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Acceptance Measurement of Health Insurance Information System Based on Technology Acceptance Model

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Abstract

The objective of this research is to evaluate P-Care BPJS information system based on Technology Acceptance Model (TAM). The type of research is analytical, cross sectional approach. Number of respondents 206 P-Care BPJS users at primary health care. Data analysis using linear regression. Based on correlation test external variables with percieved usefulness, showed high correlation = 0.6 (p <0.001); external variables with percieved ease of use showed moderate correlation = 0.4 (p <0.001); perceived ease of use with attitude showed moderate correlation = 0.5 (p <0.001); percieved usefulness with attitude showed high correlation = 0.7 (p <0.001); perceived usefulness with actual use showed moderate correlation = 0.5 (p <0.001); behavioral intention to use with percieved usefulness showed moderate correlation = 0.5 (p <0.001); attitude with behavioral intention to use showed high correlation = 0.6 (p <0.001); behavioral intention to use with actual use showed high correlation = 0.7 (p <0.001).

Introduction

WHO advises a country should have a comprehensive health assurance scheme for all citizen. This is known as Universal Coverage. In Indoneisa it is applied in UU SJSN No. 40/2004. Related with UU Number 40 year 2004 regarding National Social Assurance System. PT Askes (Persero) is officially appointed as Social Assurance Administrator Agency (BPJS) covering health assurance for all Indonesia citizen. This desicion is manifested in UU BPJS Number 24 year 2011 (Humaidi, 2016).

As a company having participants' personal data nearly 40% of Indonesia citizen and partners spread throughout Indonesia region, then PT. Askes (Persero) should have Management Information System (SIM) supporting the company business process. Currently BPJS still on preparation phase to comprehensive coverage. Among the main thing to be improved is the information system where there are many problem on data base, data distribution, participant administration, etc. Reflect from the less optimum of information system from previous programs, improvement is required basicly on BPJS information system towards the application of comprehensive coverage. The management information system on daily basis in PT Askes (Persero) connect three stake holders which are participant, health service provider and PT. Askes (Persero) it self. As known, PT. Askes (Persero) has branch on nearly all Indonesia region. This has been a challange on how to manage so that between work unit can interchange or share information smoothly. This requires strong and real time

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on line communication network (Kementerian Kesehatan RI, 2013).

Since January 2014 the JKN (BPJS Kesehatan) participant verification application has been applied for primary service (Puskesmas and Family Doctor in cooperation with BPJS Kesehatan) named "P-Care". Stated for Primary Care is a patient care information addressed to one with BPJS participant status, computer based and online. As it named, P-CARE dedicated for primary care (puskesmas) and conducted data process start from registration, diagnosing record, therapy given, until laboratory examination. Basicly, P-CARE has 2 main function which are (1) Patient registration where data entry processed by registration staff, and (2) Patient care, where data entry processed by doctor (or staff of care center). It also contain reference submitting feature, where the data can be directly accessed by referred health facility. Beside both functions, there are additional features like visit record preview, number of BPJS participants registered on a primary health facility, also medical attendant data process and password change feature. P-CARE developed by PT. ASKES is further improvement of previous health service application used for family doctor information system as well as used by Puskesmas to verify the participant by on line system. Basicly with P-CARE it is expected all health data, particularly related with patient care is real time and integrated of each departement in a health service institution.

Rapid growth of information and communication technology result the effect of higher demand to reduce cost of health care, improvement of health care quality, higher patient safety, lower medical error and higher usage of health information system on a health service organization (Meier et al., 2013; Bloomrosen et al., 2011; Fichman et al., 2011). Currently, the usage of health information system has become the basic requirement on every health service organization (Aghazadeh et al., 2012). Health information system refers to a computer system capturing, storing, managing and transmitting personal or organization health information in health service sector (Aghajari et al., 2013). The main challanges is the acceptance of final user of the system. Though sometime can't avoid the unsatisfaction to information technology application, refuse or only utilize a limited feature, or event abandon it (Halbesleben et al., 2008; Abramson et al., 2012; Friedberg et al., 2013).

