P-Care BPJS Acceptance Model in Primary Health Centers

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Abstract

Electronic Medical Records (EMR) are increasingly adopted in healthcare facilities. Recently, implementation failure of electronic information systems is known to be caused by not only the quality of technical aspects, but also the user's behavior. It is known as applying the Technology Acceptance Model (TAM). This research aimed to analyze the acceptance model of p-care BPJS in the primary health centers. A total sample of 30 p-care BPJS users was drawn by multistage random sampling in which of these 30 primary health centers participated. Data analysis used both descriptive and inferential statistics. In the phase of structural model, it indicated that p-care BPJS acceptance model in the primary health centers was formed by Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) through Attitude towards use of p-care BPJS and Behavioral Intention to use p-care BPJS.

Keywords:

Electronic Health Records; Hopsital Information Systems; Models, Theoretical

Introduction

Information and communication technologies (ICTs) have great potential to improve health in both developed and developing countries by enhancing access to health information and making health services more efficient; they can also contribute to improving the quality of services and reducing their cost. Today, most electronic information systems used in the primary health centers only store data or patient aggregate information at the management level. Based on findings from the global eHealth survey by the WHO and the World Bank, the State of Africa and Southeast Asia were the highest (over 90%) individual patient data usage in paper-based format, whereas electronic medical records (EMR) were mostly adopted in developed and developing countries, such as Brazil, China and India [1-4].

An electronic medical record (EMR) is a real-time patient health record with access to evidence-based decision support tools that can be used to aid clinicians in decision-making. The EMR can automate and streamline a clinician's workflow, ensuring that all clinical information is communicated. It can also prevent delays in response that result in gaps in care. The EMR can also support the collection of data for uses other than clinical care, such as billing, quality management, outcome reporting, and public health disease surveillance and reporting. Furthermore, an EMR may contain clinical applications that can act on the data contained within its repository, for example, a clinical decision support system (CDSS), a computerized provider order entry system (CPOE), a controlled medical vocabulary, or a results-reporting system. In general, EMRs are clinician-focused in that they enhance or augment the workflow of clinicians or administrators [1, 3, 5,

6]. Currently, the only EMR concept used in primary health centers in Indonesia is *p-care BPJS*.

P-Care BPJS is Primary-Care BPJS. BPJS is Badan Penyelenggara Kesehatan or National Social Security. In Indonesia, *P-Care BPJS* is commonly known as *p-care BPJS* in Healthcare. *P-Care BPJS* is a web-based patient care application provided by BPJS. It is used for accessing data stored in the BPJS server including patient registration, laboratory, diagnosis, treatment and therapy [7]. Recently, implementation failure of electronic information systems is caused not only by the quality of technical aspects, but also the user's behavior. Applying the TAM may help reduce implementation failure [8, 9]. TAM is an information system theory that models how users come to accept and use technology: the main dependent constructs are behavior intention to use and system usage. Until now in Indonesia, studies examining the individual acceptance of the use of *p-care BPJS* have not been done yet. This study aimed to analyze the technology acceptance model of *p-care BPJS* in the primary health centers.

Methods

This cross-sectional observational study was conducted in February-May 2016.

The study population consisted of users of *p-care BPJS* at primary health centers in the province of East Java. Users of *p-care BPJS* were responsible to operate the p-care application in primary health center. A sample size of 30 users of *p-care BPJS* from 30 primary health centers in five districts, namely: Bangkalan; Bondowoso; Lamongan; Malang; Kediri with multistage sampling method, each district was represented by 6 primary health centers and one *p-care BPJS* user from each were included.

According to TAM, this study posited the following seven hypotheses:

H_1: *Perceived Ease of Use* (PEOU) significantly affects to *Perceived Usefulness* (PU)

H_2: *Perceived Ease of Use* (PEOU) significantly affects to *Attitude towards Use p-care BPJS*

H_3: *Perceived Usefulness* (PU) significantly affects to *Attitude towards Use p-care BPJS*

H_4: *Perceived Usefulness* (PU) significantly affects to *Behavioral Intention to Use p-care BPJS*

H_5: *Perceived Usefulness* (PU) significantly affects to *Actual p-care BPJS Use*

H_6: *Attitude towards Use p-care BPJS* significantly affects *Behavioral Intention to Use p-care BPJS*

H_7: *Behavioral Intention to Use p-care BPJS* significantly affects *Actual p-care BPJS Use*

The questionnaire has been prepared in accordance to questions in the TAM [8, 9]. The response scale for all TAM items was a six-point scale, ranging from 1 (Extremely Unlikely) to 6 (Extremely likely). The questionnaire was tested for the validity The result showed that the validity and reliability was good (the Cronbach's Alpha value was 0.896).

