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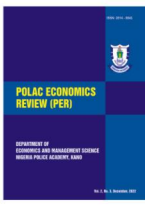

EFFECT OF SOCIOECONOMIC FACTORS ON TECHNICAL EFFICIENCY AND PRODUCTIVITY OF POULTRY INDUSTRY IN UYO METROPOLIS

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Abstract

In recent times, the contributions of poultry industry to food security and raw materials for allied industries cannot be overemphasised. Given the geometric increase in world population and renewed awareness on nutritional advantages of poultry meat over others, these contributions have caused aggregate demand for poultry products to overwhelm aggregate supply, particularly amongst the developing climes. To bridge this gap, it is contended that the impacts of some socioeconomic variables on technical efficiency and productivity of production process of the industry need to be determined. The study assesses the effects of socioeconomic factors on technical efficiency and productivity of poultry industry in Uyo Metropolis. Two Hundred and Twenty-Five (225) poultry producers were purposively selected based on their qualification as accredited and registered farmers within Uyo LGA. Generalized Linear Model (GLM) was used to estimate the parameters using Cross Sectional Data of Year 2019. Results showed that the coefficients of age and educational background were found to be statistically significant at 1 % level of significance. The study therefore rejects the null hypothesis and concludes that some socioeconomic characteristics impact technical efficiency and productivity of poultry industry in Uyo Metropolis. The study therefore recommends that farm owners should employ mature poultry workers with high educational backgrounds to enhance the technical efficiency and productivity of their poultry production activities.

Keywords: Socioeconomic Factors, Technical Efficiency, Productivity, Stochastic Frontier Model, Poultry Industry, Uyo Metropolis, Akwa Ibom State, Nigeria.

1. Introduction

Currently, poultry products make substantial contributions to global food security and nutrition, providing energy, high-quality protein, essential micro-nutrients, vitamins, and minerals as well as essential amino acids to human. Additionally, poultry products serve as raw materials for allied industries and provide a veritable source of income and employment to people the world over. The industry is imbued with immense potentialities in terms of its contributions to economic growth at macro level as well as meeting the basic nutritional and occupational needs of the teeming global population at micro level. The industry has come to change individual livelihood and food habits as well as reduction of dependence on red meat from cow, sheep, and goat and ultimately support agricultural impact on GDP growth, (Som, 2017). The overall socio-economic conditions of the beneficiaries in terms of egg and meat intake, empowerment of rural women and employment opportunities cannot be overstressed.

These developments have stimulated an increasing attention and investment in poultry industry by individuals, corporate bodies, and governments at all levels. Parts of the efforts are aimed at evaluating the possibility of boosting the technical capacity as well as tackling the challenges associated with socioeconomic variables distressing the production process. The perception is ripe that these concomitant challenges are

posing dangers to the smooth service delivery in terms of the industry's capacity to step up supply base to meet the burgeoning demand for its products. According to Omolayo (2016), there are numerous socioeconomic factors which determine the technical efficiency and productivity of poultry production within the industry. These vary from the age, sex, education background, farm size or category and marital status of the producers as well as poultry related ICT training received by the producers. The study is interested in investigating the effects of these factors on the technical efficiency and productivity of poultry production in Uyo Metropolis.

Age of the producers is critical as poultry production requires strength and maturity; so, the most ideal age bracket is between 30 – 50 years. Sex of the producers is equally cardinal in that the male can easily manage a poultry farm much more than the female counterparts in some regions, in a large-scale enterprise and especially the physically demanding aspects. The importance of a high educational background of the producers cannot be overstretched as it bears direct effect on the technical efficiency of the production process, particularly in the adoption of emerging production technologies. Highly educated producers can easily understand and adopt modern farming techniques using ICT facilities compared to the illiterates. Consideration of the marital status of poultry producers is very key as married men and women are more sedentary and emotionally stable than their unmarried counterparts. Thus, married men are presumed to be more responsible and emotionally balance than bachelors.

Given the vagaries of all socioeconomic characteristics, what might be favourable to one poultry outfit may be unfavourable to others. Therefore, the peculiarities and differences existing between the producers and production processes can bear differential effects on the technical efficiency and productivity of the industry. This implies that there could be presence of technical inefficiencies in the production process attributable to some socioeconomic variables inherent in the individual farms and in the industry in general, which might affect productivity. Given all these differential characteristics of the producers, there is therefore the need to holistically investigate and critically examine what socioeconomic variables affect technical efficiency and productivity of the industry to recommend measures that could possibly eliminate potential inefficiencies in the production process. The objective of the study is to estimate the effect of socioeconomic factors on technical efficiency and productivity of poultry industry in Uyo Metropolis. To achieve the objective of the study, the null hypothesis is formulated thus:

H_0: Socioeconomic factors do not affect technical efficiency and productivity of poultry industry in Uyo Metropolis.

2. Literature Review

2.1 Empirical Literature

Som (2017) investigated some socioeconomic factors as determinants of farm management skills among broiler poultry producers in Botswana by deploying descriptive and co-relational methods. A survey of 60 randomly sampled broiler poultry farm operators where statistical tools like mean, frequency, correlation, t-test and analysis of variance were employed. Findings revealed that socio-economic factors of gender, level of education, experience in poultry farming, farm capacity, number of workers employed, ownership status, training status and financial support status significantly influenced the level of farm management skills. Also, that broiler producers, particularly the female should be trained as the training has significant influence on the level of farm management skills.

