

Qualitative Evaluation of User Acceptance Readiness to the Implementation of the Health Center Management Information System (SIMPUS) at the South Tangerang City Health Center

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Abstrak—The success of implementing an Information System (IS) depends on how the system is run by its users. User readiness plays an essential role in ensuring the successful implementation of new technology or system. To improve the quality of health services, the South Tangerang City Health Center has implemented the Health Center Management Information System (SIMPUS), but it is not following its objectives. The implementation of SIMPUS further hampers the smooth running of health services and the performance of the Puskesmas. This study aims to understand the level of user acceptance of SIMPUS implementation and explore the factors that influence it. The study used the Technology Readiness Acceptance Model (TRAM) and qualitative methods to explore data that could not be obtained from quantitative research by collecting interview data and Focus Group Discussion (FGD). The results show that the Technology Readiness Index factor influences the dimensions of the Technology Acceptance Model. Perceived usefulness significantly affects the intention to use SIMPUS to encourage acceptance of SIMPUS implementation. In contrast, insecurity does not affect perceived usefulness in SIMPUS use because users have not optimally used SIMPUS.

Index Terms—User Readiness, Acceptance of Information Systems, Health Center Information Systems, Technology Readiness Acceptance Model (TRAM).

I. INTRODUCTION

The development of Information and Communication Technology (ICT) has grown rapidly. The use of technology is felt to increase the effectiveness and efficiency of work so that today's humans are very dependent on its use [1]. The adoption of ICT has become a necessity for companies and organizations that want competitive advantages [2].

In adopting information technology, the company or organization must successfully implement it so that the information technology is not in vain and can benefit its users. Although the application of IS will benefit the organization, the organization must first be successful in its application [3]. The

success of implementing and adopting new technologies, especially ICT in an organization, is determined mainly by the readiness of the brainware, in this case, the ICT users themselves [4].

The South Tangerang City Health Office, which is in charge of providing health services in South Tangerang City, in collaboration with the Agency for the Assessment and Application of Technology, has built a Health Center Management Information System (SIMPUS). The application of SIMPUS aims to assist and improve public health services in South Tangerang City. However, the implementation of SIMPUS has not been implemented optimally. There are still problems such as an unsupported internet network, limited human resources, and users whose competence is inappropriate. Users still find it difficult to leave the previous habit of using manual writing. These problems hinder the smooth running of health services and the performance of the Puskesmas, so it is necessary to evaluate the readiness of user acceptance in the implementation of SIMPUS.

This study uses a qualitative approach to explore data that cannot be presented with a quantitative approach based on the Technology Readiness Acceptance Model (TRAM) [5]. Ref. [6] used this model to measure m-payment acceptance in the United States, Finland, Germany, and Japan. The results show that all readiness factors in the TRAM model have a positive effect on perceived usefulness and perceived ease of use. In contrast, other studies [7, 8], [5] produced a more specific model with two factors that encourage readiness, namely optimism, innovativeness theorized to lead to higher perceived usefulness, perceived ease of use [7], and actual use [8], while two factors inhibiting readiness, namely: discomfort, and insecurity, lead to a negative relationship with the TAM dimension [7]. Another study [9] tested the TRAM model for mobile payments in Germany and South Africa. The model was accepted and suitable for the data. However, only a few where the findings showed that perceived usefulness had the most substantial

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influence on intention to use mobile payments, and optimism had the most potent effect on perceived usefulness. In addition, according to Schwakninger & Sargent, quantitative methods have shortcomings in explaining data. Data in the form of numbers and mathematical processing cannot explain the truth convincingly [10]. The quantitative research results also have explanations that are limited to numerical descriptions and lack detail in elaborating aspects of human perception. This study aims to understand the level of readiness of user acceptance in the implementation of SIMPUS by using the informant's perspective and exploring the factors that influence it.

II. LITERATURE REVIEW

Research on the readiness of user acceptance of the information system implementation has been carried out a lot. The Combined Model of Technology Readiness Index (TRI) and Technology Acceptance Model (TAM), namely the Technology Readiness Acceptance Model (TRAM), was first proposed by Lin et al. [5]. The combination of these models is a contribution to combining the general personality dimensions of TRI [11], [12] with specific dimension system TAM (*Technology Acceptance Model*) [13-15]. TRAM is used to determine the effect of IS/IT user readiness on the acceptance of information technology or information systems in organizations, as stated by Davis that the impact of factors from the dimensions of perceived usefulness and perceived ease of use on a person's interest in using information systems (intention to use) [13].