A total of 30 questionnaires were distributed with a 100% response rate. Thirty completed questionnaires were obtained and considered valid. Data analysis used both descriptive and inferential statistics. Inferential statistics was performed with *Structural Equation Modeling* (SEM) by using a SmartPLS 3.0 program consisting of two phases, the measurement model and the structural model [10].

Results

The return rate for the questionnaire was 100%. The characteristics of respondent description in table 1.

Table 1- Characteristics of Respondent

Characteristic of Respondent		Frequency	Percentage (%)
Sex	Male	12	40
	Female	18	60
	Total	30	100
Age (years)	< 20	1	3.3
	20-30	13	43.3
	31-40	16	53.4
	Total	30	100
Education Level	SMA/SMK	6	20
	Diploma	17	57
	Baccalaureate	7	23
	Total	30	100
Type of Education	Health	24	80
	Non-health	6	20
	Total	30	100

Of the 30 respondents, more than one-half were female (60%), and older than 30 years of age (53.4%). Fourty three percent were between the ages of 20-30 years of age and younger than 20 years of age (3.3%). Fifty-seven percent of respondents had obtained a 3-year diploma, with the remaining respondents having completed a four-year bachelor's degree and senior high school. Eighty percent passed from health education and the remainder having non-health education.

Construct validity test results with the Smart PLS in the measurement model can be seen in the value of convergent validity and reliability tests with value of composite reliability (CR) and Cronbach's Alpha. In Table 2 the value of the loading factor (convergent validity) was between 0.913-0.949; it can be explained that almost all indicators of loading factor >0.7 and Cronbach's Alpha > 0.6 (0.855-0.933). Thus all the constructs, Perceived Ease of Use, Perceived Usefulness, Attitude toward Use *p-care BPJS*, Behavioral Intention Use *p-care BPJS* Behavioral Intention Use *p-care BPJS*, Actual *p-care BPJS* Use have met the acceptable cut-off values of reliability [10, 11].

Table 2- Factor Loadings, Composite Reliability and Cronbach's Alpha

Constructs	Items	Loadings	Composite Reliability	Cronbach's Alpha
Perceived Ease of Use (PEOU)	PEOU 1	0.850		
	PEOU 2	0.940		
	PEOU 3	0.962	0.949	0.933
	PEOU 4	0.781		
	PEOU 5	0.691		
	PEOU 6	0.970		
Perceived Usefulness (PU)	PU1	0.903		
	PU2	0.902		
	PU3	0.640	0.931	0.910
	PU4	0.900		
	PU5	0.831		
	PU6	0.794		
Attitude toward Use *p-care BPJS* (ATU)	ATU1	0.879		
	ATU2	0.939	0.944	0.910
	ATU3	0.943		
Behavioral Intention Use *p-care BPJS* (BIU)	BIU	0.948		
	BIU2	0.911	0.913	0.855
	BIU3	0.782		
Actual *p-care BPJS* Use (AU)	AU1	0.767		
	AU2	0.962	0.923	0.876
	AU3	0.945		

The test results of the inner model consisted of a coefficient parameter path (path coefficient parameter) and the value of R Squared (R^2) in Table 3 and Table 4.

Table 3- Path Coefficient of Variables

Direct and indirect influence between endogenous and exogenous variable	B	Sample Mean (M)	Standard Error	P-values
PEOU → Attitude toward Use *p-care BPJS* (ATU)	0.521	0.165	0.327	0.041*
PEOU → Perceived Usefulness (PU)	0.892	0.894	0.036	0.000**
PU → Attitude toward Use *p-care BPJS* (ATU)	0.726	0.591	0.332	0.000**
PU → Actual *p-care BPJS* Use (AU)	0.108	0.130	0.163	0.507
PU → Behavioral Intention Use *p-care BPJS* (BIU)	0.260	0.281	0.172	0.130
Attitude toward Use *p-care BPJS* (ATU) → Behavioral Intention Use p-care BPJS (BIU)	0.657	0.627	0.172	0.000**
Behavioral Intention Use *p-care BPJS* (BIU) → Actual p-care BPJS Use (AU)	0.808	0.793	0.147	0.000**

Note: *sig=0.05, **sig=0.01

The result of path analysis in Table 3 shows that actual p-care BPJS Use were significantly influenced by Perceived Ease of Use through Perceived Usefulness, Attitude toward Use p-care BPJS, Behavioral Intention Use p-care BPJS. Actual p-care BPJS Use was not significantly influenced directly by Perceived Usefulness and also on Behavioral Intention Use p-care BPJS was not significantly influenced directly by Perceived Usefulness. A coefficient parameter path of Perceived Ease of Use p-care BPJS to Attitude toward Use p-care BPJS is smaller than through Perceived Usefulness p-care BPJS.

