Factors Influencing the Diffusion of Telehealth in Home Visit Medical Services

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Abstract

The outbreak of the long-lasting COVID-19 pandemic has forced several changes, one of which is a change in the provision of health services. Health care providers are looking for methods to meet patient needs, one of which is through telehealth innovation. Telehealth is an innovation that combines technology and health services so that patients do not need to go to the clinic to get health services. Before implementing these innovations, it is necessary to know the factors that influence consumers' desire to adopt telehealth innovations in health services. Therefore, this study aims to determine the factors influencing consumers' willingness to adopt telehealth service innovations. An analytical framework is defined based on the Diffusion of Innovation Theory (DOI) to achieve this goal. The method used in this study is Structural Equation Modeling (SEM) with the help of Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze the hypotheses from the analytical framework developed in this study. Factors that influence consumer decisions will be used as input in the development of telehealth innovation.

Keywords
Telehealth, Structural Equation Model, PLS-SEM

1. Background

Currently, the world is still faced with the corona outbreak, or what is often referred to as COVID-19. On March 11, 2020, the World Health Organization (WHO) has declared that COVID-19 has become a global pandemic with more than 11,800 cases in 114 countries and 4,291 deaths (WHO, 2020). Globally, as of October 6, 2021, the number of confirmed cases currently stands at 235,673,032 (WHO, 2021). Meanwhile, in Indonesia as of October 6, 2021, the number of positive cases of COVID-19 has reached 4,223,094 people (Satgas, 2021). Since March 2020, the entire healthcare system of hospitals and medical practitioners is facing challenges with the rapid spread of this COVID-19 virus (Hartman et al., 2020). By seeing the rapid transmission and spread of this virus, various policies have been implemented by the Government of Indonesia, one of which is the Large-Scale Social Restrictions (PSBB). These challenges certainly stimulate various parties to create or develop innovation to reduce and prevent the risk of exposure to the virus, especially in terms of providing health services. To reduce patient exposure to the virus, a shift needs to be made to limit access to only patients who need health services (Abdel-Wahab et al., 2020).

Information and Communication Technologies (ICTs) have now revolutionized life, which has changed the way we interact with each other, in our daily lives and work (Shiferaw & Zolfo, 2012). Therefore, ICT is considered to have great potential in facing the challenges that exist today, namely by providing health services that are of high quality, accessible, and cost-effective (Ryu, 2012). This service can be called Telehealth. The difficulty of patients accessing hospital services during a pandemic due to social distancing restrictions, restrictions on gatherings, and the closure of various public businesses have made the shift to Telehealth resources a solution in bringing together patients and health services today (Abdel-Wahab et al., 2020). Telehealth itself is an electronic transmission of medical services that are packaged through digital communications. Telehealth is also one of the main innovations in the provision of health services, not only in technology but also from a cultural and social perspective because of its easy accessibility to improve the quality and efficiency of health service delivery (Organization), 2016).

At the start of this pandemic, the use of Telehealth continued to increase as patients and health care providers seeking ways to access and provide safe healthcare. This can be seen from the increase in Telehealth utilization in April 2020, which was 78 times higher than in February 2020 (Bestsennyy et al., 2021). However, currently, there are very few technology companies in the health sector that focus on providing health services as well as home visits for health workers. Therefore, to develop these services as solutions for providing health services in current conditions, an integrated system will be created that can facilitate the needs of health workers and health service providers on-demand by utilizing ICT, namely through the Mobile App. The existence of this solution is expected to streamline supply and demand relationships in the fulfillment of health services in Indonesia.

In understanding supply and demand, this study will analyze the conditions or factors that drive the successful adoption of Telehealth use in Indonesia. A good understanding of the factors that influence the success of implementing Telehealth in Indonesia is important in helping the implementation of Telehealth in the right way and under the right conditions. In this research, an Diffusion of Innovation Theory (DOI) will be used. Partial Least Squares Structural Equation Modeling (PLS-SEM) was also used in this study to confirm the hypothesis of the DOI model. DOI is a theory that focuses on the decision-making process that leads to the adoption or rejection of an innovation (Weigel et al., 2020).

