ANALYSIS OF FACTORS AFFECTING INTENTION TO USE INFORMATION SYSTEMS ON THE ACQUISITION AND CLASSIFICATION OF CERVICAL CANCER IMAGE

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ABSTRACT

The use of ICT for health is known as e-health. Information System on the Acquisition and Classification of Cervical Cancer Image (ISAC) is one of e-health built on the basis of research in the field of cervical cancer image. Before applying ISAC, we need to analyze to see the readiness of user acceptance and adaptation so that it can be implemented optimally. This study aims to prove the main factors affecting the user intention to use SIPK on the basis of a combined model of the theory of planned behavior and the technology acceptance. The model testing in this research was done by using SPSS software. The result of this research obtained the factors influencing user acceptance in using ISAC as well as recommendation as an effort for improvement. These factors are perceived service availability which significantly influenced perceived ease of use, perceived ease of use which significantly influenced perceived usefulness, perceived ease of use that significantly influenced attitude toward using technology, perceived usefulness that significantly influenced attitude toward using technology, and attitude toward using technology significantly influencing behavioral intention to use.

Keywords: *Perceived Service Availability, Perceived Ease Of Use, Perceived Usefulness, Attitude Toward Using Technology, Behavioral Intention To Use.*

1. INTRODUCTION

The use of information technology has now become a necessity, one of which is on health care [1] and the services of doctors to patients [2] to meet the demands on the quality of health in the community. In Indonesia, the regulation of the minister of health has set the grand design of National Health Information System (HIS) which is applied as a service and health system nationally. Health information systems are made with the standards that meet the expectations of the community.

Healthcare services using information technology have now become an important thing in a health service in hospitals as well as in other health areas [3] [4]. In Indonesia, some hospitals have used health services through applications such as registration services, health education consulting service information, and online internal consultations. E Health provides convenience for patients in accessing health information through internet.

The factors influencing the behavior of technology acceptance related to the intention of using an information system have been widely researched [5] [6] [7], usually used to evaluate the acceptance of an information technology system. Evaluations can use many methods such as Technology Acceptance Model (TAM) on the acceptance of health information technology [8], on the acceptance of E-payment [9] [10], on social media [11], and on E-commerce [12].

Information Systems on the Acquisition and Classification of Cervical Cancer Image (ISAC)

is an integrated website-based health information system [13]. This information system is designed to assist pathologists for the acquisition of single cells for early detection of cervical cancer and to classify cell abnormalities. The difficulty of analyzing the Pap smear [14] [15], which is observation of cell images, is commonly found in field practice due to the presence of cells that interfere with the observation of cell images required in early detection of cervical cancer to determine normal or abnormal cell classification.

To improve the quality of ISAC, this paper aimed to evaluate ISAC System on Cervical Cancer Image by using combination method of Technology Acceptance Model (TAM) and Theory of Planned Behavior (TPB). In this case, TAM offers a powerful and simple explanation for the acceptance of technology and the behavior of its users [16]. The TAM model is based on Theory of Reasoned Action (TRA) which states that a person will receive a computer if the computer provides perceived usefulness and perceived ease of use [16] while TPB explains that attitude and subjective norms are two prominent variables to the intention that is combined with perceived behavior control (PBC) [17]. With the combination of TAM and TPB, it has been integrated in predicting students' intentions to use internet for academic purposes [17] and to combine explanations and predictions of e-commerce adoption in organized systems [18].

The novelty from this paper is a procedure for evaluating the application of information systems in the acquisition and classification of cervical cancer image, in the characteristic aspects of TAM and TPB. This kind of evaluation has never been done for the type of system regarding the acquisition and classification of cervical cancer image. This is very useful in the development of a system to assist pathologists in evaluating the normal and abnormal classification of Pap smear cells.

By combining the two models, it is expected to analyze the factors that influence attitudes and acceptance behavior of ISAC. This evaluation is very important for ISAC and health sector, especially for the management to know the level of use acceptance on ISAC that has been made and applied in the pathology and anatomy laboratory.

In this paper, the first section describes the background of the research. The second section describes the conceptual model used in this paper based on several previous studies. The third section describes the research methods used. The fourth section describes the discussion to obtain the results of the research. The fifth section explains the conclusions of the research and provides advice to the developers of the ISAC application.

