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Analysis Adoption of Information Technology Using the UTAUT Method on Off-taker Poultry Farmers in Indonesia

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Abstract

The impact of advances in information technology is beginning to be felt in livestock farming. Poultry farms produce a significant amount of meat, with broiler chickens accounting for 67%, native/local chickens accounting for 23%, and other types of poultry accounting for the remaining meat. Because not all poultry farmer off-takers in Bali use information technology to manage their business processes, breeder business management is ineffective and inefficient. The goal of this study was to determine the interest and behavior of poultry farmer off-takers in Bali in adopting information technology in the form of PT XYZ's Agree application. The Unified Theory of Acceptance and Use of Technology (UTAUT) Framework was used as the research method in this study. Questionnaires were distributed to respondents in five Bali districts to collect research data. For data management, the partial least squares structural equation model is used. According to the study's findings, performance expectancy has a positive and significant influence on behavioral intention. Facilitating conditions and behavioral intention have a positive and significant influence on use behavior. The availability of facilities and performance influencing poultry performance are the research's novelty and utility.

Keywords

Behavior Intention, Poultry Off-takers, Technology Adoption, and UTAUT.

1. Introduction

The current era is an era of very fast change, this is felt by all countries in the world. Globalization challenges require all countries to follow developments without limits. Industrial Revolution 3.0 which previously relied on relying and industrial automation is still leading to the digitalization era. The current industrial revolution has reached the Industrial Revolution 4.0 which has a main characteristic, namely the existence of disruption in various lines, all of which have entered the digital era in full and dynamically. Industry 4.0 is the interaction between Cyber Physical System (CPS) and Internet of Things and Service (IoT and IoS) (Lau et al. 2019). The industrial revolution 4.0 has an impact on various sectors, various aspects of life, various groups. The positive impact of technological developments due to the industrial revolution is that all human activities, whether related to daily life, related to work, can be carried out easily and practically. Likewise, especially speaking of information technology (Hudson 2020). The importance of developing information technology is starting to be felt in all aspects of life, especially in the management of agriculture. Information technology is a strategic solution to agricultural problems along with the latest transformation in the form of efficient and effective use and application of information technology (Patel and Sayyed 2014). Information and communication technology has benefits and a very strategic role in overcoming agricultural constraints.

Facts show that the agricultural sector, which has sub-sectors, namely horticultural crops, food crops, livestock, plantation crops, as well as agricultural and hunting services, have become the main driving force of the nation's economic system in most countries. Development in the agricultural sector, both for developed countries and countries in the developing stage, has an important and strategic meaning and role so that it gets the main attention and very special protection. Discussing agriculture is about survival, agriculture is a provider of food, clothing and even board materials. As long as humans in the world still need food to ensure their survival, agriculture still become a very important main character (Rozaki 2020). The process of growing the livestock business in Indonesia, can meet the existing constraints in the field of employment, food security, foreign exchange, social welfare, and the national economy. Demand for livestock products tends to continue to increase along with population growth, community economic development, improving education levels, changing lifestyles and efforts to improve public health through

the availability of livestock products. One of the livestock businesses to meet the market demand for animal protein is poultry farming.

Currently, information technology (IT) is universally considered as an important tool in increasing the competitiveness of a country's economy. There is a consensus that IT has a significant influence on individual and organizational/company productivity. This effect will only materialize if IT is widely spread to use. It is very significant to obtain an understanding of the determination IT adoption. The application of IT that is beneficial to poultry farmers can be seen in the Agree application prototype for Offtaker. This application is a container/platform that produces information according to the needs and conditions in the field for offtakers and poultry farmers. The main product of the Agree application prototype is to connect offtaker business processes with their farmer partners through one application. The application prototype being developed by PT XYZ can be **seen in figure 1**

