International Journal of Education Humanities and Social Science

ISSN: 2582-0745
Vol. 8, No. 02; 2025

ANALYSIS OF BROILER FARM PERFORMANCE IN NABIRE, PAPUA: MANAGEMENT IMPLICATIONS FOR PRODUCTIVITY

Siprianus Adi[1], Edi Widodo[2], Trisiwi Wahyu Widayati[2] and Sri Hartini[2*]
[1]Alumnus of Magister Program in Animal Science, Postgraduate Program, Universitas Papua, Manokwari, West Papua, Indonesia
[2]Graduate School Faculty of Animal Science, Universitas Papua, Manokwari, West Papua, Indonesia

https://doi.org/10.54922/IJEHSS.2025.0968

ABSTRACT

Broiler farming plays a vital role in fulfilling the community's demand for animal protein. However, its performance is influenced by multiple factors, including feed management, environmental conditions, and farmers' socio-economic characteristics. This study aims to identify and analyze the key factors affecting the Performance Index (PI) of broiler farms in Nabire, Papua. Data were collected through structured interviews with 43 broiler farmers across several districts. A multiple linear regression model was applied to assess the influence of various demographic, technical, and managerial variables on PI. The analysis revealed that feed quantity, initial body weight of day-old chicks (DOC), market weight, market age, and Feed Conversion Ratio (FCR) had a statistically significant effect on PI ($P<0.01$). In contrast, variables such as farming experience, business scale, and labor did not show a significant impact. These results highlight the importance of optimizing feed allocation, improving early chick quality, and managing market timing to enhance farm productivity. The findings suggest that targeted strategies focusing on technical efficiency—particularly feed utilization and growth management—can significantly improve broiler farm performance. Enhancing extension support and aligning production with market dynamics are also recommended to increase sustainability and competitiveness in the region.

Keywords: Broiler Chicken, Performance Index, Multiple Regression, Feed, Farm Management

1. INTRODUCTION

The broiler farming industry is a vital sector in providing animal protein sources for the population. The demand for chicken meat continues to rise in line with population growth and increasing awareness of protein consumption. However, broiler farm performance is highly influenced by various factors such as genetics, management practices, feed, environmental conditions, and the socio-economic background of farmers (Amaz & Mishra, 2024; Chen et al., 2021). In tropical regions like Nabire, Papua, broiler production faces additional challenges due to high temperatures and humidity, which can affect growth rates and feed efficiency (Amaz & Mishra, 2024; Liu et al., 2020).

The Performance Index (PI) is a commonly used parameter to measure broiler production efficiency based on body weight, market age, and Feed Conversion Ratio (FCR) (Paly, 2023). This study aims to analyze the factors affecting PI in broiler farms in Nabire. Additionally, it seeks to provide strategic recommendations for improving broiler farm performance in the region.

ISSN: 2582-0745
Vol. 8, No. 02; 2025

Previous research has shown that several factors, such as feed quantity, initial DOC weight, and market age, can significantly influence PI (Abougabal, 2020; Paly, 2023). However, specific studies on broiler farming in Nabire remain limited. Therefore, this study aims to provide deeper insights into the key factors determining broiler farm success in this region and their implications for farm management.

Using multiple regression analysis, this study examines the influence of various variables, including farmer age, experience, business scale, labor, feed quantity, initial DOC weight, market weight, market age, FCR, and government or institutional support. The findings of this study are expected to serve as a basis for farmers and stakeholders in making strategic decisions to enhance the efficiency and profitability of broiler farming in Nabire.

2. MATERIALS AND METHODS

Research time and place

This study was conducted for three months in Nabire Regency, Papua Province, Indonesia. Nabire was selected as the study site due to its growing broiler farming industry and unique tropical climatic conditions, which may influence poultry productivity. The study was carried out in six districts: Nabire City, Makimi, Teluk Kimi, West Nabire, Wanggar, and Uwapa. Data collection involved direct field observations and structured interviews with farmers. The tools used included structured questionnaires, writing instruments, and digital cameras to document farm conditions.

Respondent

The study involved 43 broiler farmers selected using a purposive sampling method to ensure representation across different business scales and farming practices. The respondents were distributed across six districts: Nabire City (8 farmers), Makimi (4 farmers), Teluk Kimi (13 farmers), West Nabire (14 farmers), Wanggar (3 farmers), and Uwapa (1 farmer). The selection criteria included farmers with at least one production cycle experience and those actively engaged in commercial broiler farming. Respondent characteristics such as age, education level, experience in poultry farming, and business scale were also recorded to assess their impact on broiler performance.

Data collection techniques, types and data sources

Data for this study were collected through structured interviews and direct field observations to ensure the accuracy and reliability of the information provided by respondents. The data consisted of primary data and secondary data, each serving a distinct purpose in understanding broiler farm performance in Nabire.

Primary data were obtained through face-to-face interviews with farmers using structured questionnaires, complemented by field observations of farm conditions and management practices. These data included key production parameters such as feed quantity (grams per bird per day), number of live birds at the end of the production cycle, initial body weight (gram), market weight (gram), market age (days), duration of the rearing period, and feed conversion ratio (FCR), which were directly used to calculate the Performance Index (PI).