2. CONCEPTUAL MODEL

In previous researches on the information technology system, TAM was often used as the underlying theory of the research. In TAM, the intention variable is influenced by two other variables: perceived usefulness and perceived ease of use [19]. However, TAM does not include the influence of social factors and control factors on behavior whereas in the next research it is known that these two factors have been proven to have a significant influence on the behavior of information technology use. These factors are also the determinants of behavior in Theory of Planned Behavior (TPB).

In TPB, social factors or social influences are called subjective norms that have been shown to affect intentions. The control factor in TPB which is perceived behavior control that is modeled affects either intention or behavior directly [20]. Perceived behavior control is a control factor found in TPB, this factor influences directly to behavior [21]. This means that the TAM and TPB models can be used together to analyze the factors that influence attitude and behavior on the use acceptance of information systems [22]. The following are integrated models and hypotheses about factors that influence the acceptance of ISAC.

Figure 1. Integrated models of TAM and TPB that connect between TAM and TPB in validating the adoption model for ISAC by adding perceived service availability factors.
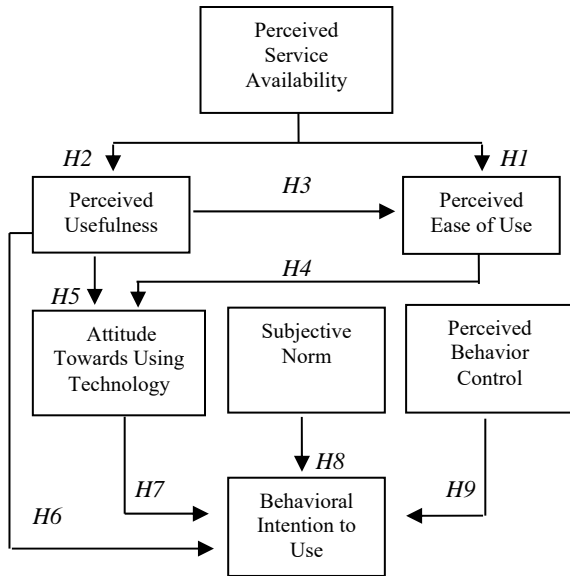
Figure 1: Integrated Model of TAM and TPB

1. Perceived ease of use is a technology defined as a measure by which a person believes that computer can be easily understood and used [23] [25]. Indicators used to measure perceived ease of use are easy to learn, flexible, able to control work, and easy to use [23]

2. Subjective norms are perceptions or views related to the perception that a person has pressure given by an organization, society, or peer group to perform certain behaviors [25].

3. Perceived behavioral control is conceptualized as a perception of the ease or difficulty in performing behavior and is assumed to reflect past experience and anticipation of obstruction [26].

4. Perceived usefulness is conceptualized as the measure by which the use of technology is believed to benefit people who use it [23]. Perceived usefulness is measured through indicators such as improving work performance, making the job easier, and overall the technology used is considered to be useful [23].

5. Attitude toward use is defined as the attitude of the user toward the use of a system in the form of acceptance or rejection as the impact of using technology in his work [23]. Attitude

toward using technology is measured with indicators that technology is fun to use, that using technology is a good idea, that the use of technology is deemed necessary, appealing to everyone using technology, and that using technology is a wise idea [23].

6. Behavioral intention to use is a form of attitude or behavior that tends to keep using a technology [23].

7. Perceived service availability is a perception of the user that the system used is considered to be capable of providing connection and that the system is on time [27]. Perceived service availability is measured by indicators that can use technology anytime and anywhere, that the technology can be easily accessed and portable, and that technology is available.

In this study, the individual's intention to use the SIPK service was analyzed by combining technology and individual perspective. The proposed research model assesses the predictive value of both the original TAM and TPB constructs constructed and correlated with hypotheses as shown in Figure 2.

3. REASEARCH METHOD

ISAC can be defined as a system that supports the existence of a process to obtain the image of cervical cancer. In addition, the existence of this system presents a system for classifying the image of cervical cancer.