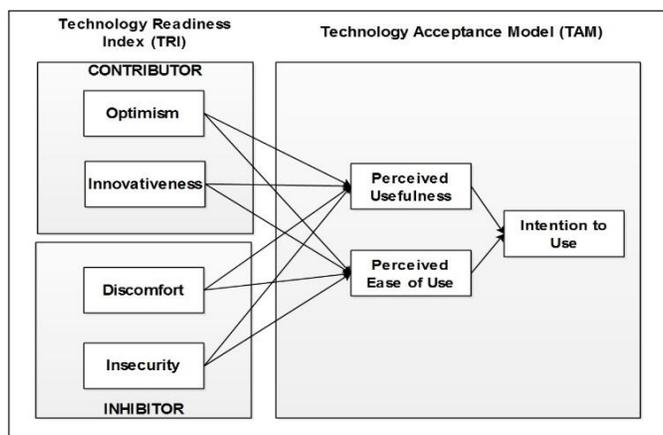


Figure 1. Technology Readiness Index Acceptance Model (TRAM)

In ref. [7] a technology readiness factor has been directly linked to the dimensions of TAM (Perceived usefulness and Perceived Ease of use) so that a more specific model is obtained. Optimism and Innovativeness are considered to cause higher perceived usefulness and perceived ease of use, while Insecurity and Discomfort are inhibiting factors in the acceptance of a technology [16].

The research themes that form the basis for conducting this research are as follows:

- T1: Effect of Optimism (OP) on Perceived Usefulness (PU)
- T2: Effect of Optimism (OP) on Perceived Ease of Use (PEOU)

- T3: Effect of Innovativeness (INN) on Perceived Usefulness (PU)
- T4: Effect of Innovativeness (INN) on Perceived Ease of Use (PEOU)
- T5: Effect of Discomfort (DIS) on Perceived Usefulness (PU)
- T6: Effect of Discomfort (DIS) on Perceived Ease of Use (PEOU)
- T7: Effect of Insecurity (INS) on Perceived Usefulness (PU)
- T8: Effect of Insecurity (INS) on Perceived Ease of Use (PEOU)
- T9: Effect of Perceived Usefulness (PU) on Intention to Use (ITU)
- T10: Effect of Perceived ease of Use (PEOU) on Intention to Use (ITU)

III. RESEARCH METHODOLOGY

This research was conducted using a qualitative approach in which the researchers directly observed, recorded, asked questions and explored information that was closely related to the implementation of SIMPUS. Moleong stated that the qualitative method is a procedure in a study that produces descriptive data. The data obtained are written or spoken words from people and observed behaviour [17].

Table 1.
Number of Research Samples

Work Unit	Position	Total
South Tangerang City Health Service	Head of SDM	1
	SDMK Staff	2
Ciputat Health Center	Admin	2
Pondok Betung Health Center	Admin	1
	Doctor	1
Rengas Health Center	Admin	1
	Doctor	1
Bambu Apus Health Center	Admin	1
East Ciputat Health Center	Admin	2
Pondok Cabe Ilir Health Center	Admin	1
	Doctor	1
Total		14

The resource persons in this study were selected using a purposive sampling technique, the sampling technique of data sources with specific considerations [18]. The essential resource persons in this research are stakeholders who play a role in SIMPUS development planning and SIMPUS users. For this reason, researchers took a sample consisting of the Head of SDM and 2 SDM staff of the South Tangerang Health Office and 11 SIMPUS users from 6 selected health centres from 29 existing health centres (Table 1).