Secondary data encompassed supporting socio-economic factors that, while not directly used in the PI calculation, could influence key production parameters. These included farmers' age (years), experience in broiler farming (years), education level (years of schooling), business scale (number of birds per production cycle), and whether farmers received external support or assistance from government agencies. These data were also obtained through interviews and

ISSN: 2582-0745
Vol. 8, No. 02; 2025

questionnaires. Additionally, regional supporting information such as topography, climate, and other environmental conditions relevant to broiler farming in Nabire was collected from official reports, scientific articles, and statistical records provided by Dinas Peternakan Kabupaten Nabire and Badan Pusat Statistik Nabire.

By integrating both primary and secondary data, this study ensured a comprehensive analysis of the factors influencing broiler farm performance in Nabire. The combination of direct observations and official records strengthened the validity of the findings, allowing for a more robust assessment of the industry's challenges and opportunities.

Research methods

The research method used in this research is descriptive with survey techniques and field observations.

Data analysis

To determine the cumulative performance of the broiler farming in Nabire district, the Performance Index (PI) was evaluated.
The Performance Index was calculated based on the following equation (Paly, 2023):

$$PI = \frac{Market\ weight\ (kg) x\ livability\ (\%) x\ 100}{Market\ age\ (days) x\ feed\ conversion\ ratio}$$

To find out the factors that affect PI, multiple regression analysis (SPSS, 2007) is used with the following equation:

$$\ln Yi = \ln\alpha + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \beta_6 \ln X_6 + \beta_7 \ln X_7 + \beta_8 \ln X_8 + \beta_9 \ln X_9 + \beta_{10} \ln X_{10} + \beta_{11} \ln X_{11} + \delta_1 D_{Assist+} \delta_2 D_{Motiv} + e$$

where,
Y = Performance Index (PI)
α = constanta
β = regression coefficient for each variable
δ = dummy variable coefficient
e = error term
X_1 = farmer's age (years)
X_2 = farmer's experience (years)
X_3= education (years)
X_4= business scale (birds per period)
X_5= amount of feed (gram/bird/day)
X_6= number of labours used (people)
X_7= number of live chickens until the end of the period (%)
X_8 = initial body weight (gram)
X_9= market weight (gram)
X_{10}= market age (days)
X_{11}= FCR
Fostered Dummy = farmer membership as assisted by the Dinas Peternakan or not (value 1 if assisted, value 0 if not assisted)
Business Dummy = business is the main job or not (value 1 if the main job, and 0 if not)

ISSN: 2582-0745
Vol. 8, No. 02; 2025

3. RESULTS AND DISCUSSION

Regional Conditions, Input Supply, and Market Challenges

Nabire Regency, located in the northwestern part of Papua Province, has a tropical climate characterized by high temperatures and humidity levels. The average temperature in Nabire ranges from 22.6°C to 31.2°C, with an average humidity of 84.0%–87.4% (BPS Nabire, 2020). These environmental conditions can pose challenges to broiler farming, as heat stress is known to reduce feed intake, slow down growth rates, and negatively impact feed conversion efficiency (Liu et al., 2020). The optimal temperature range for broiler farming is 19°C–21°C, with a relative humidity of 50%–70% (Czarick & Fairchild, 2012). The high temperatures in Nabire likely contribute to the lower-than-expected body weight and market weight of broilers in the region.

In terms of farm structure, broiler farming in Nabire is predominantly small-scale, with most farmers raising between 300 and 7,000 birds per production cycle. The primary source of day-old chicks (DOC) is PT. Charoen Pokphand Surabaya, specifically the CP 707 strain, which is adapted to tropical climates and capable of reaching about 1.9 kg at 35 days under optimal conditions. However, logistical challenges related to DOC transportation, feed supply, and high production costs remain key issues for local farmers. Feed accounts for 70%–80% of total production costs, with most farmers relying on commercial feeds such as Broiler Hi-ProVite 511 and 512, which are distributed from Surabaya. This dependency on external suppliers makes local broiler farming vulnerable to fluctuations in feed prices and supply chain disruptions.

Despite these challenges, Nabire has several advantages that support broiler farming development. The region serves as a commercial hub for surrounding districts, providing a stable demand for broiler meat. Additionally, the interest in fresh, locally produced chicken remains high, as many consumers prefer fresh poultry over frozen imports. However, the lack of local feed mills and DOC hatcheries increases production costs, highlighting the need for strategic interventions to enhance supply chain efficiency and improve overall farm performance.

General Information of Respondents

The identity of the broiler farmers is one of the internal factors that functions as an assessment indicator for the farmers. Internal factors that affect a person’s farming include age, education level, and experience (Umar et al., 2022). In addition, a person's farming can also be seen from the purpose of his business, namely as the main or side job. Socio-economic factors of broiler chicken farmers in Nabire is presented in Table 1.

ISSN: 2582-0745
Vol. 8, No. 02; 2025

Table 1. Socio-Economic Factors of Broiler Chicken Farmers In Nabire

Factor	Unit	Total (people)	Percentage (%)
Farmer Age			
	15-64 year's old	42	97.67
	> 64 year's old	1	2.33
Level of Education			
	Not finish elementary	2	4.65
	Elementary	3	6.98
	Yunior High School	13	30.23
	Senior High School	18	41.86
	College/University	7	16.28
Farmer Experience			
	<10 years	38	88.37
	≥10-15 years (max)	5	11.63
Bussiness Scale			
	<1000 chickens	12	27.90
	≥1000 chickens	31	72.10
Labor			
	<1000 chickens	39 (temporary labour)	90.70
	≥1000 chickens	4 (permanent labour)	9.30

Age of Respondents

Age is one of the indicators of a person's physical ability. A person who has a younger age tends to have stronger physical abilities than those who have an older age. The age of a farmer can affect a person's productivity because it is closely related to work ability and mindset in determining the form and management pattern applied in business.

