TECHNOLOGY ACCEPTANCE MODEL AND WEARABLE ELECTROCARDIOGRAPH (DUBDUB)

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Abstract

The Technology Acceptance Model (TAM) evaluates that perceived ease of use and perceived usefulness predict tool use. The ongoing study investigates TAM for work-related tasks with DubDub technology and uses TAM as a basis for hypothesizing the influence of these variables on the use of DubDub as a heart-preserving device while working. According to data from the Ministry of Health in Indonesia, deaths from heart attacks while carrying out activities are very high. This is a frightening prospect for workers of productive age, so there is a need for tools that can monitor heart conditions in real-time. DubDub as a wearable electrocardiograph is expected to be able to reduce the death rate due to heart attacks in Indonesia, although DubDub does not replace the use of ECGs in hospitals. This study focuses on investigating individual user acceptance of DubDub in the community as an effective heart-monitoring device. It develops a model of using technology for health. The contributions of this research are threefold. First, this research can help identify whether users want to receive DubDub or vice versa. Second, this research will help determine what factors are significant in explaining intentions toward DubDub. An attempt was made to see whether attitudinal beliefs such as perceived ease of use and perceived usefulness have a relationship to DubDub adoption. Third, this study is among the first to use a technology acceptance model in the context of telemedicine.

Keywords: Technology Acceptance Model, Perceived ease of use, Perceived usefulness, Attitude toward use, Behavioral intention to use, Telemedicine

Introduction

Cardiovascular disease is one of the biggest causes of death in Indonesia. According to data from the Ministry of Health Cardiovascular disease is still a global threat and is a disease that plays a major role as the number one cause of death throughout the world. Data from the World Health Organization (WHO) states that more than 17 million people in the world die from heart and blood vessel disease. Meanwhile, as a comparison, HIV / AIDS, malaria, and TB together kill 3 million of the world's population. Based on 2018 Basic Health Research (Riskesdas) data, the incidence of heart and blood vessel disease is increasing yearly. At least 15 out of 1000 people or around 2,784,064 individuals in Indonesia suffer from heart disease.

According to data from the Ministry of Health, it is estimated that the Indonesian people who experience symptoms of cardiovascular disease in the age range of 45-64 years number more than 2 million people, and this continues to increase every year. This age is the productive age range, an age that is the driving force for all fields in Indonesia. Threats to Indonesian people in their productive age also mean a major threat to the competitiveness and development of Indonesia's prosperity in general. In the world of health, Indonesia is still being colonized by imported products, especially medical devices. Only a handful of domestically produced medical devices can compete with imported products, and even then, only low-tech medical devices. In the context of medical devices, Indonesia is like a guest in its own country.

Patients with cardiovascular disease have great potential to experience a condition that common people call a heart attack. When this condition occurs, and the treatment is not fast and precise, the risk of death becomes very large. To find out the condition and performance of the heart of people with cardiovascular disease, an EKG device is usually used at the hospital, and it takes quite a long time for the patient to feel the symptoms until they get treatment. For people with cardiovascular disease, an examination is usually carried out periodically over a certain period, so data recording of the condition and performance of the heart of the sufferer during daily activities is important, not just data when consulting a doctor at the hospital, and that is currently not available.

In the modern era, which in all aspects has relied on information technology, computing speed, reducing the size of tools for practicality, and automation with microprocessors have significantly changed human life. In the world of health, these changes have encouraged the formation of a new era called the era of telemedicine or e-health. An era in the world of health that can be described as Health 2.0 or the digital era of health that uses the digitalization of medical data and communication via the Internet. In addition, the role of the Internet of Things (IoT) will also revolutionize personal health devices, such as digital tensimeters, blood sugar test kits, and so on. which are used daily and health developments can be monitored via the Internet connected to the telemedicine health system.