The BPJS P-Care information system should be the one who drive National Social Assurance System (Sistem Jaminal Sosial Nasional / SJSN) generally. Due to information technology is the mainframe of BPJS implementation, it should be the priority. Since then evaluate the information system applied is required to guarantee the system operational properly. Several problems related with the usage of information technology in health service, such as the application is not match; unreliable; not user friendly; the organization doesn't properly prepare to adopt the information technology by adjusts the process, clinical work flow, health information system doesn't function resulting medical error with error massage in Electronic Health Record (EHR), interuption of health data interchange, give negative impact on care achievement, and the increase of staff time to handle the delivery and process of the claim (Ekeland, et. al., 2010). The interuptions consist of financing, privacy and liability, organization characteristic and technical aspect. In this situation, evaluation is required to provide convincing evidence regarding the impact of efficiency, quality and data security for successful health information system application (Fontaine, et al., 2010). After a while, the evaluation of information system is required to improve the quality or make adjustment as organization requirement. The evaluation can be used to find out how the implementation of a system. There are many evaluations can be done on information system such as formative evaluation along the system life cycle, provide information to improve developed system and summative evaluation focusing to assest the effect or result of evaluation object in certain point after the implementation (Nykanen et al., 2011). Odhiambo-Otieno and Odero in Krishnan et al., (2010) explained the evaluation criteria phase for Health Management Information System (HMIS), which are pre implementation, implementation and post implementation. WHO in Rostami et. al., (2015) gave the

guidance for HMIS evaluation should be done for data recording and report compilation, data usage, computer hardware and software detail, training and monitoring.

User is the main key to whether a program success or fail on the application, because no matter how good a program and information system, it will not function properly without user support. When the user consider the system is too difficult or hampers their work, then it will not be used by them, and finally the plan and development of a program will be useless. Literature regarding information technology application has underlined the importance of attitude and satisfaction related with the technology. One of evaluation model for information system widely used in health service is Technology Acceptance Model (TAM). TAM is a theoritical model commonly used to predict and explain the behavior of user and IT user (Holden and Karsh, 2010). When it be used in the context of health information system, it will define the success of information system implementation as end users acceptance (Hu, et al., 2015). TAM model contains unique dimensions such as behavioral intention to use, as success dan failure determinant of information system acceptance and extended determinant which are perceived usefulness and perceived ease of use, where last both dimension can be basic construction of evaluation aspect (Holden & Karsh, 2010). Though the functionality of health information system undoubtfully, yet the added value at the end is relied to the end users, well perception, acceptance and properly used for health service (Holden & Karsh, 2010; Patel & Kannampallil, 2014). To identify how the user accepts the information system is highly required to avoid user resistance.

The implementation of TAM is considered as the most reliable concept in explaining user individual behavior to new information technology system. TAM consistantly explains around 40% of the variation of individual intention to use IT and actual usage (Venkatesh & Bala, 2008). Theoritically and practically TAM is considered as the most proper model to explain how user acceptance to a system. TAM states that behavioral intension to use is determined by two beliefs which are first, perceived usefulness defined as how far one believes the usage of the system will improve the performance. Second, perceived ease of use which is defined as how far one certain that it is easy to operate the system.

Research from Ehteshami (2017) indicated the acceptance of user measured by TAM in barcode technology application on the hospital was as many as 76.9%; perception of easy to use 87% and easy to learn 71.5%. User perception affect their attitude to larger technology application and their attitude affect their intention to use the technology and finally their intention to use the technology in reality (acceptance).

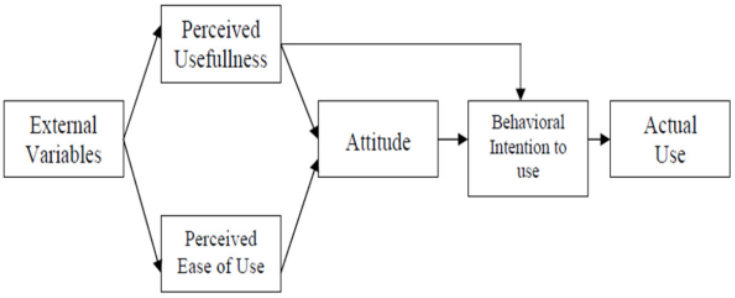
The purpose of this research is to explain theoritically the involvement of user in information system and computer based information technology application on an organization, also to explain the user behavior aspect by using Technology Acceptance Model (TAM).

