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FACTORS INFLUENCING THE DEVELOPMENT OF PEKING DUCK FARMING BUSINESS IN AMUNTAI TENGAH SUB-DISTRICT OF HULU SUNGAI UTARA REGENCY, INDONESIA

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ABSTRACT
One of the crucial factors contributing to the success of a livestock enterprise is the incorporation or adoption of technology in the management and operational processes. The adoption of technology and social capital are factors that can bring benefits in empowering farmers, thus enhancing livestock business activities. Effective empowerment carried out by the government or relevant stakeholders will motivate farmers to adopt technology and enhance their social capital, thereby achieving optimal livestock business development. This study aims to analyze the influence of technology adoption, social capital, and empowerment of farmers on the development of Peking duck farming business in the Amuntai Tengah sub-district of Hulu Sungai Utara Regency. The research was conducted in the Amuntai Tengah sub-district of North Hulu Sungai Regency, which is one of the areas with the potential for developing Peking duck farming business. However, empowerment activities in the Amuntai Tengah sub-district have not been carried out regularly and consistently, resulting in no impact on livestock business development.

KEY WORDS
Technology adoption, social capital, empowerment, business development.

Currently, the potential of duck farming is still not optimal in terms of development and utilization. This is mainly due to small-scale farming practices, where it remains a secondary occupation and relies on traditional methods with limited technological advancement. Traditional farmers generally possess limited knowledge, have minimal technological adoption, and lack efficient management systems. On the other hand, modern farmers have access to competent human resources, advanced technologies, substantial capital, and they run their farming operations in an independent and professional manner.

One of the factors that support the success of livestock farming is the implementation (adoption) of technology in the management process of the business activities. The adoption of technology is a crucial factor that farmers must undertake to ensure the smooth and progressive operation of their businesses, leading to increased income and profits from livestock farming. The adoption of technology within a community or group engaging in a particular business is likely to have a cause-and-effect relationship with the potential social capital that each individual possesses in that community. The adoption of technology and social capital are elements that can benefit the empowerment of farmers, thereby enhancing their livestock farming activities. Proper empowerment initiatives conducted by relevant stakeholders will motivate farmers to adopt technology and enhance their social capital, thereby enabling optimal development of livestock farming.

The business of raising Peking ducks has become a flagship enterprise and is widely pursued by farmers in the Amuntai Tengah sub-district at present. The demand for Peking duck meat has been increasing over time and is highly sought after in the market. The marketing of Peking duck meat in the Amuntai Tengah sub-district holds promising market share, with buyers directly approaching the farmers. These buyers then supply the demand for Peking duck meat from outside the Amuntai Tengah sub-district. Apart from daily consumption, the demand for Peking duck meat also comes from local and non-local restaurants within and beyond the Hulu Sungai Utara Regency. Peking duck meat is

preferred by consumers due to its larger body size, resulting in bigger and more tender meat with a savory taste compared to Alabio duck meat.

The development of a livestock business can be influenced by various factors, including the adoption of technology and the level of social capital among farmers, as well as the extent of empowerment activities initiated by the government or relevant stakeholders. Social capital plays a significant role in empowering farmers, thus increasing the adoption of technology and facilitating the smooth development of production activities. Moreover, high levels of social capital indicate a strong and close-knit social network within a community, which leads to effective implementation of empowerment initiatives.

Factors such as low technology adoption and social capital can potentially influence the development of businesses. These factors may affect the empowerment of farmers and hinder the progress of the livestock farming activities. Therefore, the researcher is interested in studying the factors that influence the development of the duck farming business, specifically by analyzing the relationship between technology adoption, social capital, and farmer empowerment. The research aims to investigate whether these indicators have a causal relationship with the development of the duck farming business in the Amuntai Tengah sub-district of Hulu Sungai Utara Regency.

METHODS OF RESEARCH

This research employs primary data obtained from interviews using questionnaires. The type of data used in this study is both primary and other supporting data. Data collection was directly obtained from the respondents through the completion of questionnaires containing statements.

