no longer has to use a separate platform. The existence of social media platforms such as WhatsApp, Facetime, Facebook Messenger, Skype and others, allows the wider use of telemedicine (Monaghesh & Hajizadeh, 2020), and, recently, it is quite common to use social media platforms for teleconsultation. The use of social media outside of teleconsultation can also be found in several developing countries. For example, the use of social media in Iran allows for faster coordination of health volunteers and teleradiology delivery. Meanwhile, in Indonesia, the WhatsApp platform has become a media for patient registration in hospitals and clinics in several big cities. This is one example of how telemedicine can be reached by patients or health stakeholders in their hands directly.

The Covid-19 pandemic seems to emphasize the importance of implementing telemedicine, not only for financial purposes but also for other, more fundamental purposes. With telemedicine, the prevention of virus transmission can be minimized and the handling of emergency conditions may also be accelerated. But keep in mind that all of this can be achieved if all the components that support telemedicine are ready and telemedicine users also correctly understand the telemedicine management.

4.4 Success Factor of Telemedicine

Although telemedicine can be said to be not a completely new thing, it does not mean that telemedicine implementation can be carried out smoothly in every place, in fact, significant differences in results can occur where telemedicine projects are implemented in close quarters with similar initial support (Whitten & Adams, 2003). Several factors that influence the success of a telemedicine program have been identified using a maturity model approach based on the results of evaluations from ongoing telemedicine and telehealth projects (Otto, Whitehouse, & Schelieter, 2019). Factors that influence this are called by the term "readiness". Otto compiled ten telemedicine maturity models that were introduced from 2001 to 2017 which then resulted in several types of readiness related to the application of telemedicine. The ten forms of readiness are: core readiness, provider readiness, patient readiness, public/community readiness, health sector readiness, strategic readiness, technological readiness, organizational readiness, financial readiness, and legal readiness.

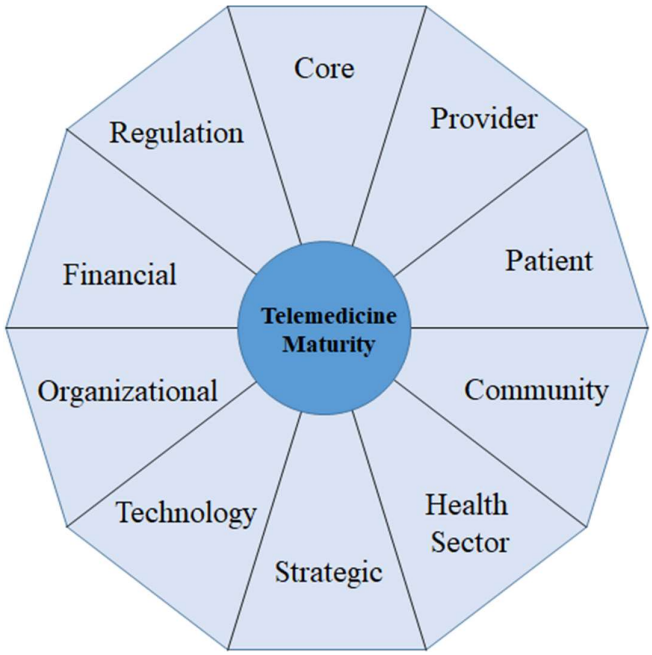

Figure 4. Ten readiness of Telemedicine Maturity

Core readiness is believed to be the main readiness factor for implementing telemedicine (Reifegerste, Harst, & Otto, 2021). In general, core readiness is the desire for a change from the previous system or the desire to use telemedicine because they have realized that telemedicine is an alternative that will have a positive impact (Awol et al, 2020). Provider readiness can be defined as the readiness of health workers or other support personnel. This readiness includes how medical workers have the willingness to use telemedicine equipment, the ability to use the equipment and the ability to interpret the output of the equipment or the technical qualifications of the health worker (Dyk, Schutte, & Fortuin, 2012). This aspect of provider readiness is considered a factor that has a significant role, it can be seen that all telemedicine maturity models include this form of readiness (Otto, Whitehouse, & Schelieter, 2019).

The readiness of medical officers also needs to be responded to by the readiness of patients who are the object of telemedicine services because this is relevant to the willingness to share information between patient and provider (Jensen et al, 2015). The patient, even though at first glance in a passive position in the context of telemedicine, must still have the readiness to operate the equipment if needed. For example, in the patient registration process through social media features such as WhatsApp, patients need to know how to use WhatsApp features and the syntax of sending messages so that they can be read by the automated system at their health

provider. In addition to patient readiness, Jensen (2015) also addresses community readiness. According to him, the culture of the local community in familiarizing ICT-based health service schemes has an influence on the maturity of the telemedicine program.

Health sector readiness is a fairly complex factor and involves many stakeholders. The scope of health sector readiness includes starting from the level of trust between stakeholders in establishing cooperation (Jensen et al, 2015), to the level of sensitivity and support from politicians and policy makers to the use of ICT in the health sector so that policies or regulations are made encouraging the development of telemedicine program positively. Health sector readiness also measures how the government can coordinate stakeholders in the health and ICT sectors with stakeholders who are unfamiliar with the world of health or ICT such as legal and financial experts (Khoja et al, 2007). Health sector readiness is related to the next form of readiness, strategic readiness. What is meant by strategic readiness is planning telemedicine programs that are measurable and able to attract users (Jennett et al, 2003). This readiness will have an effect, especially in areas where the community requires a transformation process from conventional system to the modern one. Related to system renewal, technology readiness is also a determining factor. Telemedicine will obviously depend on this factor. Technology readiness is not only about the readiness of the appropriate infrastructure in running telemedicine (Jennett et al, 2003; Khoja et al, 2007; Jensen et al 2015), but also the elements of data interoperability and the technology used (Broens et al, 2007).

Organizational readiness is determined by how the telemedicine program is implemented with a clear division of authority (Jennett et al, 2003). This readiness will affect the distribution of responsibilities for each part of the organization and the goals to be achieved. Financial readiness in telemedicine, as in other programs, is measured by financing readiness (Jensen et al, 2015) as well as reimbursement policies (Jennett et al, 2003). Legal readiness is also considered to determine the maturity of this program. As a product of health sector readiness, the legal and regulatory framework created must be able to guarantee the running of the telemedicine program (Khoja et al, 2007; Jensen et al, 2015).

The many forms of readiness show the complexity in implementing telemedicine programs. The application of telemedicine programs in different areas even though they are still in the same country will not necessarily get the same results. One example can be seen in the case in Michigan, US (Whitten & Adams, 2003). In 2000, two counties in Michigan, the Upper Peninsula and Beaver Island, received funding for a telemedicine program. Both areas are rural

in Michigan State, and both are in northern Michigan. But in the end, they enjoyed very different results. The telemedicine program in the Upper Peninsula, the Marquette General Health System (MGHS), recorded significant growth in terms of users and frequency, while the telemedicine program in Beaver Island, run by the Beaver Island Rural Health Center (BIRHC), was stagnant and usage was still very low.

In this case, both regions have the same level of readiness for several factors. For technology readiness, for example, the two regions have obstacles related to telecommunication access because they are located in rural areas. Regulatory readiness and the health sector are also relatively the same because they are in one state. Financial readiness at the initial stage is also relatively the same, where both regions receive proportional financial assistance. However, this equality is not found in the provider readiness factor. The demographic condition of Beaver Island which has a small population makes the number of experts. The emergence of problems at Beaver Island even started at the planning stage, with data errors regarding the condition of existing technology being reported by consultants. This is inseparable from the absence of local technical personnel who understand the existing technology, so they have to recruit consultants from outside the island.

This Michigan case reflects the importance of fulfilling all the factors of maturity readiness in the planning process for implementing a telemedicine program. The successful implementation of a telemedicine program in one area does not mean that it is easily applied to other areas by only considering geographical similarities. After knowing the factors that influence the implementation of telemedicine, then we will discuss the Telemedicine program in Indonesia which is the main case in this study. The scope of the research will reach the features that are provided in the telemedicine program in Indonesia which is run by the ministry of health, analyze the implementation of the telemedicine program and the potential for evidence-based application in telemedicine program planning in Indonesia.

5. Case Study: Telemedicine Project in Indonesia

5.1 Background of Telemedicine Project in Indonesia

Indonesia is a vast country that lies on the equator with a stretch of more than 5,000 km, even more than the distance from Reykjavik, Iceland to Yerevan, Armenia. As an archipelagic country consisting of more than 17,000 islands and inhabited by more than 250,000 people, Indonesia has challenges to ensure equality of public services, including medical services. This

challenge is caused by several factors, ranging from the most basic, due to the geographical conditions of the islands and mountains that make it difficult to build connecting roads between regions, to the high urbanization rate, amounting to 55.2 percent in 2015 (Mardiansjah & Rahayu, 2019). These factors make rural areas in Indonesia experience slower development compared to cities in the center of the economy (Suksmono et al, 2004).

The slow growth of rural areas has made the inequality of public services even greater, including health services (Herawati & Bakhri, 2019). Furthermore, even within one area, the condition of health services between urban and rural areas can have different qualities. For example, the quality of health care centers in Cirebon City have better quality than those located in rural areas in Cirebon Regency. This quality does not only refer to the completeness of treatment facilities but also to the ratio of available beds to the population. This has an impact on the level of community satisfaction. This refers to the finding that only 22.9 percent of patients in rural areas stated that health services in rural areas were better or as good as health services in urban areas (Herawati & Bakhri, 2019). In fact, the main goal of development is how all citizens are satisfied with the results of their government's performance, and this has implications for a high level of trust, and ultimately the achievement of stability in the country

The challenges faced by the Indonesian government seem to match the solutions promised by the telemedicine concept. Especially if we look at the development of ICT in Indonesia in the last two decades. Even though telecommunications technology existed in Indonesia before the country's independence in 1945, until the end of the 1990's its development was still limited in big cities and was still monopolized by government-owned companies (Rohman & Bohlin, 2013), thus making the flexibility of its reach expansion still dependent on government budget. The big leap began in 1999 when the government began to partially privatize state owned companies, Telkom and Indosat, and opened up bigger opportunities for the private sector to take part in the telecommunications business in Indonesia through the Telecommunications Law no. 36 of 1999. This policy aims to encourage efforts to provide telecommunications services to rural areas. The government's strategy was welcomed by cellular operators by expanding into rural areas through CDMA technology, because compared to GSM technology, which at that time was still limited to GPRS, the provision of CDMA technology was more economical because it had a larger frequency so that it had a stronger transmit power. (Fadillah, 2007).

As a result of the liberalization of the telecommunications industry, telecommunications penetration, both cellular and fixed line, has increased significantly (Rohman & Bohlin, 2013). Mobile telecommunications penetration jumped dramatically from less than 2 percent in 2000 to more than 90 percent within 10 years, and even more than 100 percent since 2011 (World Bank, 2021). Indeed, it does not mean that all Indonesians have cellular access, because the data includes individuals who may have more than one mobile phone. However, the data can illustrate changes in the pattern of telecommunications in Indonesia. The increase also occurred in the penetration of fixed line telecommunications. Non-data fixed line telecommunication subscribers jumped from 13.5 million subscribers to 40.9 million subscribers in 2010, although in the end the number of subscribers dropped to only 9 million subscribers in 2020 (World Bank, 2021) due to the function of conventional telephones being replaced by mobile phones. However, the need for internet access and the business objectives of fixed broadband operators have yielded positive results. Fixed broadband subscribers skyrocketed from 108,200 in 2005 to 10.7 million in 2020 (World Bank, 2021). Improvements in technology, ease of accessing information through the internet and changes in people's telecommunication styles are responded by business people and researchers by adopting ICT developments in a process, including in the world of health sector.

What should be noted here is that, although overall internet penetration and the number of mobile broadband subscribers have become massive in the last decade, in reality not all regions in Indonesia enjoy this. Riyadi and Larasati (2019) found that digital inequality still exists among regions in Indonesia. In addition to the fact that infrastructure development is still dominated in western Indonesia, education and economic factors are also the cause of digital inequality. This finding is in accordance with the statement of one of the participants in the interview in this study who stated that the low use of the internet in the location where he lived was also due to the local population still considering the internet as a luxury and expensive item. As a result, medical staff in some areas often find it difficult to explain the concept of ICT applications using the internet because patients are not familiar with things related to the internet. On the other hand, according to other participants who work in urban areas, dissemination of information about Telemedicine is not a problem, sometimes patients themselves initiate the initiative to contact medical officers via social media.

5.2 Telemedicine Development in Indonesia

The adoption of ICT in the medical world in the form of telemedicine is actually not something new, but the lack of publications to the public and the lack of scientific discussions discussing

telemedicine have made this concept a new thing for most people (Suksmono et al, 2004). In 1985, the first computer trials and satellite-based experiments in Indonesia were carried out in conjunction with a teleconference between seven universities in Indonesia and the World Health Organization (WHO) and medical societies at Guelph University in Canada. This activity, which is part of the Satellite for Health and Rural Education (SHARE), is sponsored by Intelsat and is a collaboration between the Government of Canada and the Government of Indonesia. The main topic of this conference is the development of biotechnology and medical science (Indonesian Embassy for the US, 1986).

Furthermore, the development of telemedicine continues and is mostly initiated or dominated by educational institutions, such as the regional collaboration Pan Asia-Pacific Region Telecommunication Network for Experiments and Research by Satellite (PARTNERS) sponsored by the Japan Ministry of Post and Technology. This collaboration involves the Bandung Institute of Technology and Tokai University School of Medicine, and as part of its development, a wireless based medicine system was tested that connects two medical schools in Bandung, a hospital in Bandung and a university, via a 2.4 GHz WLAN based on JCSAT 3 satellite connection.

