Vertical Integration and Profitability in Poultry Industry in Ogun and Oyo States, Nigeria

Olasunkanmi M. Bamiro[1], S. Momoh[2] and D. O. A. Phillip[2]

[1]*Department of Agricultural Economics, Olabisi Onabanjo University,*
Yewa Campus, Ayetoro, Nigeria
[2]*Department of Agricultural Economics and Farm Management, University of Agriculture*
Abeokuta (Unaab), Nigeria

ABSTRACT This study examines economics of vertical integration in poultry industry in Ogun and Oyo States. The study examines the production systems and analyses costs and returns to non-integrated and vertically integrated poultry farms. Primary data were generated using structured questionnaires in a field survey of 100 non-integrated poultry farms, 70 partially integrated poultry farms and 40 fully integrated poultry farms. The analytical techniques employed include descriptive statistics and budgetary analysis. The gross margin analysis reveals that the fully integrated poultry production systems have the highest gross margin while the non-integrated poultry farms have the lowest gross margin per1000birds. The gross margin per 1000 bird realized by non-integrated poultry farms, partially integrated poultry farms and fully integrated poultry farms are N758, 828.07, N909, 973.06 and N985, 645.12, respectively. Likewise, the net farm income per 1000 birds for fully integrated poultry farm is higher than that of partially integrated poultry farm which is in turn higher than that of non-integrated poultry farms. The profitability indicators: value added-sales ratio, rate of return on investment and rate of return on fixed cost, increase with the extent of vertical integration, which confirms that vertical integration, is profitable in the poultry industry.

INTRODUCTION

The business of rearing livestock especially poultry is cost-sensitive. Feed cost, for instance, account for between 65% and 70% of the total cost of raising poultry (Bamiro et al. 2001). This and other cost of poultry production has increased the price of eggs and other poultry products beyond the reach of most Nigerians. The economic implication on the part of the producer is that any producer who can lower his costs by a few Naira per crate of eggs will gain a large share of the market. The desired cost-saving can be achieved via vertical integration (Akinwumi 1976, Oueden et al. 1996).

Dependence on the use of the external market to obtain an input or to exchange an output may be through the use of a contract or a spot market. The quality of the input and the timeliness of the supply cannot be guaranteed. The failure of the external market creates profit and risk incentives for the farm to integrate vertically (Kilmer 1986).

Feed, the major factor militating against the poultry industry, hampers production, not only on the basis of high cost but also due to low quality feeds supplied by the feed millers which has a negative impact on the productivity – low level of egg production as well as rendering the birds susceptible to diseases, hence, the need for backward vertical integration via the production of quality feeds by each poultry farm – firm (Bamiro et al. 2001).

In recent times the experiences of farmers have shown that poultry production has been suffering some setbacks caused by increasing cost of feeds among others, this reduce the net return from the business significantly (Aihonsu 1999). Also many of the existing poultry farms are folding up and prospective investors are becoming increasingly reluctant to invest (Aihonsu 1999). This situation threatens the survival of poultry industry and this calls for concerted efforts to save the industry from total collapse. Failure to do this could lead to a serious reduction in poultry production and protein intake of people resulting into malnutrition and ill health, which again will transform into lower productivity and output. There is, therefore, the problem of finding adequate means of increasing net returns to farmers in the poultry business. The net returns must be significant enough to retain the farmers in the business and attract more participants.

Given the fact that the farmer has little or no control over the demand and prices of the products, because of the nature of the market which is more or less a perfectly competitive, a

more plausible approach to increasing net return to farmers is to reduce the cost of production (Aihonsu 1999). On the basis of the foregoing, poultry farmers need to seek for means to reduce costs, risks and thus increase the profitability of the poultry enterprise. According to (Buzzel 1983), (Ouden et al. 1996) the major objective of vertical integration is to eliminate or at least reduce, the transaction costs incurred when separate companies own two stages of production.

MATERIALS AND METHODS

This study was carried out in Ogun and Oyo states of Nigeria. Data collection was by personal administration of a questionnaire designed to obtain information on poultry farmers' characteristics, flock size, production characteristics and economic aspect of production. Two sets of primary data were collected, one set from the vertically integrated poultry farms, which consists data from partially integrated farms and fully integrated farms; and the second set from poultry farmers that operate non-integrated farms. Stratified random sampling technique was employed for the collection of data from non-integrated poultry farmers and partially integrated poultry farmers in the two states because the non-integrated and partially integrated farms are numerous in the two states. Each division in Ogun and Oyo states was treated as a stratum.

Purposive sampling technique was employed for the collection of data from the fully integrated farms in each state due to low number of the vertically integrated farms in the two states. Data were collected from three hundred poultry farms, two hundred poultry farms from Oyo State and one hundred farms from Ogun State. Data from two hundred and eleven respondents were used for the purpose of analysis. This consists of one hundred and ten non-integrated poultry farms seventy-one partially integrated poultry farms and thirty fully integrated poultry farms. In the selection of the data used for analysis, emphasis was placed on the use of farms that kept fairly good and accurate records of their operations.

