

Information And Communication Technology Mediates The Competence And Workers And Its Impact On The Productivity Of Corn Farming In Tojo Una - Una Regency

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Abstract.

The aim of this research is to analyze The influence of instructor competency and work motivation on mastery of information and communication technology and instructor performance and its impact on corn farming productivity in Tojo Una- Una Regency . Causality research method using the SEM-PLS approach. The research sample was 151 extension workers in Tojo Una-Una Regency. The research results show that of the 9 (nine) research hypotheses there is 1 (one) hypothesis that is not significant, namely the motivation variable The work of extension workers has an effect but is not significant on the performance of agricultural extension workers in Tojo Una-Una Regency. Furthermore, the research results show that Information and Communication Technology mediates the influence of competency and Work Motivation, and the performance of instructors mediates the application of information technology on farming productivity.

Keywords: Competence ,Work Motivation , Information and Communication Technology, Extension Worker Performance and Farming Productivity.

I. INTRODUCTION

Human Resources (HR) are a central factor in every organization. Whatever the form and objectives of the organization are created based on the Vision and Mission for the benefit of humans and in its implementation it is managed by humans. Thus, humans are a strategic factor in all institutional/organizational activities. Because HR is the central point, performance is traced to it. Performance (*performance*) as stated by Mangkunegara (2017) is a work achievement or actual achievement achieved by a person, namely the results of work in terms of quality and quantity achieved by an employee in carrying out his duties in accordance with the responsibilities given to him. Likewise, Robbins (2018) explains that performance is the level of success of a person in carrying out their work. Performance is a result achieved by a job in its work according to certain criteria that apply to a job.

Apart from that , Boyatzis (2018) explains that the main factors that can influence employee performance area) Individual, b) Job and c) *Organizational*. Tojo Una-Una Regency is designated as a corn center in Central Sulawesi Province, so with a total of 151 extension workers and a total of 134 villages, thus the average village has 1 (one) extension worker and there are even 1 (village) 2 (two)) extension workers whose villages are considered to have quite high agricultural potential, one of which is corn. Increasing the productivity of corn plants has great potential in Tojo Una- Una Regency, therefore the role of extension workers in Tojo Una-Una Regency is very important, especially competence in applying technology. Judging from the education level of the extension workers in Tojo Una-Una Regency, the educational strata distribution of the majority is Bachelor (80%) and SMA/SMK level (16%), and others are 4%. For clarity, it can be presented in the following image. Relationship of Research Variables

Relationship of Research Variables The Relationship between Competency and the Use of Information and Communication Technology

Empirical studies of competencies related to the use of information technology have been carried out by researchers including Cabezas-González et al., (2021) and Sharma & Singh, (2021) explaining that the 21st requires competencies that enable individuals to adapt to new types of information and the relationship of individual knowledge, and, therefore, the education system must contemplate new ways for students to develop according to this so-called information and knowledge society. One of the most important is what is called digital competence. Apart from that, research results from Santiago et al., (2021) state that there are various obstacles in using ICT, research respondents still experience slow internet bandwidth which makes connections and communication weak and their income status is low.

H1: Competence has a positive and significant effect on the use of Information and Communication Technology

- The Relationship Between Work Motivation and the Use of Information and Communication Technology

Empirical studies on work motivation related to the use of information technology have been carried out by researchers including Ekta Sinha and Kenneth Bagarukayo (2019) explained that UN member countries adopted the 2030 Sustainable Development Goals (SDGs). Education, which is the fourth Sustainable Development Goal, has undergone several major transformations with the emergence of digital technology. Education is increasingly being provided through this digital technology explore potential differences in enrollment, awareness and preference for online education based on country, gender, age, employment status and existing educational qualifications, to gain better insights for further facilitation and improvement of online education in developing countries.

