The Power of Resources in Independent Livestock Farming Business in Malang District, Indonesia

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Abstract. Independent farmers principally provide all production inputs from their own capital and can liberally convey their products on the market. From the problems found in the real life, thus the purposes of this study are: 1) to assess the resources that can be accessed by independent broiler breeders, 2) to find the strength of independent broiler breeders' resources that support business development. A total of 144 independent pattern broiler breeders are still running their livestock businesses in Malang Regency. Data were analyzed using SEM (Structural Equation Model) with SmartPLS 2.0 application. The results showed that: 1) independent broiler breeders have access to financial resources, technological resources, physical resources, economic resources, environmental resources, and social resources; and 2) financial, technological, physical, economic, environmental and social resources affect farmer human resources by 82.7%, while financial, technological, physical, economic, environmental, social, and HR resources have an influence on the development of chicken farming broiler at 16.3%. Economic resources have a direct and significant negative effect on the development of independent pattern broiler farming.

Keywords: SEM, resources, broiler, SmartPLS, and business development.

1. Introduction
The poverty rate in Indonesia in 2017 which reached 10.64% or around 27.77 million poor people [1], has an impact on decreasing public interest in independent pattern broiler livestock business, recorded in Malang District only 144 farmers who is still running an independent broiler farming business. Broiler chickens, or broilers, are superior breeds of hybrids from chicken nations that have high productivity, especially in producing chicken meat. Broiler are the result of cross-breeding and sustainable systems so that the genetic quality can be said to be good.

Broiler are the most economical livestock when compared to other livestock, the advantages possessed are the speed of increase / production of meat in a relatively fast and short time or about 4-5 weeks meat production can be marketed or consumed. The advantages of broiler include very fast growth with high body weight in a relatively short time, small feed conversion, ready to be cut at a young age and produce the quality of soft fibrous meat. The rapid development of broilers is also a handling effort to balance the people's needs for chicken meat. This development is supported by the strength of downstream industries such as breeding farms that produce various types of strains.
Independent pattern is broiler livestock business with capital fully borne by farmers. Farmers provide cages, equipment, labor, and livestock production facilities (Day Old Chicken / DOC, feed, vitamins, drugs, and vaccines) and market themselves in the form of live animals or in the form of carcasses. Non-partner (independent) breeders are farmers who are able to run livestock businesses with their own capital and are free to sell their output to the market. All losses and profits are borne alone. The income of independent broiler breeders and partnership patterns is strongly influenced by the combination of the use of production factors, namely chicken seed (DOC); feed; medicines, vitamins and vaccines; labor; electricity, fuel costs; and investment in pens and equipment.

Independent broiler livestock business, in principle, provide all production inputs from their own capital and are free to market their products. Decision making includes when to start raising and harvesting livestock, as well as all the benefits and risks borne entirely by the farmer. The characteristics of independent farmers are able to make their own decisions about: a) livestock business planning, b) determine housing facilities, c) determine the type and means of livestock production (sapronak) that will be used, d) determine the start of maintenance, e) determine management production, f) determine the place and price of sale of production, g) not bound in a business partnership.

Independent broiler livestock business has an impact on the low access of farmers to various resources. Farmers must be able to reach various resources independently for sustainable and profitable livestock business, such as optimizing fattening time [Setiawan et al., 2013] and conducting own nurseries as a first step[2] to reduce production costs, because the input of production factors influences the income of farmers [3]. Sumekar et al. [4] illustrates that livestock population, feed management, and breeders' technology are not optimal enough. Therefore, the role of technical factors such as social, economic, institutional, and business environment should be considered to bolster business productivity and farmer income.

Mukson et al. [5] explains that the availability of resources provides benefits for independent broiler breeders, elucidating on preproduction, marketing, to supporting services [6]. Thereby, the livestock business is expected to be feasible in terms of technical, organizational, and financial factors [7]. From the aforementioned literature reviews, the possible construction of objectives of the study is: 1) to assess the resources that can be accessed by independent broiler breeders, and 2) find the strength of independent broiler breeders' resources that support business development.

2. Methodology

The research used an ex post facto research approach. The research was conducted in January to June 2018 in Malang District, Indonesia. Respondents are independent broiler farmers, which are 144 breeders. The data collection using observation and survey methods. The survey method was carried out by means of interviews and questionnaires. The questionnaire uses a Likert scale of +1 to +5. Data were analyzed using the PLS (Partial Least Square) method.

