

The E Prescribing Acceptance model

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ABSTRACT

Errors in prescription writing are the main cause (70%) which has an impact on the safety and quality of the patient's health. Banten Provincial Hospital as the main reference center in the Banten area also implemented one of the new innovations namely electronic prescribing or e-prescribing or electronic prescription. From the direct observation and interviews with 10 employees at Banten Provincial Hospital, the results found that there were 60% errors in interpreting hand-written medication prescriptions so that the prescription was returned to the doctor because it could not be read, 40% error in determining the dosage thus the queue in ordering drugs became too long.

This study used explanatory causality (Explanatory Research) as the research design which was categorized into cross sectional research. The population this study used were all doctors who worked in Banten Provincial Public Hospital both civil servants and non-civil servants that was 65 respondents. The dependent variable in this study was the doctor's acceptance level and the independent variables were relative advantages, compatibility, complexity, trialability and observability. The instrument this study used a questionnaire using the Likert scale 1-4. This study used multiple linear regression analysis.

The results of the research showed that relative advantage, compatibility, complexity, trialability, and observability simultaneously have a positive effect on the level of physician acceptance of e-prescribing in Banten Provincial Hospital.

Keywords: Acceptance Level, Relative Advantage, Compatibility, Complexity, Trialability and Observability.

INTRODUCTION

Medication errors often occur in general and hospital practices. This errors are caused by prescription errors and prescribing errors because of wrong medical decisions. Errors in prescription writing are a major cause (70%) that have an impact on the safety and quality of patient health (Velo, 2009).

In the United States, medication errors are estimated to harm at least 1.5 million patients per year. In Australian hospitals around 1% of all patients suffer from side effects as a result of medication errors. In the UK, a thousand consecutive claims are reported to the protection of the Medical Society in connection with errors in prescribing and medication. A study in a

teaching hospital shows that there are 4 per 1000 prescription errors that can harm patients. A meta-analysis study also reports errors in prescription writing with different indicators with variations of 2-514 per 1,000 prescriptions and 4.2-82% patients (Ross, 2009).

In Indonesia, studies that report prescribing errors are very limited. A study conducted in one hospital in Jakarta in 2013, reported prescribing errors due to no drug dosage 39%, not writing drug dosage forms 84%, incorrect usage rules 34%, no administration route 49%, and no information of a given amount 18%. Furthermore, prescribing errors are also caused by the doctor's handwriting on prescription paper that is difficult to read and the use of nonstandard abbreviations in prescribing that is potentially harmful for the patients and can lead to sub-standard patient care. Therefore, preventions of prescription errors are needed to be made, including electronic prescription in order to improve service quality and patient safety (Siti Farida, 2017).

Acceptance of an innovation depends on many factors including the perception of the benefits that will be obtained by the community from the innovation, besides it also depends on the level of convenience in applying the innovation (Davis 1989). The results of Rogers' research shows that the acceptance of a technological innovation is influenced by several factors such as perceived perception of innovation (perceived of innovation), type of decision making in whether or not an innovation is received (type of innovation decision), channel used to introduce innovation (communication channels), the natural condition of a social system that will accept these innovations (nature of social systems), groups that will socialize such

innovations (extent of change agents promotion effort) (Rogers 1995).

The hospital industry in Indonesia at this time has also begun to implement new innovations in health services such as 4-dimensional ultrasound intended for obstetric and gynecology specialists, PACS which is the best image and communication filing system for image imaging specifically for specialist doctors radiology, digital mammography uses diagnostics assisted by computers to help radiologists detect potential tumors, and much more. The successful implementation of new innovations is related to perceived ease of use and perceived of usefulness, the easier technology is adapted and the more beneficial the recipient of technology is, the faster it is accepted by society (Davis 1989, Bagozzi, Davis & Warshaw 1992). According to Roger, the speed of acceptance of innovation depends on 5 things: (1) Relative advantage is the level of innovation in the same way that is better than the idea it replaces, (2) compatibility is the level of innovation that matches the existing value, experience, and needs of most adopters, (3) Complexity is the level of innovation in a innovation that feels relatively difficult to understand and use, (4) Trialability is the level of imagination of an innovation that can be tested using a limited basis, and (5) Observability is the level of innovation results seen by others (Roger 1995).