Based on empirical studies and studying the theory described previously, it is indicated that the use of Information and Communication Technology is largely determined by a person's level of motivation, thus the following hypothesis is formulated:

H2: Work motivation has a positive and significant effect on the use of Information and Communication Technology

- The Relationship between Competency and Performance

Meanwhile, simultaneously the variables of competence, compensation and work motivation have a significant effect on the performance of village officials. Based on empirical studies and studying the theory described previously, it is indicated that performance is largely determined by a person's competence, thus the following hypothesis is formulated:

H3: Competence has a positive and significant effect on performance The Relationship

- between Motivation and Performance

Empirical studies on work motivation related to the use of information technology have been carried out by researchers, among others Da et al., (2020) explained that using Partial Least Square (PLS) analysis shows that motivation has a significant positive effect on job satisfaction. The findings of this research also state that work motivation has a significant positive effect on employee performance. The implications of this study emphasize the need to improve adaptive performance so that companies can always keep up with developments in the face of increasingly fierce competition.

H4: Motivation has a positive and significant effect on performance

- The Relationship between the Use of Information and Communication Technology and Performance

Empirical studies on the use of information technology and performance have been carried out by researchers, among others Eslami et al., (2014) , results research shows that students use IT on average, and their academic performance is relatively as desired. A significant and positive relationship was found between the use of software such as word, and excel and other software. However, there was no correlation between academic performance and database usage (access) and font pages.

H5: Use of Information and Communication Technology has a positive and significant effect on Performance

- **The Relationship between Performance and Productivity**

Empirical studies on the relationship between performance and productivity have been carried out by researchers, including Jung et al., (2013) explaining that technological convergence has become the main driving force for increasing productivity. Based on dynamic panel data of Korean industry, the direct impact of information and communication technology (ICT) on labor productivity is assessed through growth accounting, and network effects are not ICT direct impact on industry total factor productivity (TFP).

H6: Performance has a positive and significant effect on business productivity

- **The relationship between mastery of information and communication technology and productivity is mediated by performance variables**

Empirical studies on the relationship between mastery of information and communication technology on productivity which is mediated by the performance variable, not many have researched it using this research model, but the influence of ICT on performance which is mediated by work stress was carried out by Ratna, (2018) based on the results of the analysis it can be seen that the use of Information technology influences employee performance.

H7: Mastery of information and communication technology has a positive and significant effect on productivity, mediated by performance variables

- **Connection Competence with Extension officer performance which is mediated by the variable mastery of information and communication technology**

Empirical studies on the relationship between competency and performance of instructors which are mediated by the variable mastery of information and communication technology, not many have researched using this research model, however, the research model carried out by Cuevas-Vargas et al., (2022) , measures the impact of technology adoption information and communication (ICT) on *absorptive capacity* (ACAP) and Open Innovation (OI) on business performance and determine whether ACAP has a mediating role in the relationship between ICT adoption and OI , through *Structural Equation Modeling* , the results show that adoption ICT has a significant impact on ACAP and OI. Furthermore, evidence suggests that ACAP.

H8: Competence has a positive and significant effect on the performance of instructors, mediated by the variable mastery of information and communication technology

- **The relationship between work motivation and instructor performance is mediated by the variable mastery of information and communication technology**

Empirical study of the relationship between work motivation and performance which is mediated by the variable mastery of information and communication technology, Not many people have researched this research model, but the research model carried out by Mulang & Ratio, (2021) and Harianja et al., (2022) uses *Structural Equation Model (SEM)* data analysis.