Dub-Dub is a small single lead ECG, equipped with an electrode chest strap that anyone can use easily at home without needing medical assistance when installing it. Dub-Dub is connected to the user's cellphone and will only send ECG signal data in real-time when abnormal heart performance is identified, so Dub-Dub is very economical on energy consumption and can be used at any time by the user to monitor the user's heart condition. Dub-Dub's ability to be used at any time makes Dub-Dub not only an ordinary medical device, but also a data collector, provider of heart condition statistics, as well as a safety and early warning system, to prevent users from critical and dangerous conditions, both for healthy users or users who are already declared to have heart disease. Dub-Dub also has technology that allows Dub-Dub to be home healthcare as well as medical devices that can be used in hospitals or clinics. Dub-Dub is also equipped with an Internet of Things system that allows Dub-Dub to function as a tool that enables relatives and family to monitor and know the user's condition in real time so that when critical things occur, help can be immediately carried out by relatives and friends. The implemented IoT system also makes Dub-Dub a remote consultation feature with medical personnel or telemedicine systems.

With Dub-Dub, it is hoped that it will be able to reduce the death rate in Indonesia caused by cardiovascular disease. The majority of deaths that occur due to cardiovascular disease are experienced by Indonesian people who are of productive age. By reducing the mortality rate of people of working age, the competitiveness and degree of prosperity of the Indonesian nation can also be increased. Dub-Dub is a product of PT ARETA Rekayasa Teknologi which is expected to become a beacon for medical devices produced in other countries so that they can compete with imported products. Dub-Dub is also designed with technological sophistication that not only enlivens national medical device industry competition but also becomes a leader in the medical device industry in welcoming the health 2.0 era or the telemedicine era.

The idea of making a continuous heart monitoring device is a solution to address the problem of heart disease, one of the causes of which is the age factor with more or more balanced population demographics between the younger and older generations. Thus, the elderly are required to be more independent in carrying out their daily lives and maintaining their health. In addition, the process of routine heart checks takes time and travels long distances to come to clinics or hospitals, both in big cities and in regions. Therefore, there is a need for a device with health standards to be used at any time and carry out routine checks on its users without having to spend time and travel long distances.

In technology research, users' attitudes toward using and actual use of technology are discussed in the technology acceptance model (TAM) (Davis, 1993); Davis, (Batra, Ahuvia, & Bagozzi, 2012). TAM (Technology Acceptance Model) is a framework used to understand the factors that influence users' adoption and acceptance of technology (Hu, Chau, Sheng, & Tam, 1999). It has been used as the theoretical basis for many empirical studies of user technology acceptance (Adams, Nelson, & Todd, 1992) (Davis, Bagozzi, & Warshaw, 1989). Technology acceptance is “an individual's psychological state regarding the voluntary or intentional use of a particular technology” (Hendrick et al., 1984). Therefore, this paper uses TAM to study the acceptance of e-learning technology. The research presented here is motivated and guided by two main questions. First, are users willing to accept DubDub as a wearable electro-cardio graph? Second, what factors are significant in explaining intentions toward DubDub? That is, do attitudinal beliefs such as perceived ease of use and perceived usefulness have any relationship with DubDub adoption? In other words, this research examines TAM in a healthcare environment, investigating the factors that influence user acceptance of wearable electrocardiograph technology.

The remainder of this paper is organized as follows. Section 2 explains the theoretical framework for DubDub reception research. Section 3 presents the research methodology. Section 4 presents the results and analysis. Section 5 discusses the research results. Section 6, conclusions and recommendations are provided.

Theoretical Framework

The technology acceptance model (TAM) was first created by (Davis, 1989), based on the theory of reasoned action (TRA) (Fishbein & Ajzen, 1977) in psychological research. TRA believes that individual behavior is driven by behavioral intentions where behavioral intentions are a function of the individual's attitude towards the behavior and the subjective norms surrounding the performance of the behavior. In other words, it states that a person's behavior and behavioral intentions are a function of his behavior attitudes toward the behavior, and perceptions of the behavior. Therefore, behavior is a function of attitudes and beliefs. TRA is presented in Figure 1 below.

