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Analyzing Cyclops Application Acceptance in Telkomsel Pamasuka using IDT and TAM

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Abstract

Purpose: In this thesis, we will examine how much employee acceptance in the Pa Masuka Area, especially "Network" and "Sales', which totals around 522 people to the CYCLOPS application using the Innovation Diffusion Theory (IDT) and Technology Acceptance Model (TAM) methods, then an online survey is conducted.

Research Methodology: Data analysis was performed using a Structural Equation Modeling (SEM) model.

Results: Digitization of processes at Telkomsel continues to be carried out to increase the effectiveness of employee work, including in the Pausuka Area, especially in the Area Network Operations Sub-Directorate of Pausuka which is responsible for 18,000 sites serving 30 million customers based on April 2023 data.CYCLOPS is a supporting application for digitizing processes that makes it easier for employees, especially the "Network" and "Sales" sections, to observe network conditions (Live Monitoring), find out the potential for network development, make improvements that are right on target according to set priorities to carry out network quality tests.

Conclusions: This study concludes that the combined use of Innovation Diffusion Theory (IDT) and the Technology Acceptance Model (TAM) effectively explains the factors influencing the acceptance of the Cyclops in-house application by Telkomsel employees in the Pamasuka area. Unlike consumer technologies like smartwatches or 5G, which require user observation before adoption, in-house applications like Cyclops are often used directly due to internal work demands.

Limitations: This research is limited to Telkomsel employees in the Pamasuka area and focuses only on the Cyclops application within sales and network divisions. Future studies can expand to other regions, different departments, or compare multiple in-house applications

Contributions: The findings provide valuable insights for companies developing internal applications. To improve adoption, developers should enhance technical features and conduct regular outreach to inform employees about the application's functions and benefits. This could turn observability into a strength, helping employees better understand and utilize internal tools like Cyclops, ultimately increasing productivity and application value.

Keywords: *CYCLOPS, IDT, TAM, SEM*

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1. Introduction

In Indonesia and worldwide, along with the development of technology and information, the telecommunications industry is also experiencing turbulence, disruption, and challenges. In addition to providing services in the form of connectivity, providers or service providers must provide a digital experience, which is now a necessity for society. In addition, the Covid-19 pandemic has placed the telecommunications industry at the center of life by empowering businesses and communities through

connectivity. However, the pandemic has hit the economy, which directly affects the telecommunications industry, worsening the competitive conditions that have been rampant in the industry (Telkomsel, 2021). This situation, of course, also affects changes in cellular customer behavior, which transitions from the demand for voice and SMS (legacy business) to the need for data (digital business), becoming an enabler for the birth of accelerated growth in the Indonesian digital industry, from digital connectivity to digital platforms and digital services. Everything is done to present the new face of Telkomsel, namely Telkomsel, which builds a world full of opportunities through the use of digital technology (Syarif, Rumengan, & Gunawan, 2021).

To address these challenges and run a business in the digital industry, Telkomsel is transforming its business by changing the concept from a telecommunications service provider company or a part of a connectivity enabler to a digital telco company. This began in 2018 when Telkomsel established the Transformation Management Office (TMO) and an ad hoc organization dedicated to leading and running the transformation program. Telkomsel conducts several programs focusing on three main aspects: people, processes, and technology (Telkomsel, 2021).

In terms of humans, Telkomsel has implemented new ways of working and adopted an agile transformation approach. It divides a large team of companies into small teams of employees, called agile quad. Each squad consists of people from various departments who allow them to work collaboratively and creatively. Agile Squads works using the scrum method, which promotes an agile approach and team work. Teams can unleash creativity and empathy, ultimately helping them precisely identify problems and offer solutions. In the Process aspect, to accelerate Telkomsel's Digital Transformation, the transformation program focuses on removing the organizational barriers that hinder innovation. Several areas of business processes and policies have been assessed and identified for change or improvement, one of which is the vision and strategy to create a customer experience (CX) and change the business view to be customer-centric.

Furthermore, in terms of technology, it is an integral part of Digital Transformation. Telkomsels integrate digital technology into several business areas to fundamentally change their operations and provide value. In 2020, Telkomsel launched Robotic Automation Process (RPA) digital software that helps automate clerical, repetitive, and high-intensity work. Implementation of the RPA system increases time efficiency and eliminates the potential for human error. In 2021, Telkomsel will gradually continue to improve the implementation of the RPA to create Intelligent Automation (IA) capabilities that will encourage Telkomsel to become a Lean Operation. Telkomsels have begun to develop tools, applications, and digital platforms to internally solve pain points. On the internal side, applications are developed to facilitate conventional business processes to become more effective and efficient. This is supported by a digital transformation that focuses on the human aspect, which is more precise in identifying problems and offering solutions (M. Suharto, Angkupi, Dacholfany, & Susminingsih, 2021).

Covering the three aspects of Telkomsel's transformation, one of the things that is emphasized is the existence of new ways of working or new ways of working that need to be formed to face challenges and achieve the company's vision and mission. One new way of working carried out by Telkomsel is by developing innovations in-house to maximize processes and businesses. This is supported by many Telkomsel programs aimed at developing innovations in the fields of technology, applications, tools, and digital platforms aimed at internal and telkomsel customers. The programs launched by the Transformation Management Office (TMO) together with Telkomsel's Human Capital Management include Innoxtion Awards, War on Waste, Digital-X, Digital Workshop, e-Learning, Polaris, and Telkomsel Digital Ecosystem.

The result of these programs is the development of new digital applications that support Telkomsel's processes and businesses by resolving the pain points of the application's target users. In line with company transformation, the use of digital applications helps increase the effectiveness of a company's work, by mastering the technology developed by the company, work will be completed in less time and increase work capacity by reducing obstacles or risks (Andi, Kusumanto, & Yusi, 2023). Digital

technology has a major impact on the workplace and work culture, and its use of digital technology accelerates work efficiency and expands work goals (Syarif & Riza, 2022); (Zabartih & Widhiarso, 2023).

One of the digital applications currently used is the Cyclops application, which was initiated in-house by the Sulawesi Regional Productivity Area Network Division, which was then used by Telkomsel Regional Sulawesi employees up to the Pamasuka Area level and has also been prepared for use nationally. All Telkomsel internals from the Management Level to Engineer level are stakeholders of the application who have responsibility and contribute so that the Cyclops application can become a Telkomsel operating tool and is part of the Robotic Automation Process (RPA), which is a form of corporate transformation (Area Tools Consolidation Directorate Network Telkomsel, 2022).

