

## Research Article

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# Power relations among actors in laying hen business in Indonesia: A MACTOR analysis

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**Abstract:** According to their respective positions, participants at the local, regional, and global actors within the poultry farming sector play strategic roles according to their respective positions. While these roles may integrate and overlap, they can also generate conflicts of interest at both the actor and institutional levels. This study analyses the actors and power relations in laying hen farming in Blitar Regency, East Java, Indonesia. The data were collected using structured interview techniques (interview guides and Matrix of Alliances and Conflicts: Tactics, Objectives and Recommendations questionnaires), observation, documentation, and focus group discussions. The research informants were chosen deliberately based on various sources including farmers, farmer groups, cooperative, central and local government, companies, and traders. This was in addition to informants obtained using the snowball sampling technique such as middlemen, poultry shops (PSs) and other additional breeders. Data validity was determined using source triangulation and method triangulation. The results revealed that the individuals and entities engaged in layer hen farming encompass a diverse range of actors. These include farmers of various scales (small, medium, and large), institutions such as farmer groups and cooperatives, governmental bodies at both central and regional levels, industry representatives such as companies, PSs, distributors involved in producing and marketing day-old chick (DOC), feed, medicines, and vaccines, as well as market participants including local traders and traders operating

across different regions. Small-scale and medium-scale farmers have the strongest relationships due to their high dependence on inputs such as DOC, feed, vaccines, and access to markets. The presence of various actors and power relations in laying hen business institutions creates both collaboration and competition in the supply of DOCs, animal feed, medicine, and even in the marketing of eggs from a food security and sustainability perspective.

**Keywords:** power relations, discourse analysis, egg production, food security, laying hen

## 1 Introduction

The poultry population in Indonesia, which comprises purebred chickens, layers, native chickens, ducks, and quails, is the largest asset within the entire livestock agribusiness. According to data from the Directorate General of Livestock and Animal Health, the production of laying hens in Indonesia was 1,632,492 (tonnes) in 2019, increasing to 1,674,356 tonnes in 2021 [1]. Unfortunately, the many actors and institutions operating within the sector render business complex and generate contestation between different parties. Large companies are increasingly dominant in providing day-old chicks (DOCs), livestock production facilities such as animal feed [2], medicines and vaccines, and marketing. Meanwhile, the Blitar Regency Livestock and Fisheries Service stated that an institution plays a strategic role in meeting needs by involving patterns of activities based on social aspects to meet the needs of members alongside the organizational patterns to perform them [3]. While they have local wisdom, farmers, within their farming businesses, are also attempting to adapt to climate change [1]. Agricultural extension practitioners routinely assist in the context of modifying adaptive behaviour [4–6]. However, farmers often have different perceptions [7] because they use their experiential perspectives [8]. Thus, while such partnerships are intended to be mutually beneficial for the farming business actors, unfortunately, farmers make their own choices about their farming business [9].

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These include group choices since farmers' groups often play a role in farmer decision-making [10].

Understanding the complex network of power relations among industry players is essential for sustainable development, equitable resource distribution, and effective policy design, considering the implications of the growing population and increasing demand for poultry products. The Matrix of Alliances and Conflicts: Tactics, Objectives and Recommendations (MACTOR) analysis framework offers a holistic approach to examining power relations by considering the interplay between multiple actors, contextual factors, and temporal dynamics. By systematically mapping out the power relations within the laying hen business, this study aims to uncover underlying patterns, asymmetries, and mechanisms that influence decision-making, resource allocation and, ultimately, the sustainability of the industry. This study, therefore, aims to identify the actors and institutions within the laying hen business as well as their various functions through a thorough assessment of the literature, qualitative interviews, and quantitative data analysis. The focus on power relations within the laying hen industry is a topic of global interest, as similar power structures and dynamics exist in various countries around the world. This study contributes to the academic literature on power relations within agricultural industries, which is a topic relevant not only to Indonesia but also to other countries with similar agricultural sectors. Scholars and researchers from various countries can build upon this research to further explore and understand power relations in different agricultural contexts.

This study is different from the existing study because it focuses on the power relations among actors in the laying hen business within a different regional context and employs a new methodological approach. While previous research outlined actors and interactions [11], it did not explore the impact of interaction strength on drug and vaccine acquisition, egg marketing, DOC procurement, and feed sourcing. In contrast, this study categorizes actors based on their interaction capabilities in each domain, presenting a novel approach to mapping interactions within the layer poultry farming sector. Moreover, the study's focus on Blitar Regency offers unique insights into the multifaceted interactions among diverse actors, encompassing small-scale farms to medium and large-scale enterprises. By leveraging MACTOR analysis, this study rigorously evaluates interaction strengths, providing nuanced insights into power dynamics.

In this article, first, we will establish the foundational understanding of the laying hen industry in Indonesia, highlighting its significance and key stakeholders. Following this, we will introduce the theoretical framework of MACTOR and its relevance to analysing power relations among various actors in this context. Subsequently, we will conduct a

comprehensive analysis of the power relations, exploring the influence exerted by different actors such as government agencies, large corporations, small-scale farmers, and consumer groups. Finally, we will conclude with insights drawn from our analysis and discuss potential implications. Through this structured approach, we aim to offer a nuanced understanding of the power relations shaping the laying hen business in Indonesia.

