

Intention and Usage of Computer Based Information Systems in Primary Health Centers

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ABSTRACT

The computer-based information system (CBIS) is adopted by almost all of in health care setting, including the primary health center in East Java Province Indonesia. Some of softwares available were SIMPUS, SIMPUSTRONIK, SIKDA Generik, e-puskesmas. Unfortunately they were most of the primary health center did not successfully implemented. This study applied the Unified Theory of Acceptance and Use of Technology (UTAUT) to assess intention and usage of CBIS in East Java. It was a cross-sectional survey, conducted on February-Maret 2015. A total 30 of user CBIS were identified and questioners were distributed which 100% completed. The user's CBIS intention was significantly influenced by performance expectancy, effort expectancy and social influence. CBIS usage was significantly influenced by user's intention and facilitating conditions. UTAUT results indicated that the facilitating conditions have a major impact to use of CBIS in primary health center. The results of this study can be helpful to the East Java provincial Health Office to adjust their program strategies and tactic for providing user's CBIS facilities in order to implement CBIS successfully.

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1. INTRODUCTION

Health Information System (HIS) in most countries are inadequate in providing the necessary support for management [1]. In Africa, poor HIS is the important challenges in monitoring the achievement of the Millennium Development Goals (MDGs). Health system performance cannot be assessed or monitored because of incomplete and inaccurate data in HIS [2]. One of the data source on HIS is data and health information in primary health centers (*Puskesmas*).

Data and Information Center of Ministry of Health RI explained that the electronic information system used was different in each primary health centers in programs sourced from the District/State/Province or Donor. The survey conducted in Nusa Tenggara Barat found that primary health centers made more than 300 reports per year through 8 kinds of available CBIS software so the workers could not concentrate and entry poorly. Every CBIS had different databases and was not integrated. The administrative burden was also too high [3].

The results of evaluation HIS in Indonesia was carried out by the Center for Data and Information Ministry of Health RI in 2007, using the Health Metrics Network-World Health Organization (HMN-WHO) consists of 6 components HIS, it is known that in general HIS in Indonesia already exist but inadequate. Components of the resources (47%), indicators (61%), the source of the data (51%), data quality (55%), the use and dissemination of data (57%) as well as data management only (35%) [4].

Today, most of electronic information system used in the primary health care only store data or patient aggregate information because of the needs in management level. Based on the findings in the global eHealth survey by the WHO and the World Bank, it was known that the State of Africa and Southeast Asia were the highest (over 90%) individual patient data usage in paper-based format [5]. Health information is a strategic resource that is needed in the process of management, decision-making, governance and implementation of accountability and good governance [6], [7].

Health information was obtained from the collecting and processing data as input for decision-making is called the Management Information System of Community Health Centers (SIMPUS) or commonly known as electronic information systems or computer-based information system (CBIS).

The results of survey in six district primary health centers Banjarbaru South Kalimantan November 2013 noted that most of primary health centers or 4 of 6 samples (66.7%) did not implement of SIMPUS. Only 2 of 6 or 33.3% used SIMPUS. Of 2 primary health centers that use the SIMPUS, 50% agree that the SIMPUS increased workload at the primary health center [8].

In line with the theory of acceptance and the use of information systems (IS), the Unified Theory of Acceptance and Use of Technology (UTAUT) is widely used. UTAUT is the theory to predicts and explains the intentions and behavior of the use of Information System which is a development of eight models of the previous studies: TRA; TAM; Motivational Model; TPB; A Combined Theory of Planned Behavior/Technology Acceptance Model or CTPB/TAM; Model of Personal Computer Use or MPCU; Diffusion of Innovations Theory or IDT; Social Cognitive Psychology | Cognitive Theory or SCT [9]-[11].

This study aimed to know the acceptance and intention to use computer-based SI (CBIS) by the users of CBIS in primary health center using UTAUT model approach.

2. RESEARCH METHOD

This observational analytic research with cross-sectional study design, was conducted in February-March 2015. The study population was user of CBIS of primary health centers in the province of East Java. Sample of 30 people coming 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.