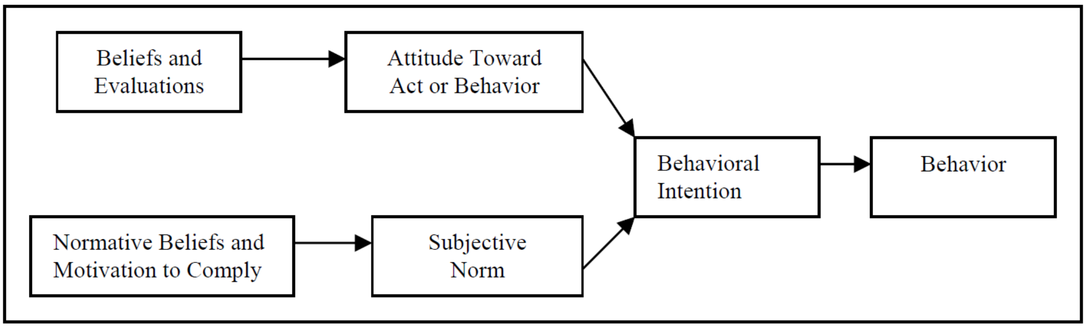

Figure 1. Theory of reasoned action

Meanwhile, TAM proposes that perceived ease of use and perceived usefulness of technology are predictors of user attitude towards using the technology, subsequent behavioral intentions, and actual usage. Perceived ease of use was also considered to influence the perceived usefulness of technology. Figure 2 presents the original version of TAM (Davis, 1989).

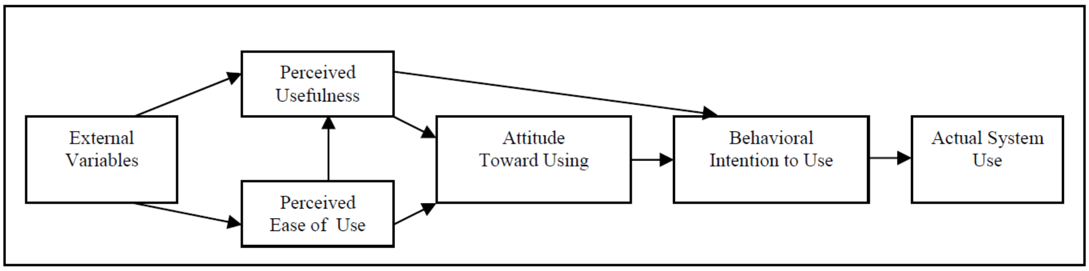

Figure 2. Original Technology Acceptance Model

TAM has been applied in numerous studies testing user acceptance of information technology, for example, word processors (Davis, 1989), spreadsheet applications (Mathieson, 1991), e-mail (Szajna, 1996), web browsers (Morris & Dillon, 1997), telemedicine (Hu et al., 1999), websites (Koufaris, 2002), e-collaboration (Dasgupta, Granger, & McGarry, 2002), and blackboard (Landry, Griffeth, & Hartman, 2006).

In TAM, *perceived usefulness* refers to the degree to which the user believes that using the technology will improve his or her work performance, while *perceived ease of use* refers to how effortless he or she perceives using the technology will be. Both are considered distinct factors influencing the user’s attitude towards using the technology, though perceived ease of use is also hypothesized to influence perceived usefulness and attitude towards using the technology. Finally, such attitude towards using the technology determines the behavioral intention to use that technology. Figure 3 depicts the research model employed in the study. It is a reduced TAM model, excluding actual system use. The external variables constructs are also not included in the research model as there is no immediate intention to examine antecedents to perceived usefulness and perceived ease of use.