Figure 2: ISAC Website of Cervical Cancer Image

Figure 2 is the display of ISAC website where in this study what factors affect users to use the system will be analyzed. ISAC website can be seen in figure 2.

In this study, steps were prepared to achieve this goal. Stages of research methods used in this study consist of several stages as in Figure 3.
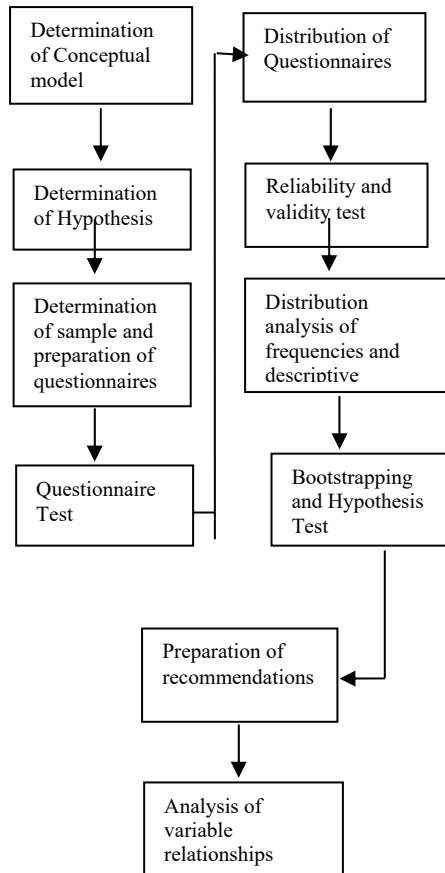

Figure 3: Research Method

Based on Figure 3, a description of each stage of the research methodology is described. This research methodology consists of 3 main stages, namely: design stage, implementation phase, and stage of discussion results. The design stage is the first stage conducted in the research methodology. The design stage consists of four main processes, namely: conceptual model determination, research hypothesis determination, sample determination, and preparation and test of questionnaire. The implementation stage consists of four main processes, namely: questionnaire distribution, validity and reliability test, analysis of frequency distribution and descriptive statistics, and
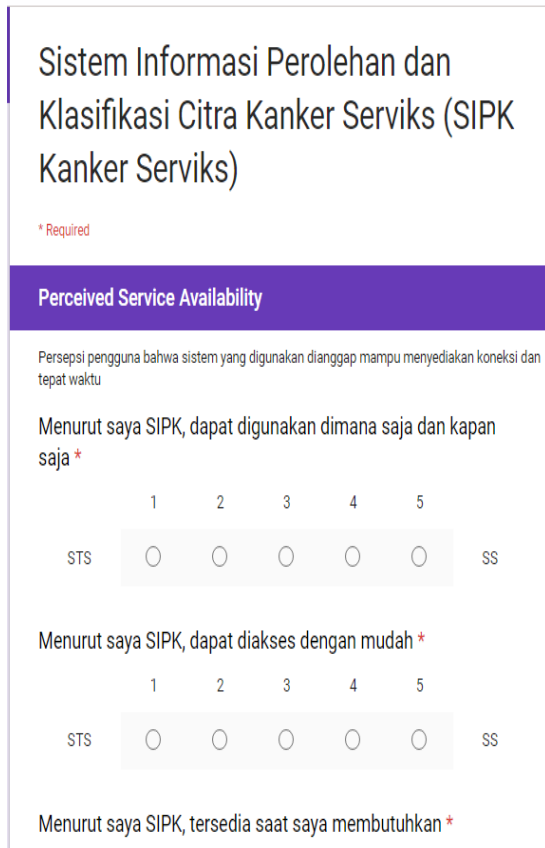
bootstrapping test and hypothesis test. This stage of analysis and discussion is a stage to conduct analysis and discussion of the results of the implementation stage that has been done before. This stage consists of two main processes, namely: analysis of variable relationships and preparation of improvement recommendations to the developer of ISAC.

