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Analysis factors that affect participant interest in cattle farm business insurance in Indonesia

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ABSTRACT: The Cattle Business Insurance Program is a protection cow yields program launched by the government to anticipate the risk of loss of farmer due to crop failure. The government started this program in 2015 by working together with an insurance company PT. Jasindo. This program is beneficial for farmer in Indonesia. Unfortunately, the impact of this program is still having a negligible effect on society because there is still a lack of attraction from the farmer to follow this insurance program. This research has a purpose in analyzing factors that caused the farmer's interest, making them want to join this insurance. We use a structural equation model (SEM) of data that has been obtained to provide the method. Based on the results, we can conclude that the accuracy factor is a dominant factor that influences the farmer's decision to join the AUTS program. This insurance has been beneficial in developing a better Cattle business insurance program in the future and motivates farmer to join this insurance. For insurance companies, this research has provided information for companies interested in opening similar and better insurance programs to increase the enthusiasm of local farmer and national cattle productions.

Keywords: Insurance; Crop failure; Structural equation model; The insurance premium

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INTRODUCTION

Cows are livestock that Indonesians widely consume. Indonesia's national cattle demand in 2018 is 663.290 tonnes. However, domestic cattle production has not achieved these enormous demands (Basith, 2001). Even every year, Indonesia has to import cattle to achieve domestic needs. Therefore, cattle farming is a community business that needs attention to its growth. The cattle farming business has various risks, including death from disease, death due to accidents, natural disasters, disease outbreaks, and even theft. So we need a protection or insurance product that guarantees the sustainability of the cattle farm business. In this case, the Indonesian government has issued Law Number 19 of 2013 concerning Protection and Empowerment of Farmers and Regulation of the Minister of Agriculture Number 40/Permentan/SR.230/7/2015 concerning Facilitation of Agricultural Insurance.

In 2016, the Ministry of Agriculture of the Republic of Indonesia had implemented agricultural insurance specifically intended for the cattle business sector; the program is called Asuransi Usaha Ternak Sapi (AUTS). This is a form of the government's support in protecting farmers from the risk of death and/or loss of cows. Cattle Business Insurance Program(AUTS) is expected to protect cattle farmers in the event of a dead cow due to disease, calving and accidents and/or loss by transferring losses to other parties through insurance coverage, as well as being able to provide education to farmers in managing risks and sound livestock business system.

As a form of activity to relieve cattle farmers in paying premiums, in the early stages of implementing the Cattle Business Insurance program, the government provided premium assistance in the form of subsidies to farmers participating in the Cattle Business Insurance program, namely by issuing a Decree of the Minister of Agriculture of the Republic of Indonesia. No: 56/Kpts/SR.230/B/06/2016 concerning Cattle Business Insurance Premium Assistance Guidelines. In this regard, it is hoped that the implementation of the Cattle Livestock Business Insurance (AUTS) program will run well.

The livestock that can only be insured under the Cattle Livestock Business Insurance (AUTS) program are cattle. The reason are the scarcity of cattle which causes an increase in beef prices and the characteristics of the agricultural sector. Particularly the cultivation sub-sector and Cattle breeding are at high risk because they are susceptible to disease and death, where these conditions can cause losses for cattle. Even though there is other livestock, such as goats, chickens, buffalo, which also have a risk of disease and death, especially for cattle, the price is higher than other livestock so that this is the background for the government in making the Cattle Business Insurance (AUTS) program.

Based on reports from the Cattle Business Insurance (AUTS) program and PT Asuransi Jasa Indonesia (Jasindo) agency, the cumulative claims since the AUTS program was launched in June 2016 to the end of 2017 amounted to 1.138 cows or 9.103.537.000 IDR. Based on this data, we see that the AUTS program positively impacts cattle farmers; with the compensation provided, cattle farmers who suffer losses due to death and/or loss of cows being raised can continue their business.

Unfortunately, the positive impact of AUTS has not been maximally felt by farmers. This is because there are still many farmers who have not joined this insurance (Mahadi, 2018). The Financial Services Authority (OJK) noted that throughout 2017, the total target to be insured was 120.000. However, the realization only reached 92.176 heads or only 76,8%. For this reason, it is necessary to conduct a study to see what factors cause the low interest of farmers in participating in this program.

Based on the background above, we formulated problems that will be examined in the following questions: 1. What factors

influence farmers to participate in Cattle Business Insurance (AUTS)? 2. How much influence do these factors have in influencing farmers' interest in participating in AUTS? Some others related research can be seen in (Ahmad Ilham Kubro, Nurlaili, 2019; Riana, Baba, & Sirajuddin, 2019; Syukur, Musdalipah, Sirajuddin, & Fitriani, 2021).