Health care effort is the variety of activities undertaken to enhance the optimal public health degrees. The hospital is a health care institution or health care facility that provides a variety of individual health service in plenary in order to accelerate the improvement of the degree of public health, and the role It is very important. The hospital provides a range of services, including inpatient services, outpatient, and

emergency. A variety of activities at home sick intertwined with each other (the Minister of health of Indonesia, 2014).

Standard service in the hospital is a benchmark that is used as a guide for the officer in carrying out the services in the hospital. Hospital Ministry is a Ministry directly accountable to the patient and the related drug preparations that can eventually help the treatment process and then was able to improve the quality of life of patients. In the written request from doctor to pharmacy to provide installation and handed the drugs to patients according to disease and the applicable rules of prescription called with (Minister of health of Indonesia, 2014).

The Ministry administering drug services pegged to patients is a very complex process. On the process a very likely error or constraint which can be bad for patient service. One of the obstacles often encountered was the genesis of prescription errors. Prescription errors that often occur because writing recipes that are vague and incomplete and therefore cannot be read properly by officers of a pharmaceutical. One factor that increases the risk of errors in the course of treatment is from recipes (Cohen, 1999).

The Provincial Hospital of Banten Province as the main referral centre in the region of banten is also going to implement one of the new innovations of electronic prescribing or e – electronic prescriptions or prescribing, namely recipe that is transmitted using electronic media, that connects various information between doctors, tool makers of electronic prescriptions, pharmacy, and the financial section either directly or indirectly. From the results of direct observation and interviews to some of the 10 employees in the Provincial Hospital of Banten Province

found there is as much as 60% error in adherence to drug prescriptions written by a physician's hands so that the recipe was returned again to the doctor for not can read, 40% error in the determination of the dose to the length of the queue in the ordering of drugs. At this point in the Provincial Hospital of Banten Province most doctors already know the plans for implementing the innovation e-prescribing or electronic prescriptions, and then after a preliminary survey to 10 doctors at the Provincial Hospital of Banten Province almost the entire the doctor receives the application of e-prescribing as much as 80%.

Health care service is one of the varieties of activities carried out to improve optimal community health status. The hospital is a health service institution or health service facility which has a very important role that provides a full range of individual health services in order to accelerate the improvement of public health status. The hospital provides various services, including inpatient, outpatient, and emergency services. Various hospital activities are interrelated with one another (Indonesian Minister of Health, 2014).

The standard of service in the hospital is a benchmark that is used as a guideline for officers in carrying out hospital services. Hospital service is a direct service and is responsible to patients regarding drug preparations which can later help the treatment process and then be able to improve the quality of life of patients. In a written request from a doctor to a pharmaceutical installation to provide and deliver drugs to patients according to the disease and the rules that apply are called prescriptions (Indonesian Minister of Health, 2014).

Drugs delivery service for patients is a very complex process. In this process, it is very possible that there will be errors and obstacles that can adversely affect patient care. One obstacle that is often encountered is the occurrence of recipe errors. The recipe errors that often occur can be prescription writing that is unclear and incomplete so it cannot be read properly by the pharmacists. In addition, one of the factors that increase the risk of errors in treatment is from a prescription (Cohen, 1999).

Banten Provincial Hospital as the main referral center in the Banten region will also implement one new innovation, namely electronic prescribing or e-prescribing or electronic prescription, which is a recipe transmitted using electronic media, which connects various information between doctors, electronic prescription devices, pharmacies, and financial part either directly or indirectly. From the results of direct observation and the results of interviews with some 10 employees at Banten Provincial Hospital found that there were as many as 60% errors in interpreting hand-written medication prescriptions so that the prescription was returned to the doctor because it could not be read, 40% error in determining the dosage for the duration queue in ordering drugs. At this time in Banten Province General Hospital, most of the doctors already knew the plan to implement e-prescribing or electronic prescription innovations, then after a preliminary survey was conducted on 10 doctors in Banten Provincial Hospital, almost all doctors received 80% of the e-prescribing.

