

## Business sustainability model of smallholder layer farms in Kendal Regency, Central Java, Indonesia

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### ABSTRAK

Penelitian ini bertujuan untuk menganalisis faktor dan model keberlanjutan usaha ayam petelur rakyat di Kabupaten Kendal, Indonesia. Metode penentuan sampel menggunakan *purposive sampling* dengan dasar kepemilikan 300 – 10.000 ekor yang digunakan untuk menentukan 120 peternak ayam petelur aktif yang berlokasi di Sukorejo, Pageruyung, Patean, Limbangan dan Boja sebagai responden penelitian. Variabel penelitian terdiri dari tiga variabel eksternal (sosial, ekonomi, dan kelembagaan) dan dua variabel internal (pendapatan dan keberlanjutan usaha) yang dikumpulkan dengan menggunakan kuesioner tertutup. Data dianalisis menggunakan pengujian model SEM dan metode deskriptif. Uji model menggunakan perangkat lunak AMOS 21. Hasil penelitian menunjukkan bahwa variabel eksogen dan endogen memenuhi kriteria permodelan dengan nilai Chi square = 160,764; probability = 0,380; CMIN/DF = 1,031; GFI = 0,892; AGFI = 0,841; TLI = 0,998; CFI = 0,998; RMSEA = 0,016. Variabel sosial, ekonomi, kelembagaan dan pendapatan berpengaruh nyata dan positif ( $P \leq 0,05$ ) terhadap keberlanjutan usaha. Model yang terbentuk memiliki hubungan yang kuat dan positif, sehingga mampu menggambarkan model keberlanjutan usaha ayam petelur rakyat di Kabupaten Kendal.

*Kata kunci: model keberlanjutan usaha, peternakan rakyat, ayam petelur, pendapatan*

### ABSTRACT

This study was aimed to analyze factors and models of business sustainability of smallholder layer farms in Kendal Regency, Indonesia. Purposive sampling method was used to select 120 active layer chicken farmers in Sukorejo, Pageruyung, Patean, Limbangan, and Boja Districts as research respondents with the ownership of 300 to 10,000 birds. Research variables consisted of three external variables (social, economic, and institutional) and two internal variables (income and business sustainability). Closed questionnaires were used to collect data. The data were analyzed descriptively using Structural Equation Modeling (SEM) by AMOS 21 software. The results showed that the exogenous and endogenous variables met the modeling criteria with Chi square value = 160.764; probability = 0.380; CMIN / DF = 1.031; GFI = 0.892; AGFI = 0.841; TLI = 0.998; CFI = 0.998; RMSEA = 0.016. Social, economic, institutional and income variables had a significant and positive influence ( $P \leq 0.05$ ) on business sustainability. The constructed model had a strong and positive relationship, so it could illustrate the sustainability model of layer business in Kendal Regency.

*Keywords: business sustainability model, smallholder, layer, income*

## INTRODUCTION

The poultry industry in Indonesia is growing rapidly along with the increasing population. Indonesia as a developing country with a population of 264 million people (the 4<sup>th</sup> biggest in the world) has a huge demand for animal products from poultry, including eggs. Statistical data from the Directorate General of Animal Farm and Health Republic of Indonesia (2018) showed that there was an increase in chicken egg consumption from 97,398 eggs per capita in 2016 to 99,796 eggs per capita in 2017. The increase in egg production was linear to the increase in consumption per capita, making business opportunities and the market for layer become promising. The existing poultry layer business is able to support one of the animal protein needs. The sustainability of layer business is specifically dependent on social, economic, and income factors. Kendal Regency is one of the highest poultry industries in Central Java with a population of 3,799,915 birds. The egg production contribution of this regency to Indonesia reached 2.7%, which is the highest among other regions in Central Java (Statistics Indonesia, 2016). The number of the population in Kendal Regency is contributed by the large number of smallholder layer farmers, and many factors that may affect the sustainability of this kind of farmers.

The sustainability of layer business is affected by social and economic factors of farmers, such as low education level, that do not dare to take risks due to no guarantee from the government on production's input factors such as capital, availability of feed ingredients, grain and drugs, while economic factors are related to production's output such as egg prices and marketing. Farmers cannot successfully develop their business if there is not enough knowledge for their business management skills, because the most important role of management in realizing business goals and business sustainability is very important (Al-Rimawi *et al.*, 2007; Baliyan and Micah, 2017). The business of layer with all of their limitations might be continued if all of the components were interconnected.

The general problem of layer in Indonesia, for example in Kendal Regency, is the instability of selling prices and therefore, there are a lot of problems. Layer farmers stop their businesses. The role of both government and private institution are needed due to both parties have an impact on the sustainability of the layer business.