MATERIALS AND METHODS

The data used in this study are primary data obtained by conducting direct surveys/interviews by giving questionnaires to several cattle farmers in Aceh Tamiang, South Lampung, and Semarang. The number of farmers interviewed was 50 farmers, with details of 30 farmers in the Aceh Tamiang area, ten farmers in South Lampung, and ten farmers in Semarang. The data was taken from February 2020 to June 2020. This study analyzed the factors that affect increasing the interest of farmers to join Cattle Livestock Business Insurance in Indonesia. We used the structural equation model (SEM-PLS).

This SEM model has been built based on the researcher's understanding of a problem to be studied by making a causality relationship between variables. There are two types of variables in this SEM model, namely latent variables and indicator variables (Bollen, 1989). Latent variables are variables that cannot be measured directly. The measurement of this latent variable must use indicator variables. This indicator variable itself can be measured directly and is expected to be able in describing the latent variable well later. The latent variables and indicators used in this study are presented in Table 1 below.

Structural equation model

The structural equation model is a multivariate analysis technique used to construct and test latent variables linked in a causal relationship. SEM models usually require extensive enough data, namely 200-300 data, based on vital basic concepts. One type of SEM model that can be used to overcome the weaknesses in the theoretical basis of the latent variable relationship and the number of samples that are not too large is the Partial Least Square model or SEM-PLS. The general form of the structural equation model is as follows :

$$\eta = B\eta + \Gamma\xi + \zeta$$

where

η: endogenous latent variable vector

B: endogenous variable coefficient matrix (η) measuring m x m

Γ: matrix of the coefficient of an exogenous latent variable (ξ) measuring m x n

ξ: exogenous variable measuring n x 1

ζ: the random residual/error vector of the relationship between η and ξ measuring m x 1

m: the number of endogenous latent

n: the number of exogenous latent variables (Rinaldi, 2015).

Validity and reliability

Validity means how precise and accurate the measuring instrument performs its functions. (Azwar, 1986). Moreover, validity is a measurement that indicates a measuring variable that the researcher should (Cooper & Schindler, 2006). The item's validity is indicated based on the correlation or support for the total item (total score); the calculation is done by correlating the item score with the item total score. If we use more than one factor, it means testing the item's validity by correlating the item score with the factor score, then continuing to correlate the item score with the total factor score (the sum of several factors).

The loading factor is a coefficient that explains the level of relationship between indicators and latent variables. The greater the square of the loading factor value, the indicators are getting better at explaining latent variables. A loading factor of more than 0.5 indicates that the indicator is valid. Reliability is the consistency of a series of measurements or measuring instruments. This could be a measurement that has the same measuring instrument (test with retest) that will give the same result, or for a more subjective measure, whether two raters give similar scores (inter-rater reliability). The

reliability of measurement can be seen from the Cronbach Alpha value. If the Cronbach Alpha is more than 0.6, it indicates that the latent variable is reliable.

Table 1. The latent variables and indicators

Latent Variable	Indicator	Description
Accuracy	X1	The sophistication of AUTS's services
	X2	The officers' physical appearance is attractive.
	X3	Adequate supporting facilities
	X4	On-time
	X5	Right information
	X6	Right on target
Responsiveness	X7	The officer's speed solved the problem
	X8	The length of time for the registration process
	X9	Officer ability to solve problems
Assurance	X10	Friendliness of officers
	X11	Easy of processing claims
	X12	Provision of a call centre
Empathy	X13	Easy of achieving AUTS
	X14	Easy of registration requirements
	X15	Easy of payment
	X16	The willingness of officers to help costumers
Price	X17	Affordable premium
	X18	Benefit of AUTS
Activity	Y1	Having an insurance policy outside the BPJS
	Y2	Following AUTS in the last few years
Interest	Y3	Respondents prefer the services of a safe financial institution.
	Y4	Looking for financial services that are low cost but have high benefits
	Y5	Respondents prioritizing quality price is not an obstacle.
	Y6	Buy goods/products that are easy to get
	Y7	Loves practical things
Opinion	Y8	Livestock insurance makes farmers tranquil from the risk of loss.
	Y9	With insurance, farmers can focus more on maintaining production quality.
	Y10	There is no need to be too serious in paying attention to livestock health with livestock insurance.
Interest in Following AUTS	P10	Possibility of continuing to follow AUTS with government subsidies
	P11	Possibility of continuing to follow AUTS without government subsidies
	P12	Willingness to recommend AUTS

To clarify the discussion in this research, here we present some basic theoretical foundations.