This research consisted of 8 variables and 59 indicators. The variable and indicator is the access of broiler farmers to various resources. Several variables involved in this study are depicted on Table 1.

| No. | Variables          | Indicators |
|-----|--------------------|------------|
| 1   | Financial (X1)     |            |
|     | Main income        | X1.1       |
|     | Income from broiler livestock business | X1.2 |
|     | Side income from non-farm businesses | X1.3 |
|     | Income from other livestock businesses | X1.4 |
|     | Income for family needs | X1.5 |
|     | Amount of savings | X1.6 |
|     | Amount of debt    | X1.7       |
|     | Amount of debt repayment | X1.8 |
|     | The number of broiler populations | X1.9 |
| 2   | Technological Resources (X2) |            |
|     | DOC selection technology | X2.1 |
|     | Feeding technology  | X2.2       |
Livestock health X2.3
Caging management X2.4
Marketing management X2.5
Body weight target X2.6
FCR knowledge X2.7

3 Physical Resources (X3)
Home ownership X3.1
Cage ownership X3.2
Ownership of vehicles X3.3
Ownership of communication tools X3.4
Ownership of information facilities X3.5
Electricity usage X3.6
Land ownership X3.7
The use of Land X3.8
Access to water source X3.9
Access to feed sources X3.10

4 Economical Resources (X4)
Formal education of farmers X4.1
Non-formal education of farmers X4.2
Involvement of siblings on work X4.3
Family health status X4.4
Family nutritional status X4.5
Residential comfort X4.6
Transfer of technology to the surrounding community X4.7
Vacation opportunity X4.8
Credibility of farmers X4.9

5 Environmental Resources (X5)
Air pollution level X5.1
Level of soil pollution X5.2
Water pollution level X5.3
Sound pollution level X5.4
Utilization of livestock waste for fertilizer X5.5
Utilization of agricultural waste for feed X5.6

6 Social Resources (X6)
The role of farmers in community X6.1
Relationship with other farmers X6.2
Relationship with village based civil servants X6.3
Relationship with health workers X6.4
Relationship with the livestock office X6.5
Relationship with feeding companies X6.6
Relationship with the DOC supplier company X6.7
Relationship with extension workers X6.8
Relationship with financial institutions X6.9
Relationship with marketing agencies X6.10

7 Farming/Breeder Human Resources (Z1)
Intellectual quality of farmers Z1.1
Level of health of farmers Z1.2
Spiritual quality of farmers Z1.3
Language abilities Z1.4

8 Business Development (Y1)
Growth of revenue Y1.1
Increasing number of broiler populations Y1.2
Growth in the number of workers Y1.3
Additional number of cages Y1.4
Partial Least Square (PLS) methods with SmartPLS is used because it is useful to strengthen weak theories and/or find a new theory [8]. The specification of the relationship between latent variables and indicators in Partial Least Square (PLS) theory is called the measurement model or outer relation. Mathematically, determining the value of outer loading on the reflective indicator is as follows:

\[ \chi = \Lambda \xi + \varepsilon \]
\[ y = \Lambda \eta + \epsilon \]

x and y are indicators for exogenous latent variables (ξ) and endogenous (η), while Λx and Λy are loading matrices that illustrate simple regression coefficients that connect latent variables to their indicators. Residuals are measured by ϵx and ϵy which can be interpreted as measurement errors.

PLS is designed for recursive models. Moreover, the relationship between latent variables applies that each dependent latent variable η can be specified as follows:

\[ \eta_j = \sum_i \beta_{ji} \eta_i + \eta \sum_i \gamma_{ji} \xi + \zeta_i \]

\( g_{jk} \) (in the form of a rotated matrix r) is a path coefficient that connects an endogenous latent variable (η) with an exogenous latent variable (ξ), whereas \( \beta_{ji} \) is a path coefficient that bridges an endogenous latent variable (η) with another endogenous latent variable (ξ), while the parameter \( \zeta \) is the inner residual variable.

Weight Relations (WR) is the estimation of the case values of the latent variables, inner models, and outer models that provide specifications, so as to provide estimates of weight relation in the following logarithmic equation:

\[ \xi_b = \sum_k W_{kb} \xi_k \]
\[ \eta_j = \sum_k W_{ki} \eta_k \]

\( W_{kb} \) and \( W_{ki} \) are k weight which are used to form estimation of latent variables η and ξ. The estimation of the latent variable is linear aggregation of indicators whose weight values are acquired from the PLS estimation procedure.