This is analytic research with cross sectional approach. Sampling technique uses total sampling. The research respondent is all puskesmas staff operating P-Care BPJS on 39 Puskesmas in DKK Banyumas work region, as many as 206 persons. The instrument is questionnaire with the measurement of each variable by Likert scale 1 to 4 (highly disagree, disagree, agree, highly agree). The research variables consist of : eksternal variabel, perceived ease of use, perceived usefulness, attitude, behavioral intention to use, and actual to use. Measured variable questions are validated with $r \geq 0,3$ and reliable with Alpha Cronbach value $\geq 0,7$. Data analysis uses linier regression. The Technology Acceptance Model theory by Davis (Davis, 1989) is pictured.

Result and Discussion

Most of the respondents are female as many as 155 persons (75.2%); ages 25 – 29 years old which are 42 persons (20.4%); high educated as many as 168 persons (81.6%); recent work period cathegory (< 6 years) as many as 100 persons (48.5%); average work period of the respondents is 118 months (9.8 years); work as nurse as many as 77 persons (37.4%); and average p-care operating duration is 2 hours/day as much as 43.7%.

The result of correlation and linier



Picture 1. TAM Theory by Davis (1989)

regression analysis of TAM variable (external variables), is as Table 1.

Result of perceived usefulness variable hypothesis test with value p= 0,000 than it is said statistically significant (real). From the result of correlation analysis can be seen there is strong relation between perceived usefulness and external variables (R= 0,615). Determination analysis results the R^2 (R Square) 0.378 or (37,8%). This indicated independent variable (perceived usefulness) contribution percentage to dependent variable (external variable) is 37.8%. Independent variable variation used in the model can explain 37.8% dependent variable variation. While the rest 62.2% is affected or explained with other variable. The constant 7.818 states if perceived usefulness value is 0 then external variables is 7.818. The regression coeffisient of X1 variable is 0.722. It means when other independent variable has steady value then every 1% increase of perceived usefulness will increase external variables 0.722.

Meanwhile, the result of perceived ease of use variable analysis result is p = 0.000 then it can be said that it is statistically significant/ real. From correlation analysis result can be known there is fair/medium relation between perceived ease of use with external variables (R= 0,4). Determination analysis results the R^2 (R Square) is 0,151 or (15,1%). Independent variable variation used in the model can explain 15.1% of dependent variable variation. While the rest 84.9% is affected or explained by other variable. The constant 8.733 states when perceived ease of use is 0 then external variable is 8.733. Regression coefficient of X1 variable is 0.557 means if other independent variable value is steady then every 1% increase of perceived ease of use will increase external variables 0.557.

From correlation test result can be seen that external variables has high correlation with perceived usefulness, as much as 0.615 (p<0,001). Sugiyono (2013) said when R value 0.60 until 0.799 then it indicate strong/high related. Perceived usefulness is user subjective belief related with the benefit of using the health information system to achieve work target. When user sense the benefit of the system is quite high, the attitude will be more possitive and willing to adopt the system. Since they belive, the system will be beneficial to the work and performance then the users will adopt positive attitude to the system (Chen and Hsiao, 2012). According to Maksum at. al. (2017), the acceptance of information system is affected by percieved usefulness and percieved ease of use. Percieved usefulness is how far an individual believe by using the technology will

Tabel 1. Correlation and Linier Regression Analysis of *External Variables*

Variable	R	R^2	Line Equation	p value
Perceived usefulness (b7-b11)	0,615	0,378	*External variables* = 7,818 + 0,722 *(Perceived usefulness)*	<0,001
Perceived ease of use (c12-c17)	0,388	0,151	*External variables* = 8,733 + 0,557 *(Perceived ease of use)*	<0,001

Source: Primary Data, 2016.

assist to elevate task performance. Perceive usefulness can be measured with indicators like increased productivity, work more effectively and work faster. Perceived usefulness is described particularly to enlarge adopted object taken in elevate individual performance achievement on the job. Percieved ease of use and percieved usefulness determine the attitude in information technology utilization.