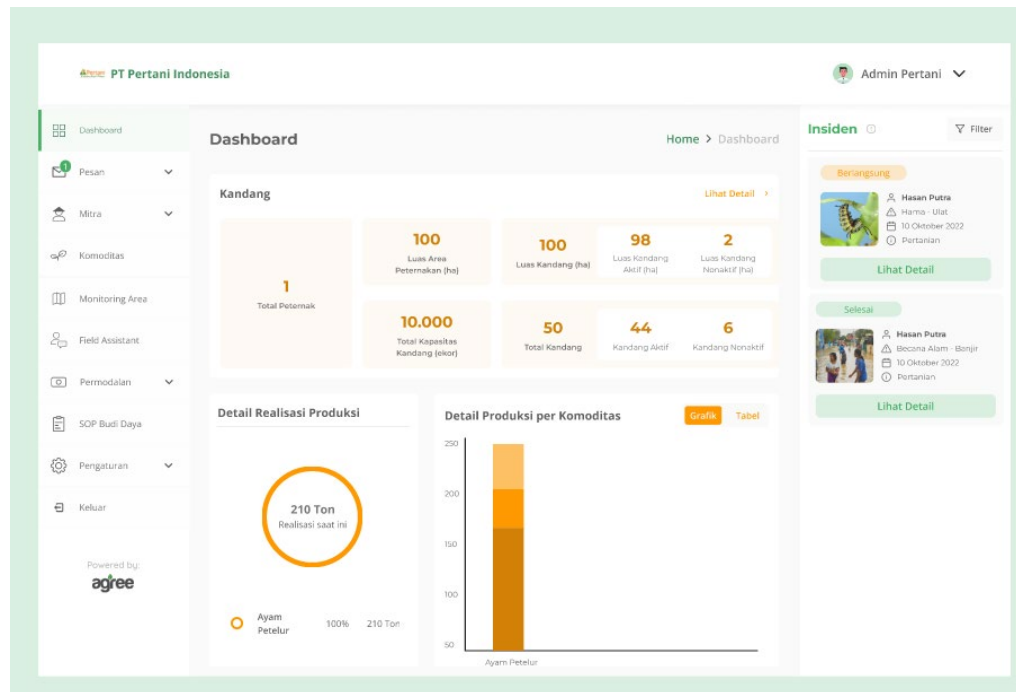


Figure 1. Agree Application

The following are a number of reviews from literature studies on various comparisons of IT adoption models at the individual level and company level. Venkatesh et al. (2012) revisit UTAUT as a comprehensive process of research on the acceptance of earlier technologies. UTAUT consists of four main parts (performance expectations, effort expectations, social influence, and facilitating conditions) that have an influence on the behavioral intention to use and apply the technology. Coupled with making a theory of individual characteristic variables in the form of age, gender, volunteerism and experience which are able to moderate the various relationships between the main UTAUT variables. Abbad (2021) in his research which aims reviews the factors that have an impress on the adoption of student e-learning applications in developing countries. This is based on the UTAUT Model. The result is that social influence has no effect on behavioral intention but effort and performance expectations have an influence relationship. The output of his research also confirms the direct influence of interest and the condition of the facilities on the implementation of the use of e-learning applications in students. Kadim and Sunardi (2022) in his research by using an adaptation of the UTAUT adoption model to examine the effect of business expectations, performance expectations, facilitation conditions and social influence on people's interest in implementing the Base Payment System: QRIS in Jabodetabek. In his research, the outcomes of performance expectations and social influence did not have a unidirectional influence on behavioral interest but were in the same direction as the effort expectation variable. Behavioral interest and facility conditions have a direct and significant influence on usage behavior.

Based on the background, research gap, and development of previous research, this paper proposes to identify behavioral interest and behavior to adopt the Agree application with UTAUT Framework on Poultry Farm Off-takers in Bali. Research has the hope of providing recommendations to the latest scientific repertoire in conducting research on the adoption of an application.

1.1 Objectives

The aim of this study is to recognize behavioral interest and behavior to adopt the Agree application with the UTAUT Framework in Poultry Farm Off-takers in Bali

2. Literature Review

Agriculture Sector

The agricultural field is one of the various fields that receives major attention to support national development, especially those related to governance and utilization of strategic outputs related to food commodity yields. It is hoped that the management and utilization of agricultural products can be implemented with careful planning by optimizing the benefits and can be equally felt by the people of Indonesia. The part of the agricultural field in shaping the economy of a country or region can be seen from various perspectives, namely the agricultural sector contributing to gross domestic product (GDP), employment opportunities or reducing unemployment, providing food availability with good nutrition and consumption patterns, industrial development upstream and downstream, as well as export activities will increase the country's foreign exchange (Olajide).