The respondents used in this research are the farmers who are engaged in the business of raising Peking ducks, located in the Amuntai Tengah sub-district of Hulu Sungai Utara Regency. The sample size for this study is 100 farmers, meeting the recommended sample size for SEM method.

The data analysis method used in this research is a combination of qualitative and quantitative analysis. The questionnaire results are assessed or measured using the Likert scale. Subsequently, with the use of the Likert scale, the variables to be measured are described into measurable indicators, which are then categorized into measurement scores ranging from 1 to 5.

The method used to test the hypotheses and analyze the factors influencing livestock business development is Structural Equation Modeling (SEM) analysis using Amos 24 software.

Table 1 – Research Variables and Indicators

Variable	Indicator	Notation	Likert Scale Measurement
Technology Adoption		X1	
	Selection of seedlings/breeding stock	X1.1	1-5
	Housing	X1.2	
	Feeding	X1.3	
	Disease control	X1.4	
	Harvesting and handling	X1.5	
Social Capital		X2	
	Trust	X2.1	1-5
	Participation	X2.2	
	Network	X2.3	
	Norm	X2.4	
Empowerment		X3	
	Training	X3.1	1-5
	Financial assistance	X3.2	
	Provision of facilities/resources	X3.3	
Livestock Business Development		Y	
	Increase in income	Y1	1-5
	Increase in livestock population	Y2	
	Expansion of the barn	Y3	

The stages of the SEM method are:

- Theoretical model development by formulating hypotheses: it is hypothesized that there is an influence between technology adoption, social capital, and empowerment of farmers on livestock business development;
- Constructing a path diagram (path diagram);
- Transforming the path diagram into structural equations;
- Selecting the input matrix for data analysis;
- Assessing model identification, SEM analysis is expected to yield an over-identified model (df > 0) and not an under-identified model (df < 0);
- Evaluating the model estimation involves fulfilling several data tests;
- Normality Test: If the values of skewness, kurtosis, and multivariate normality are not greater than 5, then it indicates that the data is still normal (Byrne, 2010); Multivariate Outlier Test with the condition that the Mahalanobis distance value < chi-square table; Validity Test using Confirmatory Factor Analysis (CFA), according to Hair et al. (1995) cited in Suliyanto (2011) indicates that an indicator is considered suitable as a component of the construct if it has a factor loading value > 0.40; Goodness-of-fit Test, the SEM model will produce parameter values that will be compared with the goodness of fit cut-off value (Suliyanto, 2011). The comparison can be seen below:

Table 2 – Goodness of fit Indices

Goodness of Fit Indices	*Cut of value*
Absolute Fit	
X²-chi square/ DF	Small expected value
Significance probability	≥ 0.05
CMIN	≤ 2.00
GFI	≥ 0.90
RMSEA	≤ 0.08
Incremental Fit	
AGFI	≥ 0.90
TLI	≥ 0.95

- Reliability test is conducted with *reliability* and *variance extract*, where indicators are *considered reliable* if the *construct reliability* (CR) value is ≥ 0.70 and *variance extracted* (VE) is ≥ 0.50.

Interpretation of the model, modifications are carried out on the hypothesized model to obtain a better-fitting model.

RESULTS AND DISCUSSION

The respondents in this research are farmers who are part of a group and engaged in the development of Peking duck farming in the Amuntai Tengah District, Hulu Sungai Utara Regency. The progress and development of a livestock business greatly depend on the resources or characteristics possessed by the farmers. The characteristics of the respondent farmers can be observed in Table 3.

The age distribution of the respondent farmers shows that the highest proportion falls within the age group of 51-60 years. Despite being older, they remain productive. Age is one of the indicators of a person's productivity in managing their business. In the case of farmers in the Amuntai Tengah District, their productive age allows them to more easily adopt and implement recommended technologies from extension officers and external sources.

Additionally, the potential for social capital among these farmers remains strong. Older farmers are generally more trusted, have higher participation rates in activities, and possess broader networks due to their extensive social experience. They also adhere more strictly to prevailing norms.

However, the empowerment activities conducted by the government through extension officers for farmers in the Amuntai Tengah District are still limited. Consequently, farmers feel that they lack knowledge and skills in managing their livestock businesses.