The questionnaire has been prepared in accordance questions in the original UTAUT [12],[13]. The response scale for all UTAUT items was a six-point scale, ranging from 1 (Extremely Unlikely) to 6 (Extremely likely). Before being used in research, the questionnaires were tested for the validity and reliability first. The result showed that the validity and reliability was good (the Cronbach Alpha value was 0.842). A total 30 questionnaires were redistributed which 100% (30 responses) was answered completely and considered as valid ones.

3. RESULTS AND ANALYSIS

Primary Health Center uses various types of Electronic Information System or CBIS in five districts/cities in East Java province as shown in Table 1, most of primary health centers using SIKDA Generik 46.7%.

Table 1. Type of CBIS in Five Districts Province East Java

Type of CBIS	Frequency	Percentage
Simpustronik	6	20.0
SIKDA Generik	14	46.7
SIK	6	20.0
e-puskesmas	4	13.3
Total	30	100

Source: data processing by Ms Excel, 2015

Construct validity test results with the Smart PLS in 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) all construct between 0.605-0.981, it can be explained that almost all indicators of loading factor > 0.7. Only one indicator of social constructs that influence or SI1 (subjective norm) with loading factor of 0.605. The loading factor of 0.5 - 0.6 is still considered quite [14]. Average Variance Extracted (AVE) > 0.5 (0.622-0.927), it shows that all indicators are valid. CR > 0.7 (0.839-0.958) and Cronbach's Alpha > 0.6 (0.733-0.934). Thus all the constructs,

Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Behavior Intention, Usage Behavior has met the cut-off value of the required and acceptable. This shows the reliability of the measurement model is very good.

Tabel 2. Factor Loadings, Composite Reliability, AVE and Cronbach's Alpha

Constructs	Items	Loadings	Composite Reliability	AVE	Cronbach's Alpha
Performance Expectancy (PE)	PE1	0.740	0.891	0.622	0.854
	PE2	0.787			
	PE3	0.824			
	PE4	0.796			
	PE5	0.794			
Effort Expectancy (EE)	EE1	0.849	0.886	0.722	0.811
	EE2	0.849			
	EE3	0.852			
Social Influence (SI)	SI1	0.605	0.839	0.839	0.733
	SI1	0.907			
	SI2	0.856			
Facilitating Conditions (FC)	FC1	0.877	0.958	0.884	0.934
	FC2	0.981			
	FC3	0.959			
Behavior Intention (BI) or Intention to use CBIS	BI1	0.863	0.905	0.761	0.841
	BI2	0.928			
	BI3	0.822			
Usage Behavior (UB) or Usage CBIS	UB1	0.752	0.927	0.927	0.881
	UB2	0.976			
	UB3	0.957			

Source: data processing by using SMART-PLS, 2015

After the model being estimated to meet criteria of outer model, and then continued to the inner model test. The test results inner model consisted of a coefficient parameter path (path coefficient parameter), the value of R Square (R^2) in Table 3 and Table 4.

The result of path analysis in Table 3 shows that intention to use CBIS were significantly influenced by performance expectancy, effort expectancy and social influence (all p-values <0.05). Usage CBIS were significantly influenced by facilitating conditions and intention to use CBIS. Path coefficient parameter and p-values on facilitating conditions (0.952; 0.000) is more than intention to use CBIS (0.066; 0.046).

Table 3. Path Coefficient of Construct

Direct and indirect influence between endogenous and exogenous variable	Path Coefficient	Sample Mean (M)	Standard Error	T Statistics	P-values
Performance Expectancy → Intention to Use CBIS	0.304	0.347	0.135	2.250	0.025*
Effort Expectancy → Intention to Use CBIS	0.382	0.328	0.200	1.967	0.044*
Social Influence → Intention to Use CBIS	0.327	0.367	0.157	2.077	0.038*
Facilitating Conditions → Usage CBIS	0.952	0.958	0.025	38.266	0.000**
Intention to Use CBIS → Usage CBIS	0.066	0.064	0.049	1.959	0.046*