The development of livestock business in Indonesia is able to respond the dares faced in terms of food security, employment, community welfare, foreign exchange, and the national economy. Demand for livestock products tends to continue to increase along with population growth, community economic development, improving education levels, changing lifestyles and efforts to improve public health through the availability of livestock products. One of the livestock businesses to meet the market demand for animal protein is poultry farming. Poultry farming plays an important role in livestock development because it is the spearhead of meeting the animal protein needs of the community. Poultry provides a large contribution to meat production, which is 67% provided by broilers, 23% by native chickens/local chickens and the rest by other types of poultry (Wahyono and Utami 2020).

2.1 Information Technology in Indonesia

IT has the meaning of a computer system to support and expedite the operations of an organization: installation, operation and maintenance of computers, data and software. An information system is a unification of several parts of technology on a computer basis that are interconnected and interact, support and work together on the basis of previously approved work procedures, which process data into a form of information. In most references, the term technology acquisition has a meaning as an ability to create and manage or regulate the process of technological transformation efficiently and effectively (Wahyono and Utami 2020). From the McKinsey Global Institute report for 2014-2017, Indonesia shows the country with the fastest global capabilities related to digital economy adoption. From this, Indonesia ranks first in the digital economy adoption growth index which is calculated based on the level of digital adoption by businesses, individuals and the government on three pillars. The percentage achieved by Indonesia is 99%, followed by India is 90%, China is 45% and Russia is 44% (Rakhmadi and Junaidi 2022)

2.2 Information Technology Adoption Model

There are several theoretical foundations used in a scientific study of information systems, more specifically in terms of technology adoption theory. The theories most frequently developed are the technology acceptance model (TAM), the theory of planned behavior (TPB), the theory of integrated technology acceptance and use (UTAUT), Diffusion of Innovation (DOI), and the technology, organization, and environment (TOE) framework. TAM, TPB and UTAUT are used at the individual level and for the company level suitable theory development is the DOI, TOE framework (Setiyani and Yeny Rostiani 2021).

2.3 UTAUT Framework

From figure 2, UTAUT is a model designed to explain user behavior towards information technology. This model was developed based on pre-existing acceptance theories including: Theory of reasoned action, TAM, Motivational Model, TPB, Combined model TAM and TPB (a model combining the technology acceptance model and the theory of planned behavior), PC Utilization Model, Innovation diffusion theory, Social cognitive theory

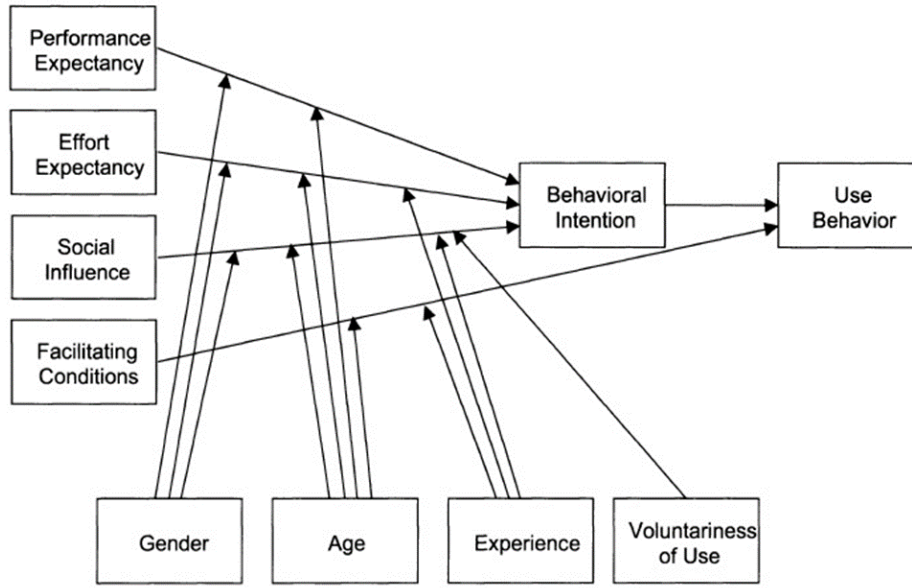


Figure 2. UTAUT Framework

In the performance expectancy model, effort expectancy, social influence and facilitating conditions influence use behavior. In this modeling there are 4 moderating variables including: gender, age, experience, and voluntariness of use on behavioral intention and use behaviour (Venkatesh et al. 2012)