Normality test (univariate and multivariate)

Normality test aims to find out whether the data has normal distribution or not. The multivariate normality test is a normal distribution test for all variable data. However, this test can also be carried out on every variable (univariate), with the logic that if each variable fulfils the normality assumption, then together (multivariate), the variable is also considered to fulfil the normality assumption. The univariate normality test used the cr kurtosis value (critical ratio kurtosis).

If | cr kurtosis | < 2.58, the indicator is normally distributed (Nawangsari & Rahmawati, 2018). Then, we use Mardia's multivariate normal test for the Multivariate normal test.

Model fit-test

In formulating a model, it almost certainly ends with testing the model's fit or testing the model's suitability with the research data that we have. The complexity of the model that has been measured requires a more complex instrument for testing the suitability or suitability of the required model. In SEM, the "fit model" describes the suitability between the covariance matrix of the sample and the estimated population covariance matrix.

Therefore, the main question posed in the model fit test is, "Does the proposed model produce a population covariance matrix estimation consistent with the sample of covariance matrix?". A model (measurement model and structural model) is said to fit or according to the data if the sample covariance matrix does not differ from the estimated population covariance matrix produced. Then the statistical hypothesis for the suitability test of the model in SEM is formulated:

H0: There is no matrix difference between the covariance sample and the population covariance matrix,

H1: There is a difference between the sample and population covariance matrices.

Many model fit tests can be used in the SEM model, including those criteria shown in Table 2 below.

Table 2. Some SEM model fit tests

Criteria	Critical value to be the fit
p-value	≥ 0.05
Root Mean Square Error (RMSEA)	≤ 0.08
The goodness of Fit Indeks (GFI)	≥ 0.9
Adjusted Goodness of Fit Index (AGFI)	≥ 0.9
Tucker Lewis Index (TLI)	≥ 0.95
Comparative Fit Index (CFI)	≥ 0.95

GFI is a similar measurement to the coefficient of determination in simple regression analysis to measure how much the model can explain the diversity of data. The formula for GFI is

$$GFI = 1 - \frac{tr\left[\left(\hat{\Sigma}^{-1}S - 1\right)^2\right]}{tr\left[\left(\hat{\Sigma}^{-1}S\right)^2\right]}$$

(Hair, Anderson, Tatham, & Black, 1998).

RESULT AND DISCUSSION

In this study, we analyze the influence of several latent variables on a farmer's interest in joining livestock insurance. There are two models that we have tried to analyze in this study. Then, we describe a description of the proposed model in the following section.

Model 1

In Model 1, the latent variables are tested to see if the farmer are interested in taking insurance such that the variables are Service Quality and Insurance Awareness. The Service Quality variable was measured using 18 indicators (X1-X18), and the insurance awareness variable was measured from 10 indicators (Y1-Y10), while the interest variable can be measured from three indicator variable questions (P10-P12).

The hypotheses used are:

1. Service Quality and insurance awareness directly influence farmer's interest in taking insurance.

2. Insurance Awareness is influenced by the quality of services provided by insurance service providers.

The following is a chart of model 1 based on these hypotheses.