However, this development has not been included in the regulatory framework or government strategy until 2012, when the Ministry of Health established pioneering telemedicine services with teleradiology and teleEKG services with a target of 2 national hospitals as supporting hospitals and 21 hospitals and 5 community health centers as supported (Direktorat Jenderal Pelayanan Kesehatan, 2019). Next in 2015, the Ministry of Health of the Republic of Indonesia listed Telemedicine as one of the 2015-2019 strategic plans (Kementerian Kesehatan., 2015). In the strategic plan document of the Ministry of Health, it is stated that telemedicine is part of the way to improve access and quality of health facilities. In fact, the percentage target for regional hospitals as telemedicine service providers is also listed at 32 percent of total regional hospitals. However, in this strategic plan the target for derivative regulations has not been set. In 2017, the Ministry of Health released a list of hospitals and public health centers that conducted trials of the telemedicine service program (Kementerian Kesehatan, 2017) and continued in 2019, the Ministry of Health released guidelines for the implementation of Telemedicine services between health care facilities (Kementerian Kesehatan, 2019). In the Ministry of Health's strategic plan for the 2020-2024 period, telemedicine is re-entered in the list of targets and strategies. It is stated that the expansion and development of types of telemedicine services, digitization of medical records and online medical records, as well as

the expansion of online health services are part of the strategy to increase the availability and quality of basic and referral health care facilities. The target set is the number of healthcare facilities that are capable of implementing telemedicine. The target is 335 health care facilities for five years or 67 units per year (Ministry of Health 2020). The document also targets the preparation of derivative regulations related to online-based health services that will regulate the use of technology through telemedicine programs in direct health services between doctors and patients.

5.3 Telemedicine Program

Telemedicine services by the Indonesian Ministry of Health are driven by several considerations. One of the main reasons is Indonesia's commitment as a member country of the World Health Organization (WHO) to achieve Universal Health Coverage (UHC). UHC is a program that targets all individuals to obtain the quality health services they need without fear of financial problems (WHO, 2005). The challenge to achieve this commitment is not an easy one, especially for developing countries with varied geographical conditions such as Indonesia. Moreover, there is a disparity in the availability of health workers who have high qualifications. Although the ratio of specialist doctors in Indonesia has reached the target of 12.2 per 100,000 population, there is still a large disparity between provinces in Indonesia and the distribution is not evenly distributed in each region or district within one province (Direktorat Pelayanan Kesehatan Rujukan, 2019). One of the triggers for this inequality is the low interest in working in rural, remote and island areas. In an interview conducted, a participant said that since 1990, the issue of the reluctance of medical workers to be assigned to rural areas has become a concern of the Ministry of Health. Several internship programs for candidates doctors have been tried, however, in the end they still choose to work in urban areas.

Meanwhile, health workers from local areas also have the potential to experience problems in improving their competence. The development of more centralized educational facilities in big cities has implications for the unequal distribution of knowledge, including knowledge in the health sector (Direktorat Pelayanan Kesehatan Rujukan, 2019). On the other hand, the government realizes that increasingly sophisticated technology can provide benefits to business processes in various fields. The ease of carrying out real-time audio-visual-based communication, which is starting to replace face-to-face communication, is considered a solution to achieve UHC's commitment, especially to solve problems in areas that are difficult to be accessed physically.

The Ministry of Health defines telemedicine as the provision of health services remotely by health professionals using ICT, including the exchange of information on diagnosis, treatment, disease and injury prevention, research and evaluation, and continuing education for health care providers for the benefit of improving individual and community health. Furthermore, the ministry of health also explained that telemedicine services are carried out between one health service facility and another in the form of consultations to establish diagnosis, therapy, and disease prevention (Direktorat Pelayanan Kesehatan Rujukan, 2019).

According to one of the referral health service directors, who was one of the participants in the interview in this study, communication lines between health facilities, especially in rural areas, have an important role. In principle, telemedicine services are carried out between health care facilities and carried out by certified health workers in health care facilities, and with the consent of the patient so that all involved in the telemedicine process know the flow of the process being carried out. In addition, participants in the interview session with PIC telemedicine also said that obtaining patient consent often takes time to explain, because not all patients are familiar with ICT-based health care schemes.

Table 9. Telemedicine Requirements

Requirements	Counselor facilities	Recipient facilities
Human Resources	Availability of doctors, specialist doctors, other health workers, other competent personnel in the field of ICT and other experts in the health sector who have certificates or licenses.	Availability of doctors, other health workers, other competent personnel in the field of ICT and other experts in the health sector who have certificates or licenses.
Facilities	A building / room that is used to carry out telemedicine services, can be integrated or separated from the main service area	
Infrastructures	· 24 hours electricity · Internet network min. 2 Mbps · Other supporting infrastructures	

Tools and Equipments	· PC with minimum specification: - RAM 4 GB - Processors 2.4 Ghz - Monitor 4K, 22 inch - HD 500 GB · Webcam · Headset · UPS · Telemedicine Software “TEMENIN”	
	-	Digital health equipment: · Digital Electrocardiograph (EKG) · Digital Ultrasonography (USG) · Computerized Radiography (CR)

The table above shows the requirements that must be met if a healthcare facility is appointed or asks for permission to provide telemedicine services. The requirements that must meet the established standards are the availability of human resources, facilities and infrastructure, tools and equipment. Basically, the requirements for counselor facilities and consultation recipients are similar, the only difference being that there must be digital health equipment that supports telemedicine at the health service facility requesting a consultation.

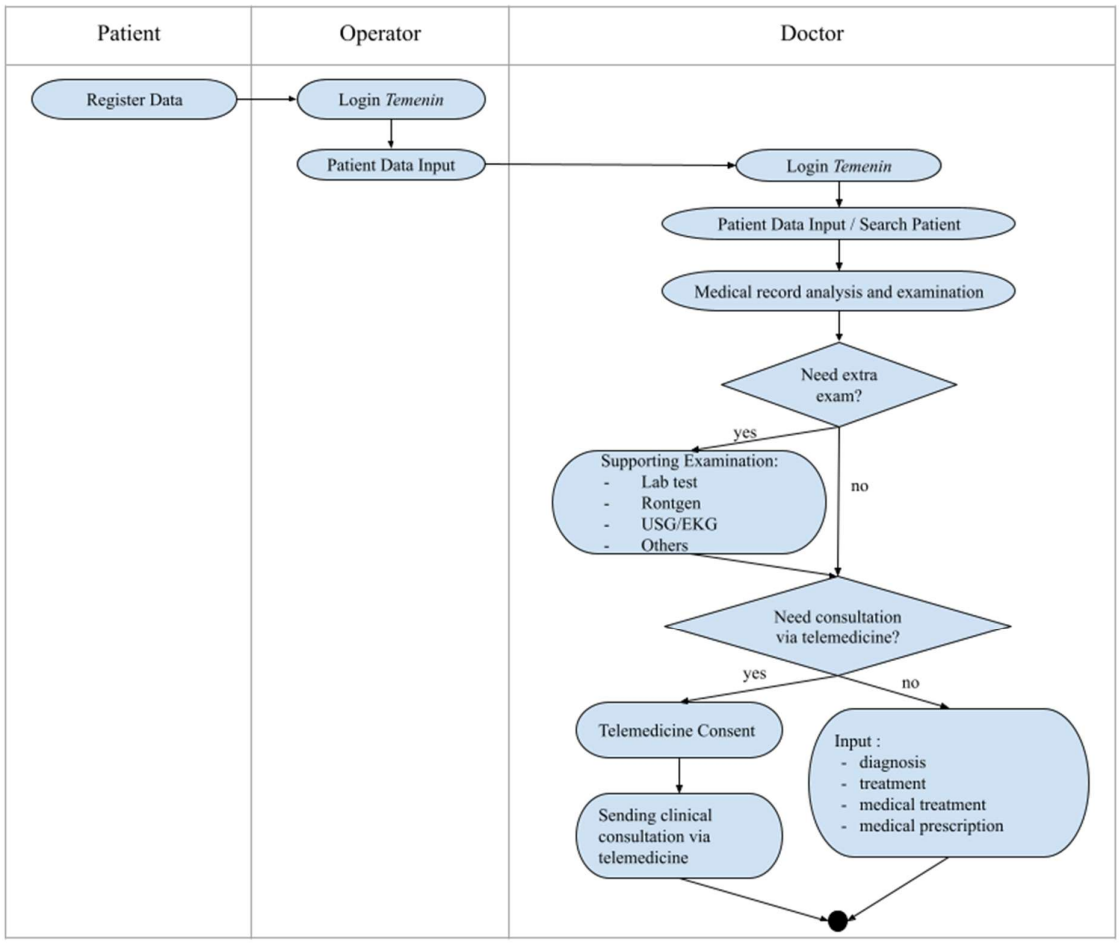

Figure 5. Telemedicine process flowchart

Based on the explanation from the ministry of health in the second FGD session, the process flow of telemedicine activities can be described as the flowchart above. The picture explains the activities carried out by hospitals requesting consultations, starting from patient registration until a request for consultation is sent. The end point on the flowchart indicates that the clinical treatment process for the patient is complete without using telemedicine or the doctor has sent a request for consultation via telemedicine to the supporting hospital. From this plot, it can be seen that the decision to run telemedicine depends on the views of the doctor who treats the patient.

In the flowchart of the telemedicine process, it can be seen that the telemedicine program uses Temenin, an application developed by the ministry of health as a platform that integrates features or types of telemedicine services which include:

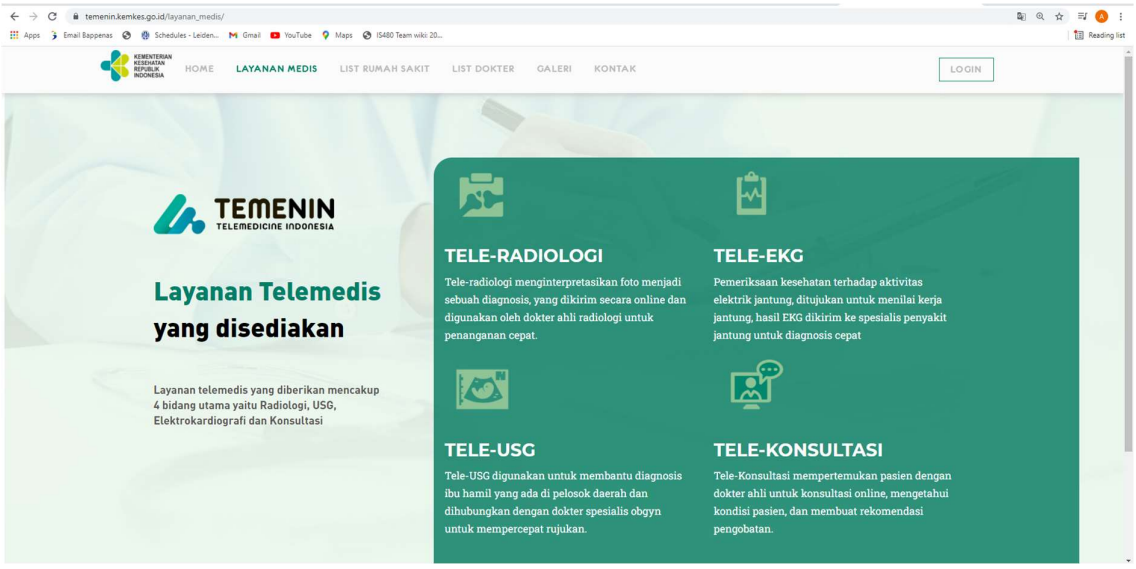

Figure 6. Indonesia Telemedicine Dashboard / Temenin

1. Tele-Radiologi

   Teler-Radiologi is a diagnostic radiology service using digital image transmission from all radiology elements along with patient supporting data from a health facility requesting a consultation that does not have a radiology specialist to a consular health facility that has a radiology specialist, to obtain expertise that will be used to strengthen the diagnosis. For hospitals that already have a radiology senior resident, teleradiology can be carried out to get a second opinion that supports the learning process during the education period. Specific requirements in the provision of teleradiology services at hospitals requesting consultations are digital radiology/Computerized Radiography (CR) equipment.

2. Tele-EKG

   Similar to the working principle of teleradiology, the principle of tele-ECG is an electrocardiography service using electronic image transmission from electrocardiogram equipment and supporting data related to patients. One of the goals of the tele-EKG is to reduce the number of deaths from heart attacks in rural areas where there are no cardiologists or internal medicine specialists. The mandatory equipment in this service is a digital electrocardiography device. Based on interviews with telemedicine PICs in several health centers, Tele-EKG is the most frequently used feature of telemedicine programs.

3. Tele-USG

Tele-USG is an obstetric ultrasound service using digital image transmission from an obstetric ultrasound scanner along with supporting data. Tele-USG services performed by a health facility requesting a consultation can be performed by a midwife in conditions where a doctor is not available at the health facility. Meanwhile, for counselor health facilities, there must be a cardiologist or obstetrics gynecology specialist (ObGyn) as a consultant doctor.

4. Tele-Konsultasi

   This service is a remote consultation that includes assistance in strengthening the diagnosis, providing considerations and advice in medical management in writing, voice or video and must be recorded in the medical record in accordance with the provisions of the legislation. Health facilities that serve as counselors must have specialist doctors who are suitable for consultation needs.

5.4 Case Study Analysis

This study raises the telemedicine program in Indonesia as a case to be analyzed. The main objective is how we can improve the planning process by using an evidence-based approach. The case of Telemedicine in Indonesia was chosen because currently the telemedicine program is one of the national priority programs to improve quality in rural areas, especially in eastern Indonesia such as Papua (Bappenas, 2021). In addition, the case of telemedicine is also interesting to study because it is a program that is currently in the development stage, so that in the future this research can provide benefits for improving the program planning process.