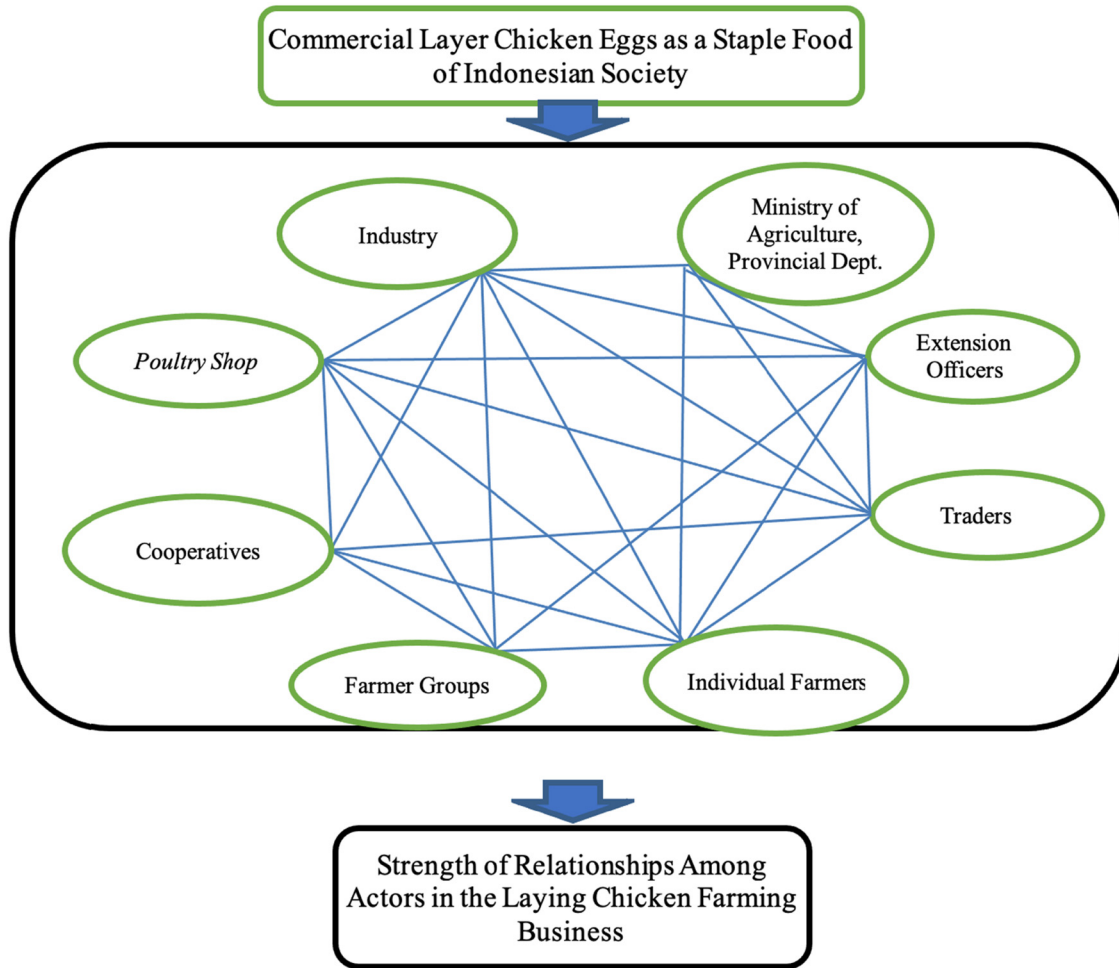
## 2 Materials and methods

### 2.1 Problem and research objectives

The demand for animal products, including eggs, has spurred the growth of the layer chicken farming industry. The district is one of the centers of layer chicken farming that has existed since the 1970s and has become a region supporting the demand for chicken eggs in Indonesia. This livestock enterprise has been established through generations and takes the form of small- and medium-scale farms. With time, the emergence of large-scale industries and farms has led to the monopoly of inputs such as DOC, feed, medicine, and vaccines, which play a significant role in the layer chicken industry. Indonesia's characteristic of a people-oriented economy strives to facilitate the sustainable development of small-, medium-, and large-scale farms collectively. This condition has given rise to dynamic and diverse actors within the layer chicken business chain. The presence of companies producing DOC, feed, medicine, and vaccines alongside small-, medium-, and large-scale farmers will create interdependent relationships.

Similarly, the role of the government through the Ministry of Agriculture and the Department of Livestock in protecting farmers is crucial. Eventually, cooperatives and farmer groups become collective means for farmers when dealing with the livestock industry, which is increasingly shifting towards a monopolistic realm. The complexity of relationships among actors in this farming business is intriguing to map out the patterns and strengths of relations among them, as depicted in the research framework presented in Figure 1.

Each actor in the poultry industry endeavors to satisfy their interests based on power or authority. Three types of actors are found in any public enterprise, including poultry: state, private, and civil society. The state actors within the laying hen business comprise the Livestock/Agriculture Office, the Trade Office, the Cooperative Service, banking, and the regional government. Private actors consist of feed and drug producers, inter-regional/island traders, pet shop



**Figure 1:** Actor relations in laying hen business in Blitar Regency.

entrepreneurs, and collectors/traders. Meanwhile, civil society actors comprise small-scale farmers and farmers' groups.

The laying hen farming business contains many actors or stakeholders. Most extant studies on layer poultry farming have focused on business feasibility analysis [12–14], income analysis [15], and product marketing [16–18]. However, studies have yet to examine the power and interests of these actors and their relations in the context of the laying hen business. The study on actor relations in the livestock business only analysed the interrelated actors in determining the potential business benefits of a small-scale pig farming system in West Papua [19]. Based on the issues mentioned above, this study aims to identify and analyse the actors and the relations between them in the laying hen farming business.

## 2.2 Research methods

This study employed a qualitative descriptive approach. The research location, namely Blitar Regency, was chosen

deliberately, for the following reasons: (1) Blitar is a centre for laying hen farming in East Java. (2) The livestock problems in Blitar differ in complexity compared to those affecting livestock centres in other regions, including the large number of actors in the livestock business from upstream to downstream, where each actor has unique interests. (3) The dynamics of laying hen farming in Blitar serve as a national barometer as it is the source of many of the eggs supplied to Jakarta, West Java, and other big cities. The data in this research were collected using structured interview techniques (interview guides and MACTOR questionnaires), observation, documentation, and focus group discussions (FGDs). The research informants were selected deliberately based on various sources including the central government (Ministry of Agriculture), regional government (Livestock and Fisheries Service, Trade Service), large, medium and small breeders, livestock group administrators, and cooperative administrators. This was in addition to informants obtained using snowball sampling such as middlemen, poultry shops (PSs) and other additional breeders.

Data validity was determined using source triangulation and method triangulation.

The data derived from the interviews, observations, and documentation were analysed using Miles and Huberman’s interactive analysis model, while MACTOR was used to analyse the data from the questionnaire results. MACTOR analysis maps the position and power of actors concerning various strategic objectives [20]. As a method, it is used to determine each stakeholder’s preferences and level of support for the identified goals [21] as well as to ascertain the convergence and divergence between actors toward specified goals [22]. The data for MACTOR analysis were obtained through in-depth interviews, FGDs, and structured questionnaires. Questionnaires are useful for obtaining more comprehensive answers from actors as a score is used to assess the influence of each actor involved and the objectives set. The scores for an actor’s position on goals were in favour of (+), neutral (0) or against (-) on a scale of 0 (not necessary) to 4 (very important). The score for each actor’s influence on other actors was also measured on a scale of 0 (no influence) to 4 (very high influence) [20].

**Consent:** Verbal consent was obtained from all participants before interviews to ensure ethical research practices.

### 3 Results

Figure 2 shows that laying hens are the dominant chicken commodity raised by farmers in Blitar Regency, as opposed to native and broiler chickens. Data on chicken farms in Blitar Regency in 2021 sourced from the Livestock and Fisheries Service of Blitar Regency, East Java Province, showed that the laying hen population in 2021 reached 20 million

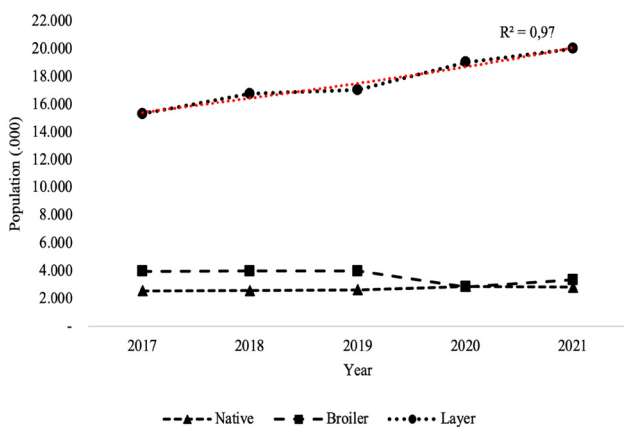


Figure 2: Comparison of the chicken population.

birds. This population size exceeded that of both native (2.8 million) and broiler chickens (3.3 million).