Source: data processing by using SMART-PLS, 2015 (* sig=0.05, ** sig=0.01)

In Table 4, R-square intention to use CBIS amounted 0.575. It meant that the effects of the construct by 0.579 in the category of moderate and almost strong. This showed that the Performance Expectancy, Effort Expectancy, Social Influence could explain the variance intention to use CBIS amounted to 57.9% and the remaining 42.1% was influenced by other variables. R-square of CBIS usage amounted 0.934 (strong). This showed that the intention to use CBIS and facilitating conditions of CBIS usage explained variance of 93.4% and the remaining influence of other variables.

Tabel 4. R-Square (R^2)

Constructs	R-square (R^2)
Intention to Use CBIS	0.575
Usage CBIS	0.934

Source: data processing by using SMART-PLS, 2015

3.1. Performance Expectancy

Performance Expectancy consists of five indicators: perceived usefulness, extrinsic motivation, job-fit, relative advantage, outcome expectations. Participants responded likely and extremely likely on all of indicator perceived usefulness, extrinsic motivation, job-fit, relative advantage, outcome expectations more than 78%.

Path coefficient of performance expectancy affected the intention to use CBIS by 0.304 and significant t-statistic of 2.250 (> 1.96). This can be explained that the performance expectancy user CBIS positive effect on intention to use CBIS.

Performance expectancy positive affected behavior intention, this is in line with previous studies [10],[14]. There was a difference with the results of research on the use “I Pass” in Taiwan which states that performance expectancy had no significant effect on behavior intention [15].

3.2. Effort Expectancy

Effort expectancy is composed of three indicators namely perceived ease of use, complexity, ease of use. Participants responded likely and extremely likely on all of indicator perceived ease of use, complexity, ease of use more than 81%. Effect of effort expectancy to the intention to use CBIS tested with path coefficient of 0.382 and significant t-statistic of 1967 (>1.96). This can be explained that the effort expectancy user CBIS affected positively on intention to use CBIS.

Effort expectancy affect positively on intention to use CBIS. CBIS user of the primary health centre, this is in line with the theory UTAUT proposed by Venkatesh et al., 2003. This result is as well as the previous study [10], [14]. There is a difference with the results of the Examining Location-Based Services (LBS) Usage from the Perspectives of Unified Theory of Acceptance and Use of Technology and Privacy Risk which stated that the effort expectancy had no significant effect on behavior intention [9].

3.3. Social Influence

Social influence is composed of sub construct subjective norms, social factors and image. Participants responded likely and extremely likely on all of indicator subjective norms, social factors and image more than 84%.

Social Influence positively affected intention to use of CBIS with path coefficient of 0.327 and significant t-statistic of 2.077 (>1.96). This can be explained empirically that social influence of primary health center user CBIS had positive effect on intention to use CBIS.

This research line is consistent with results of previous studies on health information systems to improve health care: A telemedicine case study which found that social influence results as positive effect on behavior intention [10],[14].

3.4. Intention to Use CBIS

Intention to use CBIS consists of three indicators intend, predict and plan. Intention to use CBIS had positive effect on CBIS usage with the path coefficient of 0.066 and significant with a t-statistic of 1.959 (>1.96). It can be empirically explained that the intention to use CBIS affected positively on CBIS usage effect on primary health center.

The R^2 intention to use CBIS was 0.575, this could explain that performance expectancy, effort expectancy, social influence may explain variance intention to use CBIS amounted to 57.9% and the remaining 42.1% is influenced by other variables.

3.5. Facilitating Conditions

Fasilitating conditions consisted of three indicators of perceived behavior control, fasilitating conditions, compatibility. Fasilitating conditions had positive effect on Usage CBIS with coefficient path of 0.952 and significant with a t-statistic of 38.266 (>1.96). This can be explained that empirically, fasilitating conditions had positive effect on usage CBIS at the primary health center.