Alam (2016) carried out a study on the socioeconomic status of farmers and economic analysis of poultry farming at Gazipur District in Bangladesh. A total of 40 poultry farms (20 broilers and 20 layers) were selected. The farmers and farming were evaluated through the analysis of data that were collected in a pre-structured questionnaire. This study revealed that comparatively high level of educational background and health status of the farmers were significant in affecting technical efficiency. The study recommended that more attention should be given to education and training as well as healthcare, especially in layer farming which is more profitable than broiler production.

Omolayo (2016) researched on the profitability and technical efficiency of broiler production in Lagos State Poultry Estate, Nigeria. The study aimed at describing the socioeconomic characteristics of broiler farmers and determining the profitability, technical efficiency and the major bottlenecks affecting the productivity of broiler production in the study area. A two-stage sampling technique was employed for the selection of 100 out of 193 broiler farmers. Descriptive statistics,

farm budgetary technique and stochastic frontier production function were used to analyse the data collected. The research findings revealed a male dominance (73%), with married (80%), literate (90%) and farming experience of less than 9 years (81%) amongst the producers. It was further revealed that educational level of farmers and years of experience were the factors positively influencing the technical efficiency of broiler production in the study area.

Binuomote and Ajao (2008) studied the technical efficiency of poultry egg producers in Oyo State of Nigeria. The study analysed the technical efficiency (TE) of poultry egg producers in Oyo State of Nigeria using a Cobb-Douglas Stochastic Production Frontier Function. The data for the study were collected using structured questionnaire administered on random samples of 51 poultry egg producers. The analysis showed that stock of birds is the most important determinant of poultry egg production while years of experience, management system, educational level and family size are the socioeconomic characteristic influencing the farmers' technical efficiency. The findings show that further productivity gains linked to the improvement in TE may still be realized in poultry egg production in Nigeria.

Adebayo (2005) investigated factors affecting poultry farmers in Ejigbo Local Government area of Osun State, Nigeria. Structured questionnaires were used in interviewing 80 poultry farmers randomly selected in the study area. Frequency distribution and Pearson Correlation technique were used to analyse the data. The study revealed that a national support to strengthen the poultry production is required in the area of finance and inputs. The study revealed that, educational level of farmers had positive and significant relationship with average production while age has negative and non-significant relationship with the average production of the respondents. However, the significant relationship between educational level and average production could be due to sound knowledge and efficient management required of poultry farmers to ensure profitability in poultry business.

Ojo (2003) examined the productivity and technical efficiency of poultry egg production in Nigeria using the stochastic frontier production function analysis. Primary data were collected using a set of structured questionnaires from 200 poultry egg farmers who were selected using multistage sampling techniques, from 5 LGA of Osun state, Nigeria. Results showed that the variables of interest, stock of birds, operating costs, and other costs were effectively allocated and used, as confirmed by each variable having estimated coefficient value between zero and unity. This study further observed that only location of farm (nearness to urban centre) positively affected technical efficiency, while increase in the other socioeconomic variables, age, experience and education led to decrease in technical efficiency.

3. Materials and Methods

3.1 Area of Study

The study area of this research is essentially Uyo Metropolis which is the Capital City of Akwa Ibom State in South-South Geo-Political Zone of Nigeria. Uyo became the Capital City following the creation of Akwa Ibom State on 23 September 1987 from the erstwhile Cross River State. The relief of Uyo Town is that of relatively gentle to monotonously plain land higher than 61 metres and falls within the sub-equatorial climate with a mean rainfall of 2,500 mm and a yearly relative humidity range of 70-80 per cent. The population of Uyo in 2015 was 847,500 and in 2019 was estimated at 1, 138, 019 people (NPC, 2019). The dominant tribe of Uyo is Ibibio speaking people constituting about 80 % of the population. The aboriginal inhabitants of Uyo are predominantly farmers, hunters, and fishermen because the land is suitable for wildlife conservation, food crops, tree crops, fish, and livestock/poultry farming. Agriculture is pursued by about 80 % of the working population, out of which 30 % are engaged in poultry farming. Poultry production in Uyo Agricultural Zone recorded an outstanding performance in its contributions to the economy of the State as it engaged about 40 % of the population and generated about 30 per cent of meat production in 2018 alone, thereby competing favourably with fish production (National Bureau of Statistics, 2019).

3.2 Research Design and Sample Size of the Study

This study was a type of observational research involving a thorough analysis of individual influence of each of the related socioeconomic factors such as age, sex, educational background, farm size or category, marital status and training accorded poultry producers

in poultry enterprise in the area using primary data using nonparticipant observational research method. Furthermore, the study used validated structured questionnaire to elicit responses from poultry keepers who were purposively and randomly chosen and contacted to voluntarily participate in the research within the Metropolis. Other details that the questionnaire couldn't capture were obtained from the aid of interviews and other secondary data including literature searches. Some government officials from the State Ministry of Agriculture and allied sectors as well as other related stakeholders were