Badan Pusat Statistik Nabire (BPS Nabire, 2017) divides the composition of the population based on age into 3 categories, namely:

1. Age 0-14 years : called young age or unproductive age.
2. Age 15-64 years : called adult age or working age or productive age.
3. Age >64 years : called old age/non-productive age/elderly age.

It can be seen in Table 1, that as many as 97.67 percent of the age of farmers is in the age range of 15-64 years and only 1 farmer is over 64 years old (2.33%). This shows that the majority of broiler farmers in Nabire Regency are still in productive age. The older a person is, the more likely he is to think more qualitatively and act wiser. Physically it will affect the productivity of the livestock business, where the older the farmer, the lower his work ability is.

Education Level

A person's level of education will affect their mindset, skills and knowledge (Rahman et al., 2020). Farmers who have a higher level of education will be able to maximize production factors in their business activities not only to meet household needs, but to get profits. Table 1 shows

ISSN: 2582-0745
Vol. 8, No. 02; 2025

that 16.28 percent of farmers are university graduates, 41.86 percent of high school graduates, 30.23 percent of junior high school graduates, 6.98 percent of farmers who graduated from elementary school, and 4.65% who did not graduate from elementary school. This shows that the level of education of farmers in Nabire Regency is quite high. A high level of education for farmers will easily adjust in terms of technology and cultivation techniques and help smooth communication with field extension officers.

Farmer experience

Farmers who have experience in farming will tend to have better business results than less experienced farmers (Anang, 2025; Husmaini et al., 2022). In broiler chicken farming business activities, the experience of the farmer is very influential. This is because in the broiler farming business, the output or yield of livestock business activities cannot be determined every period. The period that has been carried out will not have the same results as the period to come.

The experience of raising livestock in broiler farming in Nabire Regency is grouped into two, namely less than 10 years and more than 10 years. Based on Table 1, the experience of raising broilers in Nabire Regency is 88.37 percent less than 10 years while 11.63 percent is more than 10 years with a maximum of 15 years. The longer the farmer experience of raising livestock, the more knowledge they gain, so that their skills in running their business will increase and be profitable.

Business Scale

The scale of the broiler farming business is determined based on the population of chickens raised by farmers. The scale of broiler farming in Nabire Regency is grouped into two, namely less than 1000 birds and more than 1000 birds. Based on Table 1, farmers with a broiler business scale of <1000 birds are 27.90 percent, while those with more than 1000 birds are 72.10%. This shows that broiler farmers in Nabire Regency are on a medium business scale, but the broiler farming business is growing rapidly. Farmers are beginning to realize that the broiler market food in Nabire Regency is still very open. The number of broiler chickens cultivated by farmers is highly dependent on the ability of farmers (Anang, 2025).

Farm Labor

The labor in the broiler farming business in Nabire Regency is grouped into two, namely permanent labor and non-permanent labor or family labor. It can be seen in Table 1, that 39 farmers out of 43 farmers are still using labor from their own families, and only 4 farmers who have business scale more than 1000 birds have used permanent labor. This worker is responsible for the cleanliness of the cage and the handling of DOC from the beginning of entering the cage until marketing. This shows that large-scale farmers tend to hand over the management of broiler rearing to workers (Hakizimana, 2017).

Key Production Parameters of Broiler Farming in Nabire

The broiler farming landscape in Nabire Regency is shaped by several key production factors, including day-old chick (DOC) weight, feed quality, feed conversion ratio (FCR), mortality rate, and market weight. These variables play a crucial role in determining the overall performance and efficiency of broiler operations. By analyzing these factors, the Performance Index of broiler farms in the region can be assessed. Key production performance indicators of broiler farming in Nabire are summarized in Table 2.

ISSN: 2582-0745
Vol. 8, No. 02; 2025

Table 2. Key Production Performance of Broielr Farming in Nabire

Performance	Market Age	Value
Initial Body Weight		
	≤ 30 days	37.5 g
	> 30 days	37.4 g
Market Age		
	≤ 30 days	18 farmers (42 %)
	> 30 days	25 farmers (58 %)
Market Weight		
	≤ 30 days	1.496 kg
	> 30 days	1.924 kg
Mortality		
	≤ 30 days	5.49 %
	> 30 days	5.07 %
Average Body Weight		
	≤ 30 days	49.14 g/b/d
	> 30 days	57.67 g/b/d
Feed Consumption		
	≤ 30 days	91.54 g/b/d
	> 30 days	79.25 g/b/d
FCR		
	≤ 30 days	1.864
	> 30 days	1.374

Initial Body Weight (DOC weight)

Based on field observations, the day-old chicks (DOC) used by broiler farmers in Nabire Regency are predominantly of the Cobb strain, specifically CP 707, produced by PT. Charoen Pokphand Surabaya. This strain is preferred by the farmers due to its well-documented adaptability to hot and humid tropical climates, such as those found in Nabire. Farmers reported that this strain maintains good growth performance and survivability under local environmental conditions.