From the description of research methods in figure 1 and integrated model and research hypothesis conducted, then the research hypothesis is formulated as follows:

1. H1   : Perceived service availability has a positive and significant influence on perceived ease of use in the use of ISAC

2. H2   : Perceived service Availability has a positive and significant influence on perceived usefulness in the use of ISAC

3. H3   : Perceived ease of use has a positive and significant influence on perceived usefulness in the use of ISAC

4. H4   : Perceived ease of use has a positive and significant influence on attitude towards using technology in the use of ISAC

5. H5   : Perceived usefulness has a positive and significant influence on attitude towards using technology in the use of ISAC

6. H6   : Perceived usefulness has a positive and significant influence on behavioral intention to use in the use of ISAC

7. H7   : Attitude towards using technology has a positive and significant influence on behavioral intention to use in the use of ISAC

8. H8   : Perceived behavior control has a positive and significant influence on behavioral intention to use in the use of ISAC

9. H9   : Subjective norms have a positive and significant influence on behavioral intention to use in the use of ISAC

This study used random sampling technique through online questionnaire with criteria which are the people who are able to use internet and have an interest to use ISAC applications.

The making of questionnaires in table 1 is based on the variables in the integrated model of TAM and TPB model as well as the addition of perceived service availability variable with the number of 29 questions divided into 7 variables. The example of online questionnaires can be seen in Figure 4.

Figure 4: Online Questionnaire

Table 1: Mapping questionnaire statement items into the main variables [26]

Variable	Code	Statements
Perceived Service Availability	PSA1	I think that ISAC can be used anywhere and anytime
	PSA2	I think that ISAC can be accessed easily
	PSA3	I think that ISAC is available when I need it
	NPSA2	I think that ISAC is difficult to access
Perceived Ease of Use	PEOU1	I think that ISAC is understandable and clear
	PEOU2	I think that I can easily learn to operate ISAC
	PEOU3	I think that ISAC is generally easy to use
	PEOU4	I feel skilled at using ISAC
	NPEOU3	I think that ISAC is generally difficult to use
Perceived Usefulness	PU1	I think that using ISAC can improve the efficiency in early detection of cervical cancer
	PU2	I think using that ISAC can make it easier for me to do early detection of cervical cancer
	PU3	I think that using ISAC can improve performance in early detection of cervical cancer
	PU4	I think that using ISAC can improve the effectiveness of early detection of cervical cancer
	PU5	I think that using ISAC can be useful in early detection of cervical cancer
	NPU2	I think that using ISAC makes it difficult for me to do early detection of cervical cancer
Attitude Towards Using Technology	ATU1	I think that using ISAC is a good idea
	ATU2	I think that using ISAC is the right decision
	ATU3	I think that I like using ISAC
	ATU4	I think that using ISAC is fun
	NATU2	I think that using ISAC is a wrong decision
Subjective Norm	SN1	I thik that people recommend to use ISAC app
	SN2	I think that my family, friends, and people nearby recommend to use ISAC app
Perceived Behavior Control	PBC1	I think that I use ISAC application on my own.
	PBC2	I think that I am able to use ISAC optimally.
	PBC3	I feel that I have the resources, knowledge, and ability to use the ISAC app.
	NPBC1	I feel that using ISAC app is not because of my own desires.
Behavioral Intention to Use	BIUS1	I intend to use ISAC app later.
	BIUS2	I intend to recommend others to use ISAC.
	BIUS3	I intend to use ISAC app frequently.

The question item testing on the questionnaire used a sample of respondents as many as 20 respondents. The test results obtained 2 items of questions that are not valid in order to delete questions item 4 and 18 which are invalid.

4.   DISCUSSION

4.1 Data Collection

Data collection in this study used random sampling technique through online questionnaire with the criteria of respondents that are the general public who are able to use internet and have an interest to use ISAC services. The respondent data collected for 1 week in February 2018 and got data of 50 respondents.

4.2 Validity Test

Validity test is used to determine the eligibility of items in a list of questions in defining a variable. The test of validity used product moment correlation of Pearson, that is to correlate the score of each statement item with the total score of the statement category.