Some of the most popular theories for studying the adoption of innovation and technology are the Technology Acceptance Model (Agung & Widyarini, 2021) and Innovation Diffusion Theory (Rogers, Singhal, & Quinlan, 2014). Both theories were developed over the decades following the development of consumer behavior phenomena, especially in the fields of innovation and technology. Along with their development, TAM and IDT, which have been updated, are used as framework models to examine the intention of potential users to adopt an innovation or technology, before leading to the use of the innovation or technology. The TAM theory used in this study refers to the theory introduced by Hibur, Fanggidae, Kurniawati, and Benu (2020) in which the intention to adopt a technology is determined by the perceived ease of use and perceived usefulness. The IDT model used in this study refers to the development conducted by (Rogers et al., 2014) in which the intention to adopt a technology can be influenced by relative advantage, compatibility, visibility, image, result demonstrability, voluntariness, and ease of use. Unlike the TAM, Moore and Benbasat's IDT model has not been widely used in previous studies. Therefore, this study uses the integration of the original TAM model and the IDT version of Moore and Benbasat, because the combination of the two can lead to the development of a holistic model to explain the variables that influence the formation of individual intentions in adopting a technology (Hubert et al., 2019).

Based on the background and problem formulation that has been described, the objectives of this study are expected to be able to determine the effectiveness of the Cyclops application related to Compatibility, Observability and Trialability as well as user acceptance in this case Telkomsel employees, especially the "network" and "sales" sections related to Perceive Usefulness and Perceive Ease of Use and know Intense to Use the Cyclop application.

2. Literature Review

2.1 Technology Acceptance Model

TAM (Technology Acceptance Model) is a technology implementation model that adopts the Theory of Reasoned Action (Tran & Cheng, 2017) which is used to see the level of use of respondents in accepting information technology. This TRA is composed of the basic assumption that every human being behaves consciously in controlling himself and considers the use of information available for use in his life. A person's intention to perform a certain action can be influenced by two determining factors, the first of which is related to attitude (attitude towards behavior) and the second is social influence, namely subjective norms.

Davis developed the TAM Model in 1989 with a strong theoretical basis through the adoption of the TAM Model. TAM is a type of theory that uses a behavioral theory approach, which is widely used to study the information technology adoption process. The concept of Technology Acceptance Model (TAM), is a theory that offers a foundation for studying and understanding the behavior of technology users in accepting and using the technology offered. The TAM model was developed based on psychological theory, which explains the behavior of technology users based on beliefs, attitudes, intentions, and user behavior relationships.

The objectives of the TAM include explaining the determinants of acceptance of information-based technology in general and explaining the behavior of end-users of information technology with a wide

variety and population of users to provide a basis for understanding the influence of external factors on psychological foundations. TAM is formulated to achieve this goal by identifying a small number of key variables derived from previous research on theories and determinants of technology acceptance, and applying TRA as a theoretical background in modeling the relationship between variables.

The TAM is a behavioral model that is useful for answering the question of why many information technology systems fail to be implemented because users do not intend to use them. It is built on a strong theoretical basis and has been tested in many studies, and the results mostly support and conclude that the TAM is a good model. The most important advantage of TAM is that it is a parsimony model, which is a simple but valid model. TAM simply explains the causal relationship between behavior and beliefs (benefits of an information system and convenience), goals, and the actual use of information system users. This explanation is in accordance with the objectives of this study, namely, to examine the effect of Technology Acceptance Model, which determines user attitudes in deciding to adopt the Cyclop application. In addition, TAM is believed to be able to predict user acceptance of technology based on the impact of two factors: perceived usefulness and perceived ease of use. Actual system use is the real condition of system use, which is conceptualized in the form of measurements of the frequency and duration of using technology.

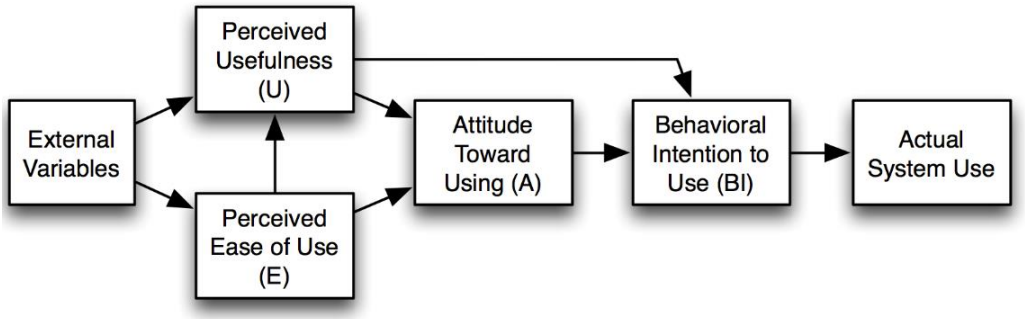

Figure 1. Technology Acceptance Model (TAM)

Figure 1 shows the Technology Acceptance Model (TAM) model after the first modification in 1989. The model was updated in 1996 as the final version of the TAM (Venkatesh & Davis, 1996) which is described as follows:

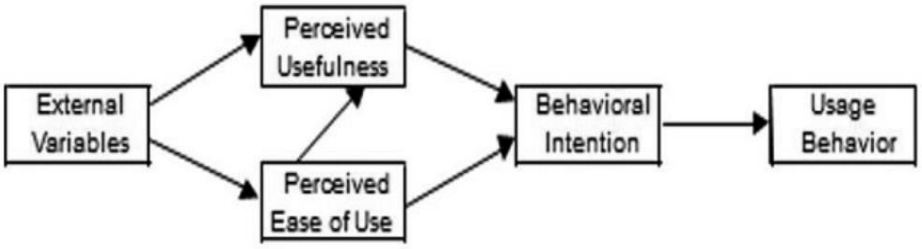

Figure 2. Final Technology Acceptance Model

Thus, TAM in this study is used to analyze consumer adoption behavior variables in the acceptance of web use.

2.1.1 Innovation Diffusion Theory (IDT)

Innovation is an idea, practice, or object that is considered new by an individual or other unit of adoption (Rogers et al., 2014). Diffusion is the process by which innovations are communicated through specific channels over time among the members of a social system (Rogers et al., 2014). Therefore, IDT theory argues that an individual makes a decision to adopt or reject an innovation based on the beliefs about the innovation. The main objective of IDT is the adoption of innovation (science, technology, community development field) by members of a particular social system. The social system can be in the form of individuals, informal groups, or organizations in the community. Innovation characteristics are the

nature of innovation diffusion, where innovation characteristics are the ones that determine the speed of an innovation process. In the construction of the Innovation Diffusion Theory (IDT) model, in-depth research was conducted to measure perceptions of the adoption of innovations in technology.

IDT is defined as "innovations that offer advantages, perceived compatibility with existing practices and beliefs, low complexity, potential triablity, and observability will have a wider and faster diffusion rate". Thus, positive behavioral intention to use e-learning is expressed by students' perception of e-learning as a useful tool, appropriate for their current activities, and easy to use.

Innovation Diffusion Theory (IDT) includes five significant innovation characteristics: Relative Advantage (ADV), compatibility , complexity (CPL), trialability () and observability (OBS).