2. Methodology

This research was developed based on the theory of diffusion of innovation. The theory of diffusion of innovation discusses the potential factors that influence individuals to use new ideas or technologies that will be applied. The theory of diffusion of innovation aims to predict the decision of each individual to use an innovation (Rogers et al., 2019). The theoretical basis is collaborated with the help of Structural Equation Modeling (SEM) to see the relationship of each variable. SEM is an update of the previous multivariate analysis method with its limitations (Hox & Bechger, 2015). Visualization of the structural model design can be seen in Figure 1.

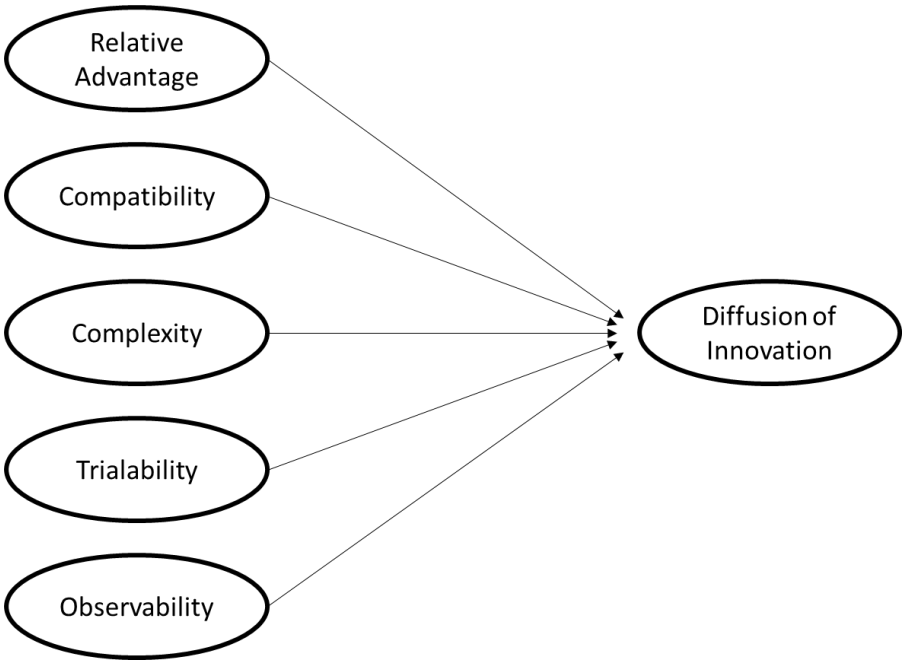

Figure 1. SEM Framework for analyze Theory Diffusion of Innovation

Relative Advantage (RE) is a measure of innovations that are better than previous innovations or existing innovations. So if the innovation is said to be better than the existing innovation, it can be stated that the innovation is a solution. The point of view of this research is that the presence of telehealth can facilitate the meeting between doctors and patients who use the application so that the impact is the efficiency of the doctor's handling of the patient's needs (Lee et al., 2011).

Compatibility (CB) is a measure of whether an innovation is very suitable for the conditions being run. In simple terms, innovations can work well if there is a demand that drives them and support from environmental conditions. This is related to the development of application technology that can speed up the meeting between demand and suppliers. So this needs to be reviewed from the point of view of health services (Lee et al., 2011) (Zhang et al., 2010). Complexity (CX) is a measure of the complexity of the innovations offered. The easier it is to apply, the greater the chance for innovation to be accepted. Complexity from a telehealth point of view is the ease with which patients can get health services with application and digital support (Zhang et al., 2010).

Trialability (TR) is a benchmark against which innovations can be tested. The purpose of trialability is to see the strengths and weaknesses of the innovation that will be applied. Technically, innovation trials use simulations before they can be introduced to users (Makkonen & Johnston, 2014).

Observability (OB) is a benchmark of an innovation to be observed by many parties. These observations can provide an assessment of innovations so that innovation can be seen from many perspectives. In addition, observability also provides a measurement standard for the innovation to be applied and provide benefits (Makkonen & Johnston, 2014).

According to the conceptual framework, the hypotheses developed such as follow:

H1: Relative Advantage (RE) has a significant positive relationship to Diffusion of Innovation (DOI).
H2: Compatibility (CB) has a significant positive relationship to Diffusion of Innovation (DOI).
H3: Complexity (CX) has a significant positive relationship to Diffusion of Innovation (DOI).
H4: Trialability (TR) has a significant positive relationship to Diffusion of Innovation (DOI).
H5: Observability (OB) has a significant positive relationship to Diffusion of Innovation (DOI).