A data can be said to be valid if the value of Coefficient Correlation is greater than r-table value [27]. The r-table value obtained based on the calculation result with the significance level of 0.05 is 0.279. Here are the results of validity test calculations performed by using SPSS:

Table 2: Validity Test Result (Processed data of SPSS, 2018)

Indicator	Coefficient Correlation	Value of Table -r	Information
PSA1	0.827	0.279	Valid
PSA2	0.803	0.279	Valid
PSA3	0.745	0.279	Valid
NPSA2	0.145	0.279	Not Valid
PEOU1	0.824	0.279	Valid
PEOU2	0.882	0.279	Valid
PEOU3	0.856	0.279	Valid
PEOU4	0.829	0.279	Valid
NPEOU3	0.141	0.279	Not Valid
PU1	0.875	0.279	Valid
PU2	0.885	0.279	Valid
PU3	0.878	0.279	Valid
PU4	0.793	0.279	Valid
PU5	0.806	0.279	Valid
NPU2	0.263	0.279	Not Valid
ATU1	0.761	0.279	Valid
ATU2	0.818	0.279	Valid
ATU3	0.841	0.279	Valid
ATU4	0.83	0.279	Valid
NATU2	0.226	0.279	Not Valid
SN1	0.915	0.279	Valid
SN2	0.962	0.279	Valid
PBC1	0.742	0.279	Valid
PBC2	0.806	0.279	Valid
PBC3	0.735	0.279	Valid
NPBC1	0.404	0.279	Valid
BIUS1	0.896	0.279	Valid
BIUS2	0.91	0.279	Valid
BIUS3	0.878	0.279	Valid

In Table 2, it is known that there are 4 items of questionnaires that are not valid. Therefore, the questionnaire was deleted. Then the data processing was performed with 25 questionnaires divided into 7 variables.

4.3 Reliability Test

After conducting the validity test, this study also carried out reliability test to find out whether the seven research variables used had a reliable measuring instrument for all respondents. Reliability test was done by calculating the Cronbach alpha value. The calculation results of the reliability test of seven variables had values from 0.822 - 0.945.

Based on Table 3 it can be seen that the result of reliability tests performed on each research variable has overall reliable results because it has a coefficient value of Cronbach's alpha more than 0.7 [28].

Table 3: Reliability Test Results of research variables (Processed data of SPSS, 2018)

Research variable	Cronbach's Alpha	Information
Perceived Service Availability	0.844	Reliable
Perceived Ease of Use	0.918	Reliable
Perceived Usefulness	0.945	Reliable
Attitude Toward using Technology	0.907	Reliable
Subjective Norm	0.822	Reliable
Perceived Behavior Control	0.848	Reliable
Behavior Intention to Use	0.873	Reliable

The reliability test results of the Cronbach's Alpha value range from 0.822 - 0.945. With this result, all these variables can be used in the next process.

4.4 Frequency Distribution

Questionnaires were distributed to users randomly through online questionnaires. The respondents are general public who can use the internet and have an interest in using ISAC.

Table 4: Frequency distribution results (Processed data of SPSS, 2018)

Factor	Frequency	Percentage
Gender		
Male	17	34%
Female	33	66%
Education Level		
Senior High School	10	20%
Vocational High School	7	14%
D3	16	32%
Undergraduate	12	24%
Graduate	4	8%
Postgraduate	1	2%
Age		
16-20	10	20%
21-25	31	62%
26-30	6	12%
31-35	1	2%
36-40	1	2%
46-50	1	2%
Profession		
Not yet working	1	2%
Lecturers	4	8%
Teachers	2	4%
College Students	25	50%
Private employees	9	18%
Researchers	1	2%
IT Staff	3	6%
Administration Staff	2	4%
Entrepreneurship	3	6%

In this study, besides questions related to the factors that influence the use of information systems, respondents were also asked about their demographic data. Based on data collected, the following is the demographics of respondents based on gender, educational level, age, and profession.

Table 4 shows the results of the frequency distribution of 50 respondents who filled out the questionnaire.

4.5 Descriptive Analysis

To find out the responses of the respondents regarding the statements in all variables asked in this study, a descriptive analysis was conducted for the seven research variables used. The mean and standard deviation of each variable was calculated to determine the response to the statement on all variables.