Correlation test between external variables and percieved ease of use results that they have fair/medium correlation as much as 0,4 (p<0,001). Sugiyono (2013) said when R value 0.40 until 0.599 indicates fair/medium relation. Perceive ease of use can be described as a level where user believe the usage of health information system will be free of effort in learning process regarding how to use the sytem. Thus it will be easier and lead to positive attitude to accept the system (Chen and Hsiao, 2012). User having perception information system is easy to use (*percieved ease of use*) tends to consider the information system will give benefit (perceived usefulness), and in the application will increase the acceptance.

Based on attitute variable hypothesis analysis result, the p value = 0.000 then it statistically significant/real. From correlation analysis result can be known there is fair/ medium relation between attitude and perceived ease of use (R=0.520). From determination analysis obtain the R^2 (R Square) as much as 0.270 (27%). This indicates the contribution percentage or independent variable (attitude) to dependent variable (perceived ease of use) as much as 27%. Or independent variable variation used in the model can explain 27.0% dependent variable variation. While the rest 73.0% is affected or explained by other variable. The constant is 9.871. This means when attitude value is 0 then perceived ease of use is 9.871. The X1 variable regression coefficient is 0.468. it means when other independent variable has steady value then each 1% attitude increase will increase perceived ease of use as much as 0.468.

Perceived ease of use and perceived usefulness determine the attitude in the use of technology information. Attitude is the reaction or respon of some one that still covered to a stimulus or object. Attitude is the feeling, thinking and tendency of a person that more or less permanently regards to certain aspects of the environment. Attitude is an evaluative tendency to a stimulus or object resulting on how someone interact with the object. According to Fishbein in Mulyati et. al. (2015), attitude is affective respon or positive-negative judgement of someone to an object. Attitude comes from a behavioral beliefs and evaluation to beared consequence (Montano, 2008 in Mulyati et al., 2015). Attitude will affect behavior through behavior intention to use in utilize the information technology. Behavior intention to use of technology will affect the acceptance of used technology.

Correlation calculation result mentions perceived ease of use has medium correlation with attitude with 0.520 (p<0.001). Sugiyono (2013) said when Rvalue is 0.40 until 0.599 indicates fair/medium relation. This is aligned with Tavakoli et. al. (2013) mentioned perceive ease of use and attitude has significant relation (r = 0,605, p </ 0001). Strong attitude positively affect behavior intention to use P- Care BPJS. Suki and Suki (2011) mentioned perceived usefulness, perceived ease of use, perceived enjoyment and attitude contribute 44.7% in the intention to use 3G mobile service technology. Attitude has positive effect and significantly related with behavior intention. Perceived ease of use can be described as assumption that the system is very simple to operate, not difficult to use, thus affect behavioral intention. Attitute considered as affective evaluation to the work involving the usage of health information system. By other word, attitude to technology usage refer to degree of like or dislike of user. Positive attitude to information system usage is

Table 2. Correlation and Linear Regression Analysis of Perceived Ease of Use

Variable	R	R^2	Line Equation	p Value
Attitude (d18-d22)	0,520	0,270	*Perceived ease of use* = 9,871 + 0,468 *(Attitude)*	<0,001

Source: Primary Data, 2016.

Table 3. Correlation and Linear Regression Analysis of Perceived Usefulness

Variable	R	R^2	Line Equation	p value
Attitude (d18-d22)	0,735	0,540	*Perceived usefulness* = 2,861 + 0,810 *(Attitude)*	<0,001
Actual use (f28-f33)	0,519	0,269	*Perceived usefulness* = 5,346 + 0,486 *(Actual use)*	<0,001
Behavioral intention to use (e23-e27)	0,511	0,261	*Perceived usefulness* = 7,633 + *0,444 (Behavioral intention to use)*	<0,001

Source: Primary Data, 2016.

insufficient to make health attendant to operate the technology, they should be certained, the technology will increase their productivity or make their work more effective (Teo and Zhou, 2014).

TAM model actually adopted from TRA model which is a theory of act reasoned with a premis that reaction and perception to something, will determine the attitude and behavior. Reaction and perception of IT user will affect the attitude in the acceptance of the technology. TAM model developed from psychology theory explains the behavior of computer user based on belief, attitude, intention and user behavior relationship. The purpose of this model is to explain main factors of user behavior to the acceptance of technology. More detail regarding the IT acceptance with certain dimension affecting the IT acceptance by user. This model places the attitude factor of each user behavior with two variables which are the ease of use and the usefulness.