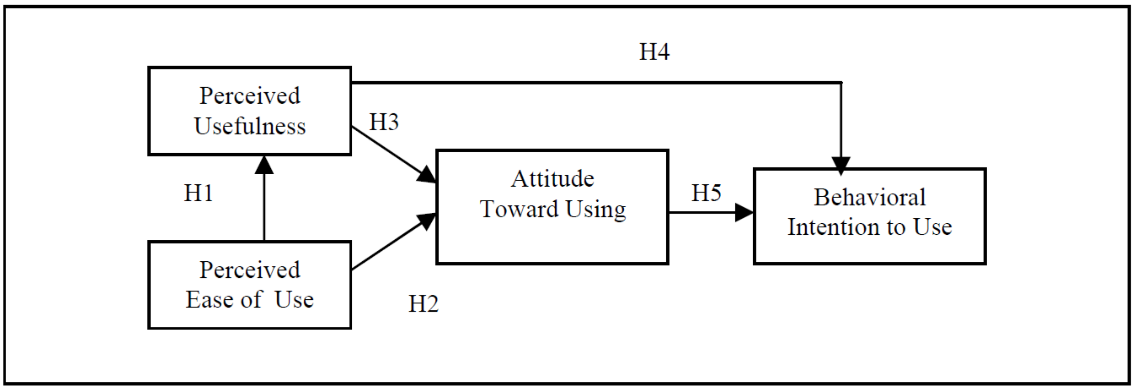

Figure 3. The research model (A technology usage model for DubDub)

Therefore, the research hypotheses based on the diagram of the TAM model in the context of this system are:

H1: Perceived ease of use has a significant effect on the perceived usefulness of the system.

H2: Perceived ease of use has a significant effect on attitude towards using.

H3: Perceived usefulness has a significant effect on attitude towards using.

H4: Perceived usefulness has a significant effect on intention to use.

H5: Attitude towards using has a significant effect on the intention to use.

Research Methodology

Sample

A survey was conducted among people from various circles with a minimum age limit of 26 years to evaluate the application of TAM to the wearable electrocardiograph (DubDub). Electrocardiographs currently on the market cannot be used during activities. The technology created is expected to be able to monitor the user's condition while carrying out activities. The main goal is to help users monitor their heart condition in real-time so that if an abnormality occurs in the user's heart, the system will provide warning information to the user to immediately take further action at the hospital. Users can also consult with a chosen cardiologist online and the cardiologist can monitor the user's condition in real time. Prospective users who have a minimum age criterion of 26 years are the subjects of this research. Subjects were taken from various groups in Indonesia, with a minimum age limit of 26 years. Each participant was asked to fill out a two-page questionnaire which on the first page contained their name, age, highest level of education, and gender. The second page indicates agreement or disagreement with each statement on a 7-point Likert-type scale with endpoints “strongly disagree” and “strongly agree”. The scale items that appeared on the survey were adapted from the variable measurement scales in (Davis, 1993). The measurement items used in this study are presented in the Appendix.

Examples of demographic information concerning age, gender, and most recent education were also extracted for potential control purposes in data analysis. The responses received in the survey were 40 respondents. The number of respondents obtained was equal in terms of gender, namely 20 people each, but their age and education varied greatly. Where it was found that 23% were aged 25-30, 35% were aged 31-40, 13% were aged 41-50, 23% were aged 51-60 and 8% were aged >61. Respondents had backgrounds with a percentage of elementary school 15%, middle school 15%, high school 20%, D3 2.5%, S1/D4/Profession 25%, and Masters 22.5%.

Measures

Before the data is used, the existing data must be subjected to two tests first, namely the validity test and the reliability test. The validity test is used to obtain the level of validity of an instrument to obtain certainty between the data that occurs on the research object by comparing the r table with the calculated r (Sujarweni, 2014). The validity test in this study uses construction validity, where apart from comparing the r table with the calculated r, you can also see the sig value, where if the sign value is greater than 0.05 then the data is considered invalid. Table 1 shows the validity of the measurement scale. The validity score exceeds the table's r value. Therefore, the results show that the data used is valid.