Income may affect the sustainability of the business as well as the institutional and socio-economic of farmers, that was affected by the production and manifested as business sustainability. However, if the enterprise experiences are being a loss then the business sustainability will also be a loss, and vice versa (Adepoju, 2008; Abdurofi *et al.*, 2017). Therefore, the research related to the sustainability model of layer farmer is needed to get a prediction of the developing smallholder farming in the future. The specific factor that was added and researched at the layer farmer by using the farmer community in Kendal regency was the influence of institutions either private or government in layer business sustainability. The purposes of this study were to find out and analyze the factors to develop business sustainability models of the smallholder layer farmers in Kendal Regency, Central Java, Indonesia.

## MATERIALS AND METHODS

This study was performed at Kendal Regency because it has the highest population of layer in Central Java. This research was conducted by survey method and used questionnaires as the main data collection technique. Purposive sampling method was used to select active layer chicken farmers having 300 - 10,000 birds in 5 selected districts (Sukorejo, Pageruyung, Patean, Limbangan, and Boja). There were 120 active breeder layer farmers used as samples in this study.

The research variables used in this study consisted of three exogenous latent variables (social, economic, and institutional) and two endogenous variables (income and business continuity) as presented in Table 1. Analysis of business sustainability factors and measurement of indicators used a Likert scale model of five categories. Structural equation model (SEM) was used to determine the direct or indirect effect of various external and internal factors that influenced the sustainability of the smallholder business such as layer farmers. AMOS version 21 was used for data processing and determination of business sustainability models. Compatibility model was shown by Chi-Square as small as possible, probability ( $\geq 0.05$ ), RMSEA (root mean square error approximation,  $\leq 0.08$ ), TLI (Tucker Lewis index,  $\geq 0.90$ ), GFI and AGFI (goodness of fit index and adjusted goodness of fit index,  $\geq 0.90$ ), CMIN (minimum sample discrepancy

function/degree of freedom  $\leq 2.00$ ).

## RESULTS AND DISCUSSION

### Description of Respondents of the Smallholder Layer Farmers

Characteristic of respondents is presented in Table 2. Age affected the experience of farming and the ability of farmers to receive market information and government policies regarding on the price of eggs and feed and also the adoption of technology in animal farming. Education influenced farmer's perspective in developing their business. This was shown by young farmers usually will have the initiative and creativity in developing businesses such as marketing goals that target modern markets, online marketing and improving product quality. The average experience of layer farmer respondents in Kendal Regency was 14 years. The more experience a

farmer has, the better they would be in running their business which may form better person's entrepreneurial spirit. The older and more educated the farmer the higher the adoption of biosecurity activities. Older farmers may have more control over their decision making and more confidence to make improved managerial decisions. More educated farmers may be more able to understand the biosecurity concept and see the potential importance of implementing these management changes (Susilowati *et al.*, 2013).

Respondents had 5,543 birds on average with daily egg production was 277 kg, these population and egg production were related to economic factors, i.e. capital, production costs, and farmers' income. Population affects production, so more population increases the production capacity. Demircan *et al.* (2010) showed that when the production capacity of layer increases, it will lead to a decrease in production

Table 1. Research Variables

Variables		Indicators
Social (Exogenous Latent)	X <sub>1.1</sub>	Education
	X <sub>1.2</sub>	Business Experience
	X <sub>1.3</sub>	Training
	X <sub>1.4</sub>	Target
	X <sub>1.5</sub>	Social Interaction
Economic (Exogenous Latent)	X <sub>2.1</sub>	Egg Demand
	X <sub>2.2</sub>	Business Efficiency
	X <sub>2.3</sub>	Capital
	X <sub>2.4</sub>	Product Diversification
	X <sub>2.5</sub>	Outpouring of Work Time
Institutional (Exogenous Latent)	X <sub>3.1</sub>	Marketing Chain
	X <sub>3.2</sub>	Partnership Model
	X <sub>3.3</sub>	Coaching Model
	X <sub>3.4</sub>	Partnership Principle
Income (Endogenous Latent)	Y <sub>1.1</sub>	Production Cost
	Y <sub>1.2</sub>	Selling Price
	Y <sub>1.3</sub>	Business Scale
Business Sustainability (Endogenous Latent)	Y <sub>2.1</sub>	Profitability
	Y <sub>2.2</sub>	Survive
	Y <sub>2.3</sub>	Licensing
	Y <sub>2.4</sub>	Taxation

Table 2. Characteristics of Research Respondents

Respondent Characteristics	Scores
The average age of Respondents (Year)	42
Education Level (%)	
Junior High School	16
Senior High School	76
Diploma/Bachelor	8
The average farming experience (Year)	14
The average ownership (birds)	5,543
The average egg production (kg/day)	277

cost per head and an increase of net profit per head.