Both variables can describe the aspect of user behaviorness. Thus TAM model can explain the user perception will determine the attitude in IT usage. This model clearly describes that the acceptance of IT user is affected by usefulness and ease of use and also construct perceived ease of use, perceived usefulness, attitude toward using, behaviour intention and actual usage.

The calculation of attitude variable hypothesis test result p Value = 0.000 then it is statistically significant/real. The result of correlation analysis found out there is strong relation between attitude and *perceived usefulness* (R= 0,735). Based on determination analysis result the R^2 Value (R Square) 0,540 or (54,0%). This indicates the effect contribution percentage of independent variable (attitude) to dependent variable (*perceived usefulness*) is 54.0%. The independent variable variation used in the model can explain 54.0% of dependent variable variation. While the rest 46.0% is affected or explained by other variable. The constant 2.861 states that when attitude value is 0 then perceived usefulness is 2.861. X1 variable regression coeffisien 0.810 means when other independent variable has steady value then every 1% attitude increase will increase perceived usefulness 0.810.

From actual use variable hypothesis test result, p value = 0.000 then it is statistically significant/real. The result of correlation analysis found out there is fair/medium relation between actual use and *perceived usefulness* (R= 0,519). Based on determination analysis result the R^2 Value (R Square) 0,269 or (26,9%). This indicates the effect contribution percentage of independent variable (actual use) to dependent variable (*perceived usefulness*) is 26.9%. Or the independent variable variation used in the model can explain 26.9% of dependent variable variation. While the rest 73.1% is affected or explained by other variable. The constant 5.346 states that when actual use value is 0 then perceived usefulness is 5.346. X1 variable regression coeffisien 0.486 means when other independent variable has steady value then every 1% actual use increase will increase perceived usefulness 0.486.

From behavioral intention to use variable hypothesis test result, p value = 0.000 then it is statistically significant/real. The result of correlation analysis found out there is fair/medium relation between behavioral intention to use and *perceived usefulness* (R= 0,511). Based on determination analysis result the R^2 Value (R Square) 0,261 or (26,1%). This indicates the effect contribution percentage of independent variable (actual use) to dependent variable (*perceived usefulness*) is 26.1%. The

independent variable variation used in the model can explain 26.1% of dependent variable variation. While the rest 73.9% is affected or explained by other variable. The constant 7.633 states that when behavioral intention to use value is 0 then perceived usefulness is 7.633. X1 variable regression coeffisien 0.444 means when other independent variable has steady value then every 1% behavioral intention to use increase will increase perceived usefulness 0.444.

From the correlation test result can be seen that behavioral intention to use with percieved usefulness has medium correlation, with correlation coefficient 0.5 ($p < 0.001$). Sugiyono (2013) stated when R value 0.40 until 0.599 then it refers to fair/medium relation. TAM is an information system theory making a model of how user willing to accept and operate a technology. This model suggests that when the user is offerred to use a new system, several factors will affect their decision regarding how and when they will use the system, particularly in terms of usefulness (the user certain by using this system will improve the performance) and perceive ease of use (where the user certain that by using this system will release from obstacle, meaning the system is user friendly).

One of the factor able to affect the IT acceptance is the perception of user upon usefulness and ease to use of it as a reasonable action in the context of technology user, thus the reason of someone in viewing the benefit and friendliness of IT operational become a reference point in the acception of a technology. Perceived usefulnes also affect the perceived ease of use but not the other way around. The system user will operate the system when it is useful whether it is ease to use or not. System that not ease to use will still be operated when the user feel the system is highly useful.