Unfortunately, the e-prescribing implementation has contrast perceptions with the hospital stakeholders'. Therefore, this research is expected to help all parties

in determining the decision of whether or not the application of e-prescribing technology could be helpful as well as meaningful. Based on the introduction, this research needs to be done because the speed of acceptance or rejection of e-prescribing innovation is related to the sustainability of the hospital.

From various previous studies, the characteristics of Rogers' innovations greatly influenced consumers to intend to adopt innovative products. Tanakinjal, et al. (2001) showed that relative advantages have an effect on the intention to adopt internet banking in Malaysia. Lawson-Body, et al. (2014) found that relative advantages had a positive effect on the decisions of war veteran members to adopt e-government services. Slyke, et al. (2002) found compatibility affected the intention to use groupware (group of conversations to work) for the benefit of the organization. Whereas Tanakinjal, et al. (2011) showed that complexity has a positive effect on the intention to adopt mobile marketing in Malaysia. Slyke, et al. (2002) found trialability had an effect on the intention to use the grupware application to support the work of the organization. Lee, et al., (2011) found the observability variable to have a positive effect on the intention to use the company's online learning system in Taiwan. Therefore the authors are interested in taking the title of the research on the level of doctor adoption of electronic prescribing at the Banten Provincial General Hospital.

RESEARCH METHODS

The design of this study was explanatory research design. The approach used in this study is the survey method. Data collection is done by surveys, namely by spreading

questionnaires. Based on the time dimension, this study was categorized into cross sectional research. The unit of analysis is individuals. The scale used in this study is the Likert scale 1-4. This study used multiple linear regression analysis. The data used in this study are primary and secondary data. The population in this study were all doctors who work in the Banten Province General Hospital both civil servants and non-civil servants which are 65 respondents.

RESEARCH RESULTS

a. F-Test Model

Collective Test Analysis (F-test Model)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1021.151	5	204.230	120.216	.000 ^b
	Residual	100.233	59	1.699		
	Total	1121.385	64			

a. Dependent Variable: Tingkat Penerimaan

b. Predictors: (Constant), Observability, Complexity, Compatibility, Relative Advantage, Trialability

The table above shows that the relative advantages, compatibility, complexity, trialability, and observability variables are simultaneously have a positive and significant effect on the level of acceptance because the significance value is 0,000 or less than 0.05.

b. T-test

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.115	1.019		.113	.910
Relative Advantage	.546	.266	.212	2.056	.044
Compatibility	.351	.165	.176	2.132	.037
Complexity	.472	.166	.200	2.837	.006
Trialability	.487	.240	.225	2.033	.047
Observability	.348	.141	.212	2.476	.016

a. Dependent Variable: Tingkat Penerimaan

The table above showed that:

1. The relative advantage variable has a positive effect of 0.546 and is significant towards the level of acceptance.
2. Compatibility variables have a positive effect of 0.351 and significant to the level of acceptance.
3. Complexity variables have a positive effect of 0.472 and significant to the level of acceptance.
4. Trialability variable has a positive effect of 0.487 and is significant towards the level of acceptance.
5. Observability variable has a positive effect of 0.348 and is significant towards the level of acceptance.

c. Coefficient of Determination (R²)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.954 ^a	.911	.903	1.303

a. Predictors: (Constant), Observability, Complexity, Compatibility, Relative Advantage, Trialability

It is known that the relative advantage, compatibility, complexity, trialability and observability variables to the level of acceptance = 0.911 or 91.1%. As much as (100% -91.1%) = 8.9% influenced by other variables not included in the modeling.

RESEARCH FINDINGS

Based on the results of the analysis it is concluded that the results of this study trialability and relative advantage variables are the most influential variables. This is because the sig t value on the trialability variable is 0.047 and the relative advantage variable is 0.044.