Table 1. Validity Test

Validity Test		R Count	R TABLE 5%
Perceived Ease of Use (PEOU)	PEOU1	0.521	0.312
	PEOU2	0.531	0.312
	PEOU3	0.646	0.312
	PEOU4	0.748	0.312
Perceived Usefulness (PU)	PU1	0.644	0.312
	PU2	0.707	0.312
	PU3	0.7	0.312
	PU4	0.7679	0.312
Attitude Toward Using (ATTITUDE)	ATT1	0.327	0.312
	ATT2	0.6	0.312
	ATT3	0.629	0.312
	ATT4	0.541	0.312
Intention to Use (ITU)	ITU1	0.5	0.312
	ITU2	0.672	0.312
	ITU3	0.591	0.312

The validity of the measurements in terms of reliability and construct validity was evaluated. Reliability analysis was carried out to ensure the internal validity and consistency of the items used for each variable. (Hair, Risher, Sarstedt, & Ringle, 2019). By recommending that a Cronbach alpha value of 0.6 to 0.7 be considered the lower limit of acceptability. An alpha of more than 0.7 would indicate that the items are homogeneous and measure the same constant.

Table 2. Reliabilities Test (Cronbach Alpha Test)

Cronbach Alpha Test (Reliabilities)		**R Count**	**Min**
Perceived Ease of Use (PEOU)	PEOU1	0.899	0.6
	PEOU2	0.899	0.6
	PEOU3	0.893	0.6
	PEOU4	0.889	0.6
Perceived Usefulness (PU)	PU1	0.898	0.6
	PU2	0.895	0.6
	PU3	0.894	0.6
	PU4	0.895	0.6
Attitude Toward Using (ATTITUDE)	ATT1	0.904	0.6
	ATT2	0.896	0.6
	ATT3	0.896	0.6
	ATT4	0.900	0.6
Intention to Use (ITU)	ITU1	0.904	0.6
	ITU2	0.896	0.6
	ITU3	0.896	0.6

Table 2 shows the reliability of the measurement scale. Cronbach's alpha reliability scores all exceeded 0.8, which is considered excellent (Rossiter, 2011). Therefore, the results indicate that the questionnaire is a reliable measurement instrument.

Result and Analysis

Based on a survey that was carried out with a total of 40 respondents and each received 15 questions, a total of 600 answers were obtained. Where 212 answers strongly agreed or 35%, 220 answers agreed or 37%, 138 answers were neutral, or 23%, 30 answers disagreed, or 5% strongly disagreed 0 answers or 0%.

Table 3. Likert Category

Likert Category	**Value**	**Total**	**Total**
Strongly agree	5	212	35%
Agree	4	220	37%
Neutral	3	138	23%
Don't agree	2	30	5%
Strongly Disagree	1	0	0%
Total		**600**	**100%**

In Table 3, more than 60% of the answers were positive (strongly agree and agree) or the score was more than 3. It can be concluded that DubDub technology is well accepted in society with a quite satisfactory score.

CrossTab Analysis

The data generated from the survey was processed using the Statistical Package for the Social Sciences (SPSS) application to see a comparison of the differences in the background of each respondent to the answers given. Figure 4 shows the results of crosstab data processing on the education variable with the Perceived Ease of Use (PEOU) variable.

Pendidikan * Perceived Ease Of Use Crosstabulation

Count

		Perceived Ease Of Use			
		Netral	Setuju	Sangat Setuju	Total
Pendidikan	SD	5	1	0	6
	SMP	2	4	0	6
	SMA	1	6	1	8
	D3	0	1	0	1
	S1/D4/PROFESI	2	1	7	10
	S2	0	1	8	9
Total		10	14	16	40

Figure 4. Crosstab Pendidikan x PEOU

In Figure 4 it can be concluded that respondents who have a higher educational background give greater scores than respondents who have a lower educational background, this is because higher educational backgrounds have broader knowledge, so they can more easily understand how to use a new technology. This can be overcome by adding a complete guide to make it easier for users to use.