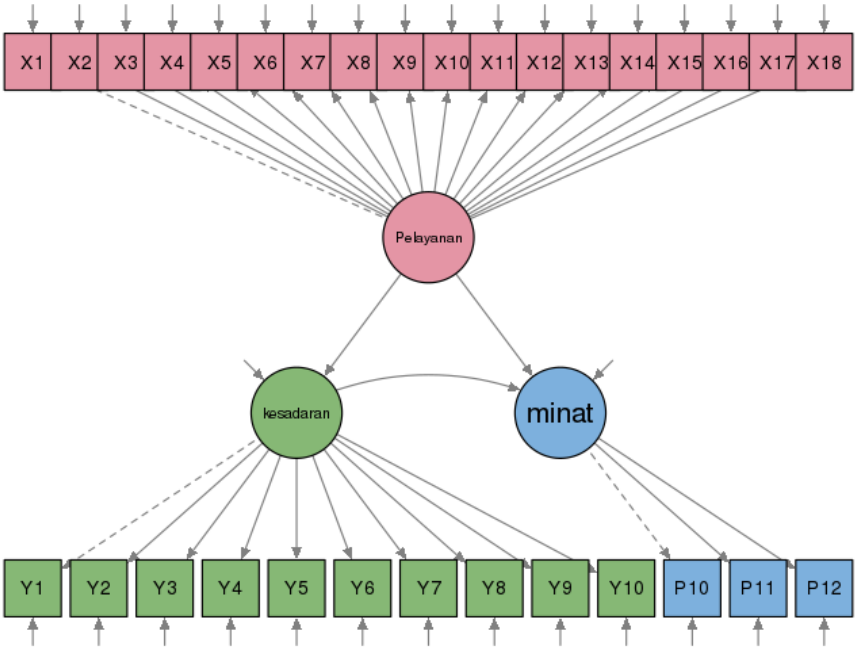

Figure 1. Chart of proposed model 1

Validity is the accuracy of the measuring device in measuring the desired variable. The validity test is carried out to see whether the indicator variable is good enough in measuring the latent variable. A validity test can be done by looking at the loading factor value. If the loading factor value is more than 0.5, the indicator is said to be valid. The validity test carried out for the indicator variables found that the X3 and X18 indicators were invalid, and all Y1-Y10 indicators were also invalid. The P12 indicator was also invalid. Therefore, it is necessary to change the model for this analysis.

Model 2

We will measure the factors influencing interest in participating in Cattle Livestock Business Insurance in Model 2 by modifying model 1. If in model 1 there was a latent variable of insurance awareness, then in model 2, this variable did not exist. In model 2, the factors that have been considered to influence interest in joining insurance are five: Accuracy, Responsiveness, Assurance, Empathy, and Price. Below is a chart for the proposed model 2.

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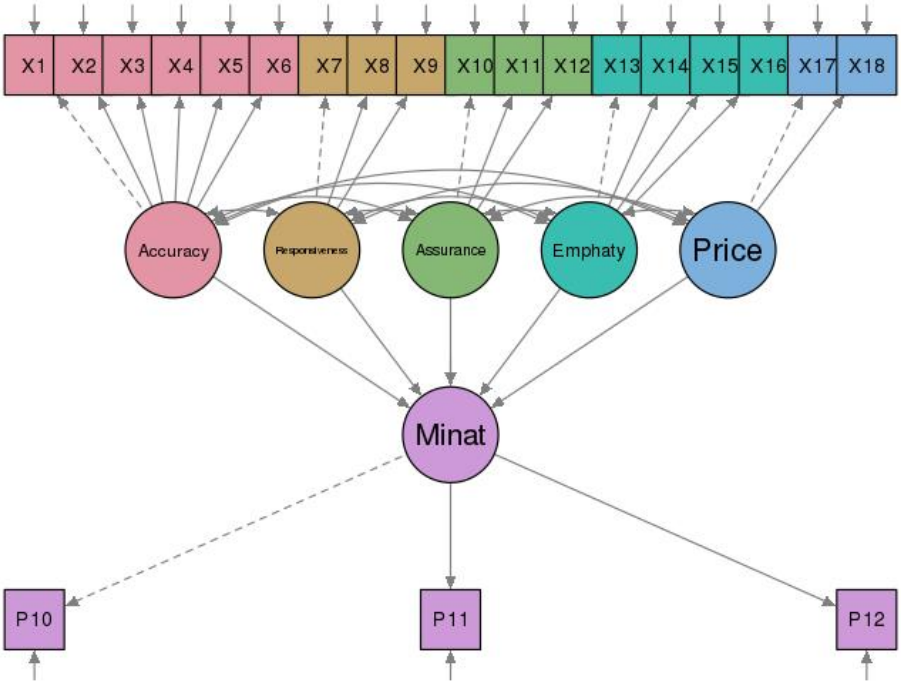

Figure 2. Chart of proposed model 2

Validity test for the indicators in model 2

From the results of the SEM test conducted, it was found that the indicators X3, X18, and P12 were invalid because they had a loading factor value of less than 0.5. Therefore, we modified model 2 by using elimination on these invalid indicators.

Before modifying model 2, it is also necessary to check whether there are outlier (outlier) data from the analyzed data. This outlier can be obtained by looking at the Mahalanobis value from the Lisrel output (Joreskog & Sorbon, 1996). If the Mahalanobis value is greater than the Chi-square table value, the data is outlier data. Then, we obtained the 34th data as outlier data so that in the following analysis, this data was eliminated.

Univariate and multivariate normality test

The univariate normality test is carried out to see whether all indicator variables are normally distributed. One of the assumptions that must be met in the SEM model is that all indicator variables must be normally distributed. The examination can be done by looking at the critical ratio kurtosis (CR kurtosis) value. If | cr kurtosis | < 2.58, the indicator is normally distributed. From the output, all indicator variables follow a normal distribution. This is because the value of | cr kurtosis | < 2.58.

Based on the normality test for the multivariate data, one method that can be used is the Mardia multivariate normal test (Kankainen, Taskinen, & Oja, 2004). From the results of the analysis carried out, it can be concluded that the data has a multivariate normal distribution according to Mardia's multivariate normal test.