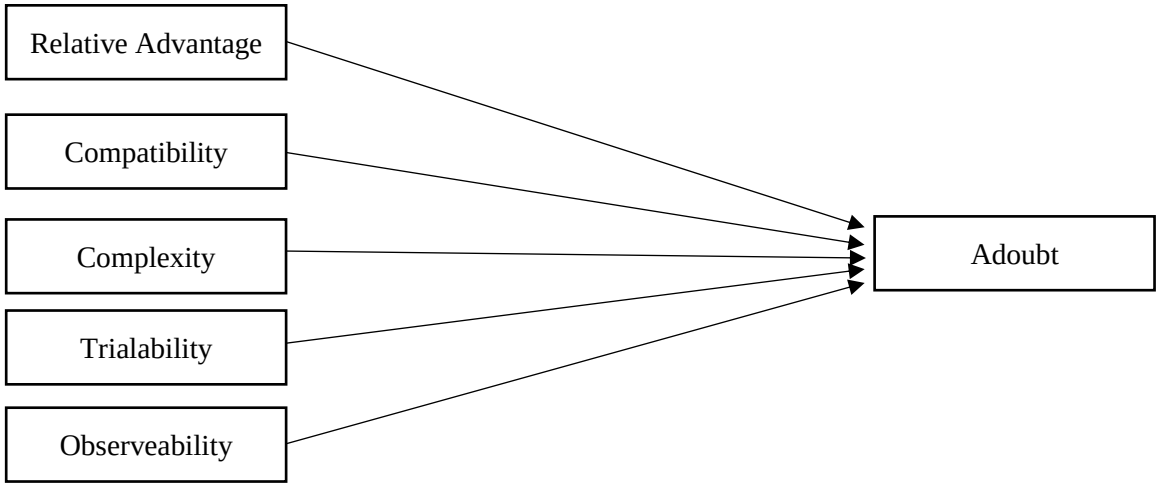

Figure 3. Innovation Diffusion Theory (IDT)
Source: (Rogers et al., 2014)

Relative advantage is defined as the level at which people assume that new innovations are better than the old ones. Thus, this term is used in this study to refer to the level at which users believe that the use of the Cyclops application can improve performance to improve network monitoring and optimization. Complexity is defined as the level of difficulty in understanding innovation and ease of use perceived by end users. Based on this definition, this study uses these terms to refer to the level of difficulty experienced by employees, which affects their performance in monitoring and optimizing networks. Previous research has found that when end users perceive an application/innovation as complex, they tend to have a low intention to use it. In addition, Hardgrave et al. revealed that complexity has a negative relationship with perceived usefulness.

Observability is defined as the degree to which "the results of the innovation can be seen by others." It is assumed that the adopter's friends and neighbors often ask for feedback. Visibility is seen as a factor that stimulates peer discussions about new ideas. Based on these points, the acceptability seen by users towards the use of the Cyclops application has an impact on the way they conduct process trials. The relationship between the intention to use a system and trialability has been discussed in several studies. These studies found that intention to use the system was positively influenced by trialability.

Trialability refers to the extent to which people think they need to experience innovation before talking about the decision to adopt it. Trialable innovations tend to have less uncertainty as perceived by individuals considering adopting them, and such individuals tend to learn through this experience. Research conducted on different populations has found that users' attitudes towards using the system and their intentions to do so are strongly influenced by observation. Research conducted in the field of TAM and IDT has found that perceived system use has a significant influence on observability by Telkomsel employees (S. Suharto, 2023). This observability also has a positive impact on other

dimensions such as perceived ease of use, behavioral intention to use the Cyclops application, and perceived usefulness.

Perceived compatibility refers to the fact that employees feel that the innovation is compatible with their standards, prior involvement, and the desire of adopters to use Cyclops. It has been found that perceived compatibility has a positive relationship only with perceived usefulness. Other researchers such as Wu and Wang and Chang and Tung reported a significant relationship between behavioral intention and perceived usefulness. The behavioral intention to use, perceived usefulness, and perceived ease of use were also strongly influenced by perceived compatibility. The relationship between similar technologies and prior experience is positively related to the ease of use of technological innovations, which have been reported to be positive.

2.2 Previous Research (State of The Art)

This research uses references from several previous studies related to the IDT and TAM integration models, one of which is from the journal "IDT-TAM Integrate Model for IT Adoption" compiled by (Zhang, Guo, & Chen, 2008). In this journal, the integrated model framework has three categories of PCI (perceived characteristics of innovating) factors: subjective evaluation, objective conditions, and interacting factors as determinants of perceived usefulness (PU) and/or perceived ease of use (PEOU), which affect the adoption behavior of Information Technology (IT) users.

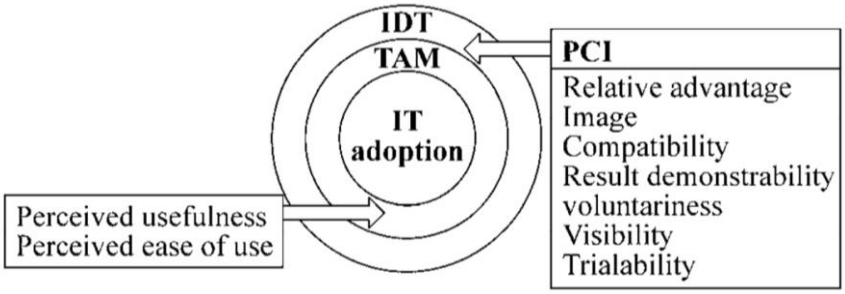

Figure 4. IDT-TAM Integrated Model Framework
Source: Person data

The next reference is from research conducted by (Setiawan & Tricahyono, 2019) with the title "Optimization Strategy of Mobile Cellular Network based on Customer Smartphone Penetration," which combines the concepts of IDT (compatibility, observability, and trialability variables) and TAM (perceived usefulness and perceived ease of use variables). It is concluded that compatibility variables in the IDT theory play an important role compared to observability and trialability variables. Compatibility does not match the customer's need for new technology, even though new technology represents service excellence. Meanwhile, observability and trialability are the only supports for determining the reliability of a new technology. Ultimately, customer needs are the top priority. There is a very close relationship between the variables in the IDT and TAM theories in influencing customer decisions to adopt new technology.

Based on the main references from the two journals and several other journals for enrichment, research was conducted on the use of the Cyclops application on Telkomsel employees in the Papua, Maluku, Sulawesi, and Kalimantan areas to transform network monitoring using mobile applications. Previous research has discussed external variables, especially those using the Innovation Diffusion Theory (IDT) method, which affect user intention to use a system using the Technology Acceptance Model (TAM) methodology. Previous research has discussed the influence and integration of these two methodologies in the fields of telecommunications, Information Technology, banking, smart cities, and education.

This research examines new things by developing a previous research model in which the variables studied are obtained based on a combination of the IDT model as external variables and TAM variables in one structural model to obtain the most influential variables and examine them on the Cyclops

application used in the telecommunications (Information Technology) world. Research related to internal applications in the world of Cellular Telecommunications is relatively new; therefore, this research differs in terms of research objectives and development of the TAM model combined with IDT variables.