Basically trialability is an innovation that can be adopted and implemented more often and faster than the other useless innovations. This is due to the respondents that can examine and observe it first so it will be easier to be used. This is related to the convenience of an electronic prescribing innovation, since it has been examined it will be easier to use it later, so the doctors will immediately get experience when trying to use this prescribing electronics. Then, the doctors intend to adopt prescribing electronic innovations because they already feel the convenience.

While for the relative advantages, levels or levels of an innovation (in this case is electronic prescribing) it is perceived as better than other innovation ideas, influencing the intention to adopt prescribing electronics. The higher the respondents perceive the advantages of prescribing electronics, the higher the chance to intend to adopt prescribing electronics. The influence of the advantages relative to the intention to adopt this is because the respondents view electronic prescribing as offering many advantages over ordinary hand-written recipes. Some of the advantages of prescribing electronics are that there are no more errors in recipe reading caused by the doctor's handwriting on the prescription paper, so there is no mistake in giving the drug to the patient. Save time so that there is no queue or long waiting time in the pharmacy and the ability of e prescribing to manage the database

that can analyze the history of drug allergies and the right dose.

DISCUSSIONS

1. The Effect between Relative Advantage Variables, Compatibility, Complexity, Trialability, and Observability towards the Level of Doctor Acceptance on e-Prescribing.

The test results on the variables of relative advantages, compatibility, complexity, trialability, and observability to the level of Doctor's acceptance on e-prescribing indicate that there is a positive effect between relative advantages, compatibility, complexity, trialability, and observability to the level of Doctor's acceptance towards e-prescribing simultaneously.

Roger (1993) explained the notion of the level of acceptance is to accept something offered and sought by other parties, the factors that influence the acceptance of an innovation are attributes of innovation. The attribute of innovation is anything that can quickly affect the rate of an innovation to be adopted by members of the social system. The attributes of innovation can also be interpreted as something that can affect an innovation either it is accepted or not by a member of a social system. Studies that are mostly referred to by researchers include the empirical findings of Tornatzky and Klein (1982) which showed the characteristics of influential innovations and significantly correlate to individuals towards innovation adoption decisions.

The results of this study also support previous research conducted by Pujari (2006) in Ing-Wu and Chen (2014) mentioned that innovation as an important aspect that affects consumer purchase

intention and marketing performance. Meanwhile, purchase intention shows an emotional reaction as a result of a consumer's overall evaluation of the overall product which also indicates the opportunity for consumers to buy products (Grewal, Monroe, & Krishnan, 1998 in IngWu& Chen, 2014). The study of Zaman and Arslan (2014) also found all of the characteristics of Rogers' innovation. The characteristics significantly affects consumer purchase intentions on new product preannouncement (NPP) or new release yet have not been announced products. Generally, if all of Rogers' creative characteristics attribute affect significantly, it can affect the rapid pace of innovation for adoption by members of the social system. In this case, it is related to the level of doctor acceptance on e-Prescribing.

2. The Effect of Relative Advantage Variables on the Doctor's Acceptance Level towards e-Prescribing.

The test results on the relative advantage of variables to the level of Doctor's acceptance towards e-prescribing indicates that there is a positive effect between the relative advantage of the level of acceptance of the doctor towards e-prescribing.

The level of profit or benefit of an innovation can be measured based on its economic value or probably from a social status (prestige), pleasure, satisfaction or the very important component that it has. The more profitable the recipient the faster the spread of innovation will be. According to Soekartawi's theory (1988) which said that if the new technology provides greater benefits than the old one, then the speed of adoption of innovation will run faster. To find innovations such criteria can be done by

means of; compare introduction technology with existing technology, then identify technology with low costs or technology with high production. Furthermore, Rogers's (1983) theory that relative advantage is the level or level of innovation is perceived to be better than previous innovation ideas. Mostly, relative profits are measured in economic terminology, while social prestige, comfort, and satisfaction factors also are the important components. The more relative advantages that an innovation feels, the faster the rate of adoption will be.