Pendidikan * Perceived Usefulness Crosstabulation

Count

		Perceived Usefulness			Total
		Netral	Setuju	Sangat Setuju	
Pendidikan	SD	6	0	0	6
	SMP	1	3	2	6
	SMA	3	4	1	8
	D3	0	0	1	1
	S1/D4/PROFESI	3	4	3	10
	S2	0	6	3	9
Total		13	17	10	40

Figure 5. Crosstab Pendidikan x PU

Figure 5 shows the results of crosstab data processing on the education variable with the Perceived Usefulness (PU) variable. In this figure it can be concluded that respondents who have a greater educational background give greater scores than respondents who have a lower background, this is because the level of understanding of respondents who have a higher background have a higher level of understanding regarding the use of tools than those who have less education. This can be above by adding an explanation regarding the usefulness of the technology being delivered.

Pendidikan * Attitude towards using Crosstabulation

Count

		Attitude towards using		Total
		Setuju	Sangat Setuju	
Pendidikan	SD	5	1	6
	SMP	1	5	6
	SMA	5	3	8
	D3	0	1	1
	S1/D4/PROFESI	1	9	10
	S2	1	8	9
Total		13	27	40

Figure 6. Crosstab Pendidikan x ATT

Figure 6 shows the results of crosstab data processing on the education variable with the Attitude Towards Using (ATT) variable. From this figure it can be concluded that all respondents tend to agree and strongly agree with their usage habits, this is because the use of DubDub technology makes the user's habits dependent.

Pendidikan * Intention to Use Crosstabulation

Count

		Intention to Use			Total
		Netral	Setuju	Sangat Setuju	
Pendidikan	SD	1	4	1	6
	SMP	0	2	4	6
	SMA	0	5	3	8
	D3	0	0	1	1
	S1/D4/PROFESI	0	3	7	10
	S2	0	2	7	9
Total		1	16	23	40

Figure 7. Crosstab Pendidikan x ITU

Figure 7 shows the results of crosstab data processing on the education variable to Use (ITU) variable. From this figure, it can be concluded that all respondents tend to strongly agree from various educational backgrounds, this is due to the high desire to use DubDub technology to monitor their hearts.

Analysis Hypothesis

In testing hypothesis 1 (H1) the regression analysis method can be used, with perceived ease of use as an independent variable and perceived usefulness as a dependent variable. The image shows the results of the regression carried out in experiment H1.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.419[a]	.176	.154	2.584

a. Predictors: (Constant), TOTAL_PEOU

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.166	1	54.166	8.110	.007[b]
	Residual	253.809	38	6.679		
	Total	307.975	39			

a. Dependent Variable: TOTAL_PU

b. Predictors: (Constant), TOTAL_PEOU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.215	2.167		4.253	.000
	TOTAL_PEOU	.373	.131	.419	2.848	.007

a. Dependent Variable: TOTAL_PU

Figure 8. Regression H1

In Figure 8, perceived ease of use significantly influences perceived usefulness (sig <0.05). This can happen because respondents who can use the technology more easily than those who cannot understand the perceived usefulness conveyed more.

Hypothesis 2 (H2) and Hypothesis 3 (H3) were tested using linear regression together where perceived ease of use and perceived usefulness were the dependent variables and attitude towards using was the independent variable. Figure 9 shows the results of the regression analysis for both H2 and H3.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.575[a]	.331	.294	1.435

a. Predictors: (Constant), TOTAL_PU, TOTAL_PEOU

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	37.617	2	18.809	9.138	.001[b]
	Residual	76.158	37	2.058		
	Total	113.775	39			

a. Dependent Variable: TOTAL_ATT

b. Predictors: (Constant), TOTAL_PU, TOTAL_PEOU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.023	1.461		8.227	.000
	TOTAL_PEOU	.148	.080	.274	1.847	.073
	TOTAL_PU	.245	.090	.404	2.726	.010

a. Dependent Variable: TOTAL_ATT

Figure 9. Regression H2 & H3

In Figure 9, perceived ease of use does not affect the attitude toward using the variable (sig > 0.05). This can happen because the ease of use of the tool does not affect usage habits, users do not feel that their usage habits are not influenced by the ease of use of the tool. Meanwhile, the perceived usefulness variable influences the attitude toward using the variable (sig <0.05). This can happen when users feel the benefits of using the technology, making their attitude towards using the technology better. However, when testing is carried out simultaneously, the two dependent variables simultaneously influence the dependent variable, namely attitude toward using (sig <0.05). This can happen because the perceived convenience and benefits of technology can influence respondents' usage attitudes. They start to like using this technology.