The level of education among the respondent farmers varies, with the majority having completed elementary school (SD) at 45% and high school (SMA) at 32%. Farmers with higher levels of education are more receptive to and quicker in implementing and understanding new information and applying new technologies to manage their livestock business. As a result, their livestock businesses tend to be more advanced compared to farmers with lower levels of education.

Table 3 – Farmers' Characteristics

Characteristics of respondents	Frequency	Percentage (%)
Age (years)		
24 – 30	5	5
31 – 40	14	14
41 – 50	22	22
31 – 60	35	15
31 – 64	6	6
≥ 65	18	3
Education		
No School	2	2
SD	45	45
SMP	21	21
SMA	32	32
Livestock business experience (years)		
< 10	46	46
24 – 30	30	30
24 – 30	18	18
> 30	6	6
Number of livestock ownership (head)		
< 10	57	57
300 – 600	34	34
601 – 1000	8	8
> 1000	1	1

The majority of farmers in the Amuntai Tengah District, accounting for 46%, have less than 10 years of livestock farming experience. Around 30% of the farmers have livestock farming experience ranging between 10 to 20 years. The Peking duck farming activities they conduct are family-run businesses that have been established for a long time and have promising potential for profitability. The length of livestock farming experience also plays a crucial role in determining individual success in expanding livestock business activities.

In the Amuntai Tengah District, there are 57 livestock farmers who operate on a small scale, with fewer than 300 head of livestock each. Additionally, there are 34 farmers who run medium-scale livestock businesses, with livestock numbers ranging between 300 and 600 heads. The scale of livestock operations has a positive influence on technology adoption, and vice versa. As the number of livestock increases, there is a greater need for implementing more technology to facilitate and streamline livestock business activities.

The development of the model used in this research involves the assessment of the developed model through testing. The model includes exogenous variables, which are technology adoption (X1) measured by 6 indicators, namely, breed selection, housing, feeding, disease control, harvest management, and marketing. Another exogenous variable is social capital (X2) measured by 4 indicators, including trust, participation, networks, and norms. The intervening variable is empowerment (X3), consisting of three indicators, namely, training, business capital assistance, and facility assistance. Lastly, the endogenous variable is livestock business development (Y), which is measured by 3 indicators, including income improvement, livestock population growth, and pen expansion.

Confirmatory Factor Analysis (CFA) test is used to measure the construct validity by examining the output values or factor loadings. The test results indicate that one indicator, namely "feeding" (X1.3), was removed from the analysis model because its factor loading value was < 0.40. The factor loading values can be seen in Figure 1.

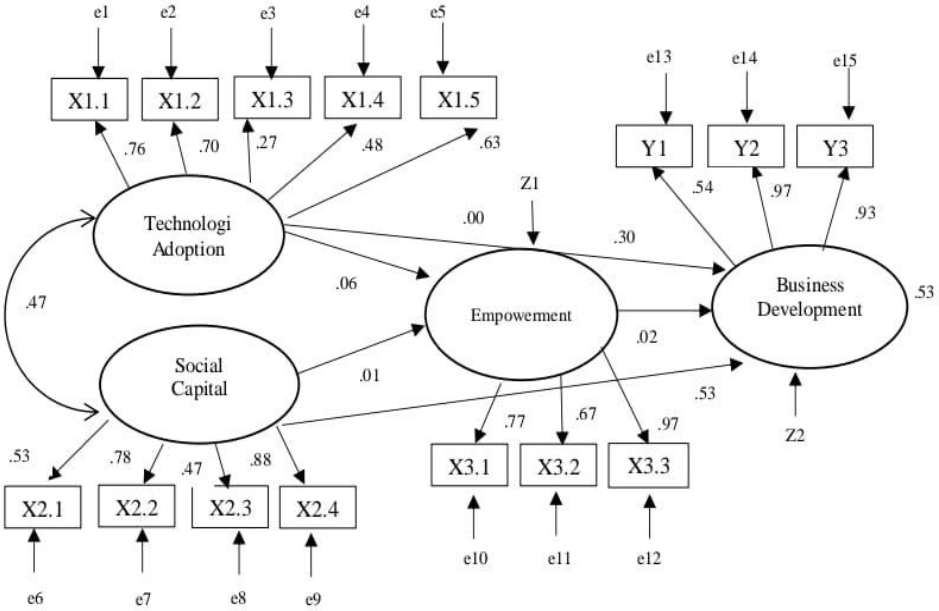

Figure 1 – Confirmatory Factor Analysis

In SEM analysis, it is expected to have an *over-identified* model (df > 0) to meet the identified standard. The obtained degree of freedom in this study is 71 > 0 (Figure 2), indicating that the model is *over-identified.*