5.4.1 Health Center Performance Data

One indicator of the success of a telemedicine program is how often health care facilities appointed to implement the program use telemedicine as a way to improve services to patients or residents. Referring to the strategic plan document of the ministry of health 2020-2024, the government targets as many as 67 health service facilities to carry out telemedicine programs, hereinafter the health center will be referred to as the Community Health Service Center / *Pusat Kesehatan Masyarakat (Puskesmas*). In 2020, the Ministry of Health conducted a survey of puskesmas that have been used as locations for implementing telemedicine services. The initial goal was to determine the readiness of the puskesmas in situations that did not allow face-to-face services due to the Covid-19 pandemic (Simamora, 2020). From this report, the researchers then conducted further discussions to explore more deeply about the success of the telemedicine program at the health centers. From the results of the discussion, data were

obtained from 47 health centers that responded. The data explored are about the success of telemedicine services and the factors that reflect the readiness criteria discussed in the previous chapter. From the data obtained, then selected data to be processed data for further analysis.

Table 10. Locations and Usage Frequencies

	Health Care	Regency	Province	Frequency
1	Tonjong	Brebes	Central Java	126
2	Semanggang	Kotawaringin Barat	Central Kalimantan	57
3	Pamenang	Merangin	Jambi	35
4	Kabila	Bone Bolango	Gorontalo	28
5	Dungaliyo	Gorontalo	Gorontalo	25
6	Karang Anyar	Lampung Tengah	Lampung	25
7	Padang Luas	Tanah Laut	South Kalimantan	20
8	Mlati II	Sleman	Yogyakarta	12
9	Bintuhan	Kaur	Bengkulu	11
10	Oransbari	Manokwari	West Papua	10
11	Balai Karangan	Sanggau	West Kalimantan	7
12	Bakam	Bangka	Bangka Belitung Archipelago	5
13	Debut	Maluku Tenggara	Maluku	5
14	Belinyu	Bangka	Bangka Belitung Archipelago	4
15	Sulamadaha	Kota Ternate	North Maluku	3
16	Riau Silip	Bangka	Bangka Belitung Archipelago	3
17	Bayan	Lombok Utara	West Nusa Tenggara	2
18	Sota	Merauke	Papua	2
19	Sangkapura	Gresik	East Java	2
20	Terawan	Seruyan	Central Kalimantan	1
21	Lakansai	Buton Utara	South East Sulawesi	1
22	Galang	Kota Batam	Riau Archipelago	-
23	Lima Puluh	Batubara	North Sumatra	-
24	Ciomas	Serang	Banten	-
25	Puding Besar	Bangka	Bangka Belitung Archipelago	-
26	Pulau Kijang	Indragiri Hilir	Riau	-
27	Sausapor	Tambrauw	West Papua	-
28	Mamasa	Mamasa	West Sulawesi	-
29	Rimba Melintang	Rokan Hilir	Riau	-
30	Petaling	Bangka	Bangka Belitung Archipelago	-
31	Mantang	Bintan	Riau Archipelago	-
32	Mapaddegat	Kep Mentawai	West Sumatera	-
33	Selat Nasik	Belitung	Bangka Belitung Archipelago	-
34	Kahala	Kutai Kartanegara	East Kalimantan	-
35	Moro	Karimun	Riau Archipelago	-
36	Pintas Tuo	Tebo	Jambi	-
37	Tarempa	Kep Anambas	Riau Archipelago	-
38	Palupuh	Agam	West Sumatera	-

39	Penagan	Bangka	Bangka Belitung Archipelago	-
40	Malunda	Majene	West Sulawesi	-
41	Panipahan	Rokan Hilir	Riau	-
42	Calabai	Dompu	West Nusa Tenggara	-
43	Entikong	Sanggau	West Kalimantan	-
44	Long Bawan	Nunukan	North Kalimantan	-
45	Long Layu	Nunukan	North Kalimantan	-
46	Legari	Nabire	Papua	-
47	Mangaran	Kep Sangihe	North Sulawesi	-

The table above presents location data, district and provinces and the number of frequencies used for telemedicine services in a year. From this data, it is known that of the 47 health centers that responded, only 21 health centers acknowledged that they had implemented telemedicine services. This fact shows the difference in the level of success of the program, we can even see that there are health centers that have provided telemedicine services more than 57 times. In fact, technically there should be no such remarkable inequality. All puskesmas have been provided with equipment that complies with the requirements, and according to regulations, all puskesmas should have an adequate number of health workers and technical personnel (Kementerian Kesehatan, 2019b).

Researcher selects some data that will be correlated with the frequency of data use. Of the ten readinesses discussed in the previous chapter, we focus on readiness which may have different values. The selection is done by eliminating readiness that is influenced by central government policies or national conditions. Core readiness, health sector readiness, strategic readiness and organizational readiness are four types of readiness that are strongly influenced by the overall government readiness, so it is assumed that these four factors do not produce variations in output. Technology readiness, although technical in nature, in the case of telemedicine, all designated locations have been prepared with equipment that meets standards, so technology readiness is also not included in data analysis. Then, there are two types of readiness that are influenced by central government policies and internal health center policies, regulation readiness and financial readiness. Internal condition data for these two types of readiness are available from the survey results. Meanwhile, the remaining three types of readiness are readiness which is dominated by internal health centers and local conditions, namely provider readiness, patient readiness and community readiness. For these three forms of readiness, the survey results only reflect provider readiness. The operational readiness of the puskesmas in

providing telemedicine services, in accordance with the specified specifications, is the readiness of facilities and human resources (Ministry of Health, 2017).

5.4.2 Location Classification and 4G Technology Availability

Apart from the data obtained from the evaluation results of the ministry of health, the study is also looking for other data that has the potential to have a correlation with the frequency of telemedicine services. The first data is data on the classification of puskesmas locations based on the Regulation of the Minister of Health No. 75/2014 and the Regulation of the Minister of Health No. 90/2015. Location classification is made based on the characteristics of the work area. Some of the indicators that determine this classification are the activities of the surrounding population, the availability and distance to tertiary facilities, such as cinemas or hotels, the percentage of the population covered by the electricity network, and road access to tertiary facilities or urban facilities. Based on this classification, puskesmas are divided into 4 categories: urban, rural, remote or very remote. In this study, the use of this data is based on the differences in ICT adoption that are very likely to occur between urban and rural areas (Hindman, 2000). In fact, it is very possible that there will be one puskesmas which is administratively located in a relatively developed district, but is located in a remote area. For example, the Sangkapura healthcare is administratively located in Gresik district, one of the districts with the highest GDP per capita in Indonesia (BPS, 2021). However, the puskesmas is a healthcare facility intended to serve residents on an island 153 km apart from the district government center.

4G availability data is also used because it is a factor directly related to the readiness of the technology infrastructure at the project site. In addition, the availability of 4G in all districts where puskesmas are located, will logically facilitate telemedicine services to end users, namely patients. 4G availability data is obtained from the results of discussions with the Ministry of National Development Planning/Bappenas. A district is considered to have 4G service availability if all sub-districts in the district are covered by 4G services at least 95% of its area.

Table 11. Locations and Data for Analysis

	Health Care	Freq	Have a dedicated Telemedicine room	have (a) trained GP(s) for telemedicine	have (a) trained nurse(s) for telemedicine	have (a) trained midwife(s) for telemedicine	have (a) trained ICT staff(s) for telemedicine	have (a) trained other staff(s) for telemedicine	Have a Telemedicine Regulation / Policy	Have an Incentive Budgeting Plan for reference hospital	Location Classification	4G Full Coverage
1	Tonjong	126	Yes	Yes	No	No	Yes	No	Yes	No	Urban	Yes
2	Semanggang	57	Yes	Yes	Yes	No	No	No	Yes	No	Rural	Yes
3	Pamenang	35	Yes	No	N/A	Yes	N/A	N/A	Yes	Yes	Urban	Yes
4	Kabila	28	Yes	Yes	No	Yes	Yes	No	Yes	No	Urban	Yes
5	Dungaliyo	25	Yes	Yes	Yes	No	No	No	Yes	Yes	Rural	Yes
6	Karang Anyar	25	Yes	Yes	No	No	No	Yes	Yes	No	Rural	Yes
7	Padang Luas	20	No	Yes	No	No	Yes	No	Yes	Yes	Rural	Yes
8	Mlati II	12	Yes	Yes	No	No	Yes	No	Yes	No	Urban	Yes
9	Bintuhan	11	No	Yes	Yes	No	No	No	No	No	Rural	Yes
10	Oransbari	10	Yes	Yes	No	No	N/A	No	No	Yes	Rural	No
11	Balai Karangan	7	No	Yes	No	No	Yes	No	No	No	Very Remote	Yes
12	Bakam	5	No	Yes	No	No	No	No	Yes	No	Rural	Yes
13	Debut	5	No	Yes	Yes	No	No	No	Yes	No	Remote	Yes
14	Belinyu	4	No	No	No	No	Yes	No	Yes	No	Urban	Yes
15	Sulamadaha	3	Yes	Yes	No	No	Yes	No	Yes	Yes	Urban	Yes
16	Riau Silip	3	No	Yes	Yes	No	Yes	No	Yes	No	Rural	Yes
17	Bayan	2	Yes	No	No	No	Yes	No	Yes	Yes	Rural	Yes
18	Sota	2	No	Yes	Yes	No	No	Yes	No	No	Rural	No
19	Sangkapura	2	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Very Remote	Yes
20	Terawan	1	Yes	No	No	No	Yes	Yes	Yes	No	Rural	Yes
21	Lakansai	1	No	No	No	No	No	Yes	No	No	Very Remote	No
22	Galang	-	Yes	Yes	No	No	Yes	No	Yes	No	Urban	Yes
23	Lima Puluh	-	Yes	Yes	No	No	No	No	Yes	No	Urban	Yes
24	Ciomas	-	No	No	No	No	Yes	No	Yes	Yes	Rural	Yes
25	Puding Besar	-	No	No	No	No	No	No	Yes	No	Rural	Yes
26	Pulau Kijang	-	No	Yes	No	No	Yes	No	Yes	No	Rural	Yes

27	Sausapor	-	Yes	Yes	Yes	No	No	No	No	Yes	Rural	No
28	Mamasa	-	No	No	No	No	No	No	Yes	Yes	Rural	No
29	Rimba Melintang	-	No	No	No	No	No	No	No	No	Rural	Yes
30	Petaling	-	No	No	No	No	No	No	Yes	No	Rural	Yes
31	Mantang	-	No	No	Yes	No	No	No	No	No	Remote	No
32	Mapaddegat	-	No	Yes	No	Yes	No	Yes	No	No	Remote	Yes
33	Selat Nasik	-	No	No	No	No	No	No	No	No	Remote	No
34	Kahala	-	Yes	Yes	Yes	N/A	N/A	N/A	Yes	No	Remote	No
35	Moro	-	Yes	Yes	N/A	Yes	N/A	N/A	No	No	Remote	No
36	Pintas Tuo	-	Yes	No	No	No	No	No	No	No	Remote	Yes
37	Tarempa	-	No	Yes	No	No	No	No	No	No	Remote	Yes
38	Palupuh	-	No	Yes	No	Yes	No	No	No	No	Remote	Yes
39	Penagan	-	No	Yes	No	No	No	No	Yes	Yes	Remote	Yes
40	Malunda	-	No	No	No	No	No	No	No	No	Remote	No
41	Panipahan	-	Yes	No	No	No	No	No	No	No	Remote	No
42	Calabai	-	No	No	No	No	No	No	No	No	Very Remote	No
43	Entikong	-	No	Yes	No	No	No	Yes	No	No	Very Remote	No
44	Long Bawan	-	Yes	Yes	Yes	No	No	No	Yes	Yes	Very Remote	No
45	Long Layu	-	No	No	No	No	No	No	No	No	Very Remote	No
46	Legari	-	No	No	No	No	No	No	No	No	Very Remote	No
47	Mangaran	-	No	No	No	No	No	No	No	No	Very Remote	Yes

5.4.3 Data Scoring

Of the eight responses and two additional data, scoring is then carried out to convert the data into quantitative data. The determination of the score is based on the initial theory which says that readiness determines the success of the program. For data obtained from telemedicine PIC responses, the "yes" answer is converted to a value of 1 and the "no" answer is converted to a value of 0. Then, the location classification data conversion is carried out by giving a value of 1-4 based on the ease of access or support for facilities around the puskesmas. Urban locations are converted to a value of 4, rural locations to a value of 3, remote locations to a value of 2 and very remote locations to a value of 1. areas that are not fully covered. Furthermore, data on the existence of special facilities or rooms for telemedicine and the readiness of human resources at the puskesmas are summed and categorized as provider readiness points. The results of data quantification can be seen in the table below.