H9: Work motivation has a positive and significant effect on The performance of instructors is mediated by the variable mastery of information and communication technology

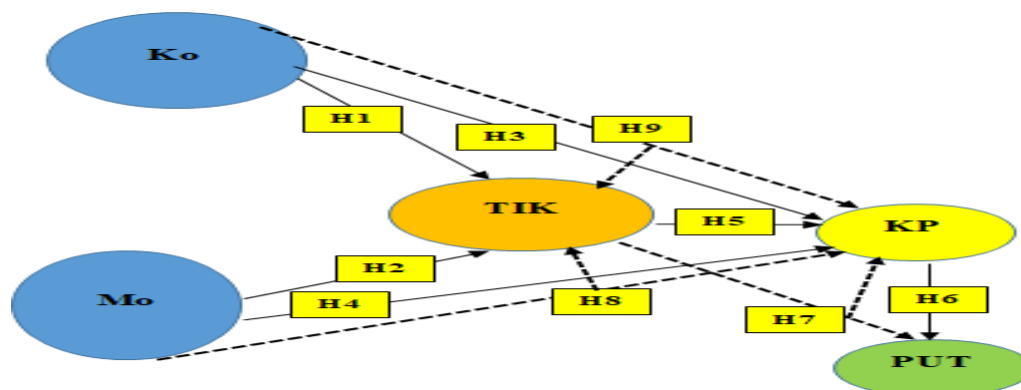


Fig 1 . Framework

- **Information**

Ko : Competence

KA-1	: Administrative Competency
KPp-2	: Program planning competency
KPe-3	: Program Implementation Competency
KPg-4	: Teaching Competency
K.K	: Communication Competency
KPM	: Human Behavior Competencies
KMP	: Competition determines professionalism
TO	: Evaluating Competency
Mo	: Work motivation
N-Ach	: The need for achievement
N-Pow	: The need for power
N-Aff	: The need for affiliation or friendship
TO	: Information Technology
TI-1	: Indicator 1: efficiency
TI-2	: Indicator 2: Effectiveness
TI-3	: Indicator 3: Ease of communication
TI-4	: Indicator 4: Collaboration
TI-5	: Indicator 5: Competitive advantage

KP : Extension Performance

KP-1	: Indicator 1: programs and activities
KP-2	: Indicator 2: Work plan
KP-3	: Indicator 3: Commodity map
KP-4	: Indicator 4: Dissemination of information
KP-5	: Indicator 5: Farmer independence
KP-6	: Indicator 6: Business partnerships
KP-7	: Indicator 7: Financial access
KP-8	: Indicator 8: Production recall
PUT	: Farming Productivity
PUT-1	: Ability to access farming capital
PU-T2	: Ability to adopt cultivation technology
PUT-3	: Oriented to quality and quantity
PUT-4	: Marketing capabilities
PUT-5	: Adaptation to Information Technology
PUT-6	: Act efficiently
PUT-7	: Act effectively
PUT-8	: Farming experience
PUT-9	: Participation

II. METHODS

- **Location, Time Study And Reason Location Selection**

The research location is Tojo Una-Una Regency, as the subject research, namely agricultural extension workers and the Association of Farmer Groups (Gapoktan), each Gapoktan of 3 farmers. This research is estimated to last for 3 months. The reasons for selecting the research location because Tojo Una-Una Regency is the largest center for producing corn commodities.

- **Type and Source Data Type Data**

The types of data used in this research are qualitative data and quantitative data. According to Sekaran and Bougie (2017). Quantitative data is data that is measured on a numerical scale (numbers). Meanwhile, qualitative data is data that cannot be measured on a numerical scale.

- **Source Data**

According to Sekaran and Bougie (2017) data can be obtained based on the source, grouped into primary data sources and secondary data sources.

- **Data Primary**

Primary data is data which are obtained directly from original sources or first parties. Primary data is specifically collected by researchers to answer research or research questions through questionnaires. The primary data contained in this research are:

- Respondent profile (a) Extension officer consisting of respondent's age, gender, highest level of education, work experience/year of work, position/class; (b) farmers: consisting of the age of the respondent, gender, last education, farming experience, land area, production, production costs, technology used .
- Questionnaire data is respondent response data which has been tabulated based on variables and indicators as questions/statements.