3. Result and Discussion

Indicator Test

Farmers’ access to various kinds of resources that support the development of independent broiler breeding businesses is examined using SmartPLS 2.0 and the results are illustrated in Table 2.

| Notation | X1   | X2   | X3   | X4   | X5   | X6   | Z4   | Y1   | Result |
|----------|------|------|------|------|------|------|------|------|--------|
| X1.2     | 0.728|      |      |      |      |      |      |      | valid  |
| X1.3     | 0.905|      |      |      |      |      |      |      | valid  |
| X1.5     | 0.798|      |      |      |      |      |      |      | valid  |
| X2.2     | 0.715|      |      |      |      |      |      |      | valid  |
| X2.4     | 0.771|      |      |      |      |      |      |      | valid  |
| X2.5     | 0.882|      |      |      |      |      |      |      | valid  |
| X2.6     | 0.878|      |      |      |      |      |      |      | valid  |
| X3.3     |      | 0.742|      |      |      |      |      |      | valid  |
| X3.5     |      | 0.594|      |      |      |      |      |      | valid  |
| X3.6     |      | 0.647|      |      |      |      |      |      | valid  |
| X3.7     |      | 0.913|      |      |      |      |      |      | valid  |
| X4.5     |      |      | 0.876|      |      |      |      |      | valid  |
| X4.8     |      |      | 0.881|      |      |      |      |      | valid  |
| X5.1     |      |      |      | 0.944|      |      |      |      | valid  |
| X5.4     |      |      |      | 0.860|      |      |      |      | valid  |
| X6.1     |      |      |      |      | 0.854|      |      |      | valid  |
| X6.2     |      |      |      |      | 0.858|      |      |      | valid  |
| X6.3     |      |      |      |      | 0.761|      |      |      | valid  |
| X6.4     |      |      |      |      | 0.973|      |      |      | valid  |
| X6.6     |      |      |      |      | 0.961|      |      |      | valid  |
Structural Test

Structural Equation Model (SEM) using the SmartPLS 2.0 application produces a structural test consisting of the value of Average Variance Extracted (AVE), Composite Reliability (CR), Cronbach's Alpha (CA), and R Square ($R^2$).

### Table 3. Results of Structural Test

| Variables | AVE | CR  | CA  | $R^2$  |
|-----------|-----|-----|-----|--------|
| Y1        | 0.709 | 0.904 | 0.849 | 0.163 |
| Z1        | 0.744 | 0.897 | 0.827 | 0.827 |
| X1        | 0.663 | 0.854 | 0.742 |
| X2        | 0.586 | 0.848 | 0.777 |
| X3        | 0.539 | 0.820 | 0.725 |
| X4        | 0.773 | 0.872 | 0.707 |
| X5        | 0.816 | 0.898 | 0.784 |
| X6        | 0.780 | 0.965 | 0.958 |

Source: Processed Data (2018)

The outcomes of structural test on the coefficient of determination ($R^2$), the t-statistic value, and the parameter coefficient value are shown in **Table 4**.

### Table 4. Results of Model Examination

| Determination Coefficient | Test Results | t-statistic | Test Results | PathCoefficients | Test Results |
|---------------------------|--------------|-------------|--------------|------------------|--------------|
| Human Resources           | 0.827        | X₁ → Y₁    | 0.325        | X₁ → Y₁          | -0.215       |
| Business Development      | 0.163        | X₂ → Y₁    | 0.041        | X₂ → Y₁          | -0.121       |
|                           |              | X₃ → Y₁    | 0.110        | X₃ → Y₁          | 0.264        |
|                           |              | X₄ → Y₁    | 1.428        | X₄ → Y₁          | -0.215       |
|                           |              | X₅ → Y₁    | 0.136        | X₅ → Y₁          | 0.161        |
|                           |              | X₆ → Y₁    | 0.415        | X₆ → Y₁          | 0.651        |
|                           |              | Z₁ → Y₁    | 1.837        | Z₁ → Y₁          | 0.608        |
|                           |              | X₁ → Z₁    | 6.461        | X₁ → Z₁          | -0.459       |
|                           |              | X₂ → Z₁    | 6.137        | X₂ → Z₁          | 0.345        |
|                           |              | X₃ → Z₁    | 6.389        | X₃ → Z₁          | -0.262       |
|                           |              | X₄ → Z₁    | 8.321        | X₄ → Z₁          | 0.776        |
|                           |              | X₅ → Z₁    | 6.340        | X₅ → Z₁          | 0.120        |
|                           |              | X₆ → Z₁    | 6.245        | X₆ → Z₁          | 0.186        |

Note: t-table = 1.681

Source: Processed Data (2018)

The results of the coefficient of determination indicate that business development is influenced by farmers' access to financial, technological, physical, economic, environmental, social, and farmer...
human resources by 16.3%, while the remaining 83.7% is influenced by other factors that are not studied in this research. The results of t statistics show that financial, technological, physical, economic, environmental and social resources that can be accessed by independent broiler breeders do not affect the development of livestock businesses. This is based on the results of interviews with breeders indicating that if more capital investment are injected by farmers, the risk faced by farmers becomes higher which has an impact on the development of independent broiler livestock business. The outcomes of t statistics show that independent broiler breeders have a significant effect on business development. The t-value of statistics is greater than the value of the t table with a significance level of 5%, $1.837 > 1.681$. The parameter coefficient value shows that the influence of breeder on business development is 0.608. Therefore, there is a positive influence from farmer on business development. The higher involvement of farmer resources, the business development opportunities are getting higher. Roessali et al. [9] says that education level and business risk have a significant negative influence on the farmers' decision to increase the business scale.