Analytical Techniques: Socio-economic characteristics were analysed using frequency tables, and other descriptive statistics. In assessing the extent of vertical integration and the effect on profitability, following (Buzzel 1983), the value added–sales ratio was employed as a measure of the extent of vertical integration in each poultry farm and poultry industry as a whole. Value-added is defined as sales revenue minus all purchases (material components, supply, energy and services by one enterprise from other enterprises). Purchases from another enterprise in the same poultry farm were treated as "outside" purchases.

The value added as a percentage of sales is given thus:

$$(VA)/(S) = 100 \left(S - P/S \right) \qquad \text{……………………..(1)}$$

Where VA= Value added, S= Sales and P= Purchase

Ceteris Paribus, the more vertically integrated a poultry farm is, the higher will be the value added – sales ratio while a less integrated poultry farms have low value added – sales ratio. Value added-sales ratio of 100% implies that 100% of sales is their contribution or value addition to the products.

Profitability Analysis: Profitability analysis was used, in addition to value added-to-sales ratio, to assess the effect of vertical integration on profitability of the poultry enterprise. The poultry farms are classified into three – the non-integrated poultry farms, partially integrated and fully integrated poultry farms. Gross margin per 1000 birds and profitability measures were computed for each category of the poultry farms.

Comparative analysis of the gross margin of the three categories of the poultry farms was carried out so as to make inference on the effect of vertical integration on the profitability of the poultry farms. Following (Aihonsu 1999) the following profitability measures were calculated:

$$RMCF = TVP - TC \qquad \text{……………………..(2)}$$

$$RRTI = 100 \left(RMCF/TC \right) \qquad \text{……………………..(3)}$$

$$GM = TR - TVC \qquad \text{…..………………….. (4)}$$

$$RRFC = 100 \left(RFC/TFC \right) \qquad \text{…..……………….. (5)}$$

Where RMCF = Return to management capital and family labour or net income,

TVP= Total value product, TVC= Total Variable Cost, RRTI =Rate of Return on Investment, TC= Total cost, RFC= Return on fixed cost (Gross margin), RRFC= Rate of return on fixed cost.

Annual depreciation value of each farm asset was calculated using the straight-line method thus:

Annual Depreciation Value =

$$\frac{\text{Cost Price} - \text{Salvage Value}}{\text{Life Span}}$$

Moreover, expected replacement cost for the fixed assets was used to account for inflation. This is necessary because the cost of most working capital items such as breeding stock, equipment and machinery tend to increase both in monetary and real terms with time. It is therefore best from a management and planning point of view to use expected replacement cost.

Each of these profitability measures was computed per 1000 birds. The values obtained for partially integrated poultry farms, fully integrated farms and non-integrated ones were compared so as to reveal the effect of vertical integration on profitability of poultry farms. The poultry farms are classified into three – the non-integrated poultry farms, partially integrated and fully integrated poultry farms. Gross margin per 1000 birds and profitability measure were computed for each category of the poultry farms. Comparative analysis of the gross margin and profitability measures of the three categories of the poultry farms were carried out so as to make

inference on the effect of vertical integration on the profitability of the poultry farms.

RESULTS AND DISCUSSION

Basic Characteristics of the Sampled Farms

Three categories of farms were sampled in this study. These are non-integrated, partially integrated and fully integrated poultry farms. Non-integrated poultry farms are commercial feed users. Partially integrated farms use privately compounded feeds, but mill their feeds at commercial feed milling centres, while fully integrated farms use privately compounded feeds that are milled in their own feed mill. Tables 1 and 2 summarise the basic characteristics of these farms and their farm owners / managers.

Overall, 47.4 per cent of the sampled poultry farms were non-integrated; 33.6 per cent were partially integrated, while the remaining 19 per cent belong to the fully integrated farm category. Owners of the poultry farms are predominantly people that are 40 years or older. Majority of the young poultry farmers (below 40years) were

Table 1: Socio-economic economic characteristics of poultry farmers

Characteristics	Non-integrated		Partially integrated		Fully integrated	
	No.	%	No.	%	No.	%
Age (years)						
Below 40	46	46	26	36.6	6	15
40-<50	20	20	25	35.2	15	37.5
50-<60	24	24	14	19.7	4	10
60 and above	10	10	6	8.5	15	37.5
Gender						
Male	84	84	60	84.5	36	90
Female	16	16	11	15.5	4	10
Main Occupation						
Poultry Farming	46	46	20	28.2	22	55
Civil service	12	12	12	16.9	4	10
Retirees	16	16	3	4.2	3	7.5
Others	26	26	36	50.7	11	27.5
Experience						
5-Jan	40	40	23	32.4	5	12.5
10-Jun	20	20	24	33.8	12	30
15-Nov	18	18	12	16.9	10	25
16-20	16	16	5	7	7	17.5
20 and above	6	6	7	9.9	6	15
Educational Status						
No formal education	0	0	5	5	3	7.5
Primary	0	0	2	2	2	5
Secondary	18	18	18	18	6	15
Diploma/NCE	10	10	10	10	13	32.5
Degree	72	72	36	36	16	40