Figure 2 also indicates how the laying hen population in Blitar Regency increased from 15 million in 2017 to 20 million in 2021. This study therefore highlights an increasing trend in the chicken population, with an average increase of 6.95% per year ( $R^2 = 96%$ ). The results of the interviews indicated that several factors contributed to the increase in population size, including the demand for eggs, which tended to increase, the increased knowledge and technical skills of farmers, and higher profitability compared to other agriculture or plantation businesses. The increased preference for poultry products can be attributed to their ecological, economic, social, and health advantages over other types of food [23].

Figure 3 shows that egg production increased from 155 thousand tonnes in 2017 to 165 thousand tonnes in 2021. This study also reveals an overall trend of increasing egg production, with an average increase of 1.56% per year ( $R^2 = 97%$ ). The highest egg production was achieved in 2020, reaching 166 thousand tonnes. However, a decrease in egg production was recorded in 2021 compared to 2020 due to the COVID-19 pandemic, which created difficulties for farmers in maintaining the productivity levels of their chickens.

Figure 4 shows the average egg price monthly. There is a clear pattern of price changes every year. Egg prices fall in January–March and rise in April–August. They then fall again in September–October before rising in November–December. In December 2020, the average price for chicken eggs was Rp. 25,500 per kg, which was the highest average price over the 5 years. Based on the average egg price annually (Figure 5), there was an increasing trend during 2017–2021. Figure 6 shows that the average price of feed for layer hens is higher from May to December compared to that from January to April. Based on annual data (Figure 7),

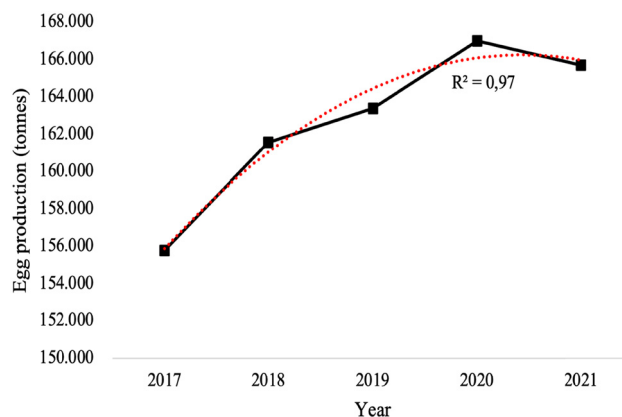


Figure 3: Laying egg production.

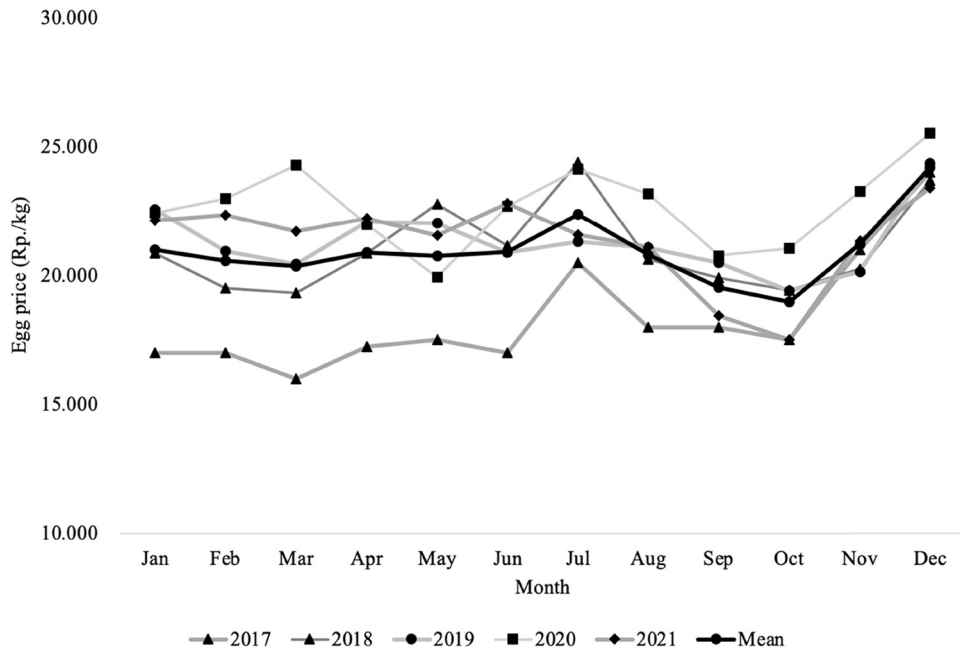


Figure 4: Average egg price monthly.

the average feed price increased during 2017–2021 from Rp. 6,850/kg in 2017 to Rp. 7,650/kg in 2021.

The increasing potential of laying hens in Blitar Regency has encouraged the growth of the laying hen business, including the actors involved. Each actor has goals and interests but can also collaborate with others. This study describes the actors involved in the organization and business of laying hens. Table 1 indicates the actors involved in the laying hen competitive landscape.

The identified actors are those who have roles and involvement in the growth of layer chicken businesses in Blitar Regency. Each actor has goals and interests, thus forming interactions or relationships among the actors.

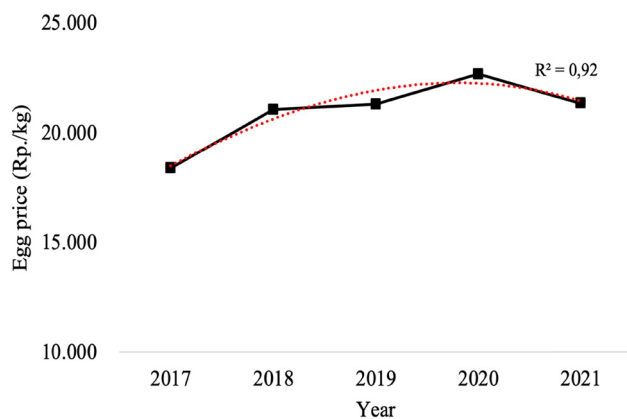


Figure 5: Average egg price yearly.

These interactions are divided into four aspects: obtaining DOC, obtaining feed supply, medicine and vaccines, and marketing aspects of the produced eggs.