3. Methods

In this research, the modified technology adoption model expanded by Venkatesh et.al. (2012) was used to assess the level of adoption of the Agree application. The initial design of this conceptual model was modified by using a literature study (Taherdoost 2018). The framework of the adoption model of this research is described in Figure 3.

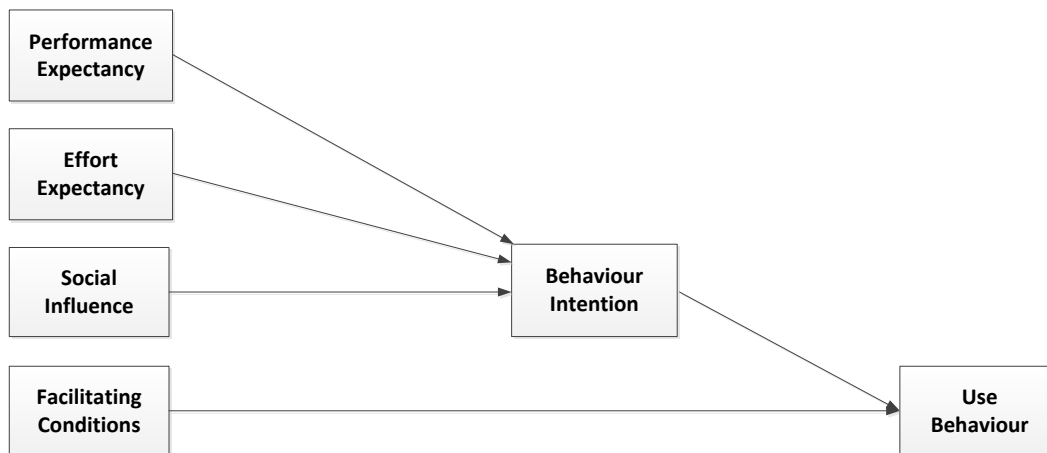


Figure 3. Research Model

The research variables using in this study are in accordance with the model concept, namely:

- a. Performance Expectancy. Performance expectation implies how an individual thinks that the use of a system will provide individual assistance in obtaining benefits associated with improving performance (Abbad 2021)

- b. Effort Expectancy. Effort expectations implies a level of appropriateness associated with using a system that is perceived by the individual (Purwanto and Loisa 2020)
- c. Social Influence. Social influence implies the level to which individuals can feel confident about having to believe that others should use a system (Abbad), (Madigan et al. 2016).
- d. Facilitating Condition. Facilitating Condition imply the extent to which individuals trust the organizational and technical infrastructure to support the use of a system (Rahi et al. 2019).
- e. Behavioral Intention. Behavioral Intention is the level of individual willingness or intention to use a system on a regular basis, assuming that users have access to information (Salloum and Shaalan 2019).
- f. Use Behavior. Use behavior implies the frequency with which an individual uses information technology (Chatterjee et al. 2021).

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The data collected from poultry off-taker will be analyzed first using the Structural Equation Modeling (SEM) technique via the use of Partial Least Squares (PLS-SEM) with SmartPLS3 software. The purpose of this method is to find causal relationships in theoretical models based on test or empirical data. PLS is a method for testing that has strong characteristics because the data does not follow a certain distribution pattern and can be carried out with a small number of samples.

4. Data Collection

Primary data search method used in this study was by distributing questionnaire instruments. The questionnaire instrument was spread offline with the assistance of the research team to off-taker respondents in 5 regencies in Bali, namely Karangasem Regency, Bangli Regency, Badung Regency, Denpasar Municipality and Tabanan Regency Where to determine the sample is done by using purposive sampling method.