### The Social, Economic and Institutional Variables

Social variable had a significant effect on education, business experience, training, goals and social interaction. Rodic *et al.* (2011), Mandes *et al.* (2014), Osti *et al.* (2016) stated that the experience of farming generally correlates with the critical attitude and prudence in running business, as well as the training that influences the success of production. Khasandakar *et al.* (2018) stated that the training aims to produce educated, skilled and educated workforce. Education and objectives have an influence in determining the success of livestock business. Education influence a clear business goal whether their layer farms are only as a side business or as a main effort to increase their scale of ownership. Social variable was also closely related to the attitude of the farmer. Farmers who have a positive attitude in interacting socially with other farmers would find it easy to obtain information about the development of a highly dynamic layer business. Mose *et al.* (2018) stated that farmers attitude influenced cost production and productivity of layer and then characteristic.

Economic variable has significant effects on egg demand, business efficiency, capital, product diversification. Oladeebo and Ojo (2012); Maoba (2016) stated that level of profit in egg production enterprises depend on the scale of production. Dogan *et al.* (2018) in their study stated that the average economic efficiency of layer farming companies was only 17.9%. However, because the

population of smallholder layer farmers is low, it leads to the low economic efficiency in a smallholder layer farmer. Diversification of products from fresh eggs to processed eggs or egg flour is expected to increase a farmer's income. The efficiency of labor used could reduce production costs, although so far the number of workers employed by layer in Kendal Regency was still efficient, as shown by the number of workers that were proportional to their livestock population and even workers from their families. Ayinde *et al.* (2012) stated that the efficiency of the number of workers may have an impact on such economic efficiency and also have a positive effect on the volume of egg production.

Institutional variables have a significant effect on the marketing chain, collaboration models, coaching models, and partnership principles. The marketing chain was a problem in egg distribution to consumers, since the length of the chain could cause decreasing egg quality as well as damage in the transportation process. Banjoko *et al.* (2014) stated that good transportation in marketing could reduce egg damage which has an impact on sales volume. The collaboration model, coaching model, and the principle of cooperation in the smallholder layer farming business were still limited. One of the strategies to develop layer farms is to build partnership between farmers and private companies to accelerate the increase in the number of farmers with an aggressive growth strategy (Pelafu *et al.*, 2018).

### The Income and Sustainability

The model developed from this study is shown in Figure 1 and showed that social variable in this sustainability model affected the income of farmers as indicated by a probability value of 0.030 ( $P \leq 0.05$ ). Social variable indicators including education, farming experiences, training, goals, and social interactions had a significant effect on social variables. Gathiaka (2012) showed that social interaction may increase knowledge and directly influence the demand for input and have a major impact on the return of inputs. The effect of social interaction on a farmer may increase production. Layer farmers who have active participation in training, having the aim of raising a farm that was clearly supported by a high level of education and able to interact with fellow farmers may affect their level of income. Kshandakar *et al.* (2018) stated that social variables give a benefit to sustainability of

poultry.

Economic factors had a significant effect in determining farmer income. In this study the probability value was 0.013 ( $P \leq 0.05$ ) as presented in Table 3. Economic indicators including egg demand, capital, business efficiency, product diversification, and outpouring of labor had a significant effect on farmer income. The increasing of egg demand along with the increase in population and awareness of the adequacy of feed nutrition needed to be balanced with an increase in business capacity, so it affects the capital supply. Therefore, business efficiency in smallholder layer farms must be as efficient as possible; one of the strategies was by reducing the outpouring of labor. Ali *et al.* (2015) stated that the costs of feed and labor simultaneously have a

very significant effect on profits in layer farms.

Institutional variables had a significant effect ( $P \leq 0.05$ ) on farmer income. Institution factor were influenced by the marketing chain, partnership models, partnership principles and coaching models that affected income of the farmer. The institutional factors such as the role of government in making policy could affect the performance of modern and conventional markets. Institutional factors have profound effect on poultry production and able to control fluctuating prices and maintain a constant income, which means a move towards value added products. (Hussain *et al.*, 2015; Kehinde *et al.*, 2016).