The initial DOC weight among the observed flocks did not show significant variation between farmers who market their broilers before 30 days and those who market later, with an average weight ranging from 37.4 to 37.5 grams. This similarity in DOC weight suggests a relatively standardized supply chain and consistent hatchery management practices. Furthermore, the uniformity in initial weight provides a reliable starting point for comparing subsequent growth performance, feed efficiency, and production outcomes among different marketing strategies. This also indicates that early differences in final body weight or productivity are more likely to be influenced by post-hatch management factors, such as feed, environment, and health management, rather than by initial chick quality (Obun & Osaguona, 2013; Payte et al., 2022).

Market Age

Observational data indicate that broiler farmers in Nabire typically market their chickens at an age ranging from 27 to 40 days, with the most common marketing age being 30 days. This variation in market age reflects differences in farm management practices, resource availability,

ISSN: 2582-0745
Vol. 8, No. 02; 2025

and production targets. Broilers marketed at younger ages (≤30 days) generally exhibit lower final body weights but may benefit from better feed conversion ratios (FCR) due to the biological efficiency of growth during early stages. Conversely, birds harvested at older ages may reach higher body weights but tend to show diminishing FCR values and incur higher feed costs due to increasing maintenance energy needs (Payte et al., 2022).

In the case of broiler farms in Nabire, the predominance of early marketing at around 30 days suggests that farmers prioritize faster production cycles and reduced risk of mortality, especially in environments where high temperatures and humidity levels can affect bird health and feed intake. The selection of market age, therefore, has direct implications for production performance indicators such as average daily gain (ADG), feed efficiency, and final market weight.

Market Weight

The average market weight of broilers in Nabire Regency aligns with their respective market ages. As presented in Table 2, broilers marketed at ≤30 days of age had an average final body weight of 1.496 kg, while those marketed at >30 days achieved a higher average weight of approximately 1.924 kg. These market weights are notably below the standard performance benchmarks provided for the CP 707 strain, which typically reaches 1.6 kg at 30 days and 2.05 kg at 35 days under optimal management conditions (Charoen Pokphand Indonesia, 2006).

Interestingly, both groups began with relatively uniform initial weights, with DOCs weighing 37.5 g (≤30 days group) and 37.4 g (>30 days group), indicating no significant difference in early chick quality. However, differences emerged in the average daily gain (ADG), with the ≤30 days group achieving 49.14 g/bird/day compared to 57.67 g/bird/day in the >30 days group. This suggests that broilers marketed earlier exhibited less efficient growth rates, possibly due to poor environmental management during the early rearing period.

The choice of market age is often influenced by economic considerations and consumer demand. Shorter production cycles (≤30 days) are associated with reduced feed costs, lower mortality risks, and quicker cash turnover, making them attractive for small-scale farmers. Conversely, extending the rearing period allows farmers to achieve higher body weights, which may be preferred by certain market segments.

Market segmentation plays a crucial role in determining target weights. In the Nabire context, broilers weighing <1.5 kg are typically in demand by food service businesses such as restaurants and traditional markets due to portion control and cooking efficiency. Meanwhile, larger broilers (>1.5 kg) are preferred for household consumption and supermarket sales, where consumers value more meat per carcass and fewer purchase cycles. Thus, aligning production strategy with consumer preferences and market access becomes a key component of optimizing broiler performance and profitability.

Depletion/Mortality

The average rate of broiler chicken depletion in Nabire district ranges from 5.07-5.49 percent. At more than 30 days, the depletion rate was lower than that of chickens marketed at 30 days of age or less. The success of broiler farming can be significantly influenced by the overall mortality rate of the flock, which is ideally maintained below 4-5 percent. High mortality rates can indicate underlying issues with management practices, environmental conditions, and animal welfare. In the specific case of Nabire, the high average mortality rate among broiler chickens

ISSN: 2582-0745
Vol. 8, No. 02; 2025

relates to both management factors and climatic influences, as the region experiences high temperatures that can adversely affect chicken vitality.

Research indicates that non-disease factors such as physical handling by workers, inadequate thermal regulation leading to stress, and exposure to extreme temperatures can elevate mortality rates in broiler flocks. It has been documented that heat stress is a critical issue affecting broiler performance and survival rates. Specifically, broiler chickens exposed to high temperatures demonstrate increased mortality rates, immune suppression, and reduced overall health, leading to significant economic loss (Amaz & Mishra, 2024). Additionally, environmental stressors can lead to physiological responses that negatively impact growth performance and welfare, correlating with higher incidences of mortality.

In the context of climate change, it is important to note that such environmental shifts are exacerbating the prevalence of heat stress in broiler production systems that utilize open house setups. The open house system, while often preferred due to lower costs, can expose birds more directly to fluctuating temperatures, thus amplifying the risk of heat-related deaths. Research suggests that both management practices and climate adaptability are critical for reducing mortality rates and enhancing the resilience of broiler farming operations (Amaz & Mishra, 2024). Ultimately, understanding mortality rates within broiler farms, especially in challenging climates like that of Nabire, underscores the necessity of implementing effective management strategies and environmental control measures to sustain productivity and welfare in poultry production.