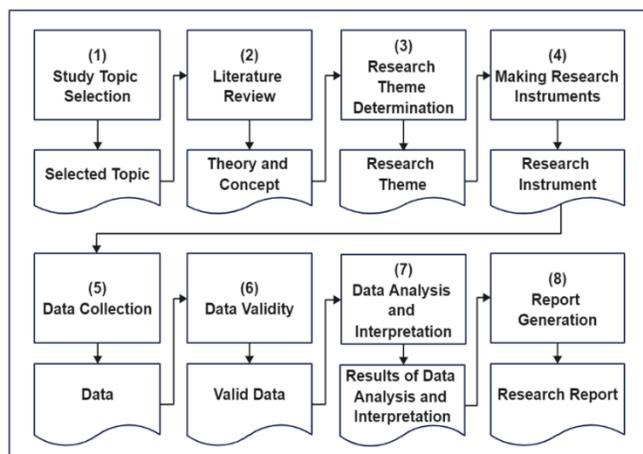


Figure 2. Research Procedure

Procedurally, this research was carried out in eight stages, namely choosing a topic of study, literature review to be used as a research reference when collecting data so that not much time was wasted [19]. This study used the TRAM theme to determine the theme and manufacture of research instruments. Research instruments are made by making a list of interview questions and FGDs with the TRAM theme. Data collection is done by observation, interviews, FGDs, and documentation. The validity of the data by testing credibility (internal validity), dependability (reliability) and confirmability (objectivity). The analysis and interpretation of the data are made with three coding stages: open coding, axial coding and selective coding, then the data is interpreted. The interpretation results are then linked to the existing theory so that the interpretation is not biased but can be explained by the theory. Furthermore, finally, report generation.

In this study, the researcher acts as a human instrument, functions to determine the focus of the research, selects resource persons as data sources, collects data, assesses data quality, analyzes data, interprets data and draws conclusions from its findings [18]. Other instruments are an application letter to conduct interviews, a list of research questions and a cellphone as a documentation tool during interviews and FGDs, Ms Word 2013, Ms Excel 2013, NVivo 12 to process qualitative data.

IV. RESULTS AND DISCUSSION

A. Results of Coding Data Analysis

Tables 2 to 4 summarise the results of the data coding analysis (open coding, axial coding, and selective coding) of the respondents' answers based on ten research themes based on the TRAM theme.

Table 2. Coding Analysis Results

P	T1 OP-PU	T2 OP-PEOU	T3 INN-PU	T4 INN-PEOU	T5 DIS-PU
P1	T1.P1.4	T2.P1.4	T3.P1.4	T4.P1.4	T5.P1.5
P2	T1.P2.4	T2.P2.4	T3.P2.4	T4.P2.4	T5.P2.4

P3	T1.P3.4	T2.P3.4	T3.P3.4	T4.P3.4	T5.P3.4
P4	T1.P4.2	T2.P4.4	T3.P4.2	T4.P4.2	T5.P4.2
P5	T1.P5.2	T2.P5.5	T3.P5.4	T4.P5.4	T5.P5.4
P6	T1.P6.2	T2.P6.3	T3.P6.2	T4.P6.4	T5.P6.2
P7	T1.P7.4	T2.P7.3	T3.P7.4	T4.P7.3	T5.P7.3
P8	T1.P8.4	T2.P8.4	T3.P8.4	T4.P8.4	T5.P8.2
P9	T1.P9.4	T2.P9.3	T3.P9.4	T4.P9.4	T5.P9.5
P10	T1.P10.5	T2.P10.5	T3.P10.4	T4.P10.4	T5.P10.2
P11	T1.P11.2	T2.P11.4	T3.P11.2	T4.P11.4	T5.P11.4
P12	T1.P12.5	T2.P12.5	T3.P12.5	T4.P12.4	T5.P12.4
P13	T1.P13.5	T2.P13.5	T3.P13.5	T4.P13.4	T5.P13.4
P14	T1.P14.5	T2.P14.5	T3.P14.5	T4.P14.4	T5.P14.4

Table 3. Coding Analysis Results (Continued)