The results of this study also support previous research conducted by Sholahudin (2017) which showed that relative advantages have an effect on the intention to adopt Sloops e paper. Similarly, the research conducted by the Tanakinjal Study, et al (2011) showed that the relative advantages have an effect on the intention to adopt mobile marketing in Malaysia.

The higher the respondents perceive the advantages of e prescribing, the higher the chance to intend and receive e prescribing. The influence of excellence relative to the intention to accept and adopt new technology can be caused by the respondents view on e-prescribing has offered many advantages over handwritten recipes. In this study, one of the advantages of using e-prescribing rather than manual prescription is using e-prescribing to read it more comfortably without fear of errors in reading.

3. The Effect of Variable Compatibility on the Level of Doctor Acceptance towards e-Prescribing.

The test results on compatibility variables on the level of Doctor's acceptance towards e-prescribing indicate that there is a positive influence between

compatibility and the level of physician acceptance of e-prescribing.

Suitability /compatibility is the level of innovation's compatibility with the values (values), previous experience and needs of the recipient. Innovations that are not in accordance with the values or norms that are believed by the recipient will not be accepted as quickly as the innovations that are in accordance with existing norms. Rogers and Shoemaker (1971) in the Tornatzky and Klein (1982) study explained compatibility refers to conformity with potential adoption values or norms or may represent conformity with existing practices in adopters. According to Gahtani (2003) in Sugandini (2009), this concept pointed out that the level of adoption of innovative product innovations will be high if consumers feel the similarity of values or beliefs offered by innovative products.

The results of this study also support the results of research conducted by Slyke, et al. (2002). Finding compatibility influences the intention to adopt groupware applications for the benefit of the organization. On the other hand, Lee, et al (2011) found compatibility had a positive effect on the intention to use an online learning system in Taiwan.

Needs that are appropriate or suitable by respondents about e prescribing will be easily accepted. The application of e prescribing is considered very appropriate to help doctors and pharmacists.

4. The Effect of Complexity Variables on the Level of Doctor's Acceptance towards e-Prescribing.

The test results on complexity variables on the level of Doctor's acceptance towards e-prescribing indicate that there is a positive effect between

complexity and the level of Doctor's acceptance towards e-prescribing.

An innovation that is easy to understand and easy to use by the recipient will quickly spread, while innovations that are difficult to understand or difficult to use by the recipient will be slow to spread. The easier it is to understand an innovation will be more quickly accepted by society. According to Rogers (1983), complexity is a level of innovation perceived as difficult to understand or use. Some innovations are easily understood by most members of the social system. Some of the innovations are more complicated so they will be slowly adopted. Complexity is assumed to be negatively related to the adoption and implementation of innovation. Rogers's conceptualization of complexity is very similar to the Davis concept, perceived ease of use, or perceived ease of use (Moghavvemi, et al 2012). In other words, the level of adoption of a product will be high if consumers feel the ease of use of products offered by innovative products (Marshal, Rainer, and Moris, 2003, in Sugandini, 2009).

The results of this study are similar with the results of previous studies. Tanakinjal, et al (2011) concluded that complexity has an effect on the intention to adopt mobile marketing in Malaysia. While a research by Chaipoopirutana and Chatchawanwan (2009) showed that complexity is related to the intention to adopt internet banking in India and Thailand.

The easier an innovation is to learn and use, the easier the innovation will be to adopt. So that the application of e prescribing has been seen as something that can facilitate, so the respondents intend to adopt and accept the application of e prescribing.

5. The Effect of Trialability Variables on the Level of Doctor's Acceptance towards e-Prescribing.

The test results of the trialability variable on the level on Doctor's acceptance towards e-prescribing indicate that there is a positive influence between trialability on the level of Doctor's acceptance of e-prescribing.

An innovation that can be tested will be accepted by the community rather than innovation that cannot be tested first. The degree of innovation can be experimented on in a limited scope (Rogers, 1983). According to Rogers and Shoemaker (1971) theory as cited in the Tornatzky and Klein Study (1982), innovations that can be tested will be adopted and implemented more frequently and faster than innovations that are less able to be implemented.