Average Body Weight

The average increase in body weight of broilers cultivated by farmers in Nabire Regency according to the age is 49.14 g/bird/day for maintenance less than equal to 30 days, and 57.67 g/bird/day for maintenance for more than 30 days. The achievement of this body weight gain is much lower than the standard that has been hinted at which is 76.40 g/bird/day for 4 weeks of age and 83.10 g/bird/day for 5 weeks of age (Charoen Pokphand Indonesia, 2006). One potential cause of this reduced growth performance is environmental temperature. Nabire's average temperature of 22.6–31.2°C and humidity of 84.0–87.4% exceed the optimal broiler conditions of 19–21°C and 50–70% humidity (Czarick & Fairchild, 2012). High temperatures contribute to heat stress, reducing feed intake and overall growth (Amaz & Mishra, 2024).

Feed Consumption

Feed is one of the most critical factors influencing broiler growth rate. At the same time, it represents the largest cost component in broiler production, with approximately 70–80% of total production expenses allocated to feed. Therefore, feed management is a key consideration for farmers when developing sustainable and profitable poultry farming systems.

In Nabire, broiler farmers primarily use commercial feeds such as Broiler Hi-ProVite 511 and Broiler Hi-ProVite 512, produced by PT. Charoen Pokphand Surabaya. The average feed intake per bird per day varies between farmer groups based on market age. Farmers who market broilers at ≤30 days report an average feed consumption of 91.54 g/bird/day, whereas those marketing their chickens at >30 days average 79.25 g/bird/day.

According to Ufi et al. (2024), the standard feed consumption for CP 707 broilers is 75.17 g/bird/day at 28 days of age and 93.80 g/bird/day at 35 days. Comparatively, the group marketing chickens at >30 days shows a lower-than-standard feed intake (79.25 vs. 93.80 g/bird/day), yet achieves a market weight only slightly below the standard (1,924 g vs. 2,049 g). This suggests that

ISSN: 2582-0745
Vol. 8, No. 02; 2025

these farmers exhibit efficient feed conversion and good flock management practices, likely optimizing environmental and nutritional conditions to support growth.

On the other hand, farmers marketing their broilers at ≤30 days achieve a final body weight that meets or exceeds the standard (1,496 g vs. 1,467 g). However, their feed consumption is significantly higher than the standard (91.54 vs. 75.17 g/bird/day), indicating possible inefficiencies in feed utilization. This could be attributed to overfeeding, suboptimal feeding schedules, or environmental factors such as heat stress, which may reduce feed conversion efficiency. Overall, the disparity in feed consumption relative to weight gain highlights the importance of effective feed management strategies, particularly in short-cycle broiler production systems.

Feed Conversion Ratio (FCR)

The Feed Conversion Ratio (FCR) of broiler farms in Nabire ranged from 1.374 to 1.864, with better FCR values recorded in flocks marketed after 30 days of age. These differences in FCR reflect variations in feed utilization efficiency, which are closely linked to both feed intake and growth performance. As previously discussed, differences in daily feed consumption between the two groups influenced the efficiency with which feed was converted into body mass.

A lower FCR in the >30-day group indicates that despite longer rearing periods, these flocks were able to convert feed into weight gain more efficiently. This suggests effective management practices that optimize feed use, likely through better feeding schedules, environmental control, and health maintenance. Conversely, higher FCR in the ≤30-day group suggests less efficient feed utilization, possibly due to imbalances between intake and growth rate.

These findings reaffirm that increasing feed intake without a proportional increase in body weight gain results in higher FCR, thereby reducing overall production efficiency. This inverse relationship between FCR and performance is critical for evaluating the sustainability and profitability of broiler production systems. Payte et al. (2022) and Onyeachonam & Ufomba (2020) also reported a positive correlation between initial weight, body weight gain (BWG), and final market weight, supporting the trend observed in this study. Thus, managing FCR through balanced feed strategies and optimal husbandry is essential to ensure both biological and economic efficiency in broiler farming.

Performance Index (PI)

Performance is a term given to livestock traits that have economic value (egg production, body weight, body weight gain, feed consumption, FCR, carcass percentage, and others) (Amaz & Mishra, 2024) Paly, 2023). The performance index of broiler farming in Nabire Regency during one maintenance period beside requiring data on the average market age, also needs data on the market weight, feed conversion ratio (FCR), and depletion rate. Performance Index of broiler farming in Nabire is shown on Table 3.

Table 3 presents the Performance Index (PI) of broiler farming in Nabire Regency based on market age, FCR, depletion rate, and market weight. For broilers marketed at ≤30 days, 100% of farmers fall into the Poor category, with the average score of 257, whereas for those marketed at >30 days, only 3 farmers fall into this category. Notably, 72% farms that marketed their broilers at > 30 days include in the category Good (4%), Very Good (40%), and Special (28%) with the average score of 375 (Very Good). According to Paly (2023), a higher PI value indicates better broiler performance and more efficient feed utilization. The poor PI observed in broilers marketed

ISSN: 2582-0745
Vol. 8, No. 02; 2025

at ≤30 days may be attributed to suboptimal management practices. Most broiler farmers in Nabire operate using an open housing system, which limits their ability to regulate temperature according to the growth requirements of the birds. This could negatively impact feed conversion efficiency and overall productivity. Nevertheless, the overall PI of broiler farming in Nabire falls within the Good category, with the PI score of 326, suggesting that most farmers have been able to adapt and optimize their production despite their relatively limited experience—most having less than 10 years in broiler farming. This adaptability indicates a strong learning capacity among the farmers, which could contribute to continued improvements in broiler performance in the region.