P	T6 DIS-PEOU	T7 INS-PU	T8 INS-PEOU	T9 PU-ITU	T10 PEOU-ITU
P1	T6.P1.4	T7.P1.2	T8.P1.4	T9.P1.4	T10.P1.4
P2	T6.P2.4	T7.P2.2	T8.P2.4	T9.P2.5	T10.P2.4
P3	T6.P3.4	T7.P3.2	T8.P3.4	T9.P3.4	T10.P3.4
P4	T6.P4.2	T7.P4.4	T8.P4.4	T9.P4.2	T10.P4.3
P5	T6.P5.2	T7.P5.2	T8.P5.4	T9.P5.3	T10.P5.4
P6	T6.P6.4	T7.P6.2	T8.P6.5	T9.P6.3	T10.P6.4
P7	T6.P7.4	T7.P7.3	T8.P7.3	T9.P7.4	T10.P7.4
P8	T6.P8.5	T7.P8.2	T8.P8.2	T9.P8.2	T10.P8.4
P9	T6.P9.4	T7.P9.4	T8.P9.2	T9.P9.2	T10.P9.3
P10	T6.P10.2	T7.P10.2	T8.P10.2	T9.P10.5	T10.P10.5
P11	T6.P11.5	T7.P11.4	T8.P11.5	T9.P11.3	T10.P11.3
P12	T6.P12.4	T7.P12.2	T8.P12.2	T9.P12.5	T10.P12.5
P13	T6.P13.4	T7.P13.2	T8.P13.5	T9.P13.5	T10.P13.5
P14	T6.P14.4	T7.P14.2	T8.P14.5	T9.P14.5	T10.P14.5

Table 4. Coding Analysis Results (Continued)

P	Analysis Results				
	1	2	3	4	5
P1	0	1	0	8	1
P2	0	1	0	8	1
P3	0	1	0	9	0
P4	0	6	1	3	0
P5	0	3	1	5	1
P6	0	4	2	3	1
P7	0	0	5	5	0
P8	0	4	0	5	1
P9	0	2	2	5	1
P10	0	4	0	2	4
P11	0	2	2	4	2
P12	0	2	0	3	5
P13	0	1	0	3	6
P14	0	1	0	3	6
Total	0	32	13	66	29

Table Description:

- T Theme 3 Neutral
- P Person 4 Affected
- 1 Very unaffected 5 Very Affected
- 2 Unaffected

Based on the results of the analysis and coding data that has been done, it can be seen from the tendency of the respondents' answers to the research theme. It is known that the ten research themes of user acceptance preparedness proposed by the researchers, as many as 47% of the respondents stated that they affected the user's readiness to accept the application of the information system. Figure 3 shows the results of the analysis and coding of interview and FGD data carried out.

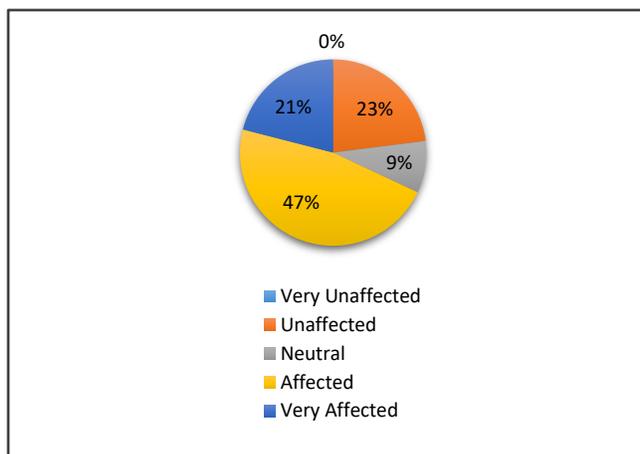


Figure 3. Results of Interview Data Analysis and FGD

B. Analysis Result and Interpretation

Theme 1: Effect of OP on PU

The tendency of respondents' answers stated that users thought that the use of information systems to support work would lead to benefits. It is consistent with previous research that states that optimism positively affects users' views on the benefits of using information systems [5-7, 9, 20].

“Of course, everything becomes easier, it happens quickly. In the past, our manual was difficult if it was manual, it took quite a long time, 13 o'clock could not be finished. After using SIMPUS at 12 o'clock it's finished.”

Theme 2: Effect of OP on PEOU

Based on the tendency of respondents' answers, optimism has a positive effect on perceived ease of use. Users accustomed to using computers will find it easier to use the system. Following previous research that users who are optimistic about the IS will have expectations of the use of IS, this will affect the user's view of the perceived ease of use of IS SI [5-7, 20].

“Easy, the application is user friendly, so it's not too complicated, it looks user friendly.”