Test fit of the modified model

We find several criteria that can influence the appropriate model to be studied in this part. Based on Model 2 that we described before, the RMSEA and the p-value that we obtained still cannot be an appropriate tools.

However, based on Table 2 above and the output that we obtained, modification on GFI model 2 is still not appropriate. It means that modifications are still needed in the indicator relationship, or we can say that there is multicollinearity between indicators that need to be corrected.

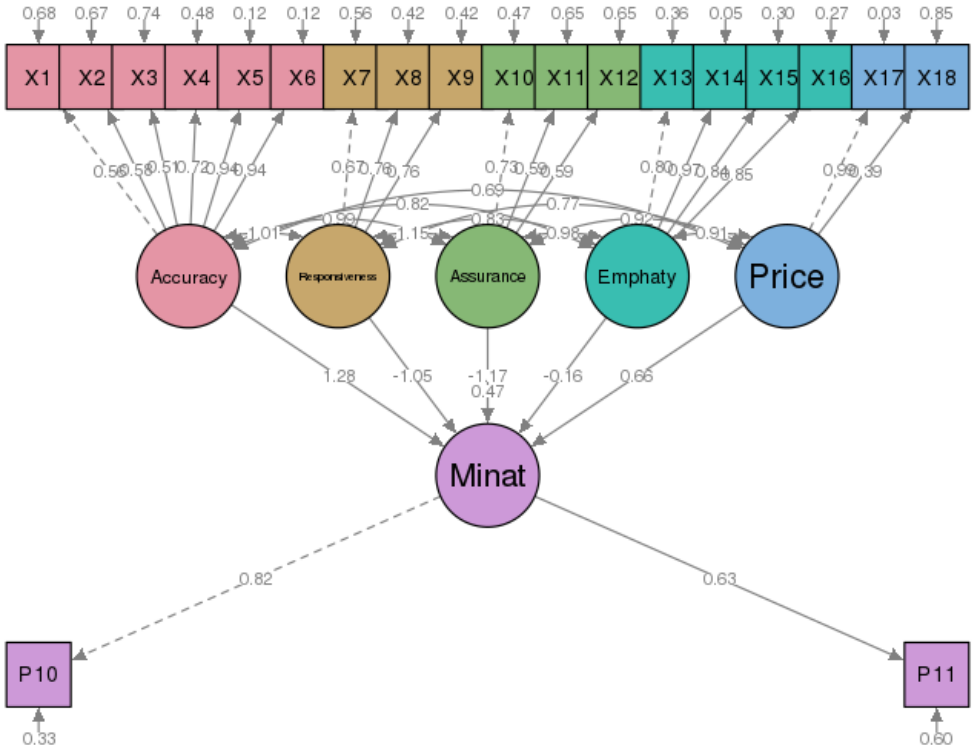

Figure 3. The Lisrel model SEM output for the modified model 2

The following equation has given the structural equation model of interest in following AUTS: $\text{Interest} = 3.264\text{Accuracy} - 1.428\text{Responsiveness} - 2.244\text{Assurance} - 0.263\text{Emphaty} + 0.834\text{Price}.$

The output above concludes that the accuracy variable is the latent variable that gives the most significant influence for farmers to join in insurance. This shows that the quality of insurance services such as timeliness in claim settlement, right on target, and the availability of supporting facilities are the most influencing factors for farmers to join AUTS insurance. Besides that, farmers' perceptions of prices are also high. This variable comes second to accuracy. This is also evident from the P11 indicator (availability of government subsidies), which provides the most significant contribution in measuring farmers' interest directly in insurance.

CONCLUSIONS

We propose a structural equation model to describe factors that influence farmer in Indonesia to join the Cattle Livestock Business Insurance or Asuransi Usaha Ternak Sapi (AUTS) program. Based on our analysis research, accuracy become the highest factor that gives the most influence for farmers to join the AUTS program. Several indicators, namely X1-X6, measured this factor. The price factor also becomes a second significant influence. They were then followed by the empathy, assurance, and responsiveness factors.

Based on this research, we can suggest that the government should evaluate the sustainability of the cattle business insurance program by increasing the service quality factor and affordable premium prices. A good premium formulation is needed so that farmer are still interested in participating in AUTS, especially after the government does not subsidize this program. The role of insurance companies as insurance providers is also crucial in this case. The data to be analyzed should be even more significant in the future because the

model will provide better-estimated values for large sample sizes. In addition, indicator modification still needs to be done in the future to make the appropriate model.

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