![Figure 1](image1.png)

**Figure 1.** Results from SmartPLS 2.0

![Figure 2](image2.png)

**Figure 2.** Results of Bootstraping SmartPLS 2.0
The results of the coefficient of determination indicate that breeders' resources are influenced by farmers' access to financial, technological, physical, economic, environmental, and social resources by 82.7%, while the remaining 17.3% is influenced by other factors not found in the study. This shows that farmers' access to resources can strengthen or weaken the influence of technology on human resource performance [10].

The results of t statistics show that financial resources have a significant effect on farmers. The value of t statistic is greater than the value of t table with a significance of 5%, 6.461 > 1.681. The parameter coefficient value shows that the influence of financial resources on farming human resources is -0.459. Thereby, there is a negative effect of financial resources on farming human resources. If the access of farmers to financial resources is getting higher, therefore the human resources become lower. Facilities and infrastructure can guarantee the efficiency of livestock business [11]. This shows the involvement of breeders in research locations to manage facilities and infrastructure so that it has an impact on livestock business efficiency.

The results of t statistics show that technological resources affect farming human resources. The t-value of statistic is greater than the value of the t table with a significance of 5%, 6.137 > 1.681. The parameter coefficient value shows that the influence of technology resources on farmer HR is 0.345. This means that there is a positive influence from technological resources on breeders' human resources. It shows that more access to technological resources has the higher impact to the human resources. This is due to the lack of knowledge of breeders on broiler health management and the low technique of selecting DOC seed stock of broiler farming purchased from the company, thus creating the need for increasing the number of DOC for livestock business productivity.

The results of t statistics show that physical resources affect farmer HR. The value of t statistic is greater than the value of t table with a significance of 5%, 6.369 > 1.681. The parameter coefficient value indicates that the influence of physical resources on farming resources is -0.262. Therefore, there is a negative effect of physical resources on the human resources. It shows that more access to physical resources will decrease human resources. The availability of physical resources for farmers at the research location provides motivation to continue trying to develop their livestock business. This factor is also influenced by the existence of support from family members [9].

The results of t statistics show that economic resources affect human resources. The t-value of statistics is greater than the value of t table with a significance of 5%, 8.321 > 1.681. The parameter coefficient value indicates that the effect of economic resources on farming human resources is 0.776. There is a positive influence of economic resources on farming human resources. Thus, it indicates that higher access to economic resources will result to higher human resources. This is supported by economic resources that have a significant positive influence on livestock breeders and the development of broiler livestock business partnership schemes in Indonesia. The increase of the business scale is caused by several factors such as the welfare, education, the motivation of the farmer [9].

The results of t statistics show that environmental resources affect farming human resources. The t-value of statistics is higher than the value of the t table with a significance of 5%, 6.340 > 1.681. The parameter coefficient value indicates that the influence of environmental resources on human resources is 0.120. The value shows that there is a positive influence of environmental resources on breeders' human resources. It indicates that higher access to environmental resources is impacting to the human resources. Skunca et al. [12] says that the livestock sector is known as one of the most influential sectors in environmental pollution, and than [5] says that the productivity was influenced significantly by environmental factor, so Gupta et al. [13] says that a high integration of crops and livestock is often considered as a step forward, but small farmers need to have sufficient access to knowledge, assets and inputs to manage this system in a way that is economically and environmentally sustainable over the long term.

The t value of statistics shows that social resources have an effect on human resources. The t-value of statistics is greater than the value of the t table with a significance of 5%, 6.245 > 1.681. The parameter coefficient value indicates that the influence of social resources on farming human resources is 0.186. Thus, there is a positive influence of social resources on breeders' human resources. From this phenomenon, it illustrates that more access to social resources is directly impacting to the higher human resources. Breeders who are not qualified but have a lot of access to social resources, are able to guarantee the development of broiler farming systems in the partnership
model in Indonesia. Priyono and Priyanto [14] state that the development of livestock business is hampered if there is no support of social resources in the form of farmer relationships with financial institutions. This occurs due to farmers experiencing difficulties in accessing financial resources. The alternative that is used besides that is the farmer must establish a partnership with another party. Fauzi et al. [15] mentioned that human capital or human resources influence financial performance and competitive strategies.

4. Conclusion

a) Independent broiler breeders have access to financial resources, technological resources, physical resources, economic resources, environmental resources, and social resources.

b) Financial, technological, physical, economic, environmental, and social resources have an effect on farmer human resources by 82.7%, while financial, technological, physical, economic, environmental, social, and HR resources have an influence on the development of broiler livestock business amounting to 16.3%.

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