Table 12. Data Scoring

#	Health Care	Freq.	Provider Readiness Points	Regulation/Policy Readiness Point	Financial Readiness Point	4G Availability	Location Classification
1	Tonjong	126	3	1	0	1	4
2	Semanggang	57	3	1	0	1	3
3	Pamenang	35	2	1	1	1	4
4	Kabila	28	4	1	0	1	4
5	Dungaliyo	25	3	1	1	1	3
6	Karang Anyar	25	2	1	0	1	3
7	Padang Luas	20	2	1	1	1	3
8	Mlati II	12	3	1	0	1	4
9	Bintuhan	11	2	0	0	1	3
10	Oransbari	10	2	0	1	0	3
11	Balai Karangan	7	2	0	0	1	1
12	Bakam	5	1	1	0	1	3
13	Debut	5	2	1	0	1	2
14	Belinyu	4	1	1	0	1	4
15	Sulamadaha	3	3	1	1	1	4
16	Riau Silip	3	3	1	0	1	3
17	Bayan	2	2	1	1	1	3
18	Sota	2	3	0	0	0	3
19	Sangkapura	2	5	1	0	1	1
20	Terawan	1	3	1	0	1	3
21	Lakansai	1	1	0	0	0	1
22	Galang	-	3	1	0	1	4
23	Lima Puluh	-	2	1	0	1	4
24	Ciomas	-	1	1	1	1	3
25	Puding Besar	-	0	1	0	1	3

26	Pulau Kijang	-	2	1	0	1	3
27	Sausapor	-	3	0	1	0	3
28	Mamasa	-	0	1	1	0	3
29	Rimba Melintang	-	0	0	0	1	3
30	Petaling	-	0	1	0	1	3
31	Mantang	-	1	0	0	0	2
32	Mapaddegat	-	2	0	0	1	2
33	Selat Nasik	-	0	0	0	0	2
34	Kahala	-	3	1	0	0	2
35	Moro	-	2	0	0	0	2
36	Pintas Tuo	-	1	0	0	1	2
37	Tarempa	-	1	0	0	1	2
38	Palupuh	-	2	0	0	1	2
39	Penagan	-	1	1	1	1	2
40	Malunda	-	0	0	0	0	2
41	Panipahan	-	1	0	0	0	2
42	Calabai	-	0	0	0	0	1
43	Entikong	-	1	0	0	0	1
44	Long Bawan	-	3	1	1	0	1
45	Long Layu	-	0	0	0	0	1
46	Legari	-	0	0	0	0	1
47	Mangaran	-	0	0	0	1	1

5.4.4 Correlation Analysis

The frequency of using telemedicine can interpret the success of the program planning, or in other words, the number of frequencies is the output of the program itself. Meanwhile, other variables are input variables that may affect the output. In statistics, the input variable is expressed as a control variable or independent variable, while the output variable is known as the dependent variable. Based on the scoring data, an exploratory analysis was carried out first to find out whether the data was ready to be analyzed or needed additional treatment. Explorative analysis was conducted to determine the skewness of the dependent variable and whether the data could be directly analyzed using the linear method. In addition, we can also identify outlier data that may need to be removed from the data analysis process to improve the accuracy of the analysis results.

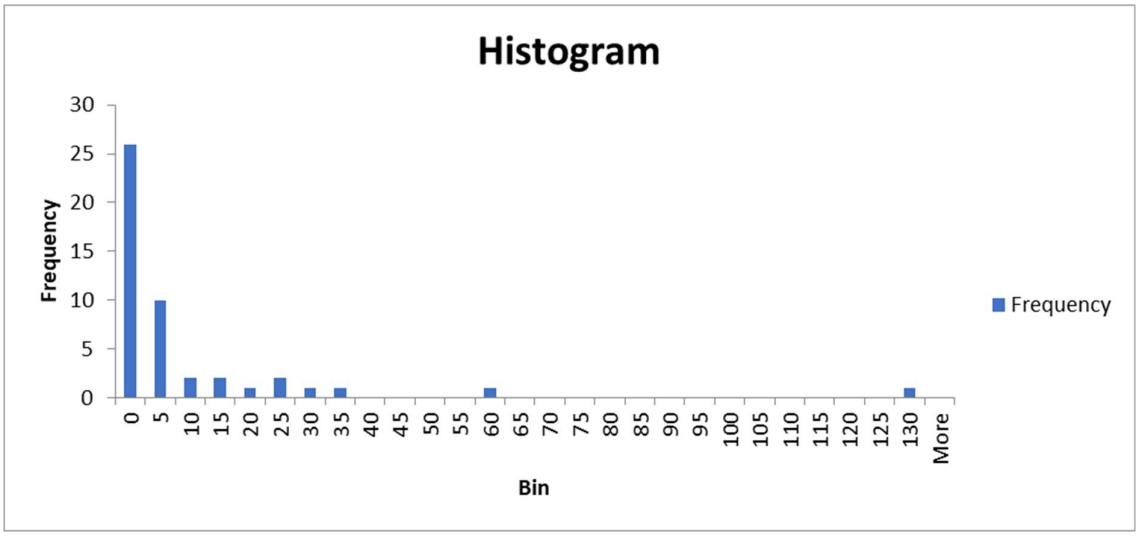

Figure 7. Distribution Histogram of Telemedicine Usage Frequency (bins : 5)

The histogram above depicts the frequency distribution of the dependent variable with a bins value of 5. Based on the distribution histogram above, and the skewness value of the dependent variable data is 4.39, then the data needs to be transformed first. By considering that many samples are 0 (zero), then the data transformation used is the square root transformation X' = sqrt (X). Data transformation was carried out for all types of variables to ensure consistent analysis results.

Table 13. Data Scoring (after Square-root transformation)

Health Care	Freq	User Readiness Points	Regulation/Policy Readinsess Point	Financial Readiness Point	4G Availibility	Location Classification	Average year of education
Tonjong	11.22	1.73	1.00	0.00	1.00	2.00	2.49
Semanggang	7.55	1.73	1.00	0.00	1.00	1.73	2.90
Pamenang	5.92	1.41	1.00	1.00	1.00	2.00	2.77
Kabila	5.29	2.00	1.00	0.00	1.00	2.00	2.84
Dungaliyo	5.00	1.73	1.00	1.00	1.00	1.73	2.67
Karang Anyar	5.00	1.41	1.00	0.00	1.00	1.73	2.75
Padang Luas	4.47	1.41	1.00	1.00	1.00	1.73	2.76
Mlati II	3.46	1.73	1.00	0.00	1.00	2.00	3.27
Bintuhan	3.32	1.41	0.00	0.00	1.00	1.73	2.87
Oransbari	3.16	1.41	0.00	1.00	0.00	1.73	2.86
Balai Karangan	2.65	1.41	0.00	0.00	1.00	1.00	2.64
Bakam	2.24	1.00	1.00	0.00	1.00	1.73	2.87
Debut	2.24	1.41	1.00	0.00	1.00	1.41	3.08
Belinyu	2.00	1.00	1.00	0.00	1.00	2.00	2.87
Sulamadaha	1.73	1.73	1.00	1.00	1.00	2.00	3.40

Riau Silip	1.73	1.73	1.00	0.00	1.00	1.73	2.87
Bayan	1.41	1.41	1.00	1.00	1.00	1.73	2.42
Sota	1.41	1.73	0.00	0.00	0.00	1.73	2.93
Sangkapura***	1.41	2.24	1.00	0.00	1.00	1.00	3.05
Terawan	1.00	1.73	1.00	0.00	1.00	1.73	2.82
Lakansai	1.00	1.00	0.00	0.00	0.00	1.00	2.96
Galang	0.00	1.41	1.00	0.00	1.00	2.00	3.34
Lima Puluh	0.00	1.41	1.00	0.00	1.00	2.00	3.38
Ciomas	0.00	1.00	1.00	1.00	1.00	1.73	2.71
Puding Besar	0.00	0.00	1.00	0.00	1.00	1.73	2.87
Pulau Kijang	0.00	1.41	1.00	0.00	1.00	1.73	2.69
Sausapor	0.00	1.73	0.00	1.00	0.00	1.73	2.25
Mamasa	0.00	0.00	1.00	1.00	0.00	1.73	2.71
Rimba Melintang	0.00	0.00	0.00	0.00	1.00	1.73	2.87
Petaling	0.00	0.00	1.00	0.00	1.00	1.73	2.87
Mantang	0.00	1.00	0.00	0.00	0.00	1.41	2.89
Mapaddegat	0.00	1.41	0.00	0.00	1.00	1.41	2.66
Selat Nasik	0.00	0.00	0.00	0.00	0.00	1.41	2.90
Kahala	0.00	1.73	1.00	0.00	0.00	1.41	3.02
Moro	0.00	1.41	0.00	0.00	0.00	1.41	2.81
Pintas Tuo	0.00	1.00	0.00	0.00	1.00	1.41	2.75
Tarempa	0.00	1.00	0.00	0.00	1.00	1.41	2.63
Palupuh	0.00	1.41	0.00	0.00	1.00	1.41	2.97
Penagan	0.00	1.00	1.00	1.00	1.00	1.41	2.87
Malunda	0.00	0.00	0.00	0.00	0.00	1.41	2.92
Panipahan	0.00	1.00	0.00	0.00	0.00	1.41	2.87
Calabai	0.00	0.00	0.00	0.00	0.00	1.00	2.90
Entikong	0.00	1.00	0.00	0.00	0.00	1.00	2.64
Long Bawan	0.00	1.73	1.00	1.00	0.00	1.00	2.79
Long Layu	0.00	0.00	0.00	0.00	0.00	1.00	2.79
Legari	0.00	0.00	0.00	0.00	0.00	1.00	3.11
Mangaran	0.00	0.00	0.00	0.00	1.00	1.00	2.84

After transforming the data, the skewness becomes 2.04. Even though this skewness value is better but still relatively high. This is probably due to outlier data which increases the skewness value significantly. The existence of this outlier data allows differences in the results of correlation analysis which lead to data interpretation errors. Therefore, interquartile range (IQR) rule calculations are used to determine outlier data that can be removed in the analysis process.

Table 14. Interquartile Rule

Q1	0
Q3	2.177050983
IQR	2.177050983
Lower Bound	-3.265576475
Upper Bound	5.442627458

According to the calculation using the interquartile rule, there are three samples with values that exceed the upper bound. The frequency data from Tonjong, Semanggang and Pamenang Health Centers is more than 5.44, so the three data are considered as outliers. Skewness by ignoring these three data is 1.35. Next we will discuss the data analysis by using and also by ignoring these three data for comparison.

In this study, the analysis of the influence of the five factors on the frequency of telemedicine use was carried out using the data analysis feature in Microsoft Excel. The selected feature is the correlation matrix feature. By using the correlation table, we can see the correlation between the variables simultaneously. The correlation value is in the range -1 to +1. A positive value indicates a positive relationship between the two variables. The greater the correlation value, the greater the influence of a variable on other variables (Schober, Boer,& Schwarte,2018). The strength of the correlation value is usually interpreted as in the table below.

Table 15. Correlation Coefficient Interpretation

Correlation Coefficient	Interpretation
0 - 0.10	Negligible Correlation
0.10 - 0.39	Weak Correlation
0.40 - 0.69	Moderate Correlation
0.70 - 0.89	Strong Correlation
0.90 - 1.00	Very Strong Correlation

Table 16. Correlation Matrix (all samples)

	Frequency	*User Readiness Points*	*Regulation/ Policy Readiness Point*	*Financial Readiness Point*	*4G Availability*	*Location Classification*	*Average year of education*
Frequency	1						
User Readiness Points	0.455	1					
Regulation/Policy Readiness Point	0.378	0.378	1				
Financial Readiness Point	0.096	0.166	0.295	1			
4G Availability	0.363	0.297	0.528	-0.027	1		
Location Classification	0.439	0.327	0.555	0.215	0.473	1	
Average year of education	-0.157	0.001	0.171	-0.271	0.063	0.101	1

Table 17. Correlation Matrix (outliers removed)

	Frequency	*User Readiness Points*	*Regulation/ Policy Readiness Point*	*Financial Readiness Point*	*4G Availability*	*Location Classification*	*Average year of education*
Frequency	1						
User Readiness Points	0.476	1					
Regulation/Policy Readiness Point	0.331	0.349	1				
Financial Readiness Point	0.161	0.182	0.301	1			
4G Availability	0.357	0.270	0.507	-0.041	1		
Location Classification	0.375	0.293	0.527	0.202	0.448	1	
Average year of education	-0.004	0.037	0.221	-0.295	0.097	0.173	1

The two tables above are the correlation matrix between the variables of telemedicine factors and the frequency of telemedicine use. The first table is the result of correlation by including outlier data, and the second table without outlier data. In the first matrix there is no factor that really shows a strong correlation to the frequency of use. However, the user readiness and location classification factors show a moderate correlation value to the frequency of telemedicine use. In a matrix that does not use outlier data, the correlation value between frequency and user readiness consistently has a moderate and slightly increasing correlation, while the correlation coefficient between location classification and frequency decreases.

5.5 User Point of View

Based on the results of data analysis which shows that there are two factors that have a correlation with the frequency of telemedicine, the researchers then conducted an in-depth study of these two factors through interviews with users. Based on interviews, 6 out of 9 PICs said that the readiness of the telemedicine team both at the puskesmas and consular hospitals was a key factor in telemedicine implementation, 2 out of 9 acknowledged that supporting infrastructure such as a stable internet network was the most influencing factor, while the rest chose good planning. the main factor in the implementation of telemedicine. Another interesting finding was that all the PICs at the puskesmas providing telemedicine admitted that local residents, especially those over the age of 30, were not accustomed to using the internet or social media. Meanwhile, PICs who work in puskesmas that have implemented telemedicine said that local residents quite often use social media. Even for the case in Tonjong, which has the highest frequency value, the surrounding community has often communicated with puskesmas officers about puskesmas services through social media. This information indicates that patient readiness and community readiness have a relationship with the frequency of telemedicine use. The habit of using ICT, which is reflected by the use of social media, influences the readiness to use ICT in health services.

For the location classification variable, the data sources claimed not to know for sure about the effect of location, except for the availability of signals in remote areas which are not as stable as in urban areas. For example, at the Legari health center, 4G signal, which is sometimes used as an alternative way for teleconsultation via social media, is often not available. In addition, from several interviewees' statements, it is known that there are differences in community activity patterns in urban, rural and remote areas. In urban areas, people tend to spend relatively longer time outside the home than in rural and remote areas. Based on these findings, in the next chapter we will discuss the indicator that can reflect the most influential factors and can be used as evidence in the EBP concept for project location prioritization in the future.

6. The Potential for using EBP in Telemedicine Project Planning

6.1 How The Government Plans The Existing Telemedicine Project.

Based on the results of the evaluation of the use of telemedicine in the provision of health services during 2019-2020, we can see that there are differences in the success of each puskesmas if we measure the intensity of its use. Differences in the frequency of use of a project

is actually a very possible thing. However, in the case of telemedicine there are a few things to highlight. The first is the fact that the existing telemedicine program is a piloting project that requires improvement in its implementation. Second, Indonesia has experienced planning errors in the implementation of ICT-related programs, namely the M-PLIK program which causes cost losses due to inaccurate planning processes. Last but not least, the Covid-19 pandemic condition has forced the government to be prepared to deal with various scenarios, and one of the weapons that needs to be considered is maturity in telemedicine.