5. Results and Discussion

5.1 Respondent Profile

Data collection has been carried out in five districts, namely Bangli district, Karangasem district, Badung district, Tabanan district and Denpasar city, capturing 30 off-taker respondents. The following is an overview of off-taker respondent profiles which are explained in table 1 based on age, gender, company year of establishment, position, business scale, business commodity.

Table 1. Respondent Profile

Characteristics	Category	Number
Age	21-30 years	5
	31-40 years	4
	41-50 years	10
	51-60 years	9
	>60 years	2
Gender	Man	28
	Woman	2
Position	Owner	24
	Director	2
	Employees	4
Company Age	1-10 years	14
	11-20 years	9
	21-30 years	5
	>30 years	2
Scale enterprises	Micro	9
	Small	7
	Medium	14
	Large	0
Commodity	Meats	13
	Eggs	8

	Feed, medicine, seeds, etc	9
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5.2 Instrument Test

Test the validity of the off-taker instrument with a sample of 36, so that the value of r table $(36 - 2; 0.05) = 0.3291$ which will be compared with the worth of r count. If r count is bigger than r table, it can be said that the measuring instrument used is valid. **The outcomes of the validation test can be shown in table 2.**

Table 2. Off-taker Instrument Validity Test Outcomes

Variable	Indicator	R value	R table value	Information
Performance Expectation	EK1	0,601**	0,3291	Valid
	EK2	0,803**	0,3291	Valid
	EK3	0,731**	0,3291	Valid
	EK4	0,736**	0,3291	Valid
Effort Expectation	EU1	0,819**	0,3291	Valid
	EU2	0,721**	0,3291	Valid
	EU3	0,801**	0,3291	Valid
	EU4	0,845**	0,3291	Valid
Social Influence	PS1	0,848**	0,3291	Valid
	PS2	0,901**	0,3291	Valid
	PS3	0,810**	0,3291	Valid
Facilitating Conditions	KP1	0,770**	0,3291	Valid
	KP2	0,884**	0,3291	Valid
	KP3	0,743**	0,3291	Valid
	KP4	0,553**	0,3291	Valid
Behaviour Intention	NM1	0,795**	0,3291	Valid
	NM2	0,854**	0,3291	Valid
	NM3	0,881**	0,3291	Valid
	NM4	0,608**	0,3291	Valid
Use Behaviour	PM1	0,838**	0,3291	Valid
	PM2	0,947**	0,3291	Valid
	PM3	0,883**	0,3291	Valid
	PM4	0,847**	0,3291	Valid

Based on the Table 2, all statements are said to be valid.

The outcomes of the calculation of the reliability test of the off-taker questionnaire instrument using the Cronbach's Alpha method (r count) can be shown in the Cronbach's Alpha column of the Table 3.

Table 3. Reliability Test Results

Variable	Alpha Value	Item Total
Performance Expectation	0.641	4

Effort Expectation	0.808	4
Social Influence	0.809	3
Facilitating Conditions	0.722	4
Behaviour Intention	0.797	4
Use Behaviour	0.895	4

The reliability test result in Table 3 shows the outcomes of the analysis of the reliability test with Cronbach's Alpha above 0.5. The reliability value of each variable is considered sufficient and strong reliability. So that includes instruments that are consistent.