Computed from survey data (2004)

Table 2: Socio-economic economic characteristics of poultry farms

	Non-integrated		Partially integrated		Fully integrated	
	No.	%	No.	%	No.	%
Enterprise Combination						
Egg production	84	84	32	45.1	28	70
Broiler production	6	6	6	8.5	0	0
Egg and broiler production	6	6	18	25.4	6	15
Egg and cockerel production	0	0	2	2.8	2	5
Egg, broiler and cockerel production	4	4	13	18.3	4	10
Flock Size						
Below 1000	48	48	28	39.4	4	10
1000 - <3000	32	32	28	39.4	14	35
3000 - <5000	10	10	11	15.5	5	12.5
5000 or more	10	10	4	5.6	17	42.5
Years After Establishment						
5-Jan	54	54	30	42.3	10	25
10-Jun	20	20	20	28.2	12	30
15-Nov	18	18	11	15.5	7	17.5
16-20	4	4	5	7	9	22.5
Above 20	4	4	5	7	2	5
No. of Poultry Workers						
3 or less	64	64	45	63.4	8	20
6-Apr	32	32	14	19.7	20	50
More than 6	4	4	12	16.9	12	30

involved in non-integrated poultry farming while poultry farmers that are relatively old operate partially and fully integrated poultry farms. Correspondingly, a higher percentage of farmers that are highly experienced in poultry farming adopt vertical integration.

While both male and female folks are equally involved in the non-integrated poultry farms, the vertically integrated (partial and full) poultry farms are predominantly owned and operated by male poultry farmers. Most of the farms have a flock size that is less than 1000 birds. The non-integrated farms have the smallest flock size while the fully integrated farms have the largest flock size.

Most of the full time farmers are involved in vertically integrated poultry farming while a large chunk of the part-time farmers are involved in vertical disintegration poultry farming. A large percentage of non-integrated poultry farmers have a relatively small flock size that is below 1000birds while most partially integrated poultry farms have a flock size that is relatively high.

Cost and Return Structures of Average Poultry Farm

This subsection presents results of budgetary analyses aimed at determining and comparing the cost and returns, and profitability of operations of an average farm in the sample under the three production systems. Table 3 summarises the cost and returns structures per 1000birds of average poultry farms by extent of integration.

The sources of revenue are sales of eggs, spent layers, broilers and cock/cockerel. The bulk of the revenue at each level of integration was realized from the sales of eggs while the least was from the sales of cock/cockerel. Feed cost constitutes about 62%, 68% and 76% respectively of the total cost of production in non-integrated, partially integrated poultry farms and fully integrated poultry farms. This result shows that feed cost increases with the level of integration. Though, the high percentage share of feed cost is in consonance with the findings of (Aihonsu 1999), (Subhash et al. 1999) and (Shittu et al. 2004), it is however contrary to expectation because vertical integration, according to (McFetridge 1994) is expected to reduce the cost of production.

Stock cost is ranked next to feed (though there is wide gap) in terms of the percentage share of the total cost of production. High share of transportation cost is not unexpected in both non-integrated poultry farms and partially integrated poultry farms because feeds and other inputs are conveyed with commercial vehicles by non-integrated poultry farmers while a colossal amount was expended on conveyance of feedstuffs to and feed from the commercial feed milling centre.

Table 3: Costs and returns per 1000 birds of an average poultry farm in the sample by extent of vertical integration