The data collection process uses a questionnaire that will be distributed to the public to test the hypotheses that have been built. Table 1 is designed to measure respondents who have a wedge against the frequency of using gadgets and their routine health control. The design of the questionnaire questions can be seen in Table 2 where the questions represent each variable that has been compiled.

Table 1. Descriptive Statistics of The Respondents

Measure	Value
Gender	Male
	Female
Age	17 – 24 Years Old
	25 – 30 Years Old
	31 – 35 Years Old
	36 – 40 Years Old
Smartphone Usage Frequency per Day	1 – 3 Hours
	4 – 7 Hours
	8 – 12 Hours
	More Than 13 Hours
Health Control Frequency per Month	1 Time
	2 Time
	3 Time
	More Than 3 Time

Table 2. Observation Variable of Diffusion of Innovation Theory

Factor	Code	Indicator
RE	RE1	Telehealth allows me to get healthcare faster
	RE2	Telehealth provides better efficiency in bringing together patients and health workers
	RE3	Telehealth can help convey patient complaints
	RE4	Telehealth can be used continuously at an affordable price
CB	CB1	Telehealth powered by the device
	CB2	Telehealth is supported by an integrated payment system
	CB3	The use of telehealth can be used by many people
CX	CX1	Believe that telehealth is easy to use
	CX2	Telehealth can be used at any time
	CX3	Telehealth can be used anywhere
	CX4	The procedure for using telehealth can be understood quickly
	CX5	Telehealth can help life
TR	TR1	The features provided can be tried well
	TR2	Use of features can be well known
	TR3	Uninstall telehealth if there are many errors in the application
	TR4	Features available according to need
	TR5	Convinced that telehealth has passed the trial stage well
OB	OB1	Telehealth has been widely used/known in the community
	OB2	Telehealth is used by the closest people
	OB3	Easy for telehealth-related discussions with the surrounding environment

Factor	Code	Indicator
	OB4	Experience the benefits firsthand from using telehealth

3. Discussion

Indonesia is currently still facing the COVID-19 outbreak. With the outbreak, innovation in health services was made by utilizing ICT, namely by providing electronic transmission of medical services packaged through digital communication, namely Telehealth. Since this pandemic, the utilization of Telehealth has continued to increase. Telehealth applications that exist in Indonesia today generally only focus on providing health service consultations. However, currently, there are very few technology companies in the health sector that focus on providing health services as well as home visits. To optimize Telehealth services to increase customer satisfaction, an integrated system will be developed to facilitate the provision of health services that can provide facilities in the form of home visits. This research is expected to produce a mobile application that can be used as a solution for providing health services at home, especially in current conditions to minimize the transmission of the COVID-19 virus. The methodology used in this study is the Diffusion of Innovation Theory (DOI) combined with several hypotheses that have been developed by the conceptual framework that has been set. The following are some of the hypotheses developed in conducting this research.

H1: Relative Advantage (RE) has a significant positive relationship to Diffusion of Innovation (DOI).
H2: Compatibility (CB) has a significant positive relationship to Diffusion of Innovation (DOI).
H3: Complexity (CX) has a significant positive relationship to Diffusion of Innovation (DOI).
H4: Trialability (TR) has a significant positive relationship to Diffusion of Innovation (DOI).
H5: Observability (OB) has a significant positive relationship to Diffusion of Innovation (DOI).

4. Conclusion and Future Research

The research framework, objectives, and respondents have been designed in this study. The assessment and analysis of the proposed innovations have been discussed to strengthen the hypotheses. The basic theory used is purely based on the Diffusion of Innovation Theory (DOI) by the goals and functions of the theory. It is highly recommended to continue this research by distributing questionnaires so that the hypothesis can be directly proven.

The results of processing from the questionnaire can be implemented as a benchmark and a description of whether telehealth innovation has become the right solution. If the hypothesis is accepted then further research can be combined with supporting theories such as The Theory Acceptance Model (TAM). The SEM method is recommended to be studied more deeply according to the needs of the case study and can represent the relationship according to real conditions.

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