- **Data Secondary**

Secondary data according to Sekaran and Bougie (2017) is data sources obtained by researchers indirectly through intermediary media or referring to information collected from existing sources. Secondary data generally takes the form of historical evidence, notes or reports that have been compiled in archives, both published and unpublished.

- **Technique Collection Data**

According to Sugiyono (2017) collection data can be done with *Interview* techniques (Interview) , Questionnaire (Questionnaire), and Observation (*Observation*)

- **Population**

The population in the study were all agricultural instructors in Tojo Una-Una Regency and all Gapoktan/farmers who were assisted by the instructors.

- **Size Sample**

In this research, the *Structural Equation Modeling* (SEM) analysis tool is used, so the sample size must meet the minimum sample size for the application of the SEM model. In general, *structural* equation models have at least 200 observations (Kelloway, 1998 in Bacharuddin And Hope, 2003).

Method Analysis

- **Analysis Statistics Descriptive**

In the research, researchers used Descriptive Analysis of the Independent and Dependent Variables which then carried out classification of the total number of respondents' scores. From the total score of respondents' answers obtained, assessment criteria for each statement item were then prepared. Stage analysis done until on scoring And index, where score is the sum of the results of multiplying each frequency weight value (1 to 5).

Table 1. Criteria Interpretation Mark Average

No	Criteria	Scale	Mark Average
1	Very important/Very High	5	4.20 – 5.00
2	Important/High	4	3.40 – 4.19
3	Enough important/sufficient Tall	3	2.60 – 3.39
4	No important/Low	2	1.80 - 2.59
5	Very No Important/Very important Low	1	1.00 - 1.79

Source: Sugiyono (2015)

- **Analysis Verify**

Verification analysis, to test hypotheses built on the basis of a framework and research structure model. The statistical tool used is PLS - SEM (*Structural Equation Modeling*)

- **Partial Least Square (PLS- SEM)**

Design study used to analyze and interpret data is analysis between latent variables. The *Partial Least Square* (PLS) model consists of structural equations and measurement equations. Study This consists from 4 (five) variable Which nature latent Which No can be measured in a way direct except through dimensions And or indicator . Analytical tools most appropriate For model study like This is a *Structural Equation Model* (PLS-SEM) which is capable of carrying out comprehensive analysis in a single analysis. There are two approaches to SEM, namely covariance-based SEM and Variance-based SEM or what is also called *Partial Least Square* (PLS) or *PLS SEM*

III. RESULT AND DISCUSSION

Respondent Characteristics

This research was conducted in Tojo Una-Una Regency with a minimum number of respondents of 151 respondents. Distribution of 151 questionnaires via questionnaire. The characteristics of the respondents will be explained as follows.

Respondent's Age

Based on the tabulation of respondents' age frequency, it shows that the respondents' age dominates, namely 41-50 years or as much as 40%. This indicates that the age of 41-50 years is a time when many extension workers have accumulated a lot of experience and expertise, making them valuable assets for the agricultural sector. This makes them more likely to remain working in the profession. For more clarity, the distribution of respondents based on gender can be presented in the following picture