The results of the normality test indicate that the skewness and kurtosis values are below 5, with a normality value of 3.670. As the normality values are still below 5, it indicates that the data is still normally distributed. Therefore, it can be concluded that the research data follows a normal distribution.

The results indicate that the highest Mahalanobis Distance value is smaller than the *chi-square* value. Mahalanobis Distance is calculated to measure the distance between a variable and the center of all observations (Santoso, 2012). The Mahalanobis Distance value is 37.31 < the critical chi-square value of 91.67 at df (71, α = 0.05), leading to the conclusion that the research data is multivariate normal.

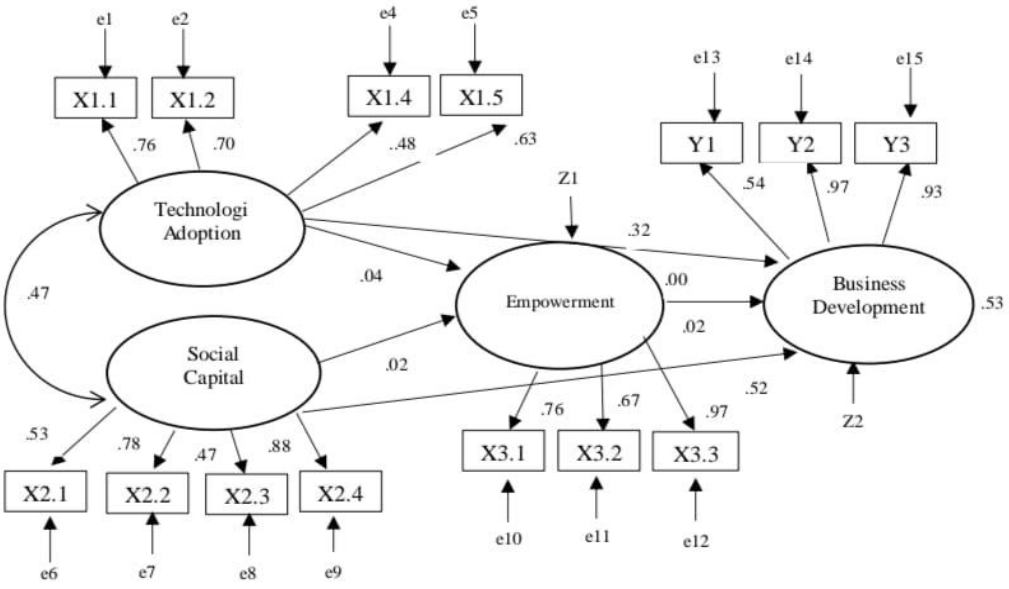

Figure 2 – Model after Removing 1 Indicator

Based on the analysis results of the model with one indicator removed, it shows that the *model fit* is not achieved, as the *chi-square* value and its associated probability do not meet the criteria. The *chi-square* value of 100.1 is greater than the expected chi-square value from the table (91.67/71, α = 0.05), which should be below the critical value. Additionally, the probability value is not significant at 0.013 (significance criterion requires P value to be ≥.05). According to Waluyo (2016) when the probability value (P) is < 0.05, the estimated model needs to be modified.

Based on the data processing, the values of CMIN/DF, RMSEA, and CF indicate a good fit, but the values of GFI, AGFI, and TLI fall into the marginal category. Since much other goodness of fit indices do not show a good fit for the model, it is crucial to perform modifications to improve the model. Detailed goodness of fit values can be seen in Table 4.