Table 2 shows that several actors have a correlation value. A value of 0 indicates that the actors had no relationship, while a value of 1 shows a correlation. As such, small-scale farmers correlated with farmers' groups, cooperatives, local government, central government, PSs, and traders. Medium- and large-scale farmers had correlations with feed or medicine producers, DOC producers, local government, central government, and traders. The local and central governments correlated with all farmers, including farmers' groups and cooperatives, feed or medicine producers, and DOC producers. Suppliers, i.e.

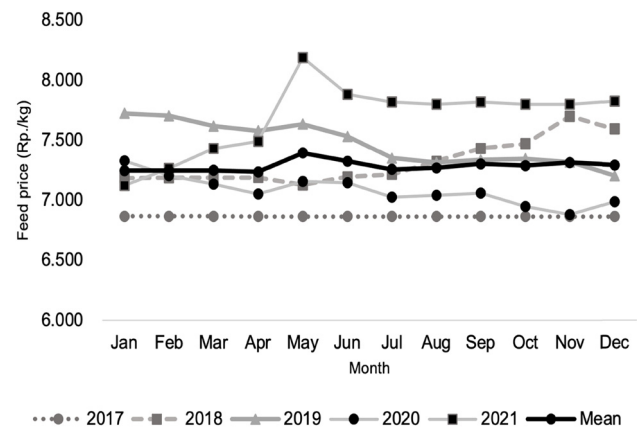


Figure 6: Average feed price monthly.

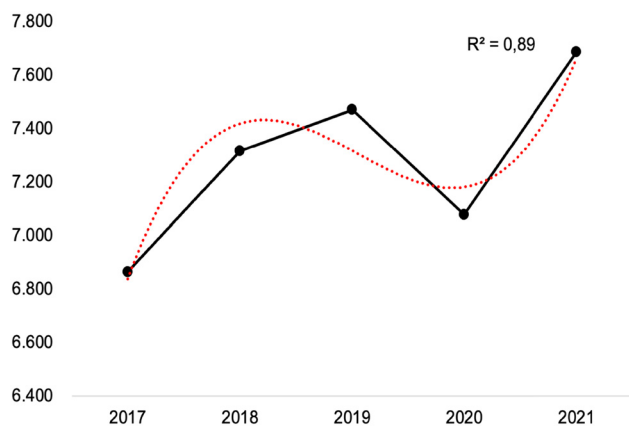


Figure 7: Average feed price yearly.

feed or medicine producers and DOC producers, correlated with medium- and large-scale farmers and cooperatives, while small-scale farmers and farmers' groups correlated with PSs. Small-scale farmers had no correlations with feed or medicine producers and DOC producers, while medium- and large-scale farmers had no correlations with farmers' groups and cooperatives. Local government, central government, feed or medicine producers, and DOC producers had no correlations with traders.

Figure 8 shows the relationships between actors regarding the DOC aspect, including small-scale farmers, medium-scale farmers, cooperatives, and farmers' groups. Figure 9 illustrates the relationships between actors in the feed/medicine aspect, including small-scale farmers, medium-scale farmers, farmers' groups, and cooperatives. Figure 10 shows the relationships between actors in the aspect of medicines and vaccines, while Figure 11 presents the relationships between actors in the marketing aspect and shows strong relationships between small- and medium-scale farmers.

Table 2: Matrix correlation of layer actors in Blitar

	SF	MF	LF	LG	CG	FM	TC	FG	CO	PS	DP
SF	0	0	1	1	0	1	1	1	1	0	0
MF	0	0	1	1	1	1	0	0	0	0	1
LF	0	0	1	1	1	1	0	0	0	0	1
LG	1	1	1	1	1	0	1	1	1	1	1
CG	1	1	1	1	1	0	1	1	1	1	1
FM	0	1	1	1	1	0	0	1	1	1	0
TC	1	1	1	0	0	0	1	1	0	0	0
FG	1	0	0	1	1	0	1	0	0	0	0
CO	1	0	0	1	1	0	0	0	0	0	1
PS	1	0	0	0	0	1	0	0	0	0	1
DP	0	1	1	1	1	0	0	0	1	1	0

SF, small-scale farmer; MF, medium-scale farmer; LF, large-scale farmer; LG, local government; CG, central government; FM, feed/medicine producer; TC, trader/collector; FG, farmer group; CO, cooperative; PS, poultry shop; DP, DOC producer.

Value: 0, when there is no correlation at all; 1, when there is correlation.

## 4 Discussion

The people of Blitar Regency have run chicken farming businesses since the early 1970s, passing them down from generation to generation. The business scale is the dominant factor in entrepreneurial success [24]. Regulation of the Minister of Agriculture Number 14 of 2020 concerning the Registration and Licensing of Livestock Businesses outlines how livestock businesses are categorized into four scales, namely micro, small, medium, and large. Laying hen businesses are thus micro (<1,000 birds), small (1,000–11,500 birds), medium (11,500–230,000 birds), or large (>230,000 birds) in scale. Given that the average hen population kept by farmers exceeds 1,000 birds, laying hen farming in Blitar Regency comprises small, medium, and large businesses. The scale of a business is influenced by the level of capital owned, the value of the credit collateral that can be guaranteed, and the network of

Table 1: Actors and their roles in laying hen farming business

No	Actor	Roles and responsibility
1	Small-scale farmers	Individuals who own and maintain livestock under 11,500 birds
2	Medium-scale farmers	Individuals who own and maintain livestock between 11,500–230,000 birds
3	Large-scale farmers	Individuals who control and raise livestock of more than 230,000 birds
4	Local government	Local government institutions working to provide regulations/policies related to egg production
5	Central government	Ministries working to provide regulations/policies related to egg production
6	Feed/medicine producers	Companies that produce and distribute feed/medicine
7	Traders/collectors	Individuals or groups who buy eggs from farmers and have sales channels to consumers
8	Farmers group	An association of farmers who own and raise livestock jointly for the same purpose
9	Cooperative	Breeder organizations help farmers meet the needs of their livestock and market eggs
10	Poultry shop	Individuals or companies that provide livestock production facilities to partner farmers (plasma)
11	DOC producers	A company that manufactures and distributes DOC