This research stems from the problem of the low level of usability of employees who use the Cyclops application, which causes a lack of effectiveness in monitoring and optimizing the network. Thus, it is necessary to analyze the variables that influence students' intention to use cyclops using a combination of IDT and TAM models. The combination of IDT and TAM has been used in a variety of information technology studies. In particular, they have been used in studies related to health systems. For example, Tung, Chang, and Chou (2008) investigated the acceptance of electronic logistics information systems in the healthcare industry using IDT and TAM models. Wu, Wang, and Lin (2007) also integrated IDT into TAM to understand the influencing factors related to healthcare services. Based on these studies, this study assumes that the combination of IDT and TAM can be applied to acceptance of the Cyclops application in the Telkomsel Pamasuka area.

Moore and Benbasat (1991) in the study "Development of an instrument to measure perceptions of adopting information technology innovations" showed that IDT and TAM have some similarities. Relative advantage and complexity in IDT are similar to the perceived usefulness and ease of use of TAM, respectively. Thus, this study includes only three perceived innovation characteristics, in compatibility, observability, and trialability, and integrates them into TAM-Perceived of Use and Perceived Ease of Use. The results of this study are expected to not only contribute to the theory of explaining which variables have the greatest influence on employee (user) intentions in utilizing the Cyclops application using a combination of IDT and TAM models. However, it will also provide input related to function or appearance for further development to increase the effectiveness of the Cyclops application.

2.3 Framework

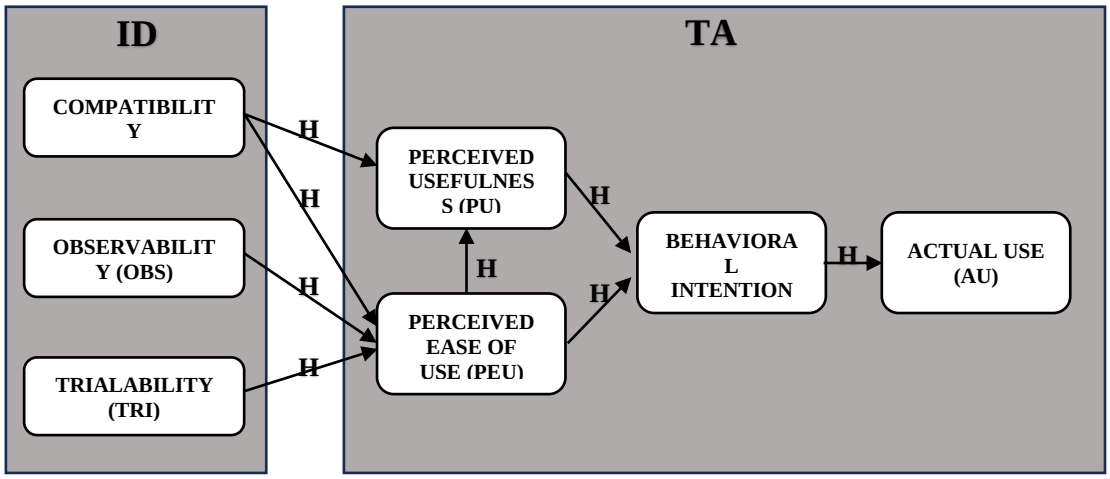

Figure 5. IDT – TAM Rationale Framework for the Cyclops application
Source: Person data (2024)

2.3 Research Hypothesis

The current research hypotheses before obtaining research results, and based on previous research, are H1a and H1b, as follows:
H1&H2: Perceived Compatibility of technology, has a positive and significant influence on Perceived Usefulness (PU)^{H1} and Perceived Ease of Use (PEU)^{H2}.

This is based on as the utilization of the target technology by users deepens, these two variables will gradually change their influence in a complex interaction with Perceived Usefulness PU and Perceived Ease of Use (PEU). In some applications of technology Compatibility affects Intention Use, for example

"Compatibility has a positive effect on Consumer Behaviour Intention in using internet banking services" (Giovanis, Binioris, & Polychronopoulos, 2012). In addition, according to Choe and Noh (2018) Compatibility also indirectly affects Intention to Use through the mediating effects of Perceived Usefulness and Perceived Ease Of Use. Observability (OBS) is defined as the extent to which the results of the innovation can be seen by others. It is an objective condition of the environment in adopting innovations, and it is positively related to the adoption rate. For example, OBS affects smartwatch usage and intention through the mediating effect of Perceived Ease of Use (Choe & Noh, 2018). The opportunity to test new technology first provides many opportunities to try the technology, allowing users to understand the difficulties of existing features. Thus, Trialability increases the likelihood of technology acceptance (Choe & Noh, 2018). Observeability is an objective condition about the environment in adopting innovations that affect Intention to Use through the mediating effect of Perceived Ease of Use in adopting information technology. Therefore, we propose is H3 the follows:
H3: Observability (OBS) of using the Cyclops application will have a significant effect on Perceived Ease of Use (PEU) in using Cyclops.

Trialability (TRI) is defined as the degree to which an innovation can be tested in a limited way. It is a concept related to risk and the opportunity to test a new technology that allows it to be accepted more quickly. Innovation trialability, as perceived by members of the social system, is positively related to the rate of adoption. (Rogers et al., 2014). TRI was also found to influence Perceived Ease of Use (PEU) on Smartwatch usage (Choe & Noh, 2018) and TRI also affects PU and PEU on biofuel energy systems in Vietnam (Tran & Cheng, 2017). Therefore, we propose is H4:
H4: It is suspected that Trialability (TRI) has a positive and significant influence on Perceived Ease of Use (PEU) in using Cyclops.

The Perceived Ease of Use (PEU) of a system refers to the extent to which an individual perceives that the use of a technology is not complicated. It has been shown in several studies conducted in the past that PEU has a positive relationship with behavioral intention to use (BIU), either directly or indirectly (Salloum, Alhamad, Al-Emran, Monem, & Shaalan, 2019). In relation to application use, PEU refers to the extent to which users feel that using the application will be easy to use (Budiastuti & Muid, 2020). In the world of education, PEU also affects BIU Fitriyani and Syamsuar (2022) thus leading to Hypothesis H5:
H5: Perceived Ease of Use (PEU) has a positive effect on Perceived Usefulness (PU) for using Cyclops.

Apart from that, the final version of the TAM model Venkatesh and Davis (1996) and the implementation of TAM in "Evaluating technology acceptance in agricultural education in Iran: A study of vocational agriculture teachers explains that Behavioral Intention to Use influences Actual Use and Perceived Usefulness (PU) has a positive effect on Behavioral Intention to Use (BIU) (Zarafshani, Solaymani, D'Itri, Helms, & Sanjabi, 2020). This is also true in the world of online education (Fitriyani & Syamsuar, 2022). Based on this, we propose the hypothesis to H6:
H6: Perceived Ease of Use (PEU) has a positive effect on Behavioral Intention to Use (BIU) for using the Cyclops Application. B

Based on previous research by Zarafshani et al. (2020) there is a significant correlation between Perceived Ease of Use (PEU) and Perceived Usefulness (PU) in agricultural education in Iran." In addition, in the technology use category, PEU also has a positive effect on BIU on data standards used in Smart Cities (Compernolle et al., 2018). Therefore, Hypothesis H7 is as follows:
H7: Perceived Usefulness (PU) has a positive effect on Behavioral Intention to Use (BIU)

The general model of TAM has shown a positive relationship between Behavior and Actual use as stated by (Hanham, Lee, & Teo, 2021); (Priyambada, Kusyanti, & Herlambang, 2018); (Salloum et al., 2019); (Syahruddin et al., 2021) and other researchers generally agree that BIU has an effect on AU, so the hypothesis we propose is H8 as follows:
H8: Behavioral Intention to Use influences Actual Use (AU) of the Cyclops application.