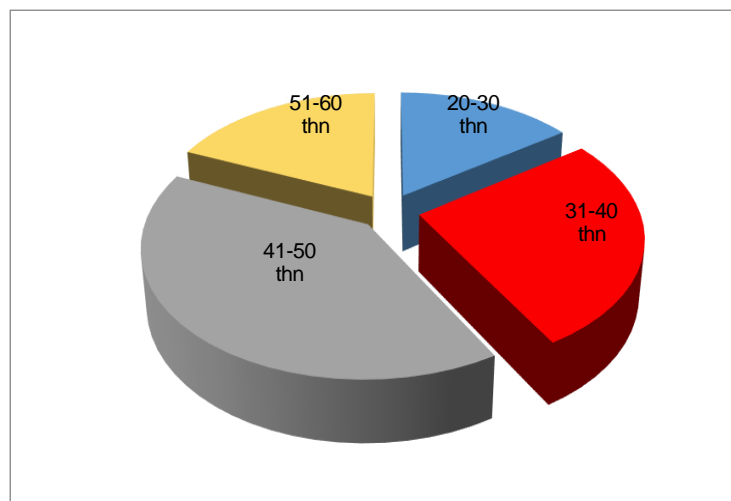


Fig 2. Characteristics of Respondents Based on Age Respondent's Education

Based on the tabulation of the frequency of respondents' education, it shows that the respondents' education dominates, namely a bachelor's degree at 80%. This indicates that agricultural instructors must have a bachelor's degree for several reasons related to competence, effectiveness and professionalism in carrying out their duties. For more clarity, the distribution of respondents based on gender can be presented in the following picture.

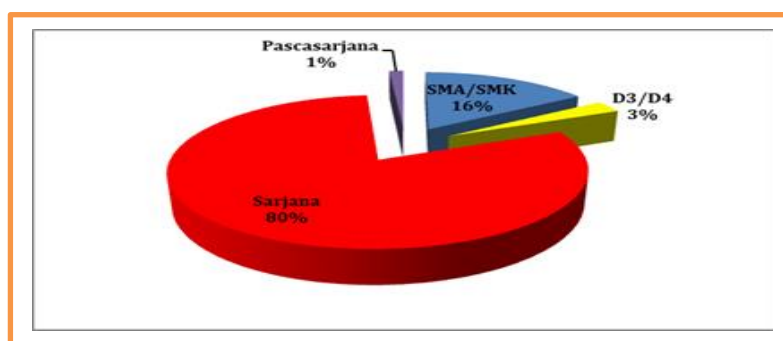


Fig 3. Characteristics of Respondents Based on Education Respondent's Work Period

Based on the tabulation of respondents' education frequency, it shows that the respondents' working period dominates, namely 11-15 years, at 28%. This indicates that agricultural extension workers who have worked for 11-15 years may have reached a career stage where they have sufficiently mature knowledge and skills, but are still of productive age to continue to contribute actively. For more clarity, the distribution of respondents based on gender can be presented in the following picture.

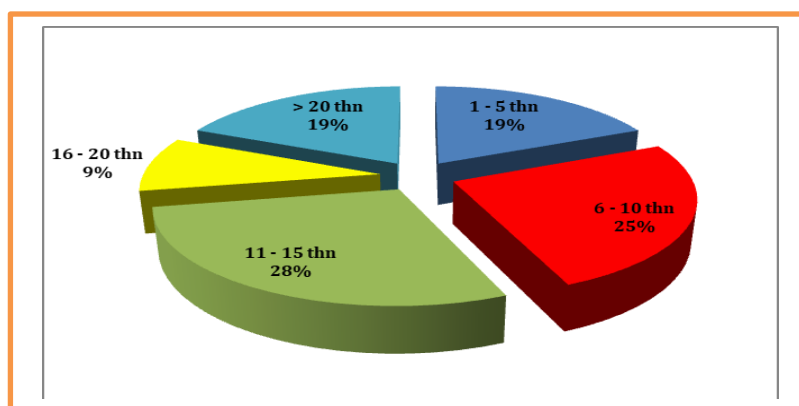


Fig 4. Characteristics of Respondents Based on Years of Work

Description of Research Variables

This section will explain the description of variables, dimensions and internal indicators sourced from the tabulated results of research questionnaires distributed to 151 respondents. For more details, it can be described in the table as follows: Based on Table 3, it shows that the total average value contribution of