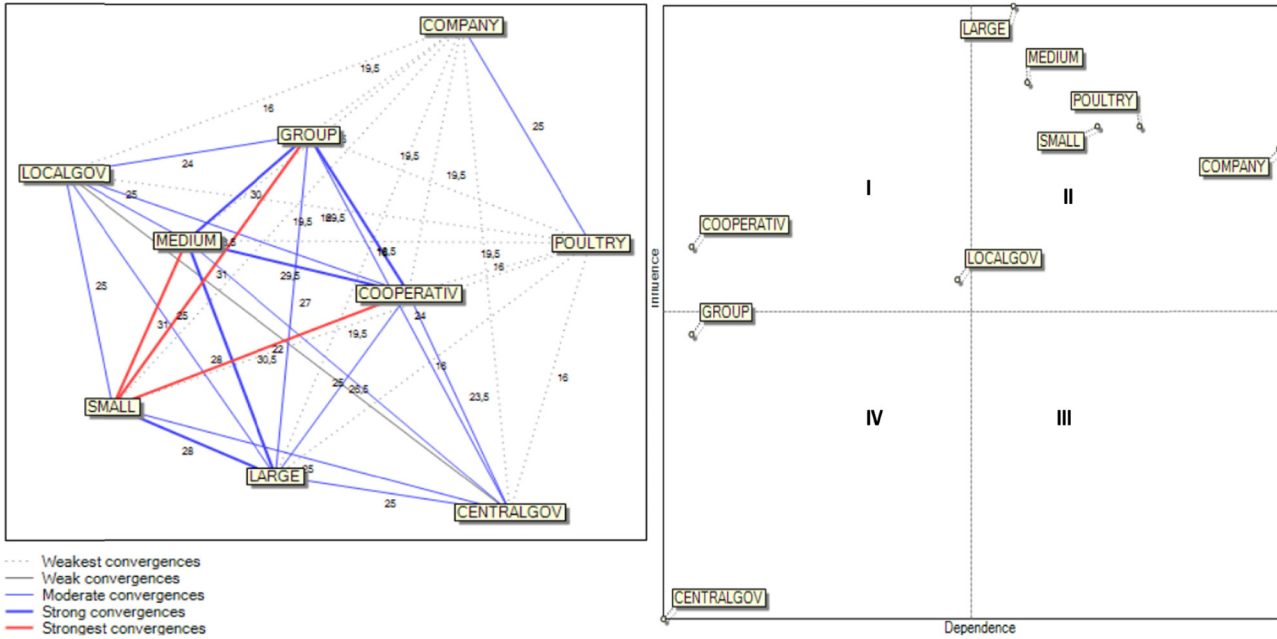


Figure 8: Actor relations in aspect DOC.

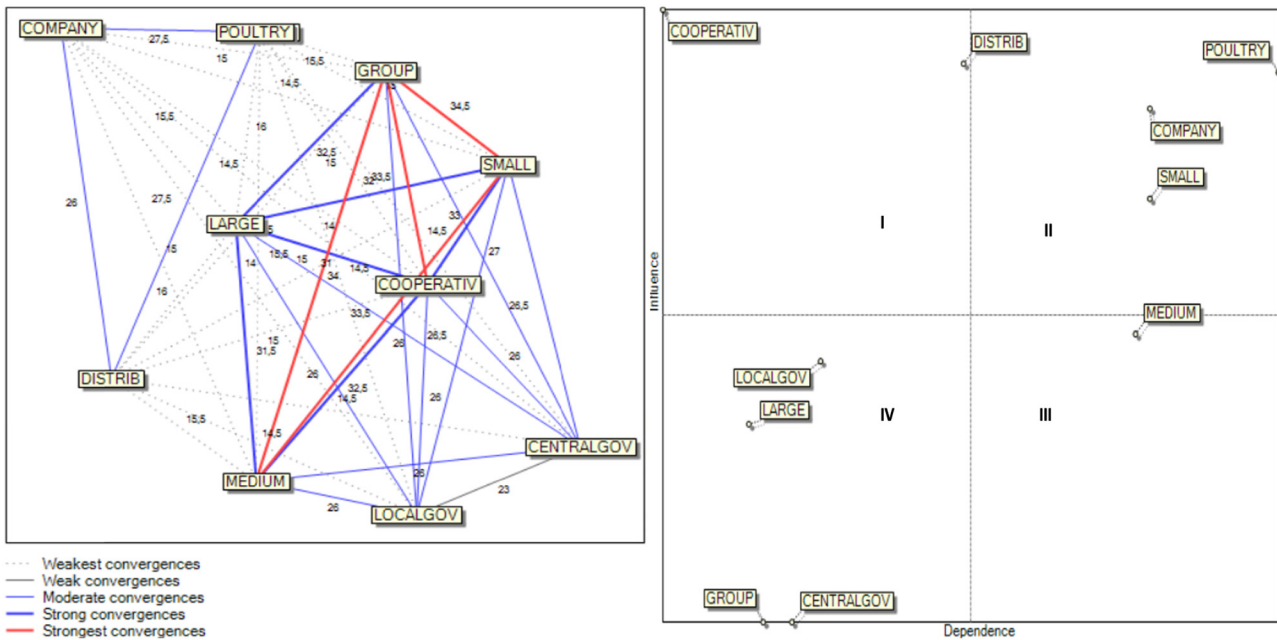


Figure 9: Actor relations in the feed/medicine aspect.

partners or markets. Micro, small, and medium farmers' business capital generally comprises their capital while they often receive additional credit from banks. Large farmers have much larger asset values, which makes it easier to access capital from banks or other financial institutions.

Central and local governments take the development of the laying hen business in Blitar seriously via coaching

and mentoring to increase egg production and ensure the availability of eggs concerning both quantity and quality. Handling is also supervised to ensure the orderly running of businesses. Based on Blitar Regency Regional Regulation Number 5 of 2018 concerning Livestock and Animal Health Business Permits, the Blitar Regency Livestock and Fisheries Service conducts supervision directly at the intended

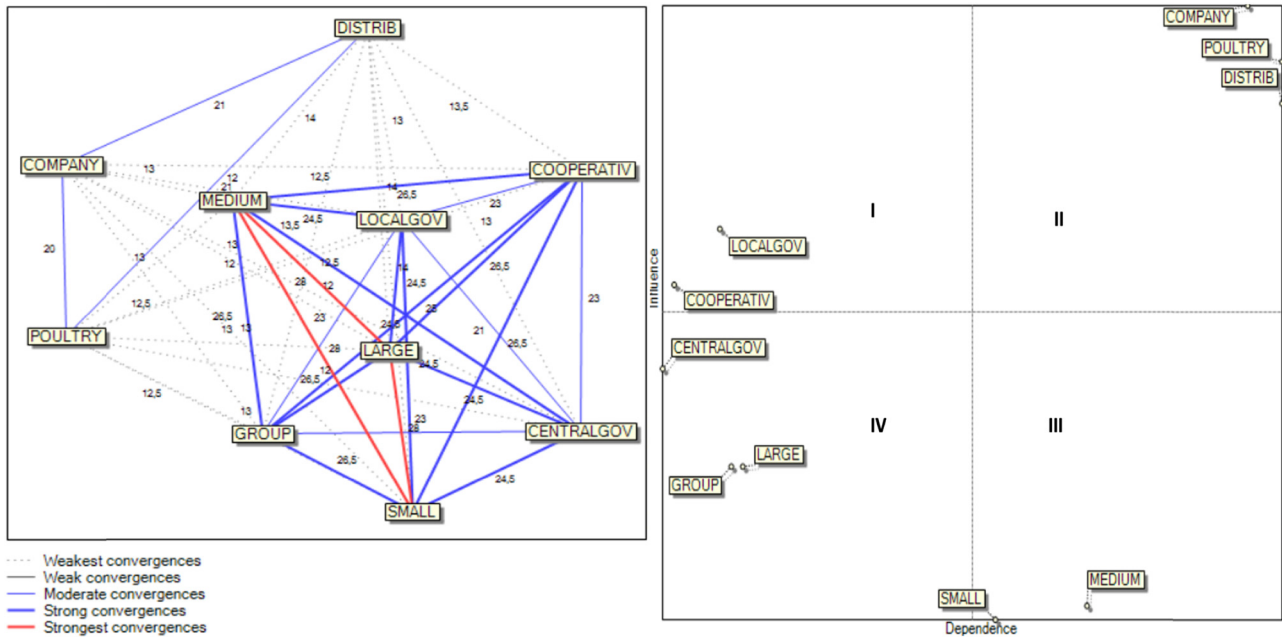


Figure 10: Actor relations in drug and vaccine aspects.

