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FINANCIAL BENEFITS ANALYSIS OF BROILER CHICKEN FARM OPERATORS IN DELTA STATE NIGERIA

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Abstract: This study examined financial benefits of broiler chicken farm operators in Delta State, Nigeria. Data were collected from 168 randomly selected broiler farm operators with the aid of structured questionnaire and analyzed using descriptive statistics, cost and return analysis and regression analysis. The result showed that 58.3% of the farmers were between age brackets of 31-40 years with 82% of them male and 76.2% were married with 67.9% having household size of 6-10 persons. About 96.4% of the broiler chicken farmers were literate with 66.7% of them having between 11-15 years of experience. The average net profit, gross margin and average net profit per bird as well as return per naira invested were N928720, N1034606, N 1254.82 and N 2.89 respectively. This implies that broiler production is profitable. Poultry droppings/litters were also essential by-products that generate enough income to the broiler chicken farmers. The result of the regression model showed that cost of chicks, cost of feed, cost medicine and veterinary cost positively influenced profit while labour cost, water supply cost , transportation cost and mortality rate had inverse relationship with profit. High cost of feeds, bird mortality and inadequate capital were the major constraints associated with broiler chicken production. It is recommended that if these aforementioned constraints are tackled will help boost broiler chicken production in the study area.

Keywords: Broiler chicken, Production, Profit, Farmers, Gross margin analysis

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1. Introduction

The growth of the poultry industry is one of the fastest avenues of narrowing the dearth gap in protein prevailing in most of the developing countries. The business of poultry enterprise, if appropriately supported can be a source of foreign earnings which has the capacity to complement crude oil that forms the most important source of foreign earnings in Nigeria (PSN, 2009). Livestock production plays a great role in the agricultural economy of developing countries with respect to activating socio economic change, improved income and quality of rural life in Nigeria (Aromolaran et al., 2013). The poultry industry serves as sources of income through employment opportunities for the people.

Broiler production is exceptional in that it gives livestock enterprises the highest turnover rate and the fastest return on investment (Gbigbi, 2017). The money invested in broiler production is recovered more rapidly than any other livestock business. In addition, the meat of broilers has high nutritional value. Broiler had short gestation periods, cholesterol content of the meat very low, returns from broiler investment is fast, need little capital to start, it doesn't requirement large space, good converter of feed and vegetables into meat compared to other animals (Onubuogu and Nnadozie, 2005).

Broiler production involves the keeping of heavy meat breed chickens, in order to obtain high quality meat products, which are generally sold live or processed at age 10 to 12 weeks (Amos, 2006). They need enough feeds to maintain their body weight. Once the supply of feeds becomes unsteady, business expansion is curtailed and in extreme cases, poultry producer are forced to sell their birds pre-maturely. Poor quality of feeds on the other hand, lead to high mortality rate, low productivity and consequently, low rate of returns to investment. Broiler production is conducted in every part of the world with no established political, social or cultural inhibitions associated with their use. In particular, investments in broiler enterprises are attractive, since the production cost per unit is low in comparison to other livestock, the meat is tender and the broiler firms have short cycles of production (Nwajiuba and Nwoke, 2000).

In Nigeria, there is a growing demand for broiler chickens because the interest of meat consumers gradually shifts from red to white meat. At the moment, however, this situation is threatened by high production costs due to the increasing cost of important ingredients required to produce feed. The outputs of broiler production could not meet their demand adequately. The production system for broiler chicken needs to be improved by the use of improved technologies by farm

operators. It is understood that technology adoption has a certain degree of correlation to the farmers' socio-economic qualities.

Broiler chicken production may be linked to farmers' characteristics such as size of farm, availability of labour, risk attitude and level of income (Achoja, 2013). The predicted income flow is one of the drivers of technology adoption. Profit is therefore the fundamental of investment in the decision of farmers to produce broiler chicken. According to Duffy and Nanhou (2003) Farm profitability is influenced by, age of farmer, period devoted to farming activities, machinery usage, economy of scale, productivity of land, management technologies applied, market distance to consumers, plants for processing, environmental conditions, such as soil, relief, weather, prospect of displaying the product in the market and likelihood of using labour.

Adepoju (2008) in his view said that the average per capita animal protein intake in Nigeria was 6.8g. The only way of solving this malnutrition problem with a view to improving the level of daily consumption of animal protein in the country is by increasing broiler production. Broiler production which is part of the livestock sub-sector needs to be a priority area because it holds the key to the problem of protein calorie malnutrition all over the world because of the high quantity and quality of protein content of meat products.

The major difficulties in this research include inadequate markets, high feed and chick-cost, insufficient finance, timely delivery of farm input and inadequate extension services (Rahman et al., 2005). Despite the high nutritional value and importance of broiler chicken production, the production pattern and profitability of broiler chicken is restricted. For increased output, broiler chicken production technology is required. Previously, insufficient research has been given to the cost and profitability of broiler chicken production. This study aims to close the knowledge gap in the development of broiler chicken in Delta, Nigeria with regard to costs, return and profitability.

Although broiler chicken production is highly nutritious and important, the pattern of production and profitability evidence are limited. For increasing production, broiler chicken production technology is necessary. Previous work has not given adequate attention to cost and profitability of broiler chicken production. This study was conceived to close the knowledge gap in the development of broiler chicken in Delta State, Nigeria with regard to costs, return and profitability.

In spite of the large investment in agriculture by the government and individuals to make Nigeria food sufficient, particularly animal protein and income generation, No research to assess its profitability has so far been performed. The situation now seems that people no longer engage in poultry business, those that are still in the business are threatening to withdraw or are diverting to other quick money making ventures. Empirical knowledge on profitability can draw investors into the development of broiler chicken. In addition, where serious constraints are identified and addressed, the production of broiler could gain popularity and growth. The correct policy structure for the poultry-based agricultural economy in Nigeria is explained by a thorough analysis of profitability determinants and constraints on the broiler chicken production.

The study revealed the opportunities that abound in broiler chicken production with a view to engage private investors who desire to go into livestock business to invest more on broiler chicken production or incorporate broiler chicken production into other agricultural practices. It will also be beneficial to policy makers and researchers. Presently, little or no information exist regarding the viability of broiler chicken farm operators in Delta State, Nigeria. The study's broad aim was to analyze the financial benefits of producing broiler chicken in Delta State, Nigeria.

2. Material and Methods

This study was conducted in Delta State, located between longitudes 5° 50` and 6° 45` east of the Greenwich meridian and latitudes 5°, 25` and 6° 30` north of the equator. It is surrounded by way of mangrove forest in the Southern part, rain and fresh water forest in the central and derived savannah in the north. It is delineated into three agricultural zones namely Delta north (9 LGAs), Delta central (8 LGAs) and Delta South (8 LGAs). Firstly, 50% of the LGAs in each agricultural zone were randomly picked. Secondly, two communities were carefully chosen from each LGA, resulting in the choice of 26 communities. Seven (7) broiler chicken farm operators were selected from each of the community to give a total sample size of one hundred and eighty (182) operators. However, 14 questionnaires could not be retrieved for the data analysis resulting to 168 operators used for the study. Data were collected using structured questionnaire. The study covers between 2014-2018 production periods

2.1. Measures of Financial Success

Analysis of data was by cost and return analysis. Mathematically, it is stated as follows (equals 1, 2 and 3):

$$NFI = TR - TC \quad (1)$$

Where;
NFI= net profit
TR= total revenue
TC= total cost

$$TR = Pq \quad (2)$$

Where;
P= Price per unit of output
q= quantity of output.

$$TC = TVC + TFC \quad (3)$$

Where;
TVC= total variable cost
TFC= total fixed cost

2.2. Regression Analysis

In order to ascertain the factors influencing broiler chicken operators' profit, multiple regression analysis was employed. The model is specified as follows (equals 4 and 5):

$$Y = f(X_1 + X_2 + X_3 + X_4 + X_5 + X_6 + \ldots\ldots + Xn + e) \quad (4)$$

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + Xn + e \quad (5)$$

Where;

Y= profit (₦/broiler production cycle)

X_1= cost of day-old chicks (₦)

X_2= cost of feed (₦)

X_3= cost of labour (₦)

X_4= cost of drugs and medication (₦)

X_5= equipment (depreciation) (₦)

X_6= cost of water supply (₦)

X_7= transportation cost (₦)

X_8=mortality rate (%)

a = constant term

b= regression coefficients

e= error term.

2.3. Ethical Consideration

The research was carried out with approval of the Ethical Committee of the Department of Agricultural Economics and Extension, Delta State University, Asaba campus, Asaba, Nigeria. I hereby declare that this research does not include any experiments with human or animal subjects.

3. Results and Discussion

Result in Table 1 showed that 58.3% of the respondents fall within the age bracket of 31-40 years, 23.8% constituted age bracket of 41-50 years and 3.6% fall within 21-30 years. Only 14.3% were above 50 years of age. This implies that majority of the respondents are in their active age of production. The finding corroborates that of Nwankwo (2007) who reported that majority (83%) of the farmers are in their active age bracket of 21-40 years. The result revealed that 82.1% of the respondents were male as against 17.9% female respondents. It implies that the males dominated the business of broiler production because of the tedious nature of the job. This finding is in line with that of (Gbigbi 2017) who reported male dominance in broiler production. The result is similar to the findings of Jabil (2009) who reported that men are more into agricultural production activities.

Table 1. Socio-economic characteristics of broiler chicken operators (N = 168)

Category	Frequency	Percentage
Age (years)		
21-30	6	3.6
31-40	98	58.3
41-50	40	23.3
Above 50	24	14.3
Sex		
Male	138	82.1
Female	30	17.9
Marital status		
Single	24	14.3
Married	128	76.2
Divorced/widow	16	9.5
Household size		
1-5	38	22.6
6-10	114	67.9
11-15	12	7.1
Above 15	4	2.4
Educational level		
No formal education	6	3.6
Primary education	32	19.0
Secondary education	120	71.4
Tertiary education	10	6.0
Broiler experience (years)		
1-5	2	1.2
6-10	42	25.0
11-15	112	66.7
Above 15	12	7.1

The result indicated that majority (76.2%) were married, 14.3% of the respondents are single while the remainder (9.5%) were divorced/widow. This finding is in line with the report of Adamu (2005) who said that 95% of the

peasant farmers in Nigeria are married. The result showed that 67.9% of the respondents had household size of 6-10 and 1-5 constituted 22.6%. About 7% had household size of 11-15 while only 2.4% had household size above 15 persons. The result showed that 71.4% of the respondents had secondary education, 19% had primary education and 6% had tertiary education while only 3.6% had no formal education. This suggests that the broiler producers in the study area are educated. The result showed that 66.7% of the respondents had between 11-15 years of experience while 25% had between 6-10 years of experience. Those with 1-5 years of experience constituted 1.2%. Only 7.1% had above 15 years of experience in broiler production. This implies that the broiler farmers are not novice in the poultry business. This support Gbigbi (2019) who pointed out that farming experience enhances efficiency in resource use.

The result in Table 2 showed the costs incurred on operating inputs and fixed cost over a five-year period for the production of broiler birds under deep litter system. The differences in the total costs incurred in the purchase of day-old chicks are attributed to the differences in the unit price of day-old chicks over the years. While the unit cost of day-old chicks was ₦100 in 2014, the corresponding amount in 2018 was ₦150. Therefore, from these unit costs of purchasing a day-old broiler, the total amount required for the purchase of day-old chicks in 2014 and 2018 were ₦30,000 and ₦70,000 respectively, showing a price increase between 2014 and 2018. The cost of feeding broilers was ₦102, 980 in 2014 as against ₦129, 840 in 2018, showing an increase between 2014 and 2018. The continued increase in the cost of feeds may be attributed to the scarcity and high cost of raw materials used in compounding poultry feeds.

Table 2. Variable and fixed costs of broiler chickens enterprise (2014-2018)

Variable inputs (₦)	2014	2015	2016	2017	2018	Average
Stock	30000	40000	50000	60000	70000	50000
Feeds	102980	113000	113000	121100	129840	115984
Labour	36000	36000	43200	43200	48000	41280
Drugs, veterinary services	4000	6000	6000	8000	10000	6800
Electricity bill	2000	2000	2000	2500	2500	2200
Marketing cost	900	900	950	1000	1000	950
Total variable cost (₦)	175880	188900	215150	235800	261340	215414
Fixed cost depreciation	39235	35401.26	31946.41	28832.75	26026.42	32288.37
Fixed asset interest, stock (₦)	67097.5	65947.76	65837.5	70597.5	68597.5	66847.5
Tax	3500	6150	7760	4500	8000	6750
Total fixed cost	109832.5	107498.76	105543.91	103930.25	102623.92	105885.9
Total cost (₦)	285712.5	296398.8	320693.9	339730.3	363963.9	321299.9

It could also be observed from the Table 2 that the cost of feeding broilers continually increases from 2014 and 2018, The increase in the cost of feeds was probably due to the no emphasis placed on the use of cheaper brewery waste and other local source of feed formulation to be adopted by the farmers in the area of study thereby forcing the cost of feeds to rise as a result of increase in the quantity of feeds demanded. However, as the cost of feeds rise, many farmers were force to invent other ways to supplement the quantity of feeds purchased. This result is in consonance with Haruna et al (2007) findings that cost of feed constituted more than half of the total variable cost of broiler enterprise.

In 2014, the total cost of labour employed for the production of broilers per batch was ₦36, 000 paid to the two poultry attendants that were needed to raise broilers per annum. The amount increased to ₦43, 200 between 2016 and 2017 and ₦48, 000 in 2018, resulting in a total increase over the years. In the case of cost incurred in drugs and veterinary services, the respective amounts over the years under consideration were found to be increasing due to increase in the price of drugs. The result showed that the total variable cost and total fixed cost was ₦215,414 and ₦105,885.9 respectively.

The result in Table 3 revealed that 583 broilers were produced in 2014 with an average price of ₦1500. The total revenue from the sale of matured broiler produced in 2014 amounted to ₦ 874,500 but in 2015, the total revenue was ₦1,039,500. The increase in the total revenue in 2015 was attributed to good management due to rise in the number of broilers produced and rise in price of broiler. 1n 2018, the total mature broiler produced was 838 which was more than the previous years and with a price of ₦2000 per broiler. The average amount realized from the sale of poultry droppings/litters in 2014-2018 was ₦8200. This is an added advantage to the poultry industry. This support a study by Dunkley et al (2010) in South Georgia that cost per ton of litter ranged from $10 to $55. The study found that 27.42% of growers bought litter for $10 to $20 per

ton while 43.55% purchased litter for $21 to $35 per ton. According to Cunningham and Fairchild (2012) opined that between 2008 to 2009 poultry litter for crop production in Georgia was sold for $40 to $60 per ton delivered. Further study showed that litter use in the southern coastal plains based on value of a harvested crop, a ton of stack-house broiler litter added $103.74 acre per year to the crop value (Dunkley et al., 2010). Therefore, the average revenue realized from broiler production between 2014 and 2018 was ₦1,250,020.

The result in Table 4 indicated that the gross margin of broiler production increase from ₦705,620 in 2012 to ₦ 860,100 in 2015 and further increase in 2016 to ₦ 998,350 and 2017 to ₦1,172,300 and also increase to ₦1,436,660 in 2018. It could be observed that operating costs, the number of broilers kept up to market weight had a marketed effect on the magnitude of the gross margin.

Table 3. Revenue from broiler chicken enterprise

Items	2014	2015	2016	2017	2018	Average
No. of day old chicks	962	980	900	992	996	966
No. of mature broilers	583	693	750	772	838	727.2
No. of dead birds	379	287	150	220	158	238.8
Mortality rate (%)	39.4	29.3	16.7	22.2	15.9	24.7
Price per broiler (₦)	1500	1500	1600	1800	2000	1680
Revenue from broilers (₦)	874500	1039500	1200000	1389600	1676000	1235920
Sales of used feed bags (₦)	2000	3500	6000	8000	10000	5900
Poultry droppings/litters (₦)	5000	6000	7500	10500	12000	8200
Total revenue (₦)	881500	1049000	1213500	1408100	1698000	1250020

Table 4. Gross margin analysis for the production of broiler chickens (2014-2018)

Items	2014	2015	2016	2017	2018	Average
Total variable cost (₦)	175880	188900	215150	235800	261340	215414
Total revenue from broiler (₦)	881500	1049000	1213500	1408100	1698000	1250020
Gross margin (₦)	705620	860100	998350	1172300	1436660	1034606
Gross margin/bird (₦)	1210.3	1241.1	1331.1	1518.5	1714.4	1403.08

The result in Table 5 revealed that broiler production was profitable over the years under consideration. The average net profit of ₦928,720.1 and average net profit per bird of ₦1254.82 derived between 2014 and 2018 showed that the farmers gained maximally from broiler production in the study area. This implies that poultry business especially broiler production has the tendency to generate income to improve the living conditions of people in Delta State, Nigeria. Every broiler was found to generate an average net profit of ₦1254.82 and every naira invested on broiler production generated an average return of ₦2.89. The result supports a study by Ironkwe and Ajayi (2007) on broiler production which reveals that it was a profitable business venture, yielding a net farm income of ₦2000/bird.

3.1. Determination of Factors Influencing Profit of Broiler Chicken Farm Operators

Multiple regression analysis was applied to determine the factors influencing broiler chicken operators. The result in Table 6 showed that the double-log functional form was chosen as the lead equation based on the high number of variables that were found significant and high value of R-squared. The result showed that the variation in the output of broiler production is jointly explained by all the explanatory variables accounting for 0.5061. This means that the variables explained only 51% of the total variation in the output of broiler production. The F-value showed that the joint influence of all these variables on output is statistically significant at 1% level.

The study results showed that the relationship between chicks and profitability is positive and significant at 1%. This could lead to the conclusion that the profitability of broiler chicken strongly depends on the price of broiler sold and the number of chicks bought. This finding suggests that the higher the broiler chicken price per unit, the greater the profitability. The result of the study shows that the coefficient of feed cost bore negative sign and has a significant relationship with profitability at 1% level.

This implies that a unit increase in the cost of feed would lead to a corresponding decrease in profitability of broiler chicken production. This could imply that farmers are using high feeds of high quality for their broiler production. The quality of feeds has very high effect on output. The more the quantity of high-quality feed, the more the expenses incurred in response to facilitate the growth of chicken for quick return of higher revenue. This result indicates that higher feed costs will increase

the overall cost to produce broiler chicken, thereby reducing the farmer's net farm income. Work such as Emenyonu et al. (2005) is in agreement with the findings in this study regarding feed cost.

The coefficient of drugs and medication was negative and significant at 1% showing that the more the broiler farmers have preventive measures to avoid death of broilers the more money they will spend. This may result that increase in cost of drugs and medication will lead to high cost, which could reduce profitability. Increase in cost of drugs and medication could lead to use of little quantity by farm operators, thereby affecting the level of profitability. This disagrees with the earlier findings of Tsado et al. (2015), who found out that a successive increase in the cost of medication/vaccine, access to information, quantity of feed, capital items and access to credit will lead to a successive increase in value of poultry production.

Table 5. Net profit of broiler chicken production (2014-2018)

Items (₦)	2014	2015	2016	2017	2018	Average
Sales of broiler (₦)	874500	1039500	1200000	1389600	1676000	1235920
Sales of used feed bags	2000	3500	6000	8000	10000	5900
Sales of droppings (₦)	5000	6000	7500	10500	12000	8200
Total Revenue (₦)	881500	1049000	1213500	1408100	1698000	1250020
Total variable cost (₦)	175880	188900	215150	235800	261340	215414
Gross margin (₦)	705620	860100	998350	1172300	1436660	1034606
Total fixed cost (₦)	109832.5	107498.76	105543.91	103930.25	102623.92	105885.9
Total cost (₦)	285712.5	296398.8	320693.9	339730.3	363963.9	321299.9
Net profit (₦)	595787.5	752601.2	892806.1	1068369.7	1334036.1	928720.1
Net profit/bird	1021.9	1086.0	1190.4	1383.9	1591.9	1254.82
Return/naira investment	2.09	2.54	2.78	3.14	3.67	2.89

Table 6. Determination of factors influencing broiler chicken operators profit

Variable	Coefficient	Standard error	t	p>/t/
Cost of chicks	0.705301***	0.2089285	3.38	0.001
Cost of feed	-0.5261068***	0.1141303	4.61	0.000
Drugs and medication	-0.2532651***	0.0827003	3.06	0.003
Labour	-0.233822**	0.0885902	2.64	0.010
Equipment (depr)	0.0153 NS	0.052254	0.29	0.770
Water supply cost	-0.2980873**	0.144181	2.07	0.042
Transport cost	-0.1711529**	0.0818895	2.09	0.040
Mortality	-0.0158143**	0.0053933	2.93	0.005
Constant	14.8416**	0.6380048	23.26	0.000
R-squared	0.5061			
Adj R-squared	0.4574			
F- value	10.38			

The coefficient of labour cost was negatively significant with profitability of broiler chicken production at 5% level. This result indicates that higher labour costs in the production of broiler chicken could lead to higher overall production costs and a reduction in profitability. The coefficient of cost of water supply was negative and significant at 5% level. Given that if the money spends on supply of water is high it could make the farmer to supply lower quantity which could result to low output and as well low profit. This is a maintenance culture to keep the birds healthy and marketable.

The coefficient of transportation cost was negative and significant at 5% level. This suggests that the cost of transportation incurred during broiler production is inversely related to the profit. This finding could be justified from the distance a farmer will travel to acquire the production inputs. Similarly, the coefficient of mortality rate is negative in the model in line with a prior expectation that the higher the mortality rate, the lower the profit in broiler production. Mortality rate is significant at 5% probability level.

3.2. Constraints Faced by Broiler Chicken Farm operators

The result presented in Table 7 showed the constraints broiler chicken farm operators faced.

3.2.1. High cost of feeds

Most of the broiler chicken operators (88.1%) described high feed cost as their key profitability concern. The results show that lack of ample bird feed would lead to low yields, thereby reducing farmers ' income.

3.2.2. Bird mortality

The study shows that 81.0% of broiler chicken farm operators regard the mortality of birds as an impediment to profitable production of broiler chicken. Profit is the objective and incentive for doing business. The low profit margin due to the high mortality rate could severely discourage current and potential broiler chicken producers.

3.2.3. Inadequate capital

Most of broiler chicken operators (77.4%) agreed that inadequate financing poses a problem in broiler chicken production. In conformity with Gbigbi's previous findings (2017), his study previously indicates that lack of capital is one of the biggest problems of production and profit.

3.2.4. High cost of drugs and medication

About the broiler chicken farm operators (64.3%) agreed that their biggest problem in the field of research was the high cost of drugs and medication. This could be due to few dealers on livestock and veterinary drugs and transaction costs for their services. This causes the sale of their birds at a discount price to adversely affect their profitability.

3.2.5. Poor feed quality

The results show that broiler chicken farm operators (53.6%) agreed that their main issue is poor feed quality. Many farmers have not yet known how to formulate and use modern feed manufacturing technology thereby reducing their operators' profit, as low profit margin could strongly dissuade current and potential broiler producers.

Table 7. Constraints of broiler chicken production

Constraints	Frequency	Percentage
High cost of feeds	148	88.1
Bird mortality	136	81.0
Inadequate capital	130	77.4
High cost of drugs/inaccessibility to veterinary	108	64.3
Poor feed quality	90	53.6

4. Conclusion and Recommendations

This study examined the financial advantages of broiler chicken production amid farm operators. The results show that the production of broiler chicken has significant financial rewards. The gross margin from broiler chicken producers was sufficient to promote current and potential investors in the production of broiler chicken in the study area for the period 2014-2018. The average net profit of ₦928, 720.1 and average net profit per bird of ₦1254.82 derived between 2014 and 2018 revealed that the farmers gained maximally from broiler production in the study area. The major constraints were high cost of feeds, bird mortality and inadequate capital. Base on the findings government should subsidize the cost of feeds, provide good management system through training of farmers on handling of broiler activities to reduce the high mortality rate. Veterinary doctors should be made accessible to the farmers. This will draw investors into the industry and also expand the existing production. Government and NGO's should provide agricultural credit to broiler farmers to ease the financial constraint confronting them. Finally, the government should help the farmers with a programme for proper utilization of the poultry droppings/litters to generate additional income to the broiler chicken farm operators in the study area.

Author Contributions

All tasks have been performed by single author.

Conflict of Interest

The author declares that there is no conflict of interest.

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