Path coefficient on facilitating condition scored highest among the construct that affected the usage CBIS in primary health centre. It supported the statement of Venkatesh et al., that facilitating conditions affects the employees in the organization. It shows that facilitating conditions in primary health center have

highest impact on CBIS usage. Facilitating conditions include resource availability, such as technical assistance, knowledge of the system and compatibility with other systems already in use [12],[13].

4. CONCLUSION

Five hypothesis of this study are all accepted and in line with the original theory of UTAUT. Variance intention to use CBIS affected by performance expectancy, effort expectancy, social influence amounted to 57.9% and the remaining 42.1% is influenced by other variables. CBIS usage variance in primary health centers by 93.4% affected by the intention to use CBIS and facilitating conditions and the remaining influence of other variables. Effect of facilitating conditions has the most powerful among the other construct, it is becoming a major determinant for successful implementation of CBIS in primary health centers. Facilitating conditions include the availability of technical assistance in the operation of CBIS, a good grasp on the system that is being used for the user and CBIS should be compatible with other systems.

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REFERENCES

- [1] T. Lippeveld, *et al.*, "Design and Implementation of Health Information Systems," WHO, Geneva, 2000.
- [2] Mutale W, *et al.*, "Improving health information systems for decision making across five sub-Saharan African countries: Implementation strategies from the African Health Initiative," *BMC Health Services Research*, vol/issue: 13(2), pp. S9, 2013. <http://www.biomedcentral.com/1472-6963/13/S2/S9>.
- [3] Soepardi J., "Human Resources for Health Information System, Center for Data and Information Ministry of Health," *Scientific Meeting IX Medical Informatics PSIK Gunadarma, Depok-Jawa Barat*, 2012.
- [4] Ministry of Health RI, "Surat Keputusan No.192/Menkes/SK/VI/2012: ROADMAP Plan of Strengthening Health Information System," 2012. <http://depkes.go.id/downloads/RoadMapSIK.PDF>
- [5] 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*, vol. 6, 2012.
- [6] Ministry of Health RI, "Surat Keputusan No.184 tahun 2004," *The Basics Policy of Primary Health Center*, 2012. <http://www.depkes.go.id>.
- [7] Ball M. J., *et al.*, "Personal Health Records: Empowering Consumers," *Journal of Healthcare Information Management*, vol/issue: 21(1), 2007.
- [8] Hosizah, "Survey on Using Computer-Based Information Systems (CBIS)," in *Primary Health Center District Banjarbaru South Kalimantan*, 2013.
- [9] Z. Tao, "Examining Location-Based Services (LBS) Usage From The Perspectives of Unified Theory of Acceptance and Use of Technology and Privacy Risk," *Journal of Electronic Commerce Research*, vol/issue: 13(2), pp.135-144, 2012.
- [10] Fillion G., *et al.*, "Testing UTAUT on the Use of ERP Systems by Middle Managers and End-Users of Medium-to Large-Sized Canadian Enterprises," *Academy of Information and Management Sciences Journal*, vol/issue: 15(2), 2012
- [11] Y. C. Son, "Factors Affecting Individuals To Adopt Mobile Banking: Empirical Evidence From The UTAUT Model," *Journal of Electronic Commerce Research*, vol/issue: 13(2), pp. 104-121, 2012.
- [12] Venkatesh V, *et al.*, "A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies," *Management Science Journal*, vol/issue: 46(2), pp. 186-204, 2000.
- [13] Venkatesh V, *et al.*, "User Acceptance of Information Technology: Toward a Unified View," *MIS Quarterly*, vol. 27, pp. 425-478, 2003. Available from: http://www.venkatesh.com/it/organizations/theoretical_models.asp.
- [14] Hengky L. & Ghazali I., "Partial Least Squares: Konsep Aplikasi Path Modelling," UNDIP, Semarang, 2013.
- [15] Cilliers L. & S. V. Flowerday, "Health information systems to improve health care: A telemedicine case study," *SA Journal of Information Management*, vol/issue: 15(1), 2013. Art. #541, 5 pages. <http://dx.doi.org/10.4102/sajim.v15i1.541>.

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