Table 5: Descriptive Analysis Results of Variable (Processed data of SPSS, 2018)

Research variable	Mean	Standard Deviation
Perceived Service Availability	3.97	0.751
Perceived Ease of Use	3.79	0.783
Perceived Usefulness	4.08	0.667
Attitude Toward using Technology	4.02	0.677
Perceived Behavior Control	3.6	0.755
Subjective Norm	3.60	0.639
Behavior Intention to Use	3.85	0.785

Based on Table 5 it can be seen that all variables have an average value located at intervals of $3.4 \leq x \leq 4.2$ indicating that the average respondent agrees with statements in all variables while all variables of standard deviation have a lower value than mean.

4.6 Research Result

Hypothesis test is done to determine whether the hypotheses made based on conceptual model of research are rejected or accepted. Hypothesis test in this research is to see the value of path coefficient generated through bootstrapping process on structural model. The hypothesis is acceptable if it has a positive loading factor value and has a t-statistic value greater than the t-table value.
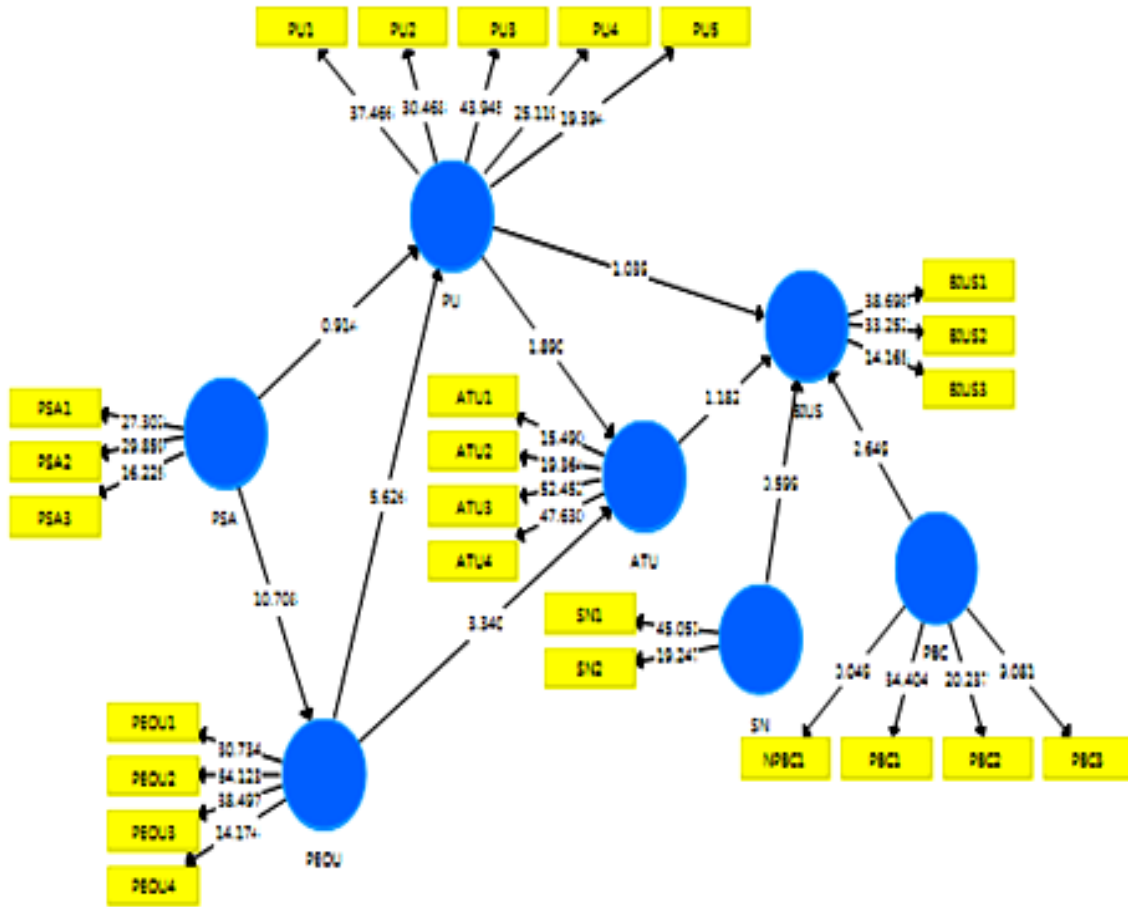
Figure 5: Bootstrapping

Table 6: Hypothesis Test (Processed data of smart PLS, 2018)