Table 4- R Squared (R^2)

Constructs	R-square (R^2)
Perceived Usefulness (PU)	0.793
Attitude towards Use *p-care BPJS* (ATU)	0.528
Behavioural Intention to Use *p-care BPJS* (BIU)	0.716
Actual *p-care BPJS* Use (AU)	0.790

In table 4, R-squared Actual *p-care BPJS* Use amounted 0.790, Behavioral Intention to Use *p-care BPJS is 0.716 and* Perceived Usefulness is 0.793.

- Perceived Usefulness

Perceived usefulness as the extent to which a person believes that using a technology will enhance her or his performance. Perceived Usefulness consists of six items: work more quickly, job performance, increase productivity, effectiveness, makes job easier, and useful. Participants responded likely and extremely likely on all of item work more quickly, job performance, increase productivity, effectiveness, makes job easier, and useful more than 75%.

Path coefficient of perceived usefulness affected Attitude towards Use *p-care BPJS* by 0.726 and significant p-value of 0.000 (<0.05). This can be explained that Perceived Usefulness user *p-care BPJS* positive effect and significantly influenced on Attitude toward Use *p-care BPJS*. Perceived Usefulness users of *p-care BPJS* had a positive effect on both Behavioral Intention and Actual *p-care BPJS* Use but were not significantly significant.

- Perceived Ease of Use

Perceived ease of use is the extent to which a person believes that using a technology will be free of effort. Perceived Ease of Use is composed of six items namely easy of learn, controllable, clear and understandable, flexible, easy to become skillful and easy to use. Participants responded likely and extremely likely on all of items easy of learn, controllable, clear and understandable, flexible, easy to become skillful and easy to use more than 79%. Effect of perceived ease of use to the perceived usefulness with path coefficient of 0.892 and significant p-value of 0.000 (<0.05). Perceived Ease of Use positively affected Perceived Usefulness users of p-care BPJS.

- Attitude Toward Use p-care BPJS

Attitude toward Use p-care BPJS is an individual's positive or negative feelings about performing the target behavior. Attitude toward use *p-care BPJS* is composed of three items have fun, enjoyment and boring. Participants responded likely and extremely likely on all of items have fun, enjoyment and boring more than 82%.

Attitude toward use of p-care BPJS positively affected Behavioral Intention Use *p-care BPJS* with path coefficient of 0.657 and significant p-value of 0.000 (<0.05). Attitude toward use of p-care BPJS of primary health center had a positive effect on Behavioral Intention Use *p-care BPJS*.

- Behavioral Intention Use p-care BPJS

Behavioral intention Use p-care BPJS consists of three items intend, predict and plan. Behavioral intention to use p-care BPJS had positive effect on actual p-care BPJS use with the path coefficient of 0.808 and significant with a p-value of 0.000 (<0.05). Behavioral intention to use p-care BPJS positively affected actual p-care BPJS effect on primary health center.

- Actual p-care BPJS Use

Actual *p-care BPJS* use was significantly influenced by perceived ease of use through perceived usefulness, attitute toward use *p-care BPJS,* and behavioral intention to use *p-care BPJS*. Actual *p-care BPJS* Use was not significantly influenced by perceived usefulness. Behavioral intention to use *p-care BPJS* was also not significantly influenced by perceived usefulness.

Discussion

This study analyzed the technology acceptance model (TAM) factors influencing *p-care BPJS* users' actual use in the Primary Health Centers. In particular, the influences of perceived usefulness, perceived ease of use, and attitude towards *p-care BPJS* on intention to use *p-care BPJS* are examined. At the same time, hypotheses about the influence among perceived usefulness, perceived ease of use, and attitude towards p-care BPJS use were also tested.

The was a strong effect (0.790) of behavioral intention to use *p-care BPJS* [11]. This showed that the perceived usefulness, attitude toward use of *p-care BPJS* and behavioral intention to use *p-care BPJS* could explain the variance of actual *p-care BPJS* amounted to 79% and the remaining 21% was influenced by other variables.