To understand the possible causes of the differences in the success rate of telemedicine implementation in each health center, we need to know the planning process for the Telemedicine project. The development of the telemedicine service network is coordinated by the ministry of health with support from other ministries in accordance with their duties, such as Bappenas which is involved in the planning and budgeting stages and the Ministry of Communication and Information Technology at the technical coordination stage. The development stages include mapping and surveying prospective locations, determining health service facilities, providing facilities, infrastructure and equipment, registering applications and training for human resources, and trials and implementation of telemedicine services (Direktorat Jenderal Pelayanan Kesehatan, 2019).

The focus of discussion in this research is the planning stage of the location of the health facility that is the party conducting the consultation. Location planning is carried out through the selection stage, field survey and location determination. The selection stage is done by selecting and mapping the puskesmas based on the criteria for the class of healthcare facilities. Priority units are pilot hospitals, puskesmas or health facilities that do not have specialist doctors, or are located far from the referral hospital. From the results of the mapping based on the class of healthcare facilities, then proceed with a site survey. In the location survey stage, the conditions of concern are the availability of internet and electricity networks, the availability of digital medical devices, the availability of hardware, and existing human resources. From the results of this survey, they are then ranked based on readiness. However, that does not mean that if these requirements are not met, the puskesmas will automatically not be selected. The ranking is used to determine technical readiness, and if there are puskesmas that are still categorized as technically feasible but still require additional or provision of these factors, then the fulfillment of the needs will be carried out after determining the location. For example, if there is a puskesmas that does not yet have the hardware needed for technical implementation of telemedicine such as a webcam or scanner, then the list of requirements will be submitted after

the puskesmas is selected as the location for implementation. Or, if there is a location that does not yet have a doctor or health worker who is experienced in using telemedicine, then technical training will be carried out for the doctor or health center staff.

Based on this planning concept, we can see that the location selection is still dominated by technical criteria. Whereas telemedicine is a form of digital transformation in a process that requires the readiness of human resources. Indeed, in the planning process, there is a training process for doctors or staff involved in medical services through telemedicine. However, this relatively instant training may not immediately improve a thorough understanding of the working concepts of telemedicine. In addition, even if training can improve technical capabilities, training that is only aimed at human resources at the puskesmas, in fact, only supports increased provider readiness. Another thing to note is that in telemedicine planning in Indonesia, the technology readiness factor has been strived to be fulfilled in all locations. This can be seen from the stages of providing facilities, infrastructure and equipment, as well as coordination with the ministry of communication and information and the national electricity company to help provide 24-hour internet and electricity networks.

The implementation of evidence-based policy in the telemedicine planning process has actually been seen from the use of hospital criteria and site visits. In contrast to location determination which is often done based on proposals from the regions and then selected through a joint discussion process between the central and regional governments (Bappenas, 2018), for telemedicine programs, location determination has been tried using the concept of evidence-based policy by paying attention to evidence in the field. However, based on the technical guidelines released by the ministry of health, the evidence used in the location determination stage still does not cover all the factors of telemedicine maturity readiness. This can be seen from the frequency output of telemedicine use which has a large variation in value. Furthermore, here we will discuss indicators that can be alternative evidence in determining the location of telemedicine programs.

6.2 Determining The Evidence of Related Telemedicine Readiness Factor

Previously, we have found that provider readiness, patient readiness and community readiness factors are maturity readiness factors of the Indonesian telemedicine program which has differences. This is also supported by the positive correlation between the frequency of use of telemedicine at a puskesmas and the results of telemedicine PIC interviews in several sample locations of puskesmas. By knowing these differentiating factors, we will try to address the

potential use of indicators in determining priority locations for the next telemedicine program. These three factors are basically related to the ICT adoption of telemedicine users themselves (Otto, Whitehouse, & Schelieter, 2019; Jensen et al, 2015). Therefore, we need to discuss the concept of ICT adoption, the factors related to or support ICT adoption, and in the end we will try to look at indicators that have the potential to be recommended as alternative indicators in determining the readiness of an area to run a telemedicine program.

ICT adoption is basically how a person or a group individually or collaboratively uses ICT as a tool to complete their work goals or to redesign their work (De Rosis & Seghieri, 2015). In the case of telemedicine, ICT adoption can be seen from how users, both health workers and patients, believe in the benefits and use ICT as a means of supporting health services. The speed of ICT adoption in each individual is different. Based on the understanding of the 10 factors that affect telemedicine in the fourth chapter, ICT adoption rate is an important part of provider readiness, patient readiness and community readiness. Therefore, basically policy makers or planners of telemedicine programs need to know the ICT adoption rate of the prospective telemedicine users themselves. The problem is that the ICT adoption rate is not something that can be measured directly.

Until now, there is no adoption rate index from regions in Indonesia that specifically measures up to the district level. In 2020, the Ministry of Communication and Information of the Republic of Indonesia released the results of measuring digital literacy in 34 provinces in Indonesia. The method used is a multi-stage random sampling survey with a home visit technique of 1,670 people. Questions in the survey include the ability to search for data and read data, communication skills, understanding of ethics in technology, understanding of digital security and the ability to handle technology (Kementerian Komunikasi dan Informatika, 2020). One of the findings from this research is that social media is currently the main source of information, and the most use is through the WhatsApp, Facebook and Youtube platforms, where WhatsApp users use these platforms for more than 5 hours per day. This finding indirectly shows the magnitude of the role of mobile phones in everyday life. This research also provides a digital literacy index in each region in Indonesia. Interestingly, the digital literacy index in underdeveloped areas is actually higher than the national index. This finding is then followed by the hypothesis that the availability of ICT is utilized by all groups nationally, but for disadvantaged areas, the use of ICT is dominated by individuals who have a higher level of education, so their use tends to be more positive.

However, there are some limitations to using this index as evidence in planning telemedicine programs. The first is the main focus of the research itself. In this research, the emphasis is on how individuals can obtain and manage information. Therefore, as in the case of high digital literacy in disadvantaged areas, the index cannot reflect the ability to adopt ICT in general, but only individuals who are already able to access information. Another limitation is that the survey coverage has not yet reached all districts, let alone sub-districts. In fact, in telemedicine planning, the work area of a *puskesmas* is specific in a particular sub-district. Therefore, we need to look for other alternative indicators that can be used as evidence.

6.3 Data Traffic as the potential indicator

Previously, we discussed the factors that affect an individual's ability to adopt ICT in their activities. Based on these four factors, we will then simplify it into a model to find out indicators that intersect and have the potential to become indicators that reflect individual readiness to adopt ICT in their works, which can then be used in the evidence-based planning process.

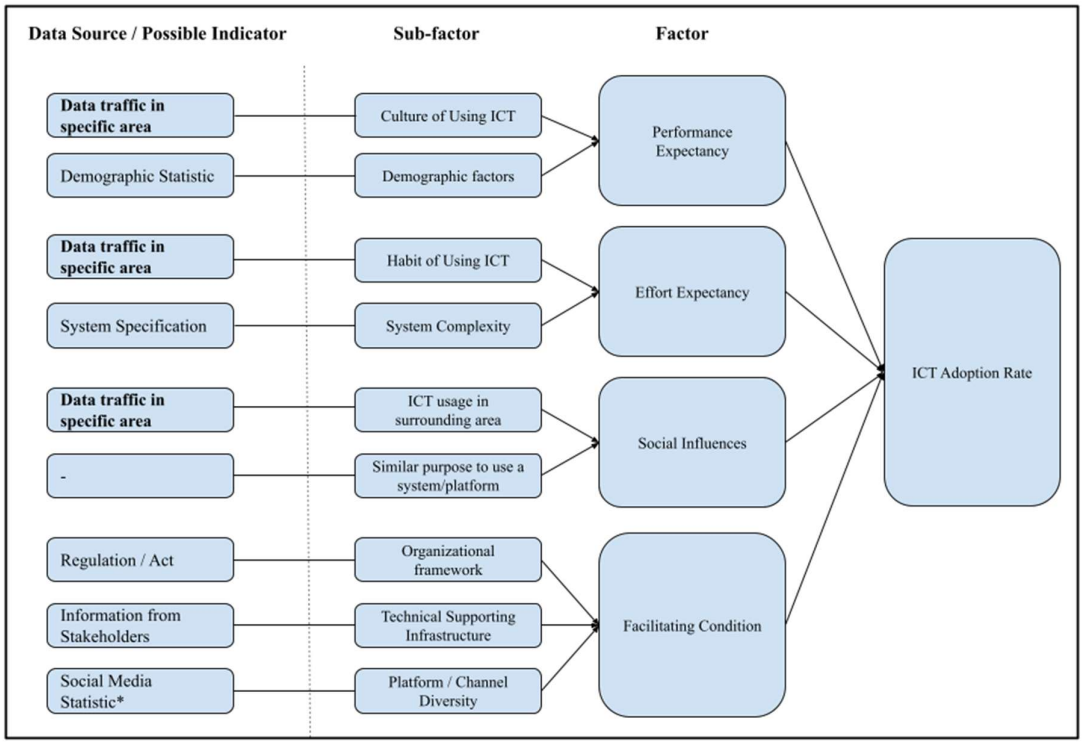

Figure 8. ICT adoption Factor and Possible Indicator

The diagram above illustrates the causal relationship of the factor and sub-factor ICT adoption rate, as well as data sources and indicators that can reflect the condition of the sub-factor. Several sub-factors can be identified using statistical data that can be obtained from statistical

institutions. Demographic factors, for example, the government can determine the education level of citizens in an area through statistical data. The problem is that not all districts, especially those in remote areas, have detailed data on the education level of citizens down to the sub-district level. In fact, for the platform/channel diversity sub-factor, the available data is still at the national level (wearesocial, 2020), until now there has been no research or measurement on this sub-factor by the government or local statistical institutions. What should be noted is that there is one indicator that can reflect three sub-factors at once. Culture and habits in using ICT, and the active use of ICT tools in an area can be measured, one of them by looking at how actively people in an area use it.

6.4 Using BTS data traffic as the Evidence in EBP for Telemedicine

The next challenge is to use an evidence-based strategy to select reputable data sources during the planning phase. We already know that data traffic is an appropriate metric for assessing ICT adoption capability. What is the best place to get it from then? Mobile broadband penetration in Indonesia has reached 89.07 percent, but fixed broadband penetration is only around 3.92 percent, as previously stated. From these data, it can be concluded that, in Indonesia, most people use mobile broadband to access the internet. The concept of mobile broadband is how end-users can access data via radio waves. The data stream is received and transmitted by a transmitter point which is often referred to as the Base Transceiver Station (BTS). At each BTS, information on the flow of data traffic and voice calls, downtime and electricity usage are recorded periodically and used as evaluation material by each cellular operator (Ningsih, Imansyah, & Pontia, 2014).

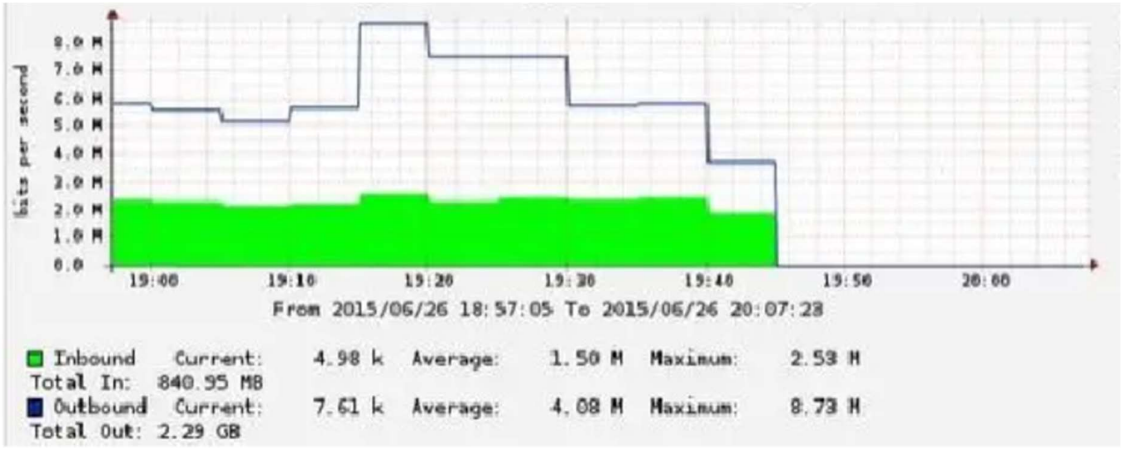

Figure 9. Data Traffic Graph Example (Putra, 2018)

Figure above is an example of a data traffic graph of BTS in Indonesia. One of the information that can be obtained from a BTS is the data traffic in the BTS. This information will be recorded by the Network Operation Center (NOC) which will evaluate the BTS performance to ensure that telecommunication services are running well. In the example of the data traffic graph above, we can see some of the information that we can get from a BTS, including the total, average and maximum number of incoming and outgoing data. The graph also depicts data traffic in real time (Putra, 2018). In the example picture above, the condition of the BTS when the data is retrieved is in a down condition. This can be seen from the blue lines and green areas that are not visible at the time of retrieval, and the low value of current traffic both inbound (4.98 kbps) and outbound (7.61 kbps).

Information about BTS is also useful as a consideration for the business strategy of telecommunication companies. If a BTS records too high traffic, then this will affect the quality of service in the area covered by the BTS (Anwar et al., 2021). High network traffic in a BTS means that the demand in the area is high, and may require additional transceivers to ensure smooth internet access, or in other words, in that area internet activity is relatively high and has the potential for business development for cellular operators. In the context of this study, information about traffic in a BTS, according to the concept of the ICT adoption rate factor, has the potential to be evidence to measure provider readiness, patient readiness and community readiness.