Table 3. Performance Index (PI) of Broiler Farming in Nabire

No	Market age (days)	Performance Index	Total farmers (person)	(%)
1	≤30	Poor (IP≤300)	18	100.0
		Moderate (IP 301 to 325)	0	0.0
		Good (IP 326 to 350)	0	0.0
		Very Good (IP 351 to 400)	0	0.0
		Special (IP >400)	0	0.0
		Total	18	100.0
2	>30	Poor (IP≤300)	3	12.0
		Moderate (IP 301 to 325)	4	16.0
		Good (IP 326 to 350)	1	4.0
		Very Good (IP 351 to 400)	10	40.0
		Special (IP >400)	7	28.0
		Total	25	100.0
		Average score	Category	
3	≤30	257	Poor	
	>30	375	Very Good	
	Overall average	326	Good	

Analysis of Factors Affecting Broiler Business Performance in Nabire

Data analysis to determine the determinants of the performance of the chicken business in Nabire Regency measured in PI using multiple regression with the following equation:

$$\ln Yi = \ln\alpha + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \beta_6 \ln X_6 + \beta_7 \ln X_7 + \beta_8 \ln X_8 + \beta_9 \ln X_9 + \beta_{10} \ln X_{10} + \beta_{11} \ln X_{11} + \delta_1 D_{Assist} + \delta_2 D_{Motiv} + e$$

Where :

Y = Peformance Index (PI)

α = Constanta

ISSN: 2582-0745
Vol. 8, No. 02; 2025

β = Coefficient regresion
δ = Coefficient Dummy Variable
e = error term
X_1 = Farmer Age (year)
X_2 = Farmer Experience (year)
X_3= Level of Education (year)
X_4= Business Scale (total of chicken/period)
X_5= Total Feed (g/bird/day)
X_6= Total Labor (person)
X_7= Total Live Birds at the end of rearing period (%)
X_8= Initial Body Weight (gram)
X_9= Market Weight (gram)
X_{10}= Market Age (days)
X_{11}= Feed Conversion Ratio (FCR)
D_{Assist} = Dummy Assisted= yes or not if farmer is assisted by Dinas Peternakan (1 if Yes, 0 if Not)
D_{Motiv} = Dummy Motivation = yes or not if the business in the main job/livelihood (1 if Yes, 0 if Not)

The result of multiple regression analysis of broiler farming business in Nabire are summarized in Table 4.

Table 4. The Result of Multiple Regression Analysis of Broiler Farming Business in Nabire

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Significant
Age	-0.0099	0.035207	-0.280305	0.7812	NS
Experience	0.0052	0.0083	0.626514	0.5359	NS
Education	-0.0073	0.018503	-0.396173	0.6949	NS
Business scale	-0.0075	0.012602	-0.591673	0.5587	NS
Feed quantity	164.3954	26.17744	6.280043	0.0000	***
Labor	0.0198	0.023442	0.846427	0.4042	NS
% livability	1.1741	1.349707	0.869916	0.3915	NS
Initial weight	3.7166	0.680857	5.458691	0.0000	***
Market weight	-170.4152	26.59164	-6.408601	0.0000	***
Market age	167.7912	25.88599	6.481933	0.0000	***
FCR	-165.4646	26.19106	-6.317599	0.0000	***
Assisted	-0.0164	0.012709	-1.294221	0.2058	NS
Motivation	-0.0057	0.017655	-0.322124	0.7497	NS

ISSN: 2582-0745
Vol. 8, No. 02; 2025

C	24.4212	14.41285	1.694402	0.1009
R-squared	0.9561	Mean dependent var		5.8863
Adjusted R-squared	0.9364	S.D. dependent var		0.1367
F-statistic	48.5978	Durbin-Watson stat		2.4460
Prob (F-statistic)	0.0000			

NS : Non Significant
*** : Significant (p<0.01)

The multiple regression analysis of factors influencing the Performance Index (PI) in broiler farms in Nabire Regency yielded an Adjusted R-square value of 0.9364. This indicates that 93.64% of the variation in PI can be explained by the independent variables: age, experience, education, business scale, labor, feed quantity, mortality, initial body weight, market weight, market age, feed conversion ratio (FCR), external assistance, and business motivation. The remaining 6.36% is influenced by factors not included in the model.

The F-test result showed a significance value of 0.000, confirming that these variables jointly have a significant impact on PI at the 99% confidence level. The t-test analysis revealed that five variables significantly affected the PI: the amount of feed, initial body weight, market weight, market age, and feed conversion ratio (FCR).

The final regression equation after logarithmic transformation is as follows:
Ln (PI) = 24.4212 – 0.0099 (age) + 0.0052 (experience) – 0.0073 (education) – 0.0075 (business scale) + 164.3954 (feed)* + 0.0198 (labor) + 1.1741 (live bird %) + 3.7166 (initial weight)* – 170.4152 (market weight)* + 167.7912 (market age)* – 165.4646 (FCR)* – 0.0164 (assistance) – 0.0057 (motivation) + 0.0636

Where:
PI = Performance Index
(*) denotes statistically significant variables at the 99% confidence level.