Perceived usefulness affected attitude toward use of *p-care BPJS*, which is in line with previous studies of the acceptance on the Clinical Information Systems among medical staff [12], [13], [14].

Perceived usefulness users of *p-care BPJS* had a positive effect on behavioral intention to use *p-care BPJS* but was not significant. Perceived usefulness was not affected by behavioral intention to use *p-care BPJS*, which is in line with previous studies [15]. Perceived usefulness of *p-care BPJS* had a positive effect on actual *p-care BPJS* use, but was also not significant. Perceived usefulness affected actual *p-care BPJS* use. This is in line with previous studies [15].

Perceived ease of use possitively affected on perceived usefulness of *p-care BPJS* users of the primary health center, which is in line with the TAM as proposed by Davis as well as the previous studies [8][16][17]. Perceived ease of use positively affected attitude towards use of *p-care BPJS*. Perceived ease of use positively affected attitude toward use of *p-care BPJS* user of the primary health center, this is in line with the previous studies physician's acceptance of hospital information systems [16], in the Acceptance of Telemedicine Systems [17].

Attitude toward use of *p-care BPJS* in primary health centers was positively effected by behavioral intention to use *p-care BPJS*. This research is also consistent with results of previous studies of in the Acceptance of Telemedicine Systems [17], user acceptance of a picture archiving and communication system (PACS) [18].

Behavioral intention to use *p-care BPJS* affected actual *p-care BPJS* use. This is in line with previous studies of user satisfaction and technology acceptance [22] and students acceptance of mobile learning for higher education [23].

Perceived usefulness affected actual *p-care BPJS* use, this is in line with previous studies of end-users' acceptance and yse of hybrid library services [25], electronic medical eecords: TAM, UTAUT and culture [26].

Goodness of Fit (GoF) index of *p-care BPJS* acceptance model in the primary health centers was 0.741. It is good and fits the model. There are three categories in GoF index: small=0.1; medium=0.25; and large=0.36. GoF index is crucial for assessing the global validity of a complex model [27].

The R^2 for the model was 0.790. This means that the diversity of behavioral data of *p-care BPJS* use in primary health centers that can be explained by the construct is 79%, the remaining 21% is explained by other constructs that were not included in the model. The determinant of *p-care BPJS* acceptance model in the primary health centers is perceived ease of use and perceived usefulness.

Conclusions

Five of seven hypotheses tested here were accepted. There was a difference with the original TAM, but in line with previous studies. Actual *p-care BPJS* use was significantly influenced by perceived ease of use through perceived usefulness, attitude toward use of *p-care BPJS,* behavioral intention to use *p-care BPJS*. Actual *p-care BPJS* use was not significantly influenced by perceived usefulness or behavioral intention to use *p-care BPJS,* not was it significantly influenced by perceived ease of use. Effect of perceived ease of use has become a determinant for successful implementation of *p-care BPJS* in the primary health centers. Thus, users of *p-care BPJS* need to be trained on an ongoing basis to keep up to date in understanding the latest version of the program. As this is a preliminary attempt to understand how the system is being accepted, a more comprehensive rigorous research approach can be adopted in the future that incorporates a larger model, such as Unified Theory of Acceptance and Use of Technology (UTAUT) and others that are able to capture external influences. It is with a hope that *p-care BPJS* will evolve and improve to serve the Primary Health Centers as a whole as well as the community through better health care approach using computer based solutions.

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References

[1] World Health Organization (WHO). *Management of Patient Information: Trends and Challenges in Member States: based on the findings of the second global survey on eHealth*. Global Observatory for eHealth Series-Volume 6 (2012)

[2] Lippeveld, T., Sauerborn, R., Bodart, C. *Design and Implementation of Health Information Systems*, WHO, (2000), Geneva

[3] Decree of Ministry of Health (MoH) Republic of Indonesia No.192/Menkes/SK/VI/2012 ROADMAP Action Plan of Strengthening on Health Information Systems,available: http://depkes.go.id/downloads/RoadMapSIK.PDF accessed December 11th 2015

[4] United States Department for Health and Human Services. *Electronic medical records*. The Office of the National Coordinator for Health Information Technology, United States Department for Health and Human Services. (2012) (http://healthit.hhs.gov/portal/server.pt/community/electronic_medical_records/1219/home/15591 accessed January 7th 2016

[5] Cilliers L., Flowerday, S.V., Health information systems to improve health care: A telemedicine case study, SA *Journal of Information Management* 15(1), Art. #541, (2013), 5 pages. http://dx.doi.org/10.4102/ sajim.v15i1.541