Variable	T-Statistic	T-Table	Hypothesis Test
PSA -> PEOU	10.708	1.681	PSA affects PEOU
PSA -> PU	0. 915	1.681	PSA does not affect PU
PEOU -> PU	5.750	1.681	PEOU affects PU
PEOU -> ATU	3.402	1.681	PEOU affects ATU
PU -> ATU	1. 938	1.681	PU affects ATU
PU -> BIUS	1.038	1.681	PU does not affect BIUS
ATU -> BIUS	1.183	1.681	ATU affects BIUS
PBC -> BIUS	2.712	1.681	PBC does not affect BIUS
SN -> BIUS	0.575	1.681	SN does not affect BIUS

From Table 6, it is known that the hypothesis test obtained 9 hypotheses. After analyzing the data, of 9 hypotheses proposed in model evaluation of ISAC, 5 hypotheses were accepted and 4 were rejected.

Based on Table 6, 5 hypotheses were received, that are the hypothesis on effect variable of perceived service availability to perceived ease of use. Perceived ease of use is significantly affected by perceived usefulness.

The results of hypothesis proof on the analysis of relationships among variables (Table 6) show the findings of this study in which the perception of user convenience relates to the availability of services perceived by users. In the use of ISAC, the availability of services perceived by users does not affect the usability felt by the user. These results indicate the same thing with research [29].

The next hypothesis producing positive and influential results is the perceived ease of use of the user having an effect on perceived usefulness and attitude toward using technology. This finding shows that for ISAC users, the perception of ease of use has a significant influence on the attitude of using technology to continue using ISAC. This is in line with the findings of [10] and [29] which indicate that the perception of ease of use has a significant influence on behavioral intention to continue using the new system.

For users, feeling the ease of ISAC has a very positive effect on the use of its technology. Another hypothesis related to perceived usefulness is behavioral intention to use. On both relations, it was found that both of them had no effect. This finding is similar to the finding of research in other systems that use TAM and TPB variables [10], [29].

The next finding from this study is the variable of behavioral intention to use. when associated with perceived usefulness, perceived behavior control, and subjective norm variables, this variable produced the same results where the test hypothesis had no impact on the behavioral intention to use. This shows that for now users think that behavioral intention to use on the use of ISAC is not a primary consideration to these variables. Behavioral intention to use that is felt by users when using ISAC is only influenced by the attitude toward using technology.

V.   CONCLUSIONS

In this conclusion, the analysis results of factors that affect the intention of using information systems of cervical cancer image acquisition will be concluded. Based on the results of analysis and research, it was concluded that the factors that influence the community to use ISAC are when the system is easy to learn, flexible, able to control the work, and easy to use. This condition also needs to be supported with the ease of using ISAC anytime and anywhere with the community's technology. The community's intentions to use ISAC also consider whether ISAC is a trusted and useful technology.

The community's intention to use ISAC is influenced by the public belief in which ISAC should be easy to use and useful overall. The intention is greater if ISAC has technological factors that are easily understood and used and if it is required by the environment or organization of the community. However, the intention has not yet emerged as a form of attitude or behavior to use ISAC technology on a regular basis. Community's attitude or behavior tending to keep using ISAC is influenced by perceptions about the ease or difficulty in using ISAC in accordance with past experience. Another factor that affects this condition is the attitude of acceptance or rejection when getting the impact of ISAC use. If the impact is positive, then the community tends to keep using ISAC. Public attitudes towards the use of ISAC will be the form of acceptance if ISAC is perceived to be easily understood.

The user community will eventually have an attitude or behavior that tends to keep using ISAC that is not influenced by perceptions or views relating to the perception in which SIPK users have pressure given by organizations, peoples, or peer groups to use ISAC.

This study has some limitations that can provide the basis for future research. First, data was collected through self-administered questionnaires, and therefore there was no control of who actually filled out the questionnaire. This allows the responses of respondents to be biased. Another statement is about the distribution of respondents' work that has not been specifically identified to have the need for ISAC. This study only focuses on the analysis of factors that influence performer's intentions. Further research on the adoption of health experts needs to do to provide an analysis of the adoption of cervical cancer acquisition information systems.

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