The regression findings indicate that technical variables such as feed quantity, FCR, and body weight metrics are dominant factors in determining broiler farm performance in Nabire Regency.

The amount of feed had the highest positive coefficient, underscoring its role in supporting growth and productivity (Yusuf et al., 2023; Ufie et al., 2024). However, effectiveness is also determined by how well feed is converted into body mass, which is where the feed conversion ratio (FCR) becomes crucial. The negative coefficient of FCR confirms that more efficient feed use (lower FCR) leads to better PI. This aligns with previous research indicating that poor FCR reduces profitability (Chen et al., 2021; Marchesi et al., 2021).

Initial body weight also showed a positive relationship with PI, highlighting the importance of high-quality chicks and early-stage management (Leandro et al., 2006). Conversely, market weight negatively affected PI, possibly due to increased feed costs without proportional returns, as noted by El-Ghamry et al. (2020). Meanwhile, market age positively influenced PI, suggesting that slightly longer production cycles may be beneficial when managed efficiently.

ISSN: 2582-0745
Vol. 8, No. 02; 2025

In terms of socio-demographic factors, experience positively affected PI, reflecting the value of accumulated knowledge in farm management (Anang, 2025; Husmaini et al., 2022). On the other hand, age and education had negative coefficients. This might be due to older farmers being less responsive to innovation (Onyeachonam & Ufomba, 2020), and formal education not always translating into effective practical skills (Bareith & Csonka, 2022).

The business scale also had a negative effect, potentially reflecting increased complexity in managing larger operations (Gharib et al., 2023). However, labor availability showed a positive impact, reaffirming the importance of adequate human resources in managing broiler operations (Alotaibi et al., 2024).

Interestingly, external assistance and motivation showed negative relationships with PI. This might suggest that such support mechanisms are either insufficient or poorly implemented (Zampiga et al., 2021).

Overall, improving PI requires both technical optimization (e.g., feed, FCR, body weight management) and managerial enhancement, including farmer training, context-specific education, and efficient resource allocation. These findings highlight the need for integrated interventions tailored to the realities of broiler farms in Eastern Indonesia

4. CONCLUSION

This multiple regression analysis highlights several key factors affecting the Performance Index (PI) of broiler farming in Nabire, Papua. Significant determinants include the amount of feed, initial body weight, market weight, market age, and feed conversion ratio (FCR), indicating that feed management and production efficiency are the most critical aspects of optimizing broiler farm performance. These findings underscore the importance of not only feed quantity but also its effective utilization, as reflected in FCR. Demographic and socio-managerial variables—such as age, education, experience, business scale, and labor—showed varying levels of influence, suggesting that human capital and farm management practices still play a supporting but relevant role. Interestingly, external assistance and motivation had limited or negative associations with performance, pointing to the need for more impactful extension services and practical interventions. Future studies should further explore interactions between technical and human factors, and integrate external variables such as input costs, market demand, and environmental conditions to build more comprehensive and predictive models for broiler farming success. A mixed-method approach combining quantitative analysis with field-based qualitative insights may also enhance understanding of underlying causal mechanisms.

REFERENCES

Abougabal, M. S. (2020). Productive performance, carcass characteristics and meat quality of broiler chickens at different marketing ages. *Egyptian Poultry Science Journal*. https://journals.ekb.eg/article_81033.html.

Alotaibi, F., Alkuriji, M., Ahmed, A., Almuhysh, F., Almannaa, S., Bashir, M.A., & Alajmi, R. (2025). The immature stages of sarcophaga dux (diptera; sarcophagidae): a proposed nutritional source for poultry. *Indian Journal of Animal Research* 59 (3): 445-450. https://doi.org/10.18805/ijar.bf-1852.

Amaz, S. A., & Mishra, B. (2024). Embryonic thermal manipulation: A potential strategy to mitigate heat stress in broiler chickens for sustainable poultry production. *Journal of Animal Science and Biotechnology*. Springer. https://doi.org/10.1186/s40104-024-01028-1

ISSN: 2582-0745
Vol. 8, No. 02; 2025

Anang, H. (2025). Analysis of production function in layer chicken business in Soppeng District. *Journal of Global Innovations in Agricultural Sciences* 13 (1): 211–218. https://doi.org/10.22194/JGIAS/25.1439.

Bareith, D., & Csonka, A. (2022). Dynamics of competition in the Hungarian poultry industry. *Agris on-Line Papers in Economics and Informatics* 14 (2): 15-29. https://doi.org/10.7160/aol.2022.140202.

BPS Nabire. (2017). Kabupaten Nabire Dalam Angka 2017. Badan Pusat Statistik Kabupaten Nabire.

BPS Nabire. (2020). Kabupaten Nabire Dalam Angka 2020. Badan Pusat Statistik Kabupaten Nabire.

Charoen Pokphand Indonesia. (2006). Manual Broiler Manajemen CP 707. In *Charoen Pokphand Indonesia, Jakarta*.

Chen, C., Su, Z., Li, Y., Luan, P., Wang, S., Zhang, H., Xiao, F., … & Leng, L. (2021). Estimation of the genetic parameters of traits relevant to feed efficiency: Result from broiler lines divergent for high or low abdominal fat content. *Poultry Science* 100 (2): 461-466. https://doi.org/10.1016/j.psj.2020.10.028.