surveillance object and also indirectly via written reports. This regional regulation classifies laying hen businesses into companies and smallholder farms. The company category contains farms with over 10,000 birds, while smallholder farms range from 1,000 to 10,000 birds.

Minister of Agriculture Regulation Number 31 of 2014 concerning Guidelines for Good Broiler and Layer Chicken

Practices is a technical regulation that refers to Law Number 41 of 2014 concerning Livestock and Animal Health and Government Regulation Number 6 of 2013 concerning Farmer Empowerment. It serves as the basis for farmers and livestock companies to ensure good broiler and layer practices. The Ministerial Regulation also serves as a guideline for the government, at both the provincial

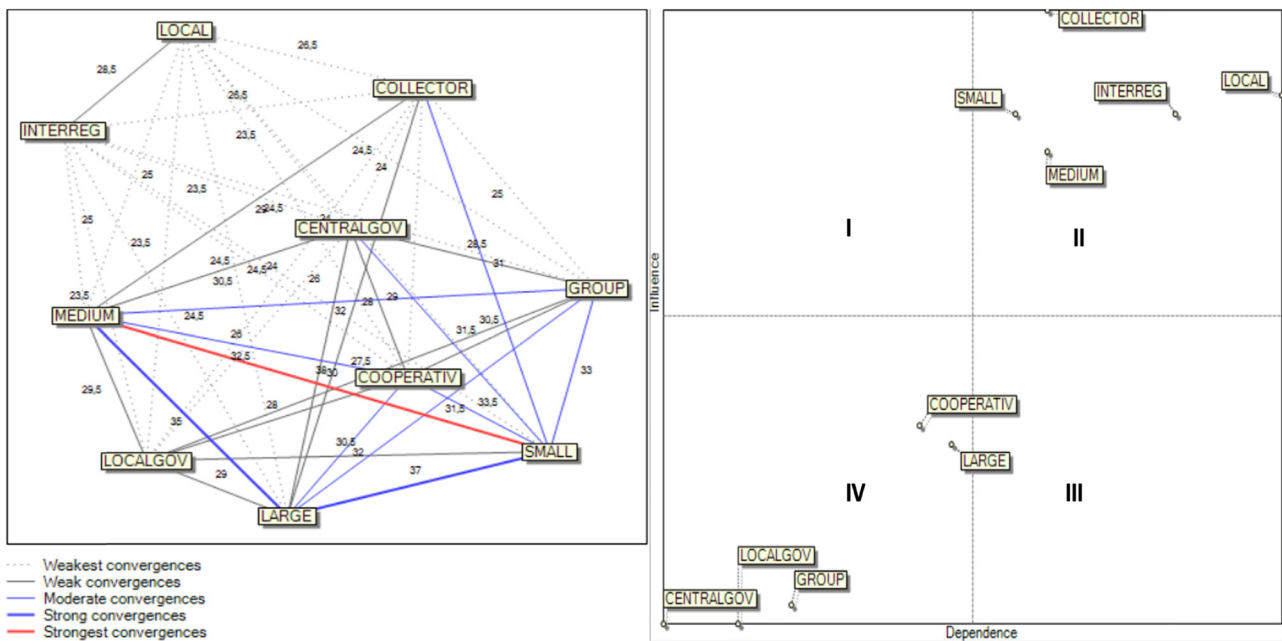


Figure 11: Actor relations in the marketing aspect.



and district/city regional levels, namely when the process of implementing guidance, supervision, and reporting is by their authority. In terms of implementing the Ministerial Regulation on Guidelines for Good Broiler and Laying Hen Practices, farmers are the main actors in running livestock businesses, while the Head of the Livestock Service Office of Blitar Regency is the supervisor.

The government maintains egg price stability at the farmer level through various policies agreed upon with local stakeholders. The government has implemented policies focusing on the upstream aspect, notably to stabilize the price of eggs by adjusting the balance of supply and demand in line with Minister of Agriculture Decree No. 3035 of 2017. The government also continues to strive to empower and protect farmers with measures including regulatory support, guidance/motivation, and competitive institutional transformation. The central government, together with the local government, in this case, the Blitar Livestock and Fisheries Service, conducts integrated coaching through population and production data collection, encouraging the formation of cooperatives, coordinating the availability of corn at affordable prices, approaching financial institutions regarding capital aspects, providing regulatory support on upstream aspects and protecting downstream aspects, especially egg prices through the publication of reference prices by the Ministry of Trade.

Laying hen farmers in Blitar Regency are generally characterized as committed actors who dedicate their time and energy to the progress of their business. They tend to maintain an open attitude to meeting consumer demand and strengthening market relations, are more likely to seek the right financing structure, and experienced farmers readily share knowledge with newcomers. The farmers are always profit-oriented and actively involved in associations. Smallholder farmers have further specific characteristics, namely a tendency towards traditional practices and experiences, investing their own capital, and maintaining a family business. Company-scale farmers, meanwhile, tend to employ skilled or experienced workers and strive to control their business costs.

#### 4.1 Actor relationships in the DOC aspect

DOC as initial capital for breeding chickens cannot be produced independently by farmers; instead, they acquire them by purchasing from hatchery industries. Unfortunately, variations in strain types and factory origins cause differences in strain prices, which tend to fluctuate. The price of DOC would be cheaper if farmers buy them in bulk. Figure 8

shows small-scale, medium-scale, cooperative, and farmer group breeders have the strongest relationships in this regard because these four actors collaborate to obtain DOC in large quantities to achieve lower prices. All four actors are interested in collective procurement of DOC as well as serving as platforms to voice aspirations and address issues faced when DOC prices become unaffordable. Farmer groups and cooperatives are interested in advocating for their members to obtain DOC in appropriate quantities and at reasonable prices. However, so far, the existence of farmer groups and cooperatives only occurs when DOC prices rise and quantities are limited. Under normal DOC prices and adequate quantities, farmers can directly deal with sales from PSs. DOC companies collaborate with PSs (usually representing the company in the region) to market DOC to small and medium-sized farmers facilitated by farmer groups or cooperatives. The relationship between the company and poultry tends to be moderate. They are subsidiaries, whereas the relationship between cooperatives and farmer groups tends to be weak because they cannot interact directly; however, there are local sales representatives assigned for DOC marketing purposes. Small-scale farmers and farmers' groups also have a stronger relationship since being part of a group can provide access to government assistance.