Hypothesis 4 (H4) and hypothesis 5 (H5) were tested using linear regression together, where Perceived usefulness and Attitude toward using became the dependent variable and Intention to use became the dependent variable. Figure 10 shows the results of the regression analysis for both hypotheses H4 and H5.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.978[a]	.956	.954	.312

a. Predictors: (Constant), TOTAL_ATT, TOTAL_PU

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.007	2	39.003	401.632	.000[b]
	Residual	3.593	37	.097		
	Total	81.600	39			

a. Dependent Variable: TOTAL_ITU

b. Predictors: (Constant), TOTAL_ATT, TOTAL_PU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.650	.533		-3.094	.004
	TOTAL_PU	-.008	.021	-.015	-.379	.707
	TOTAL_ATT	.835	.034	.986	24.427	.000

a. Dependent Variable: TOTAL_ITU

Figure 10. Regression H4 & H5

In Figure 10, the Perceived usefulness variable has a very large sig value, so it can be concluded that this variable does not influence the intention to use a variable. This could be caused by respondents who already know the function and benefits of this technology but do not have the desire or intention to use it because they do not feel comfortable with the tool. However, something very different happens to the Attitude toward the Using variable which has a very high t value and a sig value <0.05. This can happen because every user who already has a good attitude when using it wants to use the technology sustainably. A good attitude in using it makes their desire for this technology high. Likewise, when the two variables H4 and H5 were tested simultaneously, the results were obtained where these variables influenced the Intention to use the variable and had a very large F value and an influence of 95% in the R square table. This happens because when users already know the uses of the technology and they start to have a positive attitude towards use, there will be a high desire to use it.

Table 4. Summary of Hypothesis Analysis

Hypothesis	Relationship Tested	Result
H1	Perceived ease of use has a significant influence on perceived usefulness	Supported (sig <0.05)
H2	Perceived ease of use does not have a significant influence on attitude towards using	Not Supported (sig >0.05)
H3	Perceived usefulness has a significant influence on attitude towards using.	Supported (sig <0.05)
H4	Perceived usefulness does not have a significant influence on intention to use	Not Supported (sig >0.05)
H5	Attitude towards using has a very significant influence on intention to use	Supported (sig <0.05)