As previously stated, the planning process for telemedicine projects in Indonesia has actually adopted the EBP concept, however, based on the evaluation results, the results do not reflect the equality of program success rates in each location. Then, using a systematic review and data analysis, this discussion leads to the use of BTS data traffic information as evidence to support the planning process for the next telemedicine project. To strengthen the possibility of using BTS data traffic information as evidence in the telemedicine project planning process, we will review this information from five aspects: data availability, ease of access, relevance, measurable and bias.

In the business process of cellular operators, especially in the provision of internet networks. Network quality is one of the factors that most influence consumer satisfaction (Saha, Islam & Hoque, 2016; Khuhro et al, 2011). Network quality includes downtime frequency, data transmission speed, and signal coverage in consumer areas. These three parameters are highly dependent on the BTS performance of each cellular operator. Therefore, to ensure these three

parameters meet the standards desired by consumers, cellular operators, through their NOCs, always evaluate BTS performance in real time. This shows that from the aspect of data availability, BTS data traffic information can qualify as evidence.

The Ministry of Communication and Information, as the organizer of government affairs in the field of communication and informatics (President of the Republic of Indonesia, 2015), one of its functions is to formulate policies in the field of information resource management. In carrying out its functions, the Ministry of Communication and Information Technology has the authority to obtain data from telecommunications network operators, including information on BTS performance. In addition, the Ministry of Communication and Informatics has also been involved in the Telemedicine program as a support network provider (Bappenas, 2018). So, to get BTS performance data in a location that will be evaluated to become a telemedicine project location is not a difficult thing.

We have discussed the relevance of BTS data traffic information to the readiness factor for Telemedicine projects. Convergent discussion, starting from the factors that affect the intensity of the use of telemedicine programs, then continued with an explanation of the ICT adoption rate factor and narrowed it down to BTS data traffic information that can reflect the conditions of ICT use in a place. So, in terms of relevance, BTS data traffic information also meets the criteria as evidence.

Data traffic information is information in the form of quantitative data. Measurement of traffic in a BTS is done fully automatically and visualized in digital form. Each parameter, such as transfer speed, power used, and uptime, has an internationally accepted standard. This also explains how bias, especially creation bias, has a minimal value in the context of using data traffic information as evidence.

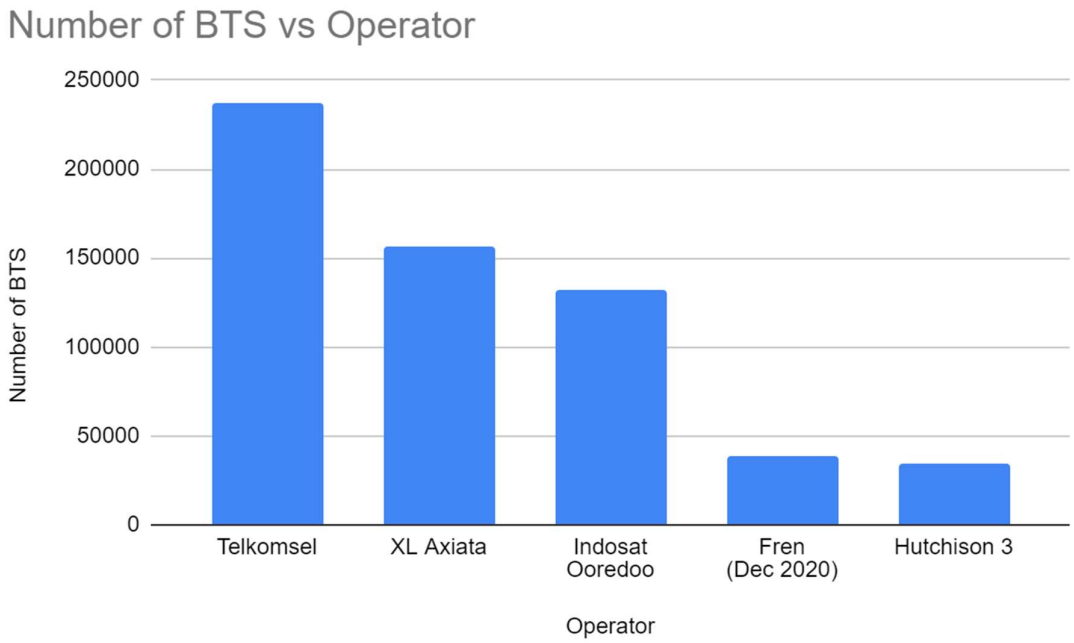

Figure 10. Number of BTS per cellular operator

The graph above illustrates the large number of BTS that the operator has built to cover the entire Indonesian archipelago. PT Telekomunikasi Selular (Telkomsel) has the most BTS with a total of 237.3 thousand BTS throughout Indonesia in June 2021. The number of BTS of PT Telkomsel is the largest compared to the number of BTS of other cellular operators. A total of 187.05 thousand Telkomsel BTS are 3G and 4G BTS, with 169.2 million subscribers. XL Axiata is in second place with 156.71 thousand BTS in June 2021 covering 38.51 thousand 2G network BTS, 52.53 thousand 3G network BTS, and 65.66 thousand 4G network BTS, with 56.77 million subscribers. PT Indosat Tbk (Indosat Ooredoo) is in third place as a cellular operator with the most BTS with a total of 132.43 BTS until the end of semester I-2021. With details, there are 28.6 thousand BTS of 2G network, 35.07 thousand BTS of 3G network, and 68.76 thousand BTS of 4G network. The number of subscribers of PT Indosat Tbk is 60.3 million. PT Smartfren Telecom Tbk (Fren) has 38.81 BTS for 4G and 4.5G networks. Fren's number of subscribers reached around 30 million by the end of December 2020. PT Hutchison 3 Indonesia (Tri) has around 33 thousand BTS and the number of subscribers is 44 million. On September 17, 2021. More than 500,000 BTS have been built throughout Indonesia by cellular operators (Katadata, 2021), but not all areas are served by communication networks, especially in outermost and remote areas (Bappenas, 2019). For this reason, the Indonesian government

plans to build 7,904 BTS in 3T areas. 4,200 BTS are planned to be built in 2021 and 3,704 BTS in 2022. The health sector is one of the main sectors that is encouraged to provide digital-based services by increasing internet coverage through the construction of BTS (Bappenas, 2019).

With a total of more than 500,000 BTS, BTS traffic information is a reliable source of evidence to be used in mapping telemedicine locations. Each BTS has a location record with coordinates and coverage area, so to find out which BTS will be used as a source of evidence, the government can overlap the coordinates and service coverage of a puskesmas with BTS points that serve the area. It doesn't matter if the area is served by multiple BTS, because what is used is the accumulation of BTS data serving in the area, not just one BTS. The only thing that might trick the data interpretation process is if people in the evaluation area use fixed-broadband more often to access the internet, so the data traffic in BTS may be relatively low. In such cases, policymakers can add information from fixed-broadband network providers. However, if we look at the target of developing a health center providing telemedicine, and the low penetration of fixed-broadband in Indonesia, it seems that the use of data traffic information from BTS as the evidence is still more relevant.

7. Discussion and Conclusion

7.1 Systematic Review to Determine Relevant Evidence

In applying the concept of Evidence Based Policy, the availability of statistical data is one of the keys (Rubin, 2012). The statistical data function often helps the planner of a program to make the best choice based on the numbers shown in the same variable. With statistical data, making decisions or policies will be easier and faster. Unfortunately, in developing countries, statistical data are often unreliable or cannot reach detailed indicators (Badiee et al., 2004). This limitation is caused by several things, such as limited statistical resources, limited funding for statistics, and political interference (Badiee et al, 2004; Calleja & Andrew, 2019; Aragão & Linsi, 2020). This is sometimes complicated by the existence of different data from two overlapping statistical sources, which eventually leads to confusion due to data inconsistency (Nugroho, 2017). This is probably due to the absence of standard metadata as a reference (Islami, 2021).

In this research case study, an example of data unavailability is digital literacy data. The only source of the digital literacy index in various areas in Indonesia is data created from research results from the Ministry of Communication and Information Technology. However, the data

is still at the provincial level. Whereas in the context of telemedicine, the need for digital literacy information is at the sub-district level. Thus, the value of digital literacy at the provincial level may not be relevant. For example, the Selat Nasik health center is located in the archipelago province of Bangka Belitung, which has a high technological capability index. However, the health center serves the Selat Nasik Subdistrict, an area with many residential areas that have not been reached by the 4G network.

Back to the concept of evidence itself, which is defined as an information that explains a causality, then evidence can be obtained from various sources. It is true that the strongest evidence is evidence generated from scientific experiments or clinical experiments that follow guidelines based on systematic reviews of randomized controlled trials (RCT) (Mudford et al., 2012). But that doesn't mean we can't use evidence from other sources or methods. Because, although the use of RCT is often seen as the gold standard to determine evidence, it is often not possible to run the RCT, especially in social science (Mudford et al., 2012). As a solution, researchers and policy makers should be able to use alternative methods such as quasi-experimental studies and systematic reviews of descriptive or qualitative studies (Harris et al. 2006). Or even in certain cases, opinions from authorities or expert committees can be used as evidence (Melnyk et al., 2017).

In this study, by combining data analysis based on a systematic review, we have found the factors that influence differences in the intensity of telemedicine frequencies, then continued with a systematic review which finally found that BTS traffic information can be used as an indicator that reflects the ICT adoption rate in an area. This proves that even if we do not have statistical data that directly has a certain value related to a parameter, we still can find an indicator that can be evidence for that parameter by understanding in advance the causal factors and stakeholders related to these factors, because they may have information and data from these factors.

7.2 Reliability and Validity

By using the FGD and interview methods, the perspective on telemedicine planning and the obstacles to its implementation becomes wider, thus, the researcher got a more comprehensive picture. Through the FGD, the researcher got a more comprehensive perspective because the questions discussed did not only come from the researcher's ideas, but also from the ideas of the FGD participants that the researcher did not think of. In the first FGD, for example, researchers learned of information about collaboration between the ministry of health and the

ministry of communication and information related to telemedicine in remote areas, after one of the FGD participants asked about the progress of the collaboration. From this information, it is then developed into the potential use of BTS traffic data which eventually becomes the proposed indicator.

Through interviews, the researcher got personal perspectives from several telemedicine PICs in various locations. This perspective then becomes important information to find out the basic differences regarding the conditions in each location behind the differences in telemedicine output. However, in carrying out this interview method, the researcher experienced problems in communicating. This constraint is caused by two main factors. First, because the research took place when Indonesia was the epicenter of Covid-19 cases in the world, this situation made the PICs of Puskesmas focus on handling patients and did not have time to be interviewed. This is made more complicated by the unstable internet connection at the puskesmas location, making it difficult to conduct interviews flexibly. As a solution, the researcher joined the WhatsApp PIC telemedicine group, so that researchers can ask questions via the group when they have research-related questions. In addition, researchers also participated in telemedicine evaluation webinars to increase the validity of the research results.

7.3 Challenges for future research

This study provides new information on how evidence-based policy influences the planning process, especially in determining the location of ICT-based projects, and how to determine evidence in the absence of available statistical data. However, in this research there is still much that can be improved. At the testing stage through the regression method, it is seen that the range of the model is relatively low due to the small number of dependent variables. This finding can be used in other studies with a larger amount of data so that it has a larger range of regression models. Other control variables can also be tested to determine the possibility of other indicators reflecting the readiness factor for ICT-related project implementation. In addition, in accordance with the concept of "gold standard evidence", further research can also improve the quality of evidence using the Randomized Controlled Trials (RCT) method or quasi-experimental studies.

Reference

Accenture. (2021). Digital adoption: Reaction or revolution?. https://www.accenture.com/us-en/insights/health/digital-adoption-healthcare-reaction-or-revolution

Ahmed, S., Sanghvi, K., & Yeo, D. (2020). Telemedicine takes centre stage during COVID-19 pandemic. *BMJ Innovations;6:*252-254.

Akiyama, M., & Yoo, B.K. (2016). A systematic review of the economic evaluation of telemedicine in Japan. *Journal of Preventive Medicine and Public Health, 49(4)*: 183–196. https://doi.org/10.3- 961/jpmph.16.043.

Anwar, S., Imansyah, F., & Pontia, F.T., Yacoub, R.R., & Marpaung, J. (2021). Pengukuran Performansi Trafik BTS 4G dari Data Metro Ethernet untuk Kawasan Komersil Central Perdana.

Aragão, R., & Linsi, L. (2020). Many shades of wrong: what governments do when they manipulate statistics. *Review of International Political Economy*. DOI: 10.1080/09692290.2020.1769704.

Auriol, E., & Fanfalone, A.L.G. (2014). *Benefit and Cost of the Infrastructure Target for the Post-2015 Development Agenda*. Working paper in Post-2015 Consensus.

Austin, O., & Omatahunde, B. (2018). Impacts of Weather and Environmental Conditions on Mobile Communication Signals. *Journal of Advances in Science and Engineering. 1.* 33-38. 10.37121/jase.v1i1.8.

Awol, S.M., Birhanu, A.Y., Mekonnen, Z.A., Gashu, K.D., Shiferaw, A.M., Endehabtu, B.F., Kalayou, M.H., Guadie, H.A., & Tilahun, B. (2020). Health Professionals' Readiness and Its Associated Factors to Implement Electronic Medical Record System in Four Selected Primary Hospitals in Ethiopia. *Advance Medical Education Practice.11:*147-154 https://doi.org/10.2147/AMEP.S233368.