5.3 Measurement Evaluation (Outer Model) of the UTAUT Off taker Model

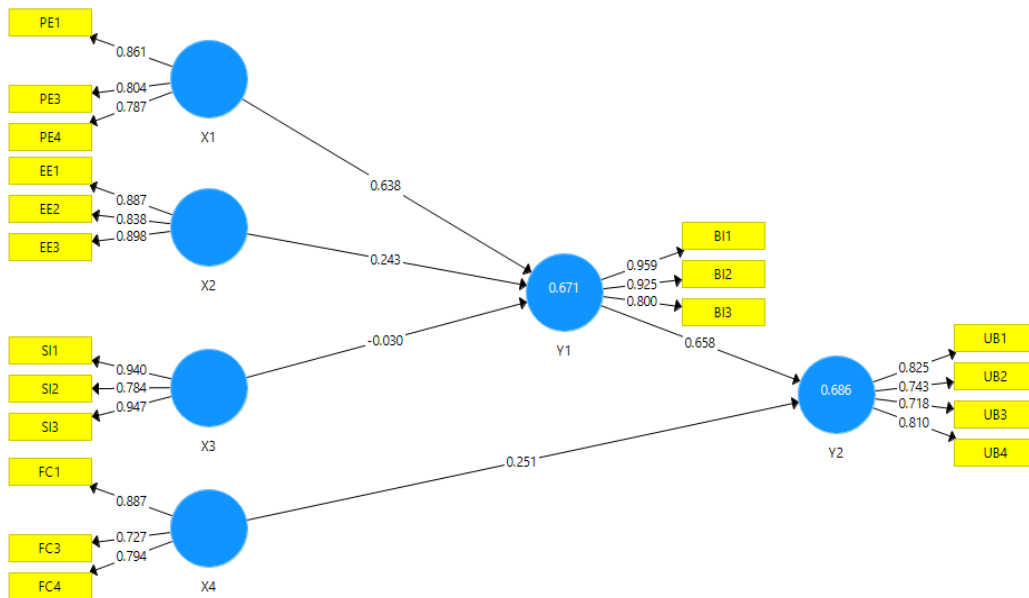


Figure 4. Off-taker UTAUT Model

Figure 4 is the UTAUT Outer Model for the off-taker or measurement model that defines the relationship of each indicator with its latent variables. The measurement model shows how the manifest variable represents the latent variable to be measured.

Table 4. Loading Factor Value, Average Variance Extracted (AVE), Cronbach's Alpha, and Composite Reliability for UTAUT Testing

		Factor Loading	Cronbach's Alpha	Composite Reliability	AVE
Behaviour Intention	BI1	0.959	0.877	0.925	0.805
	BI2	0.925			
	BI3	0.8			
Effort Expectancy	EE1	0.887	0.848	0.907	0.765
	EE2	0.838			
	EE3	0.898			

Facilitating Conditions	FC1	0.887	0.737	0.846	0.648
	FC3	0.727			
	FC4	0.794			
Performance Expectancy	PE1	0.861	0.756	0.858	0.669
	PE3	0.804			
	PE4	0.787			
Social Influence	SI1	0.94	0.877	0.922	0.798
	SI2	0.784			
	SI3	0.947			
Use Behaviour	UB1	0.825	0.778	0.857	0.601
	UB2	0.743			
	UB3	0.718			
	UB4	0.81			

Based on Table 4 for the loading factor value for each indicator for each variable in the test, it has a value that is greater than the rule of thumb value (> 0.70). The average variance extracted (AVE) value for each variable has a greater value than the rule of thumb (> 0.50). From the results of reliability testing for composite reliability and Cronbach's alpha values, it turned out that they were able to produce values $>$ from the rule of thumb value (> 0.70).

Table 5. Fornell Lacker Criterion values for testing the UTAUT Offtaker model

	Behaviour Intention	Facilitating Conditions	Performance Expectancy	Social Influence	Use Behaviour	effort Expectancy
Behaviour Intention	0.897					
Facilitating Conditions	0.576	0.805				
Performance Expectancy	0.804	0.656	0.818			
Social Influence	0.584	0.579	0.754	0.893		
Use Behaviour	0.802	0.63	0.813	0.705	0.775	
effort Expectancy	0.723	0.527	0.777	0.545	0.528	0.875

For the discriminant validity of indicators in model testing in figure 4, discriminant validity was measured using the Fornell-Larcker Criterion method. The measurement results in table 5 show that the AVE root value of the same variable is bigger than the AVE root value in different variables. The AVE Root Value is obtained from the results of the Outer Model test on SmartPLS in the results section of discriminant validity. This indicates that the criteria for discriminant validity test have been fulfilled.