Based on these relationships, the influence and dependency of each actor can be mapped into various quadrants. Figure 8 shows quadrant I (encompassing cooperatives and local governments) has a strong influence and low dependence on the aspect of DOC. Cooperatives, as legal entities authorized to facilitate the aspirations of farmers, provide a platform for farmers to struggle to maintain the sustainability of their farming efforts. In this regard, cooperatives assist in coordinating the purchase of DOC on a large scale and in groups, enabling farmers to obtain DOC at more affordable prices. Local governments, including the Livestock Department and Cooperative and Trade Services, also significantly influence the aspect of DOC as they have the authority to regulate licensing related to DOC, oversee the distribution and use of DOC, and provide supporting facilities for farmers.

Actors mapped in quadrant II, namely large-scale farmers, medium-scale farmers, small-scale farmers, PSs, and DOC companies, have strong mutual influence and interdependence. Large-scale farmers have high influence and dependence due to their greater input resources, while medium-scale and small-scale farmers have power in terms of producing and raising DOC themselves. Poultry shops and DOC companies have high influence and dependence because they wield significant power in producing and marketing DOC. Both actors control the quantity and price of DOC. Based on these

relationships, it is also known that the central government and farmers' groups have low power and dependence. This is because the central government needs to establish regulations related to DOC. Farmers' groups have low influence because they are not directly involved in the DOC production process or in collective DOC procurement efforts (often moving when there is government subsidy assistance).

## 4.2 Actor relationships in the feed aspect

Figure 9 shows the strongest relationships among actors in the aspect of feed include small-scale farmers, medium-scale farmers, farmer groups, and cooperatives. These actors are interconnected in acquiring feed and access to enhancing farmers' capacity in self-mix feed production. Such skills can also be acquired through groups and cooperatives. The main challenges in the feed aspect are the fluctuating prices and availability of corn and concentrates. The government will distribute subsidized feed to small- and medium-scale farmers through cooperatives, with the application and distribution being carried out by farmer groups. This is because both institutions provide a platform for farmers to gather, voice their aspirations, serve as a platform for movement during feed shortages, and act as intermediaries for the distribution of corn subsidies to farmers. Large-scale farmers have strong interaction power with medium-scale farmers, small-scale farmers, farmer groups, and farmer cooperatives. Large-scale farmers can obtain feed or feed ingredients directly from feed companies, and occasionally, if small-scale farmers, medium-scale farmers, cooperatives, and farmer groups have difficulty obtaining feed supplies, they can obtain them from large-scale farmers with whom they have interacted well. On the other hand, the central government and local governments have moderate power through their roles in distributing feed subsidies and market operation interventions to lower feed prices. Moderate interactions also occur between feed companies, PSs, and distributors. All three play strategic roles in determining the presence of feed in the market accessible to farmers.

Based on the strength of interaction among actors, the influence and interdependence among actors in the feed aspect, Figure 9 shows quadrant I (high influence and low dependence) includes cooperatives and feed distributors. Cooperatives become official institutions appointed by the government to facilitate farmers (small and medium-sized farmers) in distributing subsidized corn. Meanwhile, feed distributors have a strong influence because they can provide raw materials for feed as well as finished feed for

farmers. Actors in quadrant II (having high influence and high dependence) include feed companies, small farmers, and PSs. Feed companies are able to absorb feed raw materials, produce feed, and determine feed prices, while PSs are able to sell feed ingredients for farmers or plasma farmers. Small farmers, in terms of feed aspects, only have power in raising livestock, highly dependent on feed supply and producing feed (self-mix) on a small scale.

Actors mapped in quadrant III (low influence, high dependence) include medium-sized farmers. This is because medium-sized farmers have the power to produce their feed and also can directly purchase feed ingredients from companies. However, the price and quantity of feed still depend on feed-producing companies. In conditions where feed prices are expensive and difficult to obtain, they still depend on government intervention to lower prices. Regional governments, central governments, large farmers, and farmer groups are mapped in quadrant IV (low influence and low dependence) in terms of feed.

Regarding feed, central and regional governments are authorized to maintain the availability of feed ingredients but have never intervened in the form of regulating feed prices and ensuring the availability of feed sustainably. Meanwhile, farmer groups are not directly involved in maintaining the availability of feed ingredients because they are assigned to distribute feed aid from the government (if any), and large farmers can obtain feed by directly purchasing from companies. Hence, they are not dependent on other actors.

## 4.3 Actor relationships in the drug and vaccine aspects

Figure 10 shows the relationship between actors in the aspects of pharmaceuticals and vaccines, showing a very strong correlation among small-scale farmers, medium-scale farmers, and large-scale farmers. These three actors share the same goal of achieving price stability for drugs and vaccines as well as easy access. This strong relationship indicates the potential for cooperation among actors to engage in collective actions in procurement and maintaining the stability of prices and availability of drugs and vaccines. This shared interest is also fostered by farmers selecting the same breed/variety of DOC; typically, the DOC chosen by farmers usually comes with a package of drugs and vaccines to maintain the performance of their poultry. Strong relationships are also formed among cooperative actors, livestock groups, and central and regional governments. These actors collaborate to determine policies and

regulations related to drugs and vaccines. A moderate relationship is independently formed between pharmaceutical and vaccine companies, PSs, and distributors, where all three have weak direct interactions with farmers because the purchase packages of drugs and vaccines are largely determined by the current superior breed/DOC types.

Figure 10 shows the actors in quadrant I (high influence and low dependence), including local governments and cooperatives. Local governments such as the Livestock Department and the Trade Department have the authority to oversee the circulation of drugs and vaccines, maintain the availability of drugs and vaccines, and are empowered to establish policies related to drugs and vaccines. Cooperatives serve as promoters capable of mobilizing farmers to act collectively in the procurement of drugs and vaccines as well as in improving human resource capacity related to drug and vaccine applications. Quadrant II (high influence and high dependence) comprises drug and vaccine companies, PSs, and drug and vaccine distributors. All three actors serve as providers of drugs and vaccines and have the power to influence the availability and price stability of drugs and vaccines.

Actors with low influence and high dependence are located in quadrant III, including small-scale farmers and medium-scale farmers. These actors are the most affected by the impact of price instability and the availability of drugs and vaccines because they have a high dependence on drugs and vaccines as they cannot utilize technology (closed house). Meanwhile, actors in quadrant IV are those with low influence and low dependence. These actors include the central government, farmer groups, and large-scale farmers. The central government has not intervened in drug and vaccine-related matters despite having the authority to establish regulations related to drugs and vaccines. Farmer groups have low influence and dependence because their operations have been passive in both joint procurement efforts for drugs and vaccines and in increasing human resource capacity in drug and vaccine use. Large-scale farmers have low influence and dependence because in their livestock operations, they can be more independent in purchasing and using drugs and vaccines. Additionally, large-scale farmers can mitigate the reduction in drug and vaccine use by using quality strains and utilizing technology (closed house).