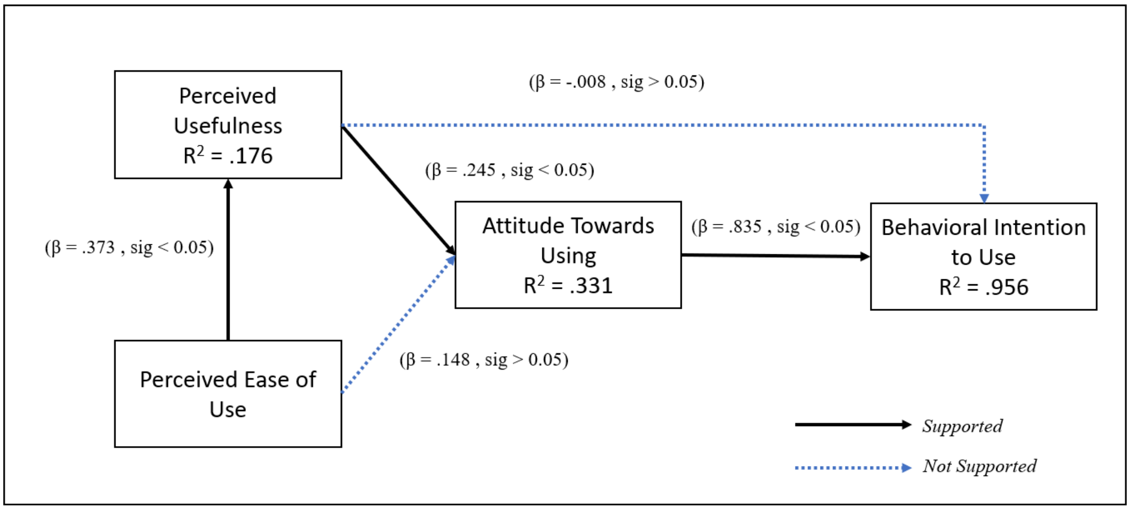

Figure 11. Result of regression analysis

Discussion

This study tested TAM using user acceptance of wearable electrocardiograph (DubDub) technology. Overall, TAM is partially supported. Based on data collected from 40 respondents, the usefulness of TAM to explain the acceptance of wearable ECG technology was evaluated. The research results show that perceived benefits are more important in determining intention to use than attitudes towards use. By the TAM postulate, perceived usefulness was found to have a significant influence on students' intention to use technology, which is by (Davis, 1993) found that attitude towards use was a partial mediator of the influence of perceived usefulness on intention to use, and this only increased little causal explanatory power. An explanation may be that users are willing to adopt useful implementations of DubDub, and this may indicate that users tend to focus on the usability of the technology itself. In this context, providing appropriate user training or guidance is essential to guide and strengthen users' perceptions of the usability of the technology. In addition, perceived usefulness and perceived ease of use were also found to have a significant influence on attitudes toward technology use. Contrary to the TAM hypothesis, the attitude was found to not affect the intention to use. This may reflect limitations in the application of TAM in terms of technology, user population, or both. Compared with previous TAM studies, this model appears to have relatively weaker utility in explaining attitude formation and the development of user intentions. TAM appears to lack sufficient specificity to describe and express user attitudes and intentions. The results of this research indicate that TAM can be used to explain user acceptance of DubDub technology.

Conclusions

This research represents research in testing the application of TAM to explain user acceptance of wearable electrocardiograph technology in the Indonesian environment, especially the Jakarta Bogor Depok Tangerang Bekasi area. The model was evaluated using data collected from 40 users, of which 20 were men and 20 were women. Where each respondent has a different background and education, starting from elementary school, middle school, high school, D3, S1/D4/Pharmacist, S2, and S3. Respondents also came from a variety of ages, from 26 years to over 61 years, so the survey results can represent several voices from several different backgrounds. Several implications can be drawn from the findings of this study. First, an important contribution is the superior use of intent-based models in a healthcare context, which is very different from the business organizations typically studied in previous research. From a managerial perspective, the findings of this study reveal that to foster an individual's intention to use technology, positive perceptions of the usefulness of the technology are very important, while the user's attitude towards the use of the technology may not be as important. Training and information sessions regarding use need to focus primarily on how the technology can help improve the efficiency and effectiveness of user activities rather than on the actual procedures for using the technology. In conclusion, TAM is not a descriptive model, i.e. it does not provide diagnostic capabilities for specific weaknesses in technology, but it can serve to evaluate and predict technology acceptance.

The authors' analysis suggests two recommendations. First, to expand the theoretical validity of the literature, retesting the TAM with other users or different populations of users and technology applications would be important. Second, this study did not test the full TAM. Actual technology use was not included in the research model. Further studies that incorporate actual technology use into research models will enable an increasingly complete examination of the applicability of TAM in explaining or predicting user acceptance of technology. Second, future research should also not be limited by the original TAM. (Davis, 1993) suggested additional factors to be included in the original TAM such as previous use, user experience, and user characteristics. Therefore, future research should investigate the role of adding these variables to the variables originally used in the model.

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