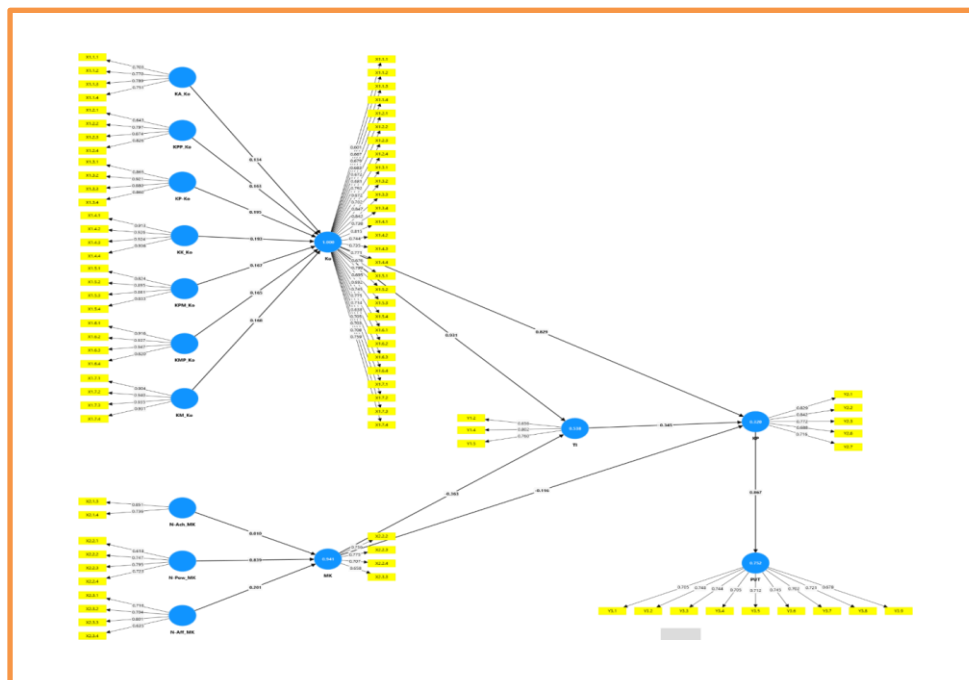
the competency variable is 4.02, the highest *mean value contribution* to the evaluation competency dimension is 4.28 and the lowest contribution is administrative competency, namely 3.59.

Data Analysis Results

Outer Model Analysis

Skema Outer Model *Partial Least Square* (PLS)

On study This, testing hypothesis use technique analysis *Partial Least Square* (PLS) with the *smartPLS* 3.0 program. The following is scheme PLS program model *Outer Model* tested:



Source: Primary Data reprocessed in 2024

Fig 5. Outer Model Scheme

Convergent Validity

The measurement model or *Outer Model* determines how each block of indicators is associated with latent variables. *The Outer Model* with reflexive indicators is evaluated by *the convergent* and *discriminant validity* of the indicators and *the composite reliability* for the block indicators. *Convergent validity* is used to determine the validity of each relationship between indicators and latent constructs (variables). An individual's reflexive measure is said to be high if it correlates more than 0.70 with the construct being measured (Ghozali, 2015). Based on these criteria, if an indicator has a *loading value* of less than 0.70, it is dropped from the analysis and re-estimated. However, for research in the initial stages of developing a measurement scale, a loading value of 0.50 to 0.60 is considered sufficient (Chin, 1999). Following is mark *outer loading* from each dimensions and indicators for each variable research is as follows :

Uji Path Coefficient

independent to variable dependent. Meanwhile *Coefficient Determination (R-Square)* used For measure how many variables endogenous influenced by variable other. Chin and Newsted (1999) mentions the result of R^2 of 0.67 to on For variable latent endogenous in model Structural indicates the influence of exogenous variables (which influence) on endogenous variables (which are influenced) is included in the good category. Meanwhile, if the result is 0.33 – 0.67 then it is included in the category moderate, and if the result is 0.19 – 0.33 then it is included in the category weak (Gozali, 2015). Based on *scheme inner model* Which has is displayed on Figure 6 above can be explained that the *Path Coefficient* values in this study from largest to smallest can be seen in the table below:

Table 2. Path Coefficient value

Tiers	Influence	Path Coefficients
1	Ko -> IT	0.931
4	MK -> IT	0.363

3	Ko -> KP	0.829
9	MK -> KP	0.116
5	IT -> KP	0.345
2	KP -> PUT	0.867
7	TI -> KP -> PUT	0.299
8	MK -> IT -> KP	0.125
9	Ko -> TI -> KP	0.321

Source: Primary Data reprocessed in 2024

Based on Table 2 above, it can be seen that the *Path Coefficients* values have the highest to lowest levels of influence. The influence of Competency on Information Technology has the highest value with a *Path Coefficients* value of 0.931. Then, at the second level, the influence of competency on instructor performance with a *Path Coefficients* value of 0.867. Next, the lowest work motivation on instructor performance is the Path coefficient value of 0.116.

Test Kind Model (Goodness of Fit)

Based on processing data Which has done with use program *smartPLS 3.0*, obtained mark R-Square as following:

Table 3. R-Square Test

VARIABLES	DIRECTION	VARIABLES	R Square
Extension Competency	>	Information Technology	0.532
Work motivation			
Extension Competency	>	Extension Performance	0,306
Work motivation			
Information Technology	>	Farming Productivity	0.751
Extension Performance			

Based on Table 3 in above, the results of the *R Square test* for the information technology variable which is explained by the instructor competency and work motivation variables is 0.532. These results show that the information technology variable can be explained by the competency and work motivation variables by 53.2% so that there is still 46.8 % explained by other variables. Then *the R test results The square* of the instructor performance variable which is explained by the instructor competency and work motivation variables is (0.306). This result shows that the instructor performance variable can be explained by the instructor competency and work motivation variables by 30.6% so that there is still 69.4% explained by other variables. *R test results The square* of the farming productivity variable explained by the Information Technology and Extension Performance variables is (0.751). These results show that 75.1% of agricultural productivity can be explained by the Information Technology and Extension Performance variables, while 24.9% is still explained by other variables.

Hypothesis test

Based on the data processing that has been carried out, the results can be used to answer the hypothesis in this research. Test the hypothesis in this research *R test results The square* of the farming productivity variable explained by the Information Technology and Extension Performance variables is (0.751). These results show that 75.1% of agricultural productivity can be explained by the Information Technology and Extension Performance variables, while 24.9% is still explained by other variables. one with see mark *T-Statistics* And mark *P-Values*. Hypothesis study can stated accepted if mark *P-Values* < 0.05 (Gozali, 2015). Following This is the result of hypothesis testing obtained in this research through *internal models*:

Table 4. Hypothesis Testing

Hypothesis	Path -C	T-S	PV	Information
H1 Ko -> IT	0.931	10,135	0,000	Significant/Hypothesis accepted
H2 MK -> IT	0.363	5,197	0,000	Significant/Hypothesis accepted
H3 Ko -> KP	0.829	4,482	0,000	Significant/Hypothesis accepted
H4 MK -> KP	0.116	1,186	0.236	Not Significant/Hypothesis rejected
H5 IT -> KP	0.345	2,569	0.010	Significant/Hypothesis accepted

H6	KP -> PUT	0.867	34,068	0,000	Significant/Hypothesis accepted
H7	TI -> KP -> PUT	0.299	2,440	0.015	Significant/Hypothesis accepted
H8	MK -> IT -> KP	0.125	2,418	0.016	Significant/Hypothesis accepted
H9	Ko -> TI -> KP	0.321	2,521	0.012	Significant/Hypothesis accepted

Based on Table 4 above, in this research there are nine hypotheses. The results of this hypothesis are as follows:

Hypothesis Testing 1: The Influence of Extension Competency Variables on Information Technology

The results of testing the first hypothesis show that the influence of the instructor competency variable on information technology shows a P value of (0.00). The P values are smaller than (0.050), thus the first hypothesis is accepted. It means Competence has a significant effect on information technology.