3. Methodology

3.1. Research sample

A quantitative approach is used in this study. The research object population is 601 Telkomsel organic employees in Pamuka who have installed the Cyclops application with the distribution as follows:

Table 1. Number of Cyclops Users in the Padalama Area

Directorate of Employees Pamasuka Area	**Total employees**
CEO's Office Directorate	23
Finance and Risk Management Directorate	36
Human Capital Management Directorate	7
Information Technology Directorate	11
Marketing Directorate	2
Network Directorate	229
Sales Directorate	293
Grand Total	**601**

Source: Person data (2024)

3.1.1 Sample

Of the total 601 employees in the Papuaska area, the number that will be the research sample is 522 people who are employees from the "Network" and "Sales" sections which are the main target users of the Cyclops application. Based on the latest employee network and sales data for the Pamuka area, the sample size was 522. Of the 522 participants, 272 completed the questionnaire. Of the 272 respondents who filled out the questionnaire, 22 still did not use Cyclops, so there were 250 respondents. respondents who were valid and could be processed as shown in Table 1.

Table 2. Demographic details of the respondents; N=250; percentages rounded to the nearest unit

Information about	Description	Total	%
Sex	Male	236	94%
	Female	14	6%
Total		250	100%
Age	<25 years	5	3%
	26-30	47	19%
	31-35	59	24%
	36-40	39	16%
	>41	100	40%
Total		250	100%
Last education	High School/Diploma	4	2%
	Bachelor (S1)	215	86%
	Graduate (S2)/Postgraduate (S3)	31	12%
Total		250	100%

3.2. Research variable

In this research, there are variables formed from symptoms that were classified into basic concepts or research theories in Chapter 2. These variables are passed on at the data search stage to internal and external parties. For this reason, the following are the IDT and TAM research variables on Cyclops

application innovation, which will become a reference in the research stages and develop into the following questions:

Table 3. Research Variables

No	Variablese	Symbol	Indicator	Question
1	Perceived Ease of Use	PEU1	Easy to use	I have never had difficulty accessing or logging into the Cyclops application
2	Perceived Ease of Use	PEU2	Easy to access	The Cyclops application is efficient for mobile access
3	Perceived Ease of Use	PEU3	Easy to understand	The features in the Cyclops application are easy to understand and I found it easy to learn
4	Perceived Usefulness	PU1	Identifying problems	With the Cyclops app, I was able to identify the problem quickly
5	Perceived Usefulness	PU2	Improve the performance	The Cyclops application speeds up the search for operational supporting data
6	Perceived Usefulness	PU3	Beneficial	Overall I feel the Cyclops application has many benefits.
7	Behavioral Intention to Use	BIU1	Plan to continue using it in the future	Cyclops applications are always used in the future
8	Behavioral Intention to Use	BIU2	Motivation to keep using	I am motivated to continue using the Cyclops application in the future
9	Behavioral Intention to Use	BIU3	Use under any conditions	I always use the Cyclops application in any condition
10	Actual Use	AU1	Compliance with actual data	The Cyclops application is used for flash reports in real time
11	Actual Use	AU2	Compliance with procedures	I use the Cyclops application according to the procedures provided.
12	Actual Use	AU3	Duration of use	I access Cyclops almost every day
13	Compatibility	COM1	Innovation makes things better	I use innovation because innovation has always made things much better
14	Compatibility	COM2	Innovation helps make work easier	I feel confident in using the technological innovation of the Cyclops application because it can make my work easier
15	Compatibility	COM3	Innovation makes it safe	I feel safe when accessing the Cyclops application
16	Observability	OBS1	Observe before using	Before using an innovation, I look for information first before using it
17	Observability	OBS2	Observation of related services	Cyclops application innovation provides the opportunity to observe Telkomsel services
18	Observability	OBS3	Observation via social media	Information about the Cyclops application is obtained via social media (chat, email, etc.)
19	Trialability	TRI1	Try the latest features	New features in the Cyclops application are usually tested
20	Trialability	TRI2	Try to invite other users	I feel that the Cyclops application innovation can be tested on anyone (Telkomsel Internal)
21	Trialability	TRI3	Try features that suit your needs	New features are always updated according to my needs

4. Results and discussions

4.1 Validity and Reliability Test

The research data were processed using SmartPLS 4.0, with the following chart.

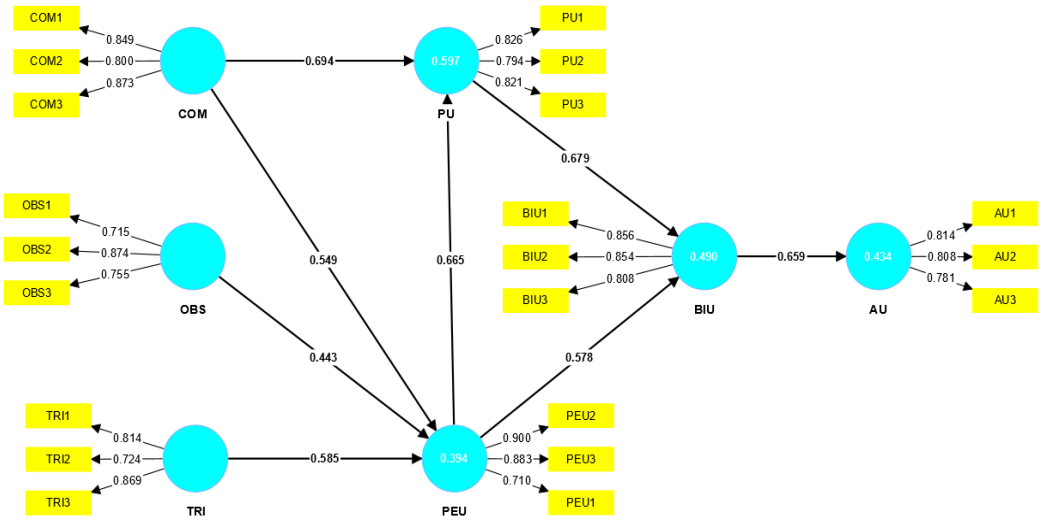

Figure 6. Validity and Reliability Test
Source: Person data (2024)

4.2.1 Outer Loading

The convergent validity of the measurement model with reflective indicators was assessed based on the correlation between the item score/component score and the construct score calculated using PLS. A reflective measure is said to be high if it correlates more than 0.7 with the construct to be measured. According to Hair, Risher, Sarstedt, and Ringle (2019) an outer loading value > 0.7 is declared valid. In the results of the data processing measurements from 250 respondents, all indicators were declared valid for outer loading, as shown in Table 4.