Theme 3: Effect of INN on PU

In this theme, the tendency of respondents' answers to state that innovativeness has a positive effect on perceived usefulness. Users apply new technology because they think that using technology will simplify and speed up work [5, 6, 9, 20]

“SIMPUS linked to the dukcapil system, so we enter the NIK into the system that reads names etc, reads patient bios, it's actually easier.”

Theme 4: Effect of INN on PEOU

The tendency of respondents' answers states that innovativeness positively affects perceived ease of use. It is consistent with previous research [5-7, 20] that innovation can lead to high perceived ease of using information systems.

“It's possible for sure, because it's easy in my opinion, there's bound to be questions but if you don't ask it's absolutely impossible, you have to be directed first, but if you have the opportunity to practice yourself, it's easy to apply.”

Theme 5: Effect of DIS on PU

In this theme, there is a tendency for users to feel discomfort with the use of information systems, which will reduce their assessment of the benefits of using information systems (perceived usefulness). It is consistent with previous research [5, 20].

“Yes, the internet is disturbed, the internet is slow. It really affects it, it takes longer, it takes longer, we wait. We just ask for it quickly, so the service will be fast.”

Theme 6: Effect of DIS on PEOU

The tendency of respondents' answers indicates that discomfort will assess the perceived ease of use of information systems is a tricky thing. Because users are still not used to using information systems, a transition process is needed to change habits from manual to information systems. It follows previous studies [5, 7, 20].

“Actually, it's simpler, but when you start transitioning from the old system to the new system, it's actually better use SIMPUS.”

Theme 7: Effect of INS on PU

In this theme, the respondents' answers state that insecurity does not affect the perceived usefulness of using SIMPUS because users themselves have not optimally used SIMPUS. They still rely on manual systems with recording. It is contrary to the research model where the insecurity factor is an inhibiting factor for perceived usefulness.

“It doesn't effect, because like I said earlier, I don't use SIMPUS here regularly.”

On the other hand, several informants stated that insecurity had a negative effect on perceived usefulness. It follows the indicators of insecurity "perception of the dangers of using technology" and "uncertainty about the use of online technology".

“I have been afraid, and we do not know if this has been saved or not, so we do not know.”

In this study, users lack confidence in the security of SIMPUS itself, the internet network used, and insecurity in electronic goods (technology), which results in individuals avoiding using technology because of the user's fear of technology [7, 21]. It follows previous studies [5, 7, 20].

Theme 8: Effect of INS on PEOU

The feeling of insecurity felt by users in using an information system or new technology, especially SIMPUS such as internet connections, interference with their computers, and the system itself makes users unable to feel the ease of using SIMPUS. It follows previous studies [5, 7, 20].

“Maybe if the system is good enough, it's better to use the system, don't use paper anymore, but with a note that wouldn't turn off the electricity, wouldn't drop the internet, wouldn't have problems with computer, that's what can't be guaranteed.”

Theme 9: Effect of PU on ITU

The respondent's answers indicate that the higher the perceived usefulness of the user in using the information system, the more interested that person will be in using and accepting the system. It shows agreement with previous studies [5, 9, 13, 20].

“Sure, if it was me. As I see SIMPUS makes it easy, if the patient has already registered, we talked about the patient who has already registered. So we just need to find the name, we click to enter the appropriate service department, that's all.”

Theme 10: Effect of PEOU on ITU

The respondents' answers show that the higher the user's assessment of the perceived ease of use of the information system will affect the user's intention to continue to use and receive the information system. It shows conformity with previous studies [5, 20].

“Yes, it has an effect, the system is easy to learn, easy to use too, it doesn't look complicated, so users feel comfortable using it. If the system does not make it difficult for users, users will also continue to use the system.”

C. Level of Readiness of User Acceptance in the Implementation of the Health Center Management Information System (SIMPUS)

From the results of interviews and FGDs with resource persons, it can be said that the level of readiness of user acceptance in implementing the Health Center Management Information System (SIMPUS) ranges from 80%-85%. It can be seen in the following excerpts from the informants' statements:

“Yes, 85% of the problem is the internet. For HR, we have trained many times, the facilities are ready, this is the network.”

“If I'm almost 85% ready, the problem is in the network.”