Hypothesis Testing 2 : The Influence of Work Motivation on Information Technology

The results of testing the second hypothesis show that the influence of work motivation on information technology shows a P value of (0.000) with). P Values are less than (0.050). These results indicate that there is a significant influence between work motivation and information technology., So the second hypothesis is accepted.

Hypothesis Testing 3: The Influence of Competency Variables on the Performance of Extension Workers.

The results of testing the third hypothesis show that the influence of competence on the performance of instructors shows a P value of (0.000) and a P value of less than (0.050). This shows that the third hypothesis is competence influential significant to the performance of extension workers, so the third hypothesis is stated accepted

Hypothesis Testing 4: The Influence of Work Motivation Variables on Extension worker Performance

The results of testing the fourth hypothesis show that the influence of work motivation on the performance of instructors shows the value of P Values (0.236) with the value of P Values greater than (0.050) These results indicate that there is no significant influence between work motivation with the performance of extension workers, so hypothesis four is rejected

Hypothesis Testing 5: The Influence of Information Technology Variables on Extension Worker Performance

The results of testing the fifth hypothesis show that the influence of information technology on the performance of instructors shows a P Value of (0.010) with a P Value of less than (0.050). These results indicate that there is a significant influence between information technology and the performance of instructors . five accepted

Hypothesis Testing 6: Influence of Variables on instructor performance Farming Productivity

The results of testing the sixth hypothesis show that the influence of instructor performance on farming productivity shows a P Value of (0.000) with a P Value of less than (0.050). These results indicate that there is a significant influence between instructor performance and farming productivity, so hypothesis six is accepted.

Testing Hypothesis 7: The influence of information technology on farming Productivity is mediated by the performance of extension workers

The results of testing the seventh hypothesis show that the influence of information technology on farming productivity is mediated by the performance of the instructor, showing a P value of (0.015) with a P value of less than (0.050). These results indicate that the instructor's performance variable can mediate the significant influence of information technology on farming productivity, thus the seventh hypothesis accepted.

Testing Hypothesis 8 : The influence of work motivation on instructor performance is mediated by information technology

The results of testing the eighth hypothesis show that the influence of work motivation on instructor performance is mediated by information technology, showing a P value of (**0.016**) with a P value of less than (**0.050**). These results indicate that information technology can mediate a significant influence between work motivation and instructor performance, thus the eighth hypothesis accepted.

Testing Hypothesis 9 : The influence of competency on instructor performance is mediated by information technology

The results of testing the ninth hypothesis show that the influence of work competency on instructor performance is mediated by information technology, showing a P value of (**0.012**) with a P value of less than (**0.050**). These results indicate that information technology can mediate a significant influence between competency on instructor performance, so that the ninth hypothesis accepted.

IV. CONCLUSION

Based on the results of research and discussion, it can be concluded:

- [1] Extension agent competency influential significant impact on mastery of information
- [2] technology in Tojo Una-Una Regency.
- [3] Extension agent's work motivation influential significant impact on mastery of information technology in Tojo Una-Una Regency.
- [4] Competence matters significant impact on the performance of agricultural extension workers in Tojo Una-Una Regency.
- [5] Motivation The work of extension agents has an effect but is not significant on the performance of instructors agriculture in Tojo Una-Una Regency.
- [6] Mastery of information and communication technology is influential significant impact on the performance of agricultural extension workers in Tojo Una-Una Regency.
- [7] Performance matters significant impact on corn farming productivity in Tojo Una-Una Regency.
- [8] Mastery of information and communication technology has a significant effect on farming productivity which is mediated by the performance variable of instructors in Tojo Una-Una Regency .
- [9] Competence matters significant impact on instructor performance which is mediated by the variable mastery of information and communication technology in Tojo Una-Una Regency.
- [10] The instructor's work motivation has a significant effect on performance of the instructor ,mediated by the variable mastery of information and communication technology in Tojo Una-Una Regency.

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