Table 4. Outer Loading

Indicator	Outer loadings	Refference	Status
AU1 <- AU	0.814	0.7	VALID
AU2 <- AU	0.808	0.7	VALID
AU3 <- AU	0.781	0.7	VALID
BIU1 <- BIU	0.856	0.7	VALID
BIU2 <- BIU	0.854	0.7	VALID
BIU3 <- BIU	0.808	0.7	VALID
COM1 <- COM	0.849	0.7	VALID
COM2 <- COM	0.8	0.7	VALID
COM3 <- COM	0.873	0.7	VALID
OBS1 <- OBS	0.715	0.7	VALID
OBS2 <- OBS	0.874	0.7	VALID
OBS3 <- OBS	0.755	0.7	VALID
PEU2 <- PEU	0.9	0.7	VALID
PEU3 <- PEU	0.883	0.7	VALID
PU1 <- PU	0.826	0.7	VALID
PU2 <- PU	0.794	0.7	VALID
PU3 <- PU	0.821	0.7	VALID
TRI1 <- TRI	0.814	0.7	VALID
TRI2 <- TRI	0.724	0.7	VALID

TRI3 <- TRI	0.869	0.7	VALID
PEU1 <- PEU	0.71	0.7	VALID

Source: SPSS data (2024)

4.2.2 Construct Reliability dan *Validity*

A research instrument is considered reliable if the Cronbach's alpha value is > 0.60 (Ghozali, 2016). According to Sarstedt, Ringle, and Hair (2021) the composite reliability (rho_c) value > 0.7 for the item variable was reliable. According to Sarstedt et al. (2021) a variable AVE value > 0.5 means that the requirements for good convergent validity have been met or indicate that the construct can explain 50% or more of the variation in the items. Therefore, the research results in Table 5 show that all indicators meet the criteria; thus, it can be said that the results of this research are reliable or convergently valid.

Table 5. Construct Reliability and Validity

Indicator	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
AU	0.721	0.721	0.843	0.642
BIU	0.793	0.796	0.878	0.706
COM	0.794	0.807	0.879	0.707
OBS	0.702	0.778	0.826	0.615
PEU	0.788	0.85	0.873	0.698
PU	0.745	0.749	0.855	0.662
TRI	0.726	0.741	0.846	0.648

Source: SPSS data (2024)

4.2.3 Discriminant Validity

Discriminant validity assessment has become a generally accepted prerequisite for analyzing the relationships between latent variables. For variance-based structural equation modeling, such as partial least squares, the Fornell–Larcker criterion and cross-loading checks are the dominant approaches for evaluating discriminant validity. Discriminant validity can be tested by examining Cross Loading, namely, the correlation coefficient of an indicator with its associated construct (crossloading) compared with the correlation coefficient with another construct (crossloading). The value of the indicator correlation construct must be greater for the associated construct than for other constructs. A larger value indicates the suitability of an indicator to explain the associated construct compared with other constructs.

Table 6. Discriminant Validity

	AU	BIU	COM	OBS	PEU	PU	TRI
AU							
BIU	0.852						
COM	0.859	0.831					
OBS	0.761	0.75	0.78				
PEU	0.655	0.695	0.643	0.53			
PU	0.862	0.875	0.893	0.749	0.831		
TRI	0.854	0.74	0.827	0.798	0.729	0.847	

Source: SPSS data (2024)

4.2.4 Cross Loading

Cross-loading is an evaluation of discriminant validity at the measurement item level. Each item has a higher correlation with the variable it measures; thus, the discriminant validity evaluation is fulfilled.

Table 7. Cross loading

	AU	BIU	COM	OBS	PEU	PU	TRI
AU1	**0.814**	0.507	0.52	0.433	0.459	0.517	0.511
AU2	**0.808**	0.515	0.6	0.504	0.474	0.536	0.598
AU3	**0.781**	0.557	0.462	0.436	0.312	0.461	0.395
BIU1	0.508	**0.856**	0.563	0.492	0.469	0.564	0.435
BIU2	0.446	**0.854**	0.537	0.494	0.463	0.561	0.455
BIU3	0.674	**0.808**	0.571	0.477	0.513	0.58	0.534
COM1	0.588	0.591	**0.849**	0.534	0.485	0.572	0.533
COM2	0.429	0.491	**0.8**	0.439	0.386	0.505	0.445
COM3	0.619	0.591	**0.873**	0.614	0.503	0.66	0.622
OBS1	0.316	0.393	0.325	**0.715**	0.209	0.35	0.328
OBS2	0.551	0.557	0.671	**0.874**	0.451	0.614	0.613
OBS3	0.42	0.383	0.401	**0.755**	0.314	0.329	0.43
PEU1	0.256	0.309	0.223	0.236	**0.71**	0.356	0.279
PEU2	0.526	0.549	0.513	0.396	**0.9**	0.596	0.529
PEU3	0.453	0.535	0.554	0.434	**0.883**	0.651	0.586
PU1	0.516	0.605	0.561	0.495	0.575	**0.826**	0.525
PU2	0.553	0.479	0.527	0.407	0.528	**0.794**	0.5
PU3	0.473	0.566	0.604	0.51	0.52	**0.821**	0.508
TRI1	0.496	0.389	0.499	0.498	0.49	0.43	**0.814**
TRI2	0.378	0.397	0.414	0.377	0.403	0.437	**0.724**
TRI3	0.609	0.582	0.62	0.589	0.512	0.637	**0.869**

Source: SPSS data (2024)

4.2.5 Inner model

An inner VIF value < 5 indicates that there is no multicollinearity between the variables influencing it. Table 8 shows that the inner VIF value satisfied the requirements.

Table 8. Inner Model

	VIF	Referensi	Keterangan
COM -> PU	1.432	0 - 5	VALID
COM -> PEU	2.023	0 - 5	VALID
OBS -> PEU	1.912	0 - 5	VALID
TRI -> PEU	1.935	0 - 5	VALID
PEU -> PU	1.432	0 - 5	VALID
PEU -> BIU	1.794	0 - 5	VALID
PU -> BIU	1.794	0 - 5	VALID
BIU -> AU	1	0 - 5	VALID

Source: SPSS data (2024)

4.2 Hypothesis test

Hypothesis testing is conducted based on the results of the Inner Model testing (structural model), which includes r-square output, parameter coefficients, and t-statistics. To determine whether a hypothesis can be accepted or rejected, attention should be paid to the significance values between constructs, t-statistics, and p-values. This research hypothesis was tested using SmartPLS (Partial Least Square) software, version 4.0. Hypothesis testing was carried out using the bootstrapping technique with data that had gone through the measurement stage. Hypothesis testing is included in the Structural Model and shows the hypothesized relationships with simulation practice. This bootstrapping test also aims to determine the direction and significance of the relationship for each latent variable. Hypothesis testing

was performed by comparing predetermined t-statistics or t-counts. The t-count produced in the botstrapping test must be greater than the one-tail t-table, namely 1.65 for a standard error of 5% or a p value below 0.05 (Hair et al., 2019). Figure 6 shows an image of the results of data processing using SmartPLS 4.0.