Based on correlation test result can be seen that attitude has high correlation with behavioral intention to use, as much as 0.6 ($p<0,001$). Sugiyono (2013) said when R value 0.60 until 0.799 indicates strong/high relation. Tavakoli et. al. research (2013) stated attitude has significant relation with *behavioral intention to use* ($r = 0,734$, $p </ 0001$). This can be caused by benefits obtained by respondents when they used the information system. This perceived usefulness has relation with respondent's attitude in operating the information system. Social influence has positive and significant correlation (p value<0.05) upon behavioral intention to use. Research indicates positive and significant correlation between facilitating condition with behavioral intention to use (Wahono & Prihatmoko, 2016). Ologeanu-Taddei *et al.*, (2016) found that individual lowly rely on social information in feeling the usefulness and intention, yet continuosly consider the usefulness of information system based on benefit potential from the utilization (the relevance with work and the benefit to performance).

The hypothesis test result of behavioral intention to use variable is $p = 0.000$ then it can be said statistically significant/real. From correlation analysis result can be seen there is strong relation between behavioral intention to use with attitude ($R= 0,626$). From determination analysis, obtain the R^2 value (R Square) is 0.392 or (39.2%). This indicates that effect contribution percentage of independent variable (*behavioral intention to use*) to dependent varible (*attitude*) is as much as 39.2%. Indipendent variable variation used in the model can explain 39.2% dependent variable variation. While the rest 60.8% is affected or explained by other variable. The constant 6.649 means when behavioral intention to use is 0 then the attitude is 6.649. X1 variable regression coefficient 0.494 means when other independent varible value is steady then every 1% increase of behavioral intention to use will increase the attitude as much as 0.494.

The hypothesis test result of actual use variable is $p = 0.000$ then it can be said statistically significant/real. From correlation analysis result

Table 4. Correlation and Regression Linear Analysis of *Attitude*

Variable	R	R^2	Line equation	p value
Behavioral intention to use (e23-e27)	0,626	0,392	*Attitude* = 6,649 + 0,494 *(Behavioral intention to use)*	<0,001

Source: Primary Data, 2016.

Table 5. Correlation and Regression Linear Analysis of *Behavioral Intention to Use*

Variable	R	R^2	Line Equation	p value
Actual Use (f28-f33)	0,681	0,464	*Behavioral Intention to Use* = 1,07 + 0,734 *(Actual use)*	<0,001

Source: Primary Data, 2016.

can be seen there is strong relation between actual use with behavioral intention to use (R= 0,681). From determination analysis, obtain the R^2 value (R Square) is 0.464 or (46.4%). This indicates that effect contribution percentage of independent variable (actual use) to dependent varible (behavioral intention to use) is as much as 46.4%. Indipendent variable variation used in the model can explain 46.4% dependent variable variation. While the rest 53.6% is affected or explained by other variable. The constant 1.07 means when actual use is 0 then behavioral intention to use is 1.07. X1 variable regression coefficient 0.734 means when other independent varible value is steady then every 1% increase of actual use will increase the behavioral intention to use as much as 0.734.

Previous study indicated the main factor of decision to adopt or user acceptance are ease of use, usefulness, anxiety and perceived behavioral control defined as someone belives on the ability to carry out certain task/work by computer, how far an individual believes that infrastructure and technical organization are ready to support the system usage (Venkatesh and Bala, 2008); system quality, information quality, service quality (Petter *et al.*, 2008); and customization or alignment to clinical work flow are consider as main concern in EMR adoption in health service (Vishwanath, *et al.*, 2010; Cresswell & Sheikh, 2013).

Conclusion

Based on correlation test result can be seen that external variables have high/ strong correlation with perceived usefulness; external variables and percieved ease of use have medium/fair correlation; perceived ease of use has medium/fair correlation with attitude; Percieved usefulness has high/strong correlation with attitude; perceived usefulness with actual use have medium/fair correlation; behavioral intention to use with percieved usefulness have medium/fair correlation; attitude has high/ strong correlation with behavioral intention to use; behavioral intention to use has high/strong correlation with actual use.

Based on determination value the effect of perceived usefulness to external variables is higher than the effect of percieved ease of use to external variables; the effect of perceived usefulness to attitude is higher than the effect of percieved ease of use terhadap attitude; the effect of actual use to perceived usefulness nearly equal to the effect of behavioral intention to use to perceived usefulness.

It is advised to the BPJS Kesehatan to consider the factor affecting P-CARE acceptance which are external variables, percieved usefulness, perceived ease of use, attitude, actual use and behavioral intention to use.

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