Badiee, S., Belkindas, M., Dupriez, O., Fantom, N., & Lee, H. (2004). Developing Countries' Statistical Challenges in the Global Economy. *9th National Convention on Statistic (NCS).*

Bali, S. (2018). Barriers to Development of Telemedicine in Developing Countries. 10.5772/intechopen.81723.

Bappenas. (2018). Peraturan Menteri Perencanaan Pembangunan Nasional/ Kepala Badan Perencanaan Pembangunan Nasional Republik Indonesia No.5/2018 tentang Tata Cara Penyusunan Rencana Kerja Pemerintah.

Bappenas. (2019). *R*encana Pembangunan Jangka Menengah Nasional 2020-2024. *Rancangan Teknokratik Versi 14 Agustus 2019*.

Beierle, T.C. & Crayford, J. (2002). *Democracy in practice. Public participation in environmental decisions.* Washington, DC: Resources for the Future.

Bice, S.D., Dever, G., Mukaida, L., Norton, S.A., & Samisone, J. (1996). Telemedicine and telehealth in the Pacific islands region: A survey of applications, experiments, and issues in Peacesat. *Pacific Telecommunications Council,* pp. 574-581.

Bigby, M., (2009). The Hierarchy of Evidence. *Evidence-Based Dermatology*: 34-37.

Bingham, N. H., Fry, J. M., & SpringerLink. (2010). *Regression linear models in statistics.* Springer.

BPS. (2021). Hasil Sensus Penduduk 2020. *Berita Resmi Statistik No. 7/01/XXIV*

Broens, T., Veld, R., Vollenbroek - Hutten, M., Hermens, H., Halteren, A., & Nieuwenhuis, B. (2007). *Determinants of successful telemedicine implementations: A literature study*. Journal of telemedicine and telecare. 13. 303-9. 10.1258/135763307781644951.

Calleja, R., & Rogerson, A. (2019). Financing Challenges for Developing Statistical Systems: A Review of Financing Option. *Paris21 Discussion Paper*. 14.

Cascio, W. & Montealegre, R. (2016). How Technology Is Changing Work and Organizations. *Annual Review of Organizational Psychology and Organizational Behavior. 3.* 349-375. 10.1146/annurev-orgpsych-041015-062352.

Cash, D., Clark, W.C., Alcock, F., Dickson, N.M., Eckley, N., & Jäger, J. (2003). Salience, Credibility, Legitimacy and Boundaries: Linking Research, Assessment and Decision Making. *KSG Working Papers Series.*

Cavanagh, S. (1997). *C*ontent analysis: concepts, methods and applications: Content analysis is a flexible methodology that is particularly useful to nurse researchers, asserts Stephen Cavanagh. *Nurse Researcher, 4,* 5–16. https://doi.org/10.7748/nr.4.3.5.s2.

Cisco, Global Center for Digital Business Transformation. (2015). *Digital Vortex: How Digital Disruption is Redefining Industries*. Cisco Publisher.

Cole, F. L. (1988). Content analysis: process and application. *Clinical Nurse Specialist CNS, 2(1)*, 53–57. https://doi.org/10.1097/00002800-198800210-00025.

Combi, C., Pozzani, G., & Pozzi, G. (2016). Telemedicine for Developing Countries: A Survey and Some Design Issues. *Applied Clinical Informatics. 7.* 1025–1050 http://dx.doi.org/10.4338/ACI-2016-06-R-0089.

Davis, F.D. (1989). Perceived usefulness, perceived ease of use and user acceptance of information technology. *MIS Quarterly, 13(3)*, 319–339. doi: 10.2307/249008.

Davis, F., Bagozzi, R., & Warshaw, P. (1992). Extrinsic and Intrinsic Motivation to Use Computers in the Workplace1. *Journal of Applied Social Psychology. 22*. 1111 - 1132. 10.1111/j.1559-1816.1992.tb00945.x.

De Rosis, S., & Seghieri, C. (2015). Basic ICT adoption and use by general practitioners: an analysis of primary care systems in 31 European countries. *BMC Medical Informatics and Decision Making. 15*. 70. https://doi.org/10.1186/s12911-015-0185-z.

Direktorat Jenderal Pelayanan Kesehatan. (2019). *Laporan Akuntabilitas Instansi Pemerintah Direktorat Jenderal Pelayanan Kesehatan Kementerian Kesehatan 2019*. Kementerian Kesehatan Republik Indonesia.

Dorsey, E.R., & Topol, E.J. (2020). Telemedicine 2020 and the next decade. *The Lancet. 395. 10227*. 859. ISSN 0140-6736.

Duque, B., Ynalvez, M., Sooryamoorthy, R., Mbatia, P., Dzorgbo, D., & Shrum, W. (2005). Collaboration paradox: Scientific productivity, the internet, and problems of research in developing areas. *Social Studies of Science. 35(5).* 755–785. doi:10.1177/0306312705052359.

Dyk, L., Schutte, C.,& Fortuin, J. (2012). *A Maturity Model for Telemedicine Implementation.*

Elo, S., & Kyngäs, H. (2008).The qualitative content analysis. *Journal of Advanced Nursing, 62*. 107–115. https://doi.org/10.1111/j.1365-2648.2007.04569.x.

Enfield, K., Mehring, B., Carpenter, R., Rheuban, K., Cattell-Gordon. D., Gunnell, D., Corey, T., Burke, V., Rose, R., & Sifri, C.D. (2015). *A*pplication of a Telemedicine Platform, Isolation Communication Management System, for the Care of Dangerous Infectious Disease: A Case Series. *Open Forum Infectious Diseases. 2(1)*. 228, https://doi.org/10.1093/ofid/ofv133.105.

England, I., Stewart, D., & Walker, S. (2000). Information technology adoption in health care: when organisations and technology collide. *Australian health review : a publication of the Australian Hospital Association*, *23*(3), 176–185. https://doi.org/10.1071/ah000176

Erumban, A.A., & de Jong, S.B. (2006). Cross-country differences in ICT adoption: A consequence of Culture?. *Journal of World Business : JWB. 41(4).* 302–314. https://doi.org/10.1016/j.jwb.2006.08.005

Fadilah, R. (2007). Perbandingan layanan data pada sistem GSM dan CDMA. *Skripsi thesis.* Sanata Dharma University.

Fanelli, D. (2009). How Many Scientists Fabricate and Falsify Research? A Systematic Review and Meta-Analysis of Survey Data. *PLoS ONE 4(5)*: e5738.

Gershon-Cohen, J., Hermel, M.B., Read, H.S., Caplan, B., & Cooley, A.G. (1952). Telognosis: Three Years of Experience with Diagnosis by Telephone-Transmitter Roentgenograms. *JAMA.148(9)*. 731–732. doi:10.1001/jama.1952.62930090001012.

Gerpott, T.J., & Ahmadi, N. (2015). Composite indices for the evaluation of a country's information technology development level: Extensions of the IDI of the ITU. *Technological forecasting & social change. 98*. pp. 174–185. doi:10.1016/j.techfore.2015.03.012

Gibbs, G. (2007). *Analyzing Qualitative Data*. Sage Publications Ltd. https://doi.org/10.4135/9781849208574 .

Giest, S. (2017). Big data for policymaking: fad or fasttrack?. *Policy Science 50 (3)*. 367–382. https://doi.org/10.1007/s11077-017-9293-1

Gleeson, D., Legge, D., O'Neill, D., & Pfeffer, M. (2011). Negotiating Tensions in Developing Organizational Policy Capacity: Comparative Lesson to be Drawn. *Journal of*

Comparative Policy Analysis: Research and Practice 13 (3). 237-263. doi:10.1010/13876988.2011.565912

Gough, D., Oliver, S., & Thomas, J. (2017). *An introduction to systematic reviews (2nd ed.)*. Sage Publications Ltd.

Green, C. & Ruhleder, K. (1995). Globalization, borderless worlds, and the Tower of Babel. *Journal of Organizational Change Management. 8.* 55-68.

Gurung, M., Dorji, G., Khetrapal, S., Ra, S., Babu, Giridhara, R.,& Krishnamurthy, R. (2019). Transforming health care through Bhutan's digital health strategy: progress to date. *WHO South-East Asia journal of public health. 8.* 77-82. 10.4103/2224-3151.264850. .

Gustafsson, M., Norlinder, J. & Rehn, M. (2018). Using an ICT System to Increase Efficiency and Effectiveness in Patient-Practitioner Communication. *Dissertation*. Uppsala Universiteit.

Harris, A. D., McGregor, J. C., Perencevich, E. N., Furuno, J. P., Zhu, J., Peterson, D. E., & Finkelstein, J. (2006). The use and interpretation of quasi-experimental studies in medical informatics. *Journal of the American Medical Informatics Association : JAMIA, 13(1)*, 16–23. https://doi.org/10.1197/jamia.M1749.

Hartl, E., & Hess, T. (2017). The Role of Cultural Values for Digital TransformationL Insight from a Delphi Study. *Twenty-third Americas Conference on Information Systems.*

Head, B. W. (2008). Three Lenses of Evidence-Based Policy. *Australian Journal of Public Administration, 67(1),* 1–11. doi:10.1111/j.1467-8500.2007.00564.x.

Herawati, C.,& Bakhri, S. (2019). Ketimpangan Pelayanan Kesehatan Dasar dan Ekonomi di Wilayah Perbatasan. *Jurnal Kesehatan Masyarakat, 4(1),* pp. 17-27. doi: 10.31943/afiasi.v4i1.9.

Hindman, Douglas. (2000). The Rural-Urban Digital Divide. *Journalism & Mass Communication Quarterly 77*. 549-560. 10.1177/107769900007700306.

Howlett, M. (2010). Designing Public Policies: Principles and Instruments. 1-236. 10.4324/9780203838631.

Indonesian Embassy for the US. (1987). Indonesia News and Views. Vol VII No. 14 pp.5-6

International Telecommunication Union / ITU. (2020). ICT Development Index 2020: A proposal. *Background document*. ITU.

International Telecommunication Union / ITU. (2021). Statistics. https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx (last retrieve 7 November 2021).

Jackson, E., Purnawati, E., & Shaxson, L. (2018). How and When Do Policymakers Use Evidence? Taking Politics into Account. 10.1007/978-981-13-0167-4_5.

Jagarapu, J. & Savani, R. (2021). A Brief History of Telemedicine and the Evolution of Teleneonatology. *Seminars in Perinatology. 45.* 151416. 10.1016/j.semperi.2021.151416.

Jahangirian, M., & Taylor, S.J. (2013). Profiling e-health projects in Africa: trends and funding patterns. *Inf Dev*.;8:0266666913511478.

Jennett, P., Jackson, A., Healy, T., Ho, K., Kazanjian, A., Woollard, R., Haydt, S.,& Bates, J. (2003). A study of a rural community's readiness for telehealth. *Journal of telemedicine and telecare. 9*. 259-63. 10.1258/135763303769211265.

Jensen, L.K., Knarvik, U., Pedersen, C.D., Tangene, W.,& Whitehouse, D. (2015). Deliverable 3.4: personalised blueprint for telemedicine deployment: validated and tested version. European momentum for mainstreaming telemedicine deployment in daily practice. http://www.telemedicine-momentum.eu/wp-content/uploads/2015/02/D3.4_v1.0_ValidatedBlueprint.pdf .

Katadata. (2021). Telkomsel Juarai Kepemilikan BTS Terbanyak di Indonesia, Capai 237 Ribu BTS. Databoks : Data Stories. https://databoks.katadata.co.id/datapublish/2021/09/27/telkomsel-juarai-kepemilikan-bts-terbanyak-di-indonesia-capai-237-ribu-bts (Last retrieve 8 November 2021).

Kementerian Kesehatan. (2014). Peraturan Menteri Kesehatan Republik Indonesia No.75/2014 tentang Pusat Kesehatan Masyarakat.

Kementerian Kesehatan. (2015). Keputusan Menteri Kesehatan Republik Indonesia No. HK.02.02/MENKES/52/2015 tentang Rencana Strategis Kementerian Kesehatan 2015-2019.

Kementerian Kesehatan. (2017) Keputusan Menteri Kesehatan Republik Indonesia No. HK.01.07/MENKES/650/2017 tentang Rumah Sakit dan Puskesmas Penyelenggara Uji Coba Program Pelayanan Telemedicine.

Kementerian Kesehatan. (2019a). Peraturan Menteri Kesehatan Republik Indonesia No.20/2019 tentang Penyelenggaraan Pelayanan Telemedicine Antar Fasilitas Pelayanan Kesehatan.

Kementerian Kesehatan. (2019b). Peraturan Menteri Kesehatan Republik Indonesia No.43/2019 tentang Pusat Kesehatan Masyarakat.

Kementerian Kesehatan. (2020). Peraturan Menteri Kesehatan Republik Indonesia No.21/2020 tentang Rencana Strategis Kementerian Kesehatan 2020-2024.

Kementerian Komunikasi dan Informatika. (2020). Status Literasi Digital Indonesia https://aptika.kominfo.go.id/wp-content/uploads/2020/11/Survei-Literasi-Digital-Indonesia-2020.pdf (last retrieve 4 November 2021).

Kementerian PPN/Bappenas. (2021). Peraturan Menteri Perencanaan Pembangunan Nasional/ Kepala Badan Perencanaan Pembangunan Nasional Republik Indonesia Nomor 2 tahun 2021 tentang Rancangan Rencana Kerja Pemerintah Tahun 2022.

Khuhro, R.A., Azahr, S.M., Bhutto, N.A., Sarki, I.H., & Shaikh, I.A. (2011). Customer Satisfaction in Telecom Industry after Mobile Number Portability. *Interdisciplinary Journal of Contemporary Research in Business. 3(8)*. 840-846.

Krippendorff, K. (2004). *Content Analysis: An Introduction to Its Methodology (second edition).* Sage Publications.

Ling, G.H.T. (2020). Effects of the Coronavirus (COVID-19) Pandemic on Social Behaviours: From a Social Dilemma Perspective. *Technium Social Sciences Journal, Technium Science. vol. 7(1):* 312-320.