D. Other Factors Affecting User Readiness for Acceptance of the Implementation of the Health Center Management Information System

This study found other factors that affect the readiness of user acceptance in implementing information systems, including:

1) *Facilities and infrastructure factors*; in this study, the internet network is the factor most often mentioned as an obstacle to the readiness to implement SIMPUS.

2) *Human resources factors*; in this case, there are two categories. Firstly, the informants stated that training to use SIMPUS was a factor in user readiness. The second is that in the implementation of SIMPUS, additional human resources are needed to work on SIMPUS because the implementation of SIMPUS goes hand in hand with the use of the manual system.

3) *Organizational Factors*; This study found that the implementation of SIMPUS is a recommendation from the health office and is required for all health centres.

This finding follows previous research, which states that the System Context, Person & Action, Organization Context variables in the input dimension in this research model are

possible to influence other variables, which are the TRI variables [3, 10, 22].

In contrast, previous studies [6, 7, 9, 23, 24], used the TRAM model to measure technology acceptance readiness with a quantitative approach. This study uses a qualitative approach to understand the effect of information system user readiness on the acceptance of SIMPUS implementation by using the informant's point of view in detail and exploring the factors that influence it. Quantitative methods have shortcomings in explaining the data [10]. The study's findings not only show the level of influence of the ten research themes but also explore the factors that influence them. In addition, it is contrary to previous research [6, 7, 9, 23, 24] where the insecurity factor is an inhibiting factor for perceived usefulness. In this study, the tendency of respondents states that insecurity does not affect the perceived usefulness of using SIMPUS is because users themselves have not optimally used SIMPUS. They still depend on manual systems with recording.

V. CONCLUSION

In this study, an evaluation of the readiness of user acceptance for the application of SIMPUS in the South Tangerang City Region was carried out using a qualitative method with the Technology Readiness Acceptance Model (TRAM). This study aims to determine the level of acceptance of SIMPUS users and explore the influencing factors.

Hasil penelitian menunjukkan bahwa tingkat kesiapan penerimaan pengguna terhadap penerapan SIMPUS sekitar 80%-85%. Berdasarkan tema penelitian diketahui bahwa sebesar 68% narasumber menyatakan kesiapan pengguna berpengaruh terhadap penerimaan pengguna terhadap penggunaan SIMPUS. Diketahui bahwa dari 10 tema yang diajukan peneliti 9 tema berpengaruh yaitu pengaruh optimism dan innovativeness yang tinggi akan menyebabkan tingginya perceived ease of use dan perceived usefulness terhadap IS dan mendorong intention to use penggunaan IS, perceived usefulness sendiri berpengaruh secara signifikan terhadap intention to use, sehingga akan berpengaruh baik terhadap penerapan IS. The results showed that the level of user acceptance of the SIMPUS implementation was around 80%-85%. Based on the research theme, it was found that 68% of respondents stated that user readiness affected user acceptance of SIMPUS use. Of the ten themes proposed by the researcher, nine influential themes, namely the influence of high optimism and innovativeness, will lead to high perceived ease of use and perceived usefulness towards IS and encourage intention to use IS. Perceived usefulness itself has a significant effect on the intention to use, so that will positively affect the implementation of IS. On the other hand, high discomfort reduces the user's perceived usefulness and perceived ease of use. High insecurity of technology reduces the perceived ease of use of IS, thus inhibiting the intention to use the use of IS. Furthermore, one theme had no effect, insecurity did not lead to higher or lower perceived usefulness. In addition, three other factors were found that affect the readiness of user acceptance

of the SIMPUS implementation, namely infrastructure, human resources, and organization factors.

On the other hand, qualitative research is very dependent on the interpretation of subjectivity that exists in researchers regarding the implied meaning of the results of interviews and FGDs. Hence, the tendency for bias still exists. In addition, the purposive sampling technique in selecting resource persons causes the researcher to be unable to generalize the study results because the number of existing samples cannot represent other user groups of the system where the admin dominates the sources.

Further research on similar studies (topics and methods as used in this study) may consider adding the scope of informants so that a complete variety of data and information can be obtained. Although the level of readiness for user acceptance has reached 80%, there are several obstacles, such as two jobs simultaneously (manual and SIMPUS), lack of human resources, and a less than optimal internet network reducing user interest in using SIMPUS. It can be taken into consideration to improve and improve SIMPUS implementation.

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