#### 4.4 Actor relationships in marketing

Concerning marketing, the actors tend to share the same objectives. In addition, they have almost identical market

preferences or marketing channels, thus creating the potential for cooperation in supplying eggs collectively in order to be more competitive. In the marketing of chicken egg products, a very strong relationship in marketing aspects is established between small- and medium-scale farmers (Figure 11). Both actors have the same goals in marketing and have almost the same marketing preferences or channels, thus having the potential for cooperation in collectively supplying eggs to be more competitive. Often, medium-scale farmers will absorb chicken eggs from small-scale farmers, and small-scale farmers are greatly assisted in this position as they are facilitated in marketing.

Meanwhile, actors with strong relationships include large-scale farmers towards small- and medium-scale farmers. This is because these actors have the same desire to obtain protection in marketing, thus potentially establishing cooperation to obtain more stable prices. The length of the marketing channel through middlemen causes small-scale and medium-scale farmers to face price pressures, making it safer to partner with large-scale farmers who already have direct market networks to major cities in Indonesia.

Figure 11 shows the actors with high influence and dependence (quadrant II) include small-scale farmers, medium-scale farmers, middlemen, local traders, and inter-regional traders. Small- and medium-scale farmers act as suppliers and middlemen, and local traders and inter-regional traders serve as marketing channels. Medium-scale and small-scale farmers heavily rely on marketing channels such as middlemen, yet marketing through middlemen often results in lower prices. Farmers often have no other choice but to market their produce through middlemen because the money obtained must be immediately reinvested to purchase chicken feed. Actors with low influence and dependence (quadrant IV) include cooperatives, central government, local government, farmer groups, and large-scale farmers. Both central and local governments have authority through regulations and policies governing marketing activities. However, interventions from the central and local governments need to be functioning as they should. For instance, the implementation of market operations often leads to prices falling below the cost of production or the price set by the trade office. The central and local governments should collaborate with several programs that can help absorb farmers' produce, such as the stunting prevention program and other government social assistance. Farmer groups and cooperatives have low influence and dependence because they have been passive in marketing activities due to capital constraints. However, both of these actors should be able to serve as collective marketing channels for farmers. Large-scale farmers have low influence and dependence because they can seek or establish markets for their produce.

## 4.5 Limitation

This research has limitations that could affect the reliability and applicability of its results. Changes in regulations, market conditions, and other external factors may lead to shifts in power dynamics within the laying hen industry over time. Therefore, the findings of this study may only reflect a specific period and may not fully capture ongoing changes in power relations.

## 4.6 Conclusion, recommendation, and future direction

The actors involved in the layer chicken farming efforts in Blitar Regency include farmers (small, medium, and large-scale farmers), institutions (farmer groups and cooperatives), government (central and regional), industry (companies, PSs, distributors producing and marketing DOC, feed, medicines, and vaccines), and market participants (local traders and inter-regional traders). Interactions among actors occur in four aspects of livestock farming, with different strengths of interaction in each aspect. The results of the MACTOR analysis indicate the following:

1. The strongest interaction strength exists among small-scale, medium-scale, cooperative, and farmer group actors because these four actors collaborate to obtain a large quantity of DOC to obtain cheaper prices.
2. The strongest interaction among actors in the aspect of feed includes small-scale farmers, medium-scale farmers, farmer groups, and cooperatives. These actors are inter-related in obtaining feed and feed ingredients and facilitating members to obtain feed requirements.
3. The strongest interaction among actors in the aspect of medicine and vaccines occurs between small-scale farmers, medium-scale farmers, and large-scale farmers. These three actors share the same goal of stabilizing medicine and vaccine prices and facilitating access.
4. A very strong relational strength in the marketing aspect is established between small-scale and medium-scale farmers. Both actors have the same goal in marketing and have almost the same marketing preferences or channels, thus working together to supply eggs to obtain competitive egg prices collectively.

Overall, in all aspects of laying hen farming, the most intense and strong relationships occur between small-scale and medium-scale farmers, where both have a very high dependence on obtaining DOC, feed, vaccines, and medicine, as well as accessing markets to sell their eggs. Middlemen

and intercity traders become supporting actors in marketing who often make more profits than small-scale farmers. The central government (Ministry of Agriculture) and local government (Livestock Service) have not been able to play a strategic role in regulating livestock input policies such as DOC, feed, medicine, and vaccine, as well as setting egg prices. However, this role is very strategic in helping small-scale and medium-scale farmers to remain competitive. Meanwhile, cooperatives and livestock groups only play a role in distributing assistance from the government; their role in facilitating DOC, feed, medicine, and collective marketing is still hindered by capital and market networks.

Based on the findings of this study, several recommendations can be proposed as follows:

1. Strengthening Farmer Cooperatives and Groups: Government and industry stakeholders should support and strengthen these cooperative structures by providing financial assistance, technical support, and capacity-building programs to enhance their role in facilitating access to resources such as DOC, feed, medicine, and vaccines.
2. Government Intervention in Market Regulation: Given the significant role of small-scale and medium-scale farmers in the layer hen industry, there is a need for strategic intervention by both the central and local governments in regulating input prices (such as DOC, feed, medicine, and vaccines) and setting fair egg prices. Policies should be implemented to protect farmers from exploitation by middlemen and intercity traders, ensuring they receive equitable returns for their products.
3. Improving Access to Resources: Efforts should be made to improve access to essential resources such as DOC, feed, medicine, and vaccines for small-scale and medium-scale farmers. This could involve initiatives to enhance distribution networks, provide subsidies or incentives for inputs, and promote the development of local supply chains to reduce dependency on external suppliers.

By implementing these recommendations, stakeholders can work together to create a more inclusive, equitable, and resilient laying hen industry in Indonesia, ultimately benefiting farmers, consumers, and the broader society.

The future direction for the findings of this study could involve several avenues for further exploration and development. For example, comparing power relations among actors in the laying hen business across different regions or countries could be pursued. This comparative approach could highlight contextual factors influencing power dynamics and inform strategies for stakeholders in various settings. Additionally, investigating the implications of power relations on policy-making and regulatory frameworks within the laying

hen industry is crucial. Understanding how power dynamics influence decision-making processes can inform more effective and equitable policies to address challenges and promote sustainable development. Another potential avenue is investigating the impact of power relations on sustainability practices and animal welfare standards within the laying hen industry. This could involve assessing how power dynamics influence resource allocation, environmental practices, and ethical considerations. Overall, these future directions aim to deepen our understanding of power relations among actors in the laying hen business and contribute to more informed decision-making processes, ultimately fostering greater sustainability, equity, and resilience within the industry.

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