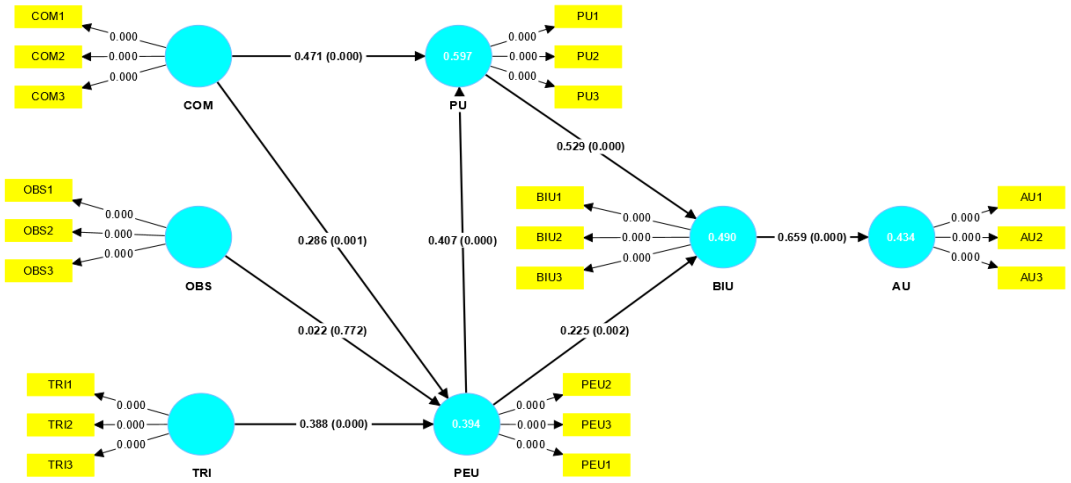

Figure 6. Prosessing of hypothesis data
Source: Person data

Details of the results of hypothesis testing using bootstrapping are shown in table 9 of the data processing results below.

Table 9. Details of the results of hypothesis testing using bootstrapping

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
COM -> PU	0.471	0.467	0.048	9.78	0
COM -> PEU	0.286	0.282	0.082	3.498	0.001
OBS -> PEU	**0.022**	**0.034**	**0.077**	**0.289**	**0.772**
TRI -> PEU	0.388	0.393	0.078	4.96	0
PEU -> PU	0.407	0.407	0.05	8.082	0
PEU -> BIU	0.225	0.232	0.071	3.155	0.002
PU -> BIU	0.529	0.528	0.068	7.782	0
BIU -> AU	0.659	0.664	0.043	15.35	0

Source: Data prosessing (2024)

In Hypothesis Test 1:
H1: Compatibility on Perceived Usefulness (PU).
H1': Compatibility has no influence on Perceived Usefulness (PU).
Based on Table 9, the variable COM -> PU with a t-statistic value of 9.78 > 1.65 and p-values 0.000 < 0.05, then H1' is rejected and H1 is accepted, which means that compatibility has an effect on Perceived Usefulness.

In Hypothesis Test 2:
H2: There is an influence of Compatibility on Perceived Ease of Use (PEU).
H2': There is no influence of Compatibility on Perceived Ease of Use (PEU).
Based on Table 9, for the variable COM -> PEU with a t-statistic value of 3,498 > 1.65 and p-values 0.001 < 0.05, H2' is rejected and H2 is accepted, which means that compatibility has an effect on Perceived Ease of Use.

In Hypothesis Test 3:
H3: Observability influences of Observability (OBS) on Perceived Ease of Use (PEU).
H3': There is no influence of Observability (OBS) on Perceived Ease of Use (PEU).
Based on Table 9, for the variable COM -> PEU with a t-statistic value of 0.289 < 1.65 and p-values 0.772 > 0.05, H3 is rejected and H3' is accepted, which means that observability has no effect on Perceived Ease of Use.

In Hypothesis Test 4:
H4: Trialability influences of Trialability (TRI) on Perceived Ease of Use (PEU).
H4': There is no influence of Trialability (TRI) on Perceived Ease of Use (PEU).
Based on Table 4.8, the variable TRI -> PEU with a t-statistic value of 4.96 > 1.65 and p-values 0.000 < 0.05, H4' is rejected, and H4 is accepted, which means that Trialability (TRI) has an effect on Perceived Ease of Use.

In Hypothesis Test 5:
H5: There is an influence of Perceived Ease of Use (PEU) on Behavioral Intention to Use (BIU).
H5': There is no influence of Perceived Ease of Use (PEU) on Behavioral Intention to Use (BIU).
Based on table 9, the variable TRI -> PEU with a t-statistic value of 3,155 > 1.65 and p-values 0.002 < 0.05, then H5' is rejected and H5 is accepted, which means that Perceived Ease of Use (PEU) influences Behavioral Intention to Use (BIU).

In Hypothesis Test 6:
H6: There is an influence of Perceived Ease of Use (PEU) on Perceived Usefulness (PU).
H6': There is no influence of Perceived Ease of Use (PEU) on Perceived Usefulness (PU).
Based on table 9, the variable PEU -> PU with a t-statistic value of 8.082 > 1.65 and p-values 0.000 < 0.05, then H5' is rejected and H5 is accepted, which means that Perceived Ease of Use (PEU) influences Perceived Usefulness (PU).

In Hypothesis Test 7:
H7: There is an influence of Perceived Usefulness (PU) on Behavioral Intention to Use (BIU).
H7': There is no influence of Perceived Ease of Use (PEU) on Behavioral Intention to Use (BIU).
Based on Table 9, the variable PEU -> PU with a t-statistic value of 7,782 > 1.65 and p-values 0.000 < 0.05, H6' is rejected and H6 is accepted, which means Perceived Usefulness (PU). influence on Behavioral Intention to Use (BIU).

In Hypothesis Test 8:
H8: There is an influence of Behavioral Intention to Use (BIU) on Actual Use (AU).
H8': There is no influence of Behavioral Intention to Use (BIU) on Actual Use (AU).
Based on table 9, the variable BIU -> AU with a t-statistic value of 15.35 > 1.65 and p-values 0.000 < 0.05, then H8' is rejected and H8 is accepted, which means that Behavioral Intention to Use (BIU) is related to Actual Use (AU).

4.3 Discussion

This section explains the analysis results. The aim of this research is to determine the factors of IDT and TAM that influence the use of the Cyclops application among Telkomsel Pamuka Area employees, especially sales and networks. Considering previous literature, this research uses 3 (three) main items from IDT: compatibility observability (OBS), trialability (TRI), and 4 (four) items from TAM, including Perceived Usefulness (PU), Perceived Ease of Use (PEU), Behavioral Intention to Use (BIU), and Actual Use (AU). From these variable items, eight hypotheses were developed and tested using the Structural Equation Modeling (SEM) method assisted by SmartPLS 4.0. The results of this study can be summarized as follows:

First, Compatibility influences Perceived Usefulness. In this hypothesis, the majority of respondents believe that Cyclops is an innovation that helps in daily work in identify problems and improve the performance of respondents, so this hypothesis is accepted. This is also in line with previous research

which states that in several technology applications Compatibility has an effect on Intention to Use, for example "Compatibility has a positive effect on Consumer Behavior Intention in using internet banking services" (Giovanis et al., 2012)

Second, Compatibility also influences Perceived Ease of Use as evidenced by the results of respondents who stated that the Cyclops application is easy to access mobile so it can be used anywhere and anytime, as well as features that are easy to understand so this makes the hypothesis accepted and the same as Previous researchers stated that according to Choe and Noh (2018) "Compatibility also indirectly influences Intention to Use through the mediating effect of Perceived Usefulness and Perceived Ease of Use."