Figure 1 and Table 4 showed income variable had a significant effect on sustainability ( $P \leq 0.05$ ), and the factors that significantly

Table 3. Analysis Result of Sustainability Confirmatory Factor

			Estimation	S.E.	C.R.	P	Label
Income	←	Social	.342	.157	2.172	.030	par_14
Income	←	Economic	.309	.125	2.475	.013	par_15
Income	←	Institutional	.334	.090	3.724	***	par_16
Sustainability	←	Income	.628	.081	7.726	***	par_17

S.E. = standard error; C.R. = critical ratio; P = probability; \*\*\* Very small (below 0.001)

Table 4. Model Test of *Goodness of fit* of Sustainability

<i>Goodness of index</i>	<i>Cut-off value</i>	Result of Model	Description
<i>Chi square</i>	Smaller	160.764	Good
<i>Probability</i>	$\geq 0.05$	0.380	Good
GFI	$\geq 0.90$	0.832	Marginal
AGFI	$\geq 0.90$	0.841	Marginal
CMIN	$\leq 2.00$	1.031	Good
TLI	$\geq 0.95$	0.998	Good
CFI	$\geq 0.95$	0.998	Good
RMSEA	$\leq 0.08$	0.016	Good

GFI = goodness of fit index; AGFI = adjusted goodness of fit index; CMIN = the minimum sample discrepancy function/ degree of freedom; TLI = Tucker Lewis index; CFI = comparative fit index; RMSEA = root mean square error of approximation

Chi Square = 160.764  
 df = 156  
 Probability = .380  
 CMIN/DF = 1.031  
 GFI = .892  
 AGFI = .841  
 TLI = .998  
 CFI = .998  
 RMSEA = .016

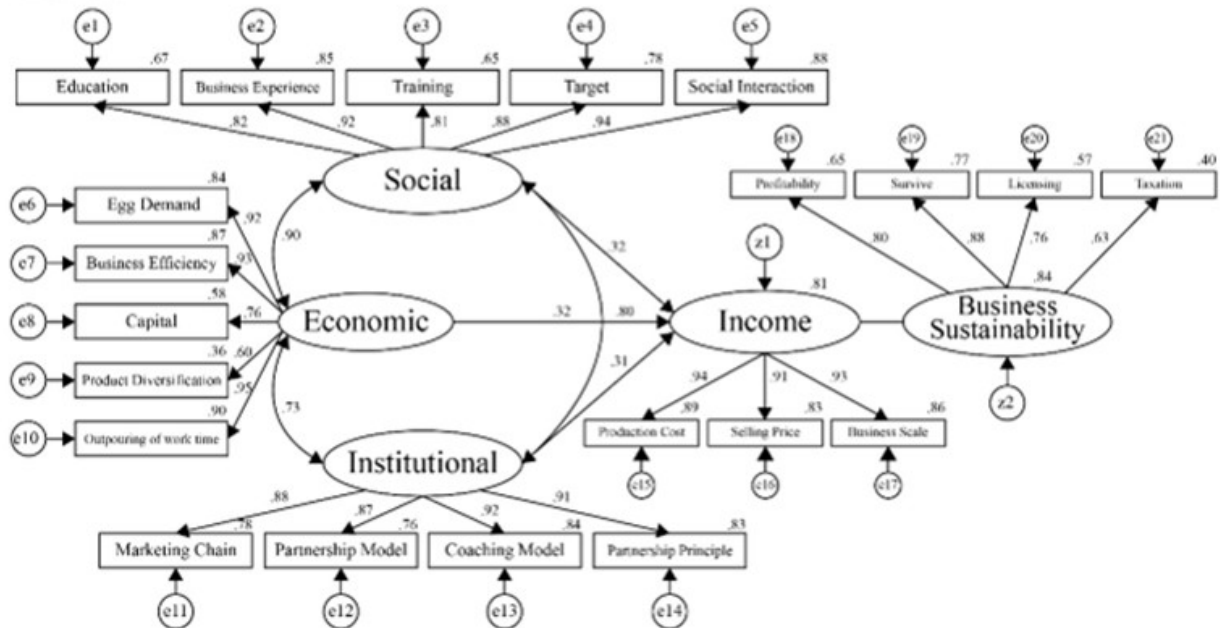


Figure 1. The Sustainability Model of Layer Farms in Kendal Regency

affected income, were social, economic and institutional. The higher incomes of layer farming business has made it more sustainable business and it indicated that layer business were profitable (Odimegwe *et al.*, 2015; Roy, 2017; Emokaro and Erhabor, 2014). This sustainability was affected by factors of profitability, licensing, taxation, and survival. Each factor had a significant effect ( $P \leq 0.05$ ) on farming business sustainability (Table 4). Profitability could be used as a measure of profit efficiency that affects the financial condition of a layer business.

### CONCLUSION

The average ownership of layer farmer in Kendal Regency was 5,543 birds with an average egg production of 277 kg daily. Social, economic, and institutional variables had positive influences and significantly affected the income. The model developed had a very strong relationship because the business sustainability was formed from these social, economic, institutional, and income variables.

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