5.4 R Square Test

Table 6. R Square Test Results

	R Square	R Square Adjusted
Behaviour Intention	0.671	0.633
Use Behaviour	0.686	0.663

From the results of the analysis in table 6 for testing the UTAUT Breeders model, the R Square value for the Behavior Intention construct is 0.671 and Use Behavior is 0.686, meaning that the variability of Behavior Intention and Use Behavior in the model is 67.1% and 68.6% and is included in moderate model category

5.5 Hypothesis Test

Table 7. Path Coefficient

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	P Values
Behaviour Intention -> Use Behaviour	0.658	0.654	0.096	0.000
Facilitating Conditions -> Use Behaviour	0.251	0.272	0.119	0.035
Performance Expectancy -> Behaviour Intention	0.638	0.611	0.195	0.001
Social Influence -> Behaviour Intention	-0.03	-0.012	0.166	0.857
Effort Expectancy -> Behaviour Intention	0.243	0.257	0.177	0.171

From Table 7 the outcomes of the path coefficient for testing the UTAUT model without a moderator it can be seen that for the effect of performance expectancy on behavior intention, namely Performance expectation. It affects the intention to behave positively and significantly, with a significance level of $0.001 < \alpha$ level of 5%. For the effect of facilitating conditions on use behavior, namely facilitating conditions affect use behavior positively and significantly, with a significance level of $0.035 < \alpha$ level. For the effect of behavior intention on use behavior, namely behavior intention has a direct positive and significant influence on use behavior, namely with a significance value of $0.000 < \alpha$ level. Different results were found that effort expectancy and behavior intention, namely effort expectancy, had a positive but not significant relationship with a significance value of behavior intention of $0.171 > \alpha$ level of 5%. Social influence with behavior intention, namely social influence has a negative but not significant relationship with a significance value of behavior intention of $0.857 > \alpha$ level of 5%.

5.4 Discussion

Based on testing the UTAUT model without a Moderator, it can be seen that performance expectations affect the intention to behave positively and significantly. This output is the same as the output of the study (Venkatesh et.al. 2012) and (Abbad 2021). Facilitating conditions affect use behaviour positively and significantly. This output is the same as the output of the study by (Kadim and Sunardi 2022). Behavior intention has a direct positive and significant effect on use behavior. This output is the same as the output of the study conducted by (Venkatesh et.al. 2012), (Kadim and Sunardi 2022). Different results show that effort expectancy has a positive but not significant relationship to behavior intention. This output is the same as the output of (Andrianto 2020) research results. Social influence has a negative but not significant behavioral intention relationship. This output is the same as the output of the study by (Abbad 2021)), (Kadim and Sunardi 2022).

Based on testing the UTAUT Off-taker model, it can be seen that performance expectancy influences behavioral intention positively and significantly. Facilitating conditions and Behavioral intention influences use behavior positively and significantly. Different results show that effort expectancy has a straight but not significant relationship to behavior intention. Social influence has a negative but Based on the discussion and discussion above as well as some input from the off-taker at the time of data collection, a recommendation can be drawn for the Agree application development process for the off-taker, namely from the off-taker's UTAUT model without moderation, it is recommended that the factors that influence behavioral interest and behavior using the Agree Application Off-taker is performance expectancy and facilitating condition. The off-taker is interested in using the agree application because of the hope for the performance of the application to increase the results of the off-taker's efforts. What makes this research different for off-takers is that off-takers do not pay too much attention to the influence of the social

environment. This is because off-takers are used to implementing digital technology in the current era of change and off-takers consider it a necessity to apply digital technology in order to improve business results so that without any influence from the surrounding environment they are already interested and using this application. The off-taker also provides direct aspirations for the development of an agree system, namely there needs to be an IoT that is connected between the cage data and the smartphone in real time, and there needs to be integration with farmers regarding the need for rice husk.

6. Conclusion

Performance expectancy has a positive and significant influence on behavioral intention. Facilitating conditions and behavioral intention have a positive and significant influence on use behavior. The availability of facilities and performance influencing poultry performance are the research's novelty and utility. As a suggestion for future input for this research, so that the number of research samples used is increased in order to obtain maximum research results. Testing is also carried out after the implementation of the application is implemented.

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