Third, the results of this study do not fully support the theory developed by Choe and Noh (2018) regarding the combination of IDT and TAM in Smartwatch adoption. on the observability variable on Perceived Ease of Use, which has no significant effect on the use of the Cyclops application. This is based on the results of the respondents, most of whom stated that they did not observe the Cyclops application before using the application. This is based on the fact that Cyclops is an in-house project application so its users are internal employees who directly use the application without making observations first.

Fourth, Trialability influenced Perceived Ease of Use. In this hypothesis, respondents tended to immediately use the Cyclops application and experiment with each application feature according to their needs. "So this hypothesis is positively accepted and is the same as previous research which stated that Trialability was also found to influence Perceived Ease of Use (PEU) in Smartwatch use (Choe & Noh, 2018).

Fifth, in the fifth hypothesis of this research, Perceived Ease of Use has a positive effect on Perceived Usefulness, which reflects that when using the Cyclops application, employees get many benefits in improving performance and identifying problems such as network problems, payload, and revenue. So this is in accordance with what was said in previous research such as the final version of the TAM model (Rumengan, Syarif, Rumengan, & Rumengan Chablullah Wibisono, 2020) and the implementation of TAM in "Evaluating technology acceptance in agricultural education in Iran: A study of vocational agriculture teachers explains that Behavioral of Intention to Use " have an effect on Actual Use and Perceived Usefulness (PU) have a positive effect on Behavioral Intention to Use (BIU) (Zarafshani et al., 2020). This is also true in the world of online education (Fitriyani & Syamsuar, 2022).

The sixth hypothesis explains that Perceived Ease of Use has a positive effect on Behavioral Intention To Use. This indicates that the ease with which respondents use the Cyclops application tends to increase. As was done by previous research, Perceived Ease of Use also has a positive effect on Behavioral Intention To Use on standard data used in Smart Cities (Compernolle et al., 2018).

Seventh, Perceived Usefulness influences the Behavioral Intention to Use. Thus, through the Cyclops application, respondents can easily identify a problem and support operations, so that they will continue to use this application. This is in accordance with previous theories, such as the final version of the TAM (S. Suharto, 2023) and the implementation of TAM in Evaluating technology acceptance in agricultural education in Iran: A study of vocational agriculture teachers explains that Perceived Usefulness (PU) has a positive effect on Behavioral Intention to Use (BIU) (Zarafshani et al., 2020). This is also true in the world of online education (Fitriyani & Syamsuar, 2022).

The eighth hypothesis is related to Behavioral Intention to Use on Actual Use, which has a positive effect as respondents respond to questions with statements that they will continue to use Cyclops in the future in accordance with procedures and in making simple reporting. This is consistent with the statements quoted from (Hanham et al., 2021); (Priyambada et al., 2018); (Salloum et al., 2019); (Syahruddin et al., 2021).

The results of this research are somewhat different from previous research which is the author's reference, namely Combined Model of Technology Acceptance and Innovation Diffusion Theory for Adoption of Smartwatch Choe and Noh (2018), Optimization Strategy of Mobile Cellular Network based on Customer Smartphone Penetration (Sulistiobudi, Merizka, Syawie, & Paramitha, 2023) and IDT-TAM Integrate Model for IT Adoption (Zhang et al., 2008) previous research all had an influence on Perceive Usefulness (PU) and Perceived Ease of Use (PEU), however in research related to the acceptance of the CYCLOPS application in Telkomsel Papuaska Area it was found that the Observability factor (OBS) did not really influence Perceive Ease of Use (PEU), this is According to the author, this is more due to information technology such as the Cyclops application within Telkomsel's internal circles, the terms, parameters and features in it are quite familiar to users, especially Network and Sales, which is different from the introduction of new technology such as in the 3 (three) previous studies. However, another factor that could also cause observation to be less needed in this research is the lack of familiarity with the use of the Cyclops application, so that users only use a few features that are already familiar, while there are still features that can be utilized but have not been explored further.

The weakness of this research is that it is still limited to applications that are more intended for limited groups, especially employees in the Network and Sales Division with a limited scope, namely in the Pamuka area. It is hoped that further research can be carried out to determine the acceptance of internal (in-house) companies, whose use is intended more widely for all employees in all existing divisions, to obtain more comprehensive data regarding the acceptance of information technology (IDT-TAM) based on the profile of each division in a company, so that an application can be well received and used optimally by all employees.

5. Conclusions

In the research "Analysis of the Acceptance of the Cyclops Application in Telkomsel Papuasa Area Using Innovation Diffusion Theory (IDT) and Technology Acceptance Model (TAM)" several things that we can conclude from this research model are that it is able to explain the variables that influence the use of in-house applications such as Cyclops to Telkomsel employees, especially in the sales and network division of the Pamuka Area, with a combination of innovation factors at IDT which can be traced to their influence on the main TAM factors. The model of this research is based on the development of TAM theory by adding the IDT theory. Therefore, the results of this research have several implications for the theory developed and the results of the previous research on which it is based.

The results showed that when using in-house company applications, such as the Cyclops application, employees did not need to make observations or find out first about the application to be used, but instead used the application directly. This is different from the adoption of smartwatches and 5G services, where the observability factor is important because, in both technologies, it is something completely new for users, so acceptance requires an observation process first.

Based on the results of this research, the findings that are useful for companies developing in-house applications that aim to provide added value for user convenience are as follows; In-house application development must focus on factors that influence the application adoption process. This aims to accelerate the process of adopting in-house applications in a company. Several input factors from the respondents include the level of data accuracy, access speed, features, and design. It would be better for companies or application/information technology developers to provide more frequent outreach to employees regarding in-house applications developed by the company so that employees can find out more about the functions/features and benefits of these applications. In this way, observability will later become a supporting factor in the use of in-house applications, such as Cyclops in a company, so that the benefits of an application can be further optimized.

Limitations and Future Study

This research is limited to Telkomsel employees in the Pamasuka area and focuses only on the Cyclops application within sales and network divisions. Future studies can expand to other regions, different departments, or compare multiple in-house applications. Further research could also examine the long-term impact of observability and outreach programs on application usage behavior.

Acknowledgements

The findings provide valuable insights for companies developing internal applications. To improve adoption, developers should enhance technical features and conduct regular outreach to inform employees about the application's functions and benefits. This could turn observability into a strength, helping employees better understand and utilize internal tools like Cyclops, ultimately increasing productivity and application value.

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