Czarick, M. & Fairchild, B. (2012). Relative humidity...The best measure of overall poultry house air quality. *Poultry Housing Tips* 24 (2): 1-3.

El-Ghamry, E.H., Karousa, Moh. M., El-gendi, G.M., & Ali, E.A. (2020). Effect of some feed additives (yeast, fenugreek seeds, and chamomile flowers) on some behavioral patterns and productive performance in pigeons (*Columba livia domestica*). *Benha Veterinary Medical Journal* 39: 22-27. https://doi.org/10.21608/bvmj.2020.36464.1226.

Gharib, H., Elmenawey, M., & Hamouda, R. (2023). Factors affecting small-scale broiler chicken farm profitability and challenges faced by farmers in egyptian rural. *Tropical Animal Science Journal* 46(2): 261-268. https://doi.org/10.5398/tasj.2023.46.2.261

Hakizimana, C. (2017). Land and agricultural commercialisation in Meru County, Kenya: Evidence from three models. *Journal of Peasant Studies* 44 (3): 555–573. https://doi.org/10.1080/03066150.2016.1260555.

Husmaini, Putra, R.A., Juliyarsi, I., Edwin, T., Suhartati, L., Alianta, A.A., & Harmaini. (2022). Population structure of Kokok Balenggek chicken in in-situ area as indigenous chicken of Indonesia. *Advances in Animal and Veterinary Sciences* 10 (5): 993–998. https://doi.org/10.17582/JOURNAL.AAVS/2022/10.5.993.998

Liu, L., Ren, M., Ren, K., Jin, Y., & Yan, M. (2020). Heat stress impacts on broiler perfromance: a systematic review and meta-analysis. *Poultry Science* 99: 6205-6211. doi: 10.1016/j.psj.2020.08.019

Marchesi, J. A. P., Ono, R. K., Cantão, M. E., Ibelli, A. M. G., …. & Ledur, M.C. (2021). Exploring the genetic architecture of feed efficiency traits in chickens. *Scientific Reports* 11: 4622-4634. https://www.nature.com/articles/s41598-021-84125-9

Obun, C. O., & Osaguona, P. O. (2013). Influence of post-hatch starvation on broiler chick's productivity. *Journal of Agriculture and Veterinary Science* 3 (5): 05-08. https://www.researchgate.net/profile/ObunOtu/publication/363687390

Onyeachonam, E. C., & Ufomba, A. F. (2020). Enhancing levels of vitamins A, C, and E (antioxidants) in broiler feeds to improve their feed conversion ratios and reduce cost of production. *Asian Journal of Research in Animal and Veterinary Sciences* 3(3): 286-291. https://doi.org/10.9734/ajravs/2020/v3i3100.

ISSN: 2582-0745
Vol. 8, No. 02; 2025

Paly, M.B. (2023). Broiler performance index based on strains, commercial ration and their interaction. *International Journal of Progressive Sciences and Technologies (IJPSAT)* 37 (2): 524-532.

Payte, G. S., Purnamasari, L., Olarve, J. P., de Leon, N.J.P., & dela Cruz, J.F. (2022). Correlation between body weight day old chick (DOC) and body weight each week from commercial farms in province of Rizal, Philippines. *Jurnal Ilmu Produksi dan Teknologi Hasil Peternakan 10 (3): 126-131*. https://doi.org/10.29244/jipth.10.3.126-131.

Prakash, A., Saxena, V. K., & Singh, M. K. (2020). Genetic analysis of residual feed intake, feed conversion ratio and related growth parameters in broiler chicken: A review. *World's Poultry Science* 76 (2): 304-317. https://doi.org/10.1080/00439339.2020.1735978

Rahman, A.A.A., Aziz, M.I., Uthamaputhran, S.A/L., Anuar, N.I.M., Isa, Y.Z.Md @ Yusuff, & Muhammad, N.M.N. (2020). Changing entrepreneurial leadership knowledge competency in higher education: a way to move forward. *International Journal of Criminology and Sociology* 9: 2566-2571.

SPSS. (2007). SPSS 16.0 Command Symtax Reference. Inc. Chicago IL., Chicago.

Ufie, E.K., Malle, D., & Hehanussa, S.Ch. H. (2024). The relationship between feed consumption and broiler feed growth and conversion in the PT Mitra Sinar Jaya Partnership. *Jurnal Agrosilvopasture-Tech* 3 (1): 134-145.

Umar, H., Luka, E., Alu, E., & Peter, E. (2022). Analysis of profitability and technical efficiency of broiler production in north-central, nigeria. *Fudma Journal of Agriculture and Agricultural Technology* 8(1): 56-63. https://doi.org/10.33003/jaat.2022.0801.075.

Yusuf, K.O., Imaji, A.E., Abioye, O.M., Sanusi, H.O., & Abadunmi, T. (2023). Performance of broiler chickens fed wheat offal and maize-based diets. *Journal of Agriculture and Environment* 19 (2): 69-75. https://doi.org/10.4314/jagrenv.v19i2.7.

Zampiga, M., Calini, F., & Sirri, F. (2021). Importance of feed efficiency for sustainable intensification of chicken meat production: implications and role for amino acids, feed enzymes, and organic trace minerals. *World Poultry Science Journal* 77(3): 639-659. https://doi.org/10.1080/00439339.2021.1959277.