Table 4 – Goodness of Fit Test

Goodness of Fit Indices	Estimate	Cut of Value	Result
Absolute Fit			
X²-chi square/ DF	100,1/71	small expected value	*Not Fit*
Significance probability	0.013	≥ 0.05	*Not Fit*
CMIN	1.410	≤ 2.00	*Fit*
GFI	0.870	≥ 0.90	*Marginal Fit*
RMSEA	0.064	≤ 0.08	*Fit*
Incremental Fit			
AGFI	0.808	≥ 0.90	*Marginal Fit*
TLI	0.938	≥ 0.95	*Marginal Fit*
CFI	0.950	≥ 0.95	*Fit*

Modification is carried out on the hypothesized model to obtain a better-fitted model. The modification of the model is done by examining the values of modification indices resulting from the analysis. One of the tools to improve a model is through modification indices. Modification indices provide recommendations for correlation lines between error variances of indicators to be analyzed. The correlation results can reduce the chi-square value, making the model more fit. The chi-square value can be reduced by using modification indices (MI) with the largest values (Haryono & Parwoto, 2015). The recommendation for modification indices is based on the highest MI value, which is observed between e7-e14 with a value of 9.321. Subsequently, both error values are connected with a correlation line within the model.

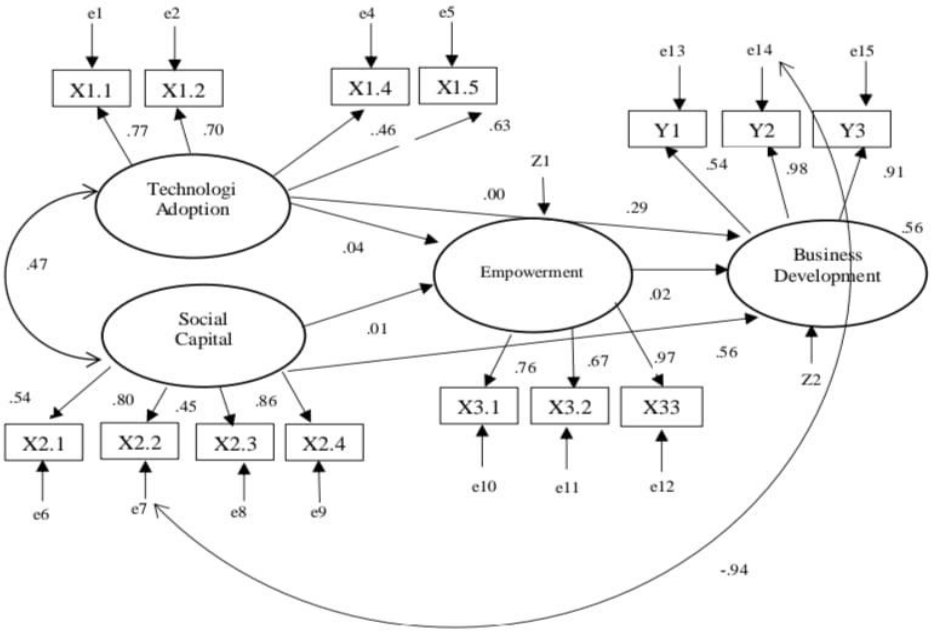

Figure 3 – Modified Model

The modified model results not only reduced the value of the *chi-square* but also yielded a probability value ≥ 0.05. If the test results of the model are appropriate, then these indicators can be used as parameters to measure the variable. The modification of the model showed a decrease in the *chi-square* value from 100.1 to 88.5, and the probability value increased from.013 to 0.067 ≥ 0.05. Thus, the model became a *good fit*, enabling further hypothesis testing. The results of the modified model can be seen in Figure 3.

Based on the *goodness of fit* values, there are six (6) criteria that meet the required standard values, indicating that the model is sufficiently *fit.* Therefore, the modified structural model is considered appropriate and adequate to produce the desired predictive level. Detailed results of the goodness of fit test can be seen in Table 5 below.