Macharis, C., Turcksin, L., & Lebeau, K. (2012). Multi actor multi criteria analysis (MAMCA) as a tool to support sustainable decisions: State of use. *Decision Support Systems. 54(1)*: 610-620. ISSN 0167-9236, https://doi.org/10.1016/j.dss.2012.08.008.

Mardiansjah, F.H., & Rahayu, P., (2019). Urbanisasi dan Pertumbuhan Kota-kota di Indonesia: Suatu Perbandingan Antar-Kawasan Makro Indonesia. J*urnal Pengembangan Kota. Vol 7(1)*. 91-110.

Melnyk, B. M., Gallagher-Ford, L., Fineout-Overholt, E., & Sigma Theta Tau International, issuing body. (2017). Implementing the evidence-based practice (EBP) competencies in healthcare : a practical guide to improving quality, safety, and outcomes.

Mudford, O. C., McNeill, R., Walton, L., & Phillips, K. J. (2012). Rationale and standards of evidence in evidence-based practice. In P. Sturmey & M. Hersen (Eds.), *Handbook of evidence-based practice in clinical psychology, Vol. 1. Child and adolescent disorders* (pp. 3–26). John Wiley & Sons, Inc.. https://doi.org/10.1002/9781118156391.ebcp001001

Muinde, F. (2009). Investigation of factors affecting the adoption of information and communication technologies for communication of research output in research institutions in Kenya. Victoria University of Wellington, Wellington, New Zealand

Muriithi, P., Horner, D., & Pemberton, L. (2016) Factors contributing to adoption and use of information and communication technologies within research collaborations in Kenya, Information Technology for Development, 22:sup1, 84-100, DOI: 10.1080/02681102.2015.1121856

Murphy, R. L., Jr, & Bird, K. T. (1974). Telediagnosis: a new community health resource. Observations on the feasibility of telediagnosis based on 1000 patient transactions. *American journal of public health*. *64*(2). 113–119. https://doi.org/10.2105/ajph.64.2.113

Kaptchuk T. J. (2003). Effect of interpretive bias on research evidence. *BMJ (Clinical research ed.)*. *326*(7404). 1453–1455. https://doi.org/10.1136/bmj.326.7404.1453

Keshvardoost, S., Bahaadinbeigy, K., & Fatehi, F. (2020). Role of Telehealth in the Management of COVID-19: Lessons Learned from Previous SARS, MERS, and Ebola Outbreaks. *Telemedicine journal and e-health : the official journal of the American Telemedicine Association*.

Khoja, S., Scott, R., Casebeer, A., Mohsin, M.,Ishaq, A.F.M., & Gilani, S. (2007). e-Health Readiness Assessment Tools for Healthcare Institutions in Developing Countries. *Telemedicine journal and e-health : the official journal of the American Telemedicine Association. 13*. 425-31. 10.1089/tmj.2006.0064.

Krieger, N. (1992). The Making of Public Health Data: Paradigms, Politics, and Policy. *Journal of Public Health Policy. 13*:412-427.

Langer, L., Tripney, J. & Gough, D. (2016). The Science of Using Science: Researching the Use of Research Evidence in Decision-Making. *Technical Report.*

Marović, I. & Hanak, T. (2017). Selection of adequate site location during early stages of construction project management: A multi-criteria decision analysis approach. *IOP Conference Series: Materials Science and Engineering. 251.* 012044. 10.1088/1757-899X/251/1/012044.

Monaghesh, E. & Hajizadeh, A. (2020). The role of telehealth during COVID-19 outbreak: A systematic review based on current evidence. *BMC Public Health. 20.* 10.1186/s12889-020-09301-4.

Nakajima, K., Takane, Y., Kikegawa, Y., Furuta, Y., & Takamatsu, H. (2021). Human behaviour change and its impact on urban climate: Restrictions with the G20 Osaka Summit and COVID-19 outbreak. *Urban Climate. 35*. 100728, ISSN 2212-0955

Newman, J., Cherney, A.,& Head, B.W. (2017). Policy capacity and evidence-based policy in the public service. *Public Management Review. 19:2.* 157-174, DOI: 10.1080/14719037.2016.1148191

Nguyen, M. H., Gruber, J., Fuchs, J., Marler, W., Hunsaker, A., & Hargittai, E. (2020). Changes in Digital Communication During the COVID-19 Global Pandemic: Implications for Digital Inequality and Future Research. *Social Media + Society.* https://doi.org/10.1177/2056305120948255

Ningsih, T.W., Imansyah, F., & Pontia, F.T., (2014) *Analisis Jaringan Base Transceiver Station (BTS) Sidomulyo Terhadap Performansi Jaringan PT. Indosat Sintang*. Universitas Tanjung Pura

Norton, S.A., Floro, C., Bice, S.D., Dever, G., Mukaida, L., Scott, J.C. (1996). Telemedicine in Micronesia. *Telemed Journal. 2(3)*. 225-231.

Nugroho, Y. (2017). *After Data Synchronising and Sharing - What Do We Learn? Lesson From Satu Data*. Kantor Staf Presiden RI.

Nyasulu, C. & Chawinga, W. (2018). The role of information and communication technologies in the delivery of health services in rural communities: Experiences from Malawi. *SA Journal of Information Management. 20.* 10.4102/sajim.v20i1.888.

Otto, L., Whitehouse, D., & Schlieter, H. (2019). On the Road to Telemedicine Maturity: A Systematic Review and Classification of Telemedicine Maturity Models. *32nd Bled eConference - Humanizing Technology for a Sustainable Society*. 10.18690/978-961-286-280-0.26.

Parkhurst, Justin (2017) The politics of evidence: from evidence-based policy to the good governance of evidence. *Routledge Studies in Governance and Public Policy*. Routledge, Abingdon, Oxon, UK. ISBN 9871138939400

Phillips, J. G., & Reddie, L. (2007). Decisional style and self-reported Email use in the workplace. *Computers in Human Behavior. 23*(5). 2414–2428. https://doi.org/10.1016/j.chb.2006.03.016

President of Republic Indonesia. (2015) Peraturan Presiden Republik Indonesia Nomor 54 Tahun 2015 tentang Kementerian Komunikasi dan Informatika.

Putra, D.C., (2018). *Instalasi dan Monitoring Jaringan Micro Base Transceiver Station (MBTS) Menggunakan Software Cacti di PT Iforte Solusi Infotek*. Universitas Mercu Buana Jakarta.

Qiang, C.Z., Pitt, A. & Ayers, S. (2004). Contribution of Information and Communication Technologies to Growth. *World Bank Working Paper;No. 24.* Washington, DC: World Bank. © World Bank. https://openknowledge.worldbank.org/handle/10986/15059 License: CC BY 3.0 IGO.

Reifegerste, D., Harst, L., & Otto, L. (2021). Sauerbruch, STARPAHC, and SARS: Historical Perspectives on Readiness and Barriers in Telemedicine. *Journal of Public Health.* 1-10. 10.1007/s10389-021-01513-1.

Riyadi, & Larasaty, P. (2019). Ketimpangan Akses Terhadap Teknologi Informasi Dengan Pendekatan Human Opportunity Index (HOI). *Seminar Nasional Official Statistics 2019: Pengembangan Official Statistics dalam Mendukung Implementasi SDGs.*

Rogers, E. M. (2003). *Diffusion of innovations*. (5th ed.). New York, NY: Free Press.

Rohman, I. K., & Bohlin, E. (2014. Decomposition analysis of the telecommunications sector in Indonesia: What does the cellular era shed light on?. *Telecommunications policy. 38(3).* 248–263. doi: 10.1016/j.telpol.2013.10.006.

Rubin, A. (2012). Statistics for Evidence Based Practice and Evaluation. http://lst-iiep.iiep-unesco.org/cgi-bin/wwwi32.exe/[in=epidoc1.in]/?t2000=026767/(100).

Rudnicka, A. R., & Owen, C. G. (2012). An introduction to systematic reviews and meta-analyses in health care. *Ophthalmic & Physiological Optics. 32(3).* 174–183. https://doi.org/10.1111/j.1475-1313.2012.00901.x

Saha, N.K., Islam, M.R., & Hoque, A.U., (2016). Factors Affecting Customer' Satisfaction of Mobile Phone Subscribers: An Empirical Study in Mobile Telecommunication Industry in Bangladesh. *International Journal of Business and Management. 11(6).* 252-261. http://doi.org/10.5539/ijbm.v.11n6p252

Schmidt, S., & Shay, L.A., Saygin, C., Wan, H.,Schulz, K., Clark, R. & Shireman, P. (2018). Improving pilot project application and review processes: A novel application of lean six sigma in translational science. *Journal of Clinical and Translational Science. 2.* 1-4. 10.1017/cts.2018.30.

Sherman, L.W (1998) Evidence-based policing. Ideas in American policing lecture series. *Police Foundation.*

Simamora, T.M. (2020), Laporan Kajian: Penguatan Kesiapan Puskesmas Melalui Pengembangan Jejaring Pelayanan Telemedicine di Masa Pandemi Covid-19 dalam Upaya Reformasi Sistem Kesehatan. *Dokumen Puslitbang Sumber Daya dan Pelayanan Kesehatan Balitbangkes Kementerian Kesehatan RI.*

Scott, R.,& Mars, M.(2015). Telehealth in the developing world: current status and future prospects. *Smart Homecare Technology and TeleHealth*. 3. 25-37 https://doi.org/10.2147/SHTT.S75184

Schober, P., Boer, C.,& Schwarte, L. (2018). Correlation Coefficients: Appropriate Use and Interpretation. *Anesthesia & Analgesia. 126(5)*. 1763-1768 doi: 10.1213/ANE.0000000000002864

Simpson, A. T., Doarn, C. R., & Garber, S. J. (2020). Interagency Cooperation in the Twilight of the Great Society: Telemedicine, NASA, and the Papago Nation. *Journal of Policy History. 32(1).* 25–51. https://doi.org/10.1017/S0898030619000265

Srinuan, C., Srinuan, P., & Bohlin, E. (2010). The Mobile Broadband and Fixed Broadband Battle in Swedish market: Exploring complementary or substitution. *21st European Regional ITS Conference.*

Suksmono, A., Sastrokusumo, U.,Mengko, T., Pramudito, J.T., & Oktowaty, S. (2004). Overview of telemedicine activities in Indonesia: progress and constraints. *International Journal of Pediatric Otorhinolaryngology Extra*. 37 - 40. 10.1109/HEALTH.2004.1324464.

Taherdoost, H., & Keshavarzsaleh, A. (2016). Critical Factors that Lead to Projects' Success/Failure in Global Marketplace. *Procedia Technology. 22.* 1066-1075. 10.1016/j.protcy.2016.01.151.

Van Veldhoven, Z., & Vanthienen, J. (2021) Digital transformation as an interaction-driven perspective between business, society, and technology. *Electron Markets*. https://doi.org/10.1007/s12525-021-00464-5

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly. 27(3)*. 425–478

Walker, W. (2000). Policy Analysis: A Systematic Approach to Supporting Policymaking in the Public Sector. *Journal of Multi-criteria Decision Analysis. 9.* 11-27. 10.1002/1099-1360(200001/05)9:1/33.3.CO;2-V.

Wearesocial. (2020). Special Report DIGITAL 2020 Your ultimate guide to the evolving digital world. *https://wearesocial.com/blog/2020/01/digital-2020/* (last retrieve 7 November 2021)

Wesselink, A., Colebatch, H. & Pearce, W. Evidence and policy: discourses, meanings and practices. *Policy Sci 47*, 339–344 (2014). https://doi.org/10.1007/s11077-014-9209-2

WHO (2020). https://www.who.int/news-room/detail/27-04-2020-who-timeline---covid-19 (last accessed August 29, 2021)

World Bank. (2021). Various charts of the ICT Indicator Database of Indonesia. https://data.worldbank.org/indicator/IT.CEL.SETS.P2?end=2020&locations=ID&start=1991&view=chart (last retrieve 28 October 2021)

World Bank (2021). Fixed telephone subscriptions (Maps) https://data.worldbank.org/indicator/IT.MLT.MAIN.P2?view=map&year=1998 (last retrieve 7 November 2021)

World Health Organization. (2005). Sustainable health financing, universal coverage and social health insurance. *World Health Assembly Resolution*. *58*. 1z39-140.

World Health Organization. (2009). Telemedicine: opportunities and developments in Member States: report onthe second global survey on eHealth. *Global Observatory for eHealth Series. 2.* World Health Organization.

Yalia, M. (2013). Evaluasi Kebijakan Program Mobile Pusat Layanan Internet Kecamatan (MPLIK). *Jurnal Penelitian Komunikasi. 16*. 10.20422/jpk.v16i2.143.

Zhang, N., Jia, W., Lei, H., Wang, P., Zhao, P., Guo, Y., Dung, C.H., Bu, Z., Xue, P., Xie, J., Zhang, Y., Cheng, R., & Li, Y.(2021). Effects of Human Behavior Changes During the Coronavirus Disease 2019 (COVID-19) Pandemic on Influenza Spread in Hong Kong. *Clinical Infectious Diseases. 73(5)*. e1142-e1150. doi: 10.1093/cid/ciaa1818. PMID: 33277643; PMCID: PMC7799278.

Zou C, Li P. & Jin, L. (2021) Online college English education in Wuhan against the COVID-19 pandemic: Student and teacher readiness, challenges and implications. *PLoS ONE 16(10)*: e0258137. https://doi.org/10.1371/journal.pone.0258137.

Zulman, D.M., Verghese, A. (2021). Virtual Care, Telemedicine Visits, and Real Connection in the Era of COVID-19: Unforeseen Opportunity in the Face of Adversity. *JAMA. 325(5)*. 437–438. doi:10.1001/jama.2020.27304.