[6] Johnson DL, Spielman CM. *Data and Information Management*. In: LaTour KM, Maki SE, Ed. Third. Health Information Management: Concepts, Principles and Practice. American Health Information Management Association (AHIMA) (2010): Chicago Illinois

[7] http://www.bpjs-online.com/mengenal-pcare-bpjs-kesehatan accessed December 12th 2015

[8] Davis, F.D., Perceived usefulness, perceived ease of use, and Acceptance of Information System Technology, *MIS Quarterly*, **13** (1989)

[9] Jogiyanto HM, Sistem Informasi Keperilakuan. Yogyakarta: Penerbit Andi, 200

[10] Hair JF, Hult GTM, Ringle CM, Sarstedt M. (2014) *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. United Kingdom: SAGE Publication.

[11] Mustafa, Wijaya. (2012) *Panduan Teknik Statistik SEM & PLS dengan SPSS AMOS*. Yogyakarta: Cahaya Atm Pustaka

[12] Christors D., Modeling the acceptance of the clinical information systems among medical staff: An extended TAM model. *Journal Biomedical Informatics*, **4** (2011), 553-564

[13] Dhesi BR, Cheah WL, Perception of End Users on I-Kelahiran in Sabah, Malaysia, *electronic Journal of Health Informatic*s; **8** (2014), 19

[14] Zhu Ge, Sangwan S., Lu T., A new theoretical framework of technology acceptance and empirical investigation on self-efficacy-based value adoption model, Nankai *Business Review International*, **1** (2010

[15] Sentosa I, NikMat NK. Examining a theory of planned behavior (TPB) and technology acceptance model (TAM) In internet purchasing Using Structural Equation Modeling. *Journal of Arts, Science & Commerce* **11** (2012), 2231-4172.

[16] ChenRai-Fu, HsiaoJu-Ling, An investigation on physician's acceptance of hospital information systems: A case study. *International Journal of Medical Informatics* (2012), 810-820

[17] Djamasbi S, Fruhling AL, Loiacono ET, The influence of affect, attitude and usefulness in the acceptance of telemedicine systems. *Journal of Information Technology Theory and Application (JITTA): A Publication of the Association for Information System* **10** (2009), 41-58

[18] Bakheet Aldosari, User acceptance of a picture archiving and communication system (PACS) in a Saudi Arabian hospital radiology department. Aldosari, *BMC Medical Informatics and Decision Making* **12** (2012), 44

[19] Chihung L, I-Chun L, Jinsheng R, Barriers to physicians' adoption of healthcare information technology: An empirical study on multiple hospitals, *Journal Medical System* **36** (2012), 1965–1977

[20] C.Lin, I-C. Lin, Roan J., Barriers to Physicians' Adoption of Healthcare Information Technology: An Empirical Study on Multiple Hospitals, *Journal Medical System* (**36**) (2012), 1965–1977

[21] Jian WS, Shabbir SA, Sanjay PS, Peisan L, Hsu MinH, Ho CH, Li YC, Wen HC. Factors influencing consumer adoption of USB-based Personal Health Records in Taiwan, BMC Health Services Research, (2012) 12:277

[22] Miyamoto M, Kudo S., Lizuka K. Measuring ERP success: Integrated model of user satisfaction and technology acceptance: An empirical study in japan. *International Proceedings of Economics Development and Research* **57** (2013), 86

[23] Nassuora A.B. Students Acceptance of Mobile Learning for Higher Education In Saudi Arabia, *American Academic & Scholarly Research Journal* **4** (2012).

[24] SivanarulselvanSachidanandam, Why Physicians Do or Do Not Use Computerized Physician Order Entry Systems: Applying The Technology Acceptance, ProQuest Information and Learning Company, 2007

[25] Tibenderana P, Patrick O, Ikoja-Odongo J, Wokadala J. Measuring levels of end-users' acceptance and use of hybrid library services, *International Journal of Education and Development using Information and Communication Technology (IJEDICT),* **6** (2010), 33-54

[26] Trimmer K, Cellucci, Wiggins C, Woodhouse W. Electronic Medical Records: TAM, UTAUT and Culture, International *Journal of Healthcare Information Systems and Informatics* **4** (2009), 55-68

[27] Akter S, D'Ambra J, Ray P. An evaluation of PLS based complex models: the roles of power analysis, predictive relevance and GoF index, (2011). Proceedings of the 17th Americas Conference on Information Systems (AMCIS2011) (pp. 1-7). Detroit, USA: Association for Information Systems.

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