The results of this study are in line with the results of Slyke, et al (2002) that found trialability has an effect on the intention to use groupware applications (technology designed to facilitate work in groups) for the benefit of the organization. Lee, et al (2011) also found that trialability had a positive effect on the intention to use an online learning system in Taiwan.

Prescribing electronics when tested first, the user will find it easy to learn, operate, easy to prepare inputs, and interpret the output of a program. New users only need adjustments at the beginning of use. New users do not need a long time (only an average of three days) to be able to use e-prescribing. So that it will affect the doctor's acceptance of e-prescribing.

6. The Effect of Variable Observability on the Level of Doctor's Acceptance towards e-Prescribing.

The test results of observability variables on the level of Doctor's acceptance towards e-prescribing indicate that there is a positive effect of observability on the level of Doctor's acceptance towards e-prescribing.

Innovation must be easy to observe. If the innovation is easily observed, there are many adopters who are able to use it by imitating its implementation without asking experts. Thus a diffusion process will occur, so that the number of adopters will increase. Visibility is the level at which an innovation is visible to others. The easier it is for individuals to see the results of an innovation, the more likely they are to adopt it (Rogers, 1983).

The results of this hypothesis test are in harmony with previous research which stated that observability has an effect on the intention to adopt innovation. Lee, et al (2011) also found observability to influence the intention to use the online learning system in Taiwan.

Some instructions for using e-prescribing can affect the level of acceptance of a respondent to implement e-prescribing is seen to be good so that it affects them to accept the application of e-prescribing.

IMPLICATIONS

Empirically, the innovation adoption theory developed by Rogers (1983) describes five proven characteristics of innovation. Five characteristics of Rogers' work innovations (relative advantages, compatibility, complexity, trialability, observability) that can theoretically predict the speed of individuals accepting new ideas, and help to socialize about innovation e-prescribing to doctors at Banten Provincial Hospital through these five characteristics, especially trialability and

relative advantages. Banten Provincial Hospital can use the results of this study to assist in socializing and then applying e prescribing at Banten Provincial Hospital, so that the use of e prescribing can be realized and implemented properly by paying attention to all aspects of the relative advantages, compatibility, complexity, trialability and observability variables, especially in the variable trialability and relative advantage.

It should be realized that e-prescribing is not only a messaging system between doctors (prescriber) and network pharmacies, but is a software system that is expected to be able to manage patient databases. Patient profiles in stored data can be used to analyze inappropriate prescriptions or excessive prescriptions, monitor drug side effects and or prevent drug interactions that harm patients. The system in managing the management of inpatients in hospitals and outpatients can reduce longer hospitalizations, prevent morbidity and mortality, and minimize the addition of larger costs by proactively finding errors in drug use.

With the e prescribing, it can shorten the time in reading prescriptions so that the pharmacist can prepare the medicine needed faster, so that with the presence of innovation e prescribing can reduce the queue or waiting time in the pharmacy at Banten Provincial Hospital.

CONCLUSION

1. Relative advantage, compatibility (compatibility / complexity), complexity (complexity / complexity), trialability (trialability / can be tested), and observability (observable) simultaneously have a positive effect on the level of Doctor's acceptance of e-prescribing at the Banten Provincial Hospital.

2. Relative advantage has a positive effect on the level of Doctor's acceptance towards e-prescribing in Banten Provincial Hospital.
3. Compatibility has a positive effect on the level of Doctor's acceptance towards e-prescribing at Banten Provincial Hospital.
4. Complexity has a positive effect on the level of Doctor's acceptance towards e-prescribing at Banten Provincial Hospital.
5. Trialability has a positive effect on the level of Doctor's acceptance towards e-prescribing at Banten Provincial Hospital.
6. Observability has a positive effect on the level of Doctor's acceptance towards e-prescribing at Banten Provincial Hospital.

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