Table 5 – Goodness of Fit Test after Modification

Goodness of fit indices	Estimate	*Cut of value*	Result
Absolute Fit			
X2-*chi square/ DF*	88.5 / 70< 90.53	<*Chi square*	*Fit*
Significance probability	0.067	≥ 0.05	*Fit*
CMIN	1.265	≤ 2.00	*Fit*
GFI	0.886	≥ 0.90	*MarginalFit*
RMSEA	0.052	≤ 0.08	*Fit*
Incremental Fit			
AGFI	0.828	≥ 0.90	*Marginal Fit*
TLI	0.960	≥ 0.95	*Fit*
CFI	0.951	≥ 0.95	*Fit*

Reliability testing is used to measure the level of consistency between manifest variables in measuring their latent constructs. A construct is considered to have good reliability if the *Construct Reliability* (CR) value is ≥ 0.70, and the *Variance Extracted* (VE) value is ≥ 0.50. Based on the calculation results, the *Construct Reliability* (CR) of each construct is already ≥ 0.70, and the *Variance Extracted* (VE) for each construct is also ≥ 0.50. Therefore, it can be concluded that the indicators or constructs used in constructing the model are considered consistent and reliable. The results of the reliability test for the variables can be seen in Table 6.

Table 6 – Reliability test value

Variable	Construct Reliability	Variance Extracted
Technology Adoption	0.92	0.75
Social Capital	0.92	0.77
Empowerment	0.97	0.92
Business Development	0.96	0.90

Based on the statistical data processing, the next step is to determine the hypothesis results regarding the influence between each indicator and variable, which can be observed below in Table 7.

The technology adoption activities carried out by the Peking duck farmers in the Amuntai Tengah District include selecting healthy and high-quality breeds, implementing intensive housing systems, regularly and routinely controlling diseases, maintaining a healthy environment, ensuring proper harvest management, and pursuing extensive and sustainable marketing. Based on the data analysis, the indicators comprising the technology adoption variable (X1) such as breed selection (X1.1), housing (X1.2), disease control (X1.4), harvest management, and marketing (X1.5) are significant at a significance level of α = 0.05 and have a positive influence on livestock business development. This indicates that these six indicators constitute dimensions that can measure technology adoption as a variable. This means that all these technology adoption activities have been implemented effectively and regularly by the farmers Lestari *et.al,* (2009) emphasized that the success of farmers in running their livestock businesses is influenced by factors such as the availability of quality

breeds, providing appropriate animal feed, intensive animal husbandry practices, technology utilization, and livestock health management.

Table 7 – Regression Weight

			Estimate	C.R.	P	Result
Empowerment	<---	Technology adoption	.044	.292	.770	Not Significant
Empowerment	<---	Social capital	.016	.093	.926	Not Significant
Business development	<---	Technology adoption	.191	2.448	.014	Significant
Business development	<---	Social capital	.451	3.926	***	Significant
Business development	<---	Empowerment	.014	.267	.789	Not Significant
X11	<---	Technology adoption	1.000		***	
X12	<---	Technology adoption	.890	5.904	***	Significant
X14	<---	Technology adoption	.537	3.961	***	Significant
X15	<---	Technology adoption	.820	4.910	***	Significant
X33	<---	Empowerment	1.000		***	
x32	<---	Empowerment	.696	6.437	***	Significant
X31	<---	Empowerment	.911	7.325	***	Significant
X24	<---	Social capital	1.000		***	
X23	<---	Social capital	.663	4.502	***	Significant
X22	<---	Social capital	.869	8.327	***	Significant
X21	<---	Social capital	.801	5.317	***	Significant
Y1	<---	Business development	1.000		***	
Y2	<---	Business development	2.108	6.146	***	Significant
Y3	<---	Business development	1.988	6.124	***	Significant

Based on the analysis results, it is evident that the technology adoption variable significantly influences livestock business development, with a probability value of 0.014 at a significance level of α = 0.05. This finding aligns with the research conducted by Fitrimawati and Ismet (2018) which stated that the adoption of livestock technology has a significant and positive impact on livestock business development.

Within the group, this can depict that the transfer and application of technology have been carried out effectively by the farmers, leading to the advancement of their livestock businesses. Similarly, the significant and positively influential social capital indicates that group interactions and socializing among the farmers are well-established, facilitating the reception of new information and innovations, as well as expanding business networks.

Social capital (X2) is measured by 4 indicators, namely: trust (X2.1), participation (X2.2), networks (X2.3), and norms (X2.4), which have been proven to be dimensions and measuring tools of the social capital variable. This finding is consistent with Fitrimawati, (2015) which indicates that indicators such as trust and participation in social capital have interrelated influences on each other.

The social capital possessed by the farmers exerts a significant influence with a probability value of P 0.000 (***) at a significance level of α = 0.05, and it has a positive effect on the variable of livestock business development. This means that the higher the level of social capital resources owned by the farmers, the greater the opportunities for them to engage in livestock business development. This finding aligns with Fitrimawati (2017) which indicated that the existing social capital as the basis for forming groups has a positive impact on livestock business development within a group. Similarly, Amam *et al.,* (2019) also supported the notion that factors present in social capital are closely related to livestock business development. The higher the farmers' access to resources, the greater the likelihood that they will be motivated to develop their livestock business.

The presence of social capital will motivate livestock farmers to engage in various activities to achieve success. Farmers participate in group activities, cooperate with each other to build trust, adhere to applicable norms, expand friendship networks with relevant stakeholders, and improve marketing efforts to advance their Peking duck farming business.

The empowerment activities, which include mentoring and providing facilities and infrastructure assistance for the livestock farmers in the Amuntai Tengah District, are mainly carried out by the government. However, the benefits are still relatively limited for these farmers, primarily due to the constrained number of training and assistance provided.

The empowerment variable is formed by training indicators (X3.1), business capital assistance (X3.2), and facility assistance (X3.3). The data processing results indicate that all these indicators significantly influence the empowerment variable at a significance level of α = 0.05. However, the analysis shows that empowerment does not have a significant effect on livestock business development, with a probability value of 0.789 at a significance level of α = 0.05. The empowerment condition among the livestock farmers in the Amuntai Tengah District is still inadequate, leading to low motivation among the farmers to develop and improve their businesses. This is attributed to their perception of lacking knowledge, skills, capital, and facilities necessary to support the success of their businesses. Additionally, there is a lack of government-led empowerment training programs.

Livestock farming efforts involve high risks due to unpredictable factors, such as sudden livestock diseases, environmental conditions like floods, and others. The more empowered the farmers are, the lower the level of risk they face in their endeavors (Magfiroh and Wibowo, 2019). Thus, high levels of empowerment can influence the success of a business. However, the government's empowerment activities for livestock farmers in the Amuntai Tengah District, such as training sessions, financial support, and provision of facilities, have not been widely beneficial. This is because these empowerment programs have not been consistently and sustainably implemented each year by the government or other relevant parties.

CONCLUSION

Based on the results and discussion of this research regarding the factors influencing the development of Peking duck livestock enlargement businesses in the Amuntai Tengah District, Hulu Sungai Utara Regency, it can be concluded that:

- The adoption of technology by the Peking duck farmers in the Amuntai Tengah District has a significant effect with a probability value of 0.014 at a significance level of α = 0.05 on livestock business development. The adoption of technology will have a positive impact on enhancing livestock business activities;
- The social capital possessed by the livestock farmers exerts a significant influence with a probability value of 0.000 at a significance level of α = 0.05, and it has a positive effect on the variable of livestock business development. The strength of social capital among the livestock farmers will enhance business development;
- The empowerment variable does not have a significant effect on livestock business development with a probability value of 0.789 at a significance level of α = 0.05. The empowerment activities in the Amuntai Tengah District have not been consistently and optimally conducted, resulting in no impact on livestock business development.

SUGGESTIONS

It is expected that the government can provide more training on livestock product processing to increase the economic value of Peking duck products.

The government can assist in establishing a Peking duck breeding center in the Amuntai Tengah District, so that livestock farmers do not encounter difficulties in obtaining high-quality Peking ducklings.

The agricultural extension workers, serving as facilitators between the government and livestock farmers, can provide accurate proposals for enhancing the farmers' human resource capacity. Consequently, empowering them will yield beneficial outcomes for the advancement of the livestock industry.

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