| | Extent of integration | | | | | |
| | Non-integrated | | Partially integrated | | Fully integrated | |
	Amount N	Share %	Amount N	Share %	Amount N	Share %
Revenue						
Egg	2426930	83.22[1]	2118228	80.14[1]	2182263	81.97[1]
Broiler	77069.8	26.43[2]	117581	4.45[3]	61355.3	2.30[3]
Cock/Cockerel	10461	0.36[4]	63611.7	2.41[4]	47141.9	1.77[4]
Spent Layers	401897	13.78[3]	343840	13.01[2]	371390	13.95[2]
Gross Revenue	2916357		2643260		2662150	
Costs						
Birds Stocked	431590	18.25[2]	327079	18.70[2]	260333. 52	15.38[2]
Feed	148968	61.70[1]	1197937	68.32[1]	1295028	76.53[1]
Veterinary services	29360.2	1.24[6]	22356.6	1.28[4]	20166.1	1.19[4]
Labour	149052	6.30[3]	123955	7.07[6]	66075.6	3.90[3]
Water	22378.9	0.95[7]	19265.1	1.10[6]	13393.3	0.79[5]
Energy	29666.2	1.25[5]	18796.9	1.07[7]	8269.66	0.49[7]
Transportation	30933.7	1.30[4]	20726.7	1.18[5]	11046.2	0.65[6]
Others variable cost	5580.75	0.24[8]	3170.44	0.18[8]	2193.05	0.13[8]
Total Variable Cost	2157529	91.23	1733287	98.86	1676505	98.84
Gross Margin	758828		909974		985645	
Less: Fixed Cost	207285	8.77	198892	1.14	195651	1.16
Net Farm Income	551544		711082		789995	
Profitability Indicators						
Value Added/Sale Ratio	0.26		0.33		0.35	
Rate of returns on investment	23.3		35.63		43.36	
Rate of returns on fixed cost	358.92		440.92		490.36	

Note: Figures in superscripts denote the rank of revenue / cost share in an average poultry farms cost/return structure
Source: Computed from survey data, 2004**.**

The share of energy cost is ranked 5th, 7th and 8th in non-integrated poultry farms, fully integrated poultry farms and partially integrated poultry farms respectively. The high share of energy cost in non-integrated poultry farms and partially integrated poultry farms compared with that of fully integrated poultry farms is unexpected and it might be due to inability to separate energy consumption at the home front from that of the poultry farms because most of the non-integrated and partially integrated poultry farms share the same electrical source with the poultry farmers' house.

It can also be observed from Table 3 that the non-integrated poultry farms in accordance with *a-priori* expectation have the lowest gross margin/1000birds and profit/1000birds while the fully integrated poultry farms have the highest gross margin/1000birds and net farm income/1000birds. The value added-sales ratios for non-integrated poultry farms, partially integrated poultry farms and fully integrated poultry farms are 26%, 33% and 35% respectively. This shows that the higher the value-added sales ratio, the

greater the extent of integration. It also shows the respective contributions or value additions of each system of production.

The rate of return on investment also known as return to capital is highest for fully integrated poultry farms while the non-integrated poultry farms have the lowest return to capital. The rate of returns on investment per 1000birds for non-integrated poultry farms, partially integrated poultry farms and fully integrated poultry farms are 23.30%, 35.64% and 43.40% respectively. These values imply that for every naira invested in non-integrated poultry farms, partially integrated poultry farms and fully integrated poultry farms, about N23.00, N36.00, and N43.00 are realized respectively. The rates of return on fixed cost follow the same trend. Return on fixed cost increases as the level of integration increases. Specifically, the result shows that for every naira invested on fixed assets, there is a return of about N359.00, N441.00 and N490.00 per 1000birds to non-integrated poultry farms, partially integrated poultry farms and fully integrated poultry farms respectively. On the basis of the result and

foregoing discussion, it can be concluded that vertical integration is profitable for the average poultry farm in Ogun State and Oyo State. This in consonance with the findings of (Bamiro 2007).

CONCLUSIONS

In the context of the results obtained from this study, the following major conclusions are drawn:

A large percentage of poultry farmers in Ogun and Oyo states are young and agile with the required vigour needed in the poultry business. Their rich experience coupled with formal education enhances their managerial ability.

The poultry business is left in the hands of sole proprietors who are profit maximizers. The implication of this is that the availability as well as stability in prices of poultry and poultry products cannot be guaranteed. In this wise the outcry of the government for food security and the realization of consumption of required minimum protein of animal source in the nearest future is doubtful.

The profitability of the three categories of poultry farms reveals that the fully integrated poultry farm is the most profitable while the non-integrated poultry farms have the least value of all the profitability indicators. Hence, vertical integration is profitable in poultry industry. However, the profitability of the vertically integrated farms was limited by scale and scope incompatibility.

RECOMMENDATIONS

Based on the findings and conclusions drawn from this study, the following recommendations are made:

Poultry production being cost sensitive, poultry farmers should minimize cost especially feed cost, which accounts for 80% of the variable cost, hence, they should integrate backward by producing their feed.

Maize, being a major ingredient in poultry feeds, and considering the inadequate quantity in the market and continuous increase in its price, poultry farmers should cultivate maize farms, as this will further reduce the cost of production.

Farmers that integrate backward into feed milling should commercialize their feed mill so as not to underutilize the installed feed mill capacity. Rather than just milling feed for poultry farms that have no feed mill, they should sell excess feed unused in their farms. This will help them to overcome the limitation to vertical integration created by scale and scope incompatibility.

The poultry farmers that desire to increase their profitability should endeavour to vertically integrate their poultry farms. However, they should fully integrate, as half-way integrated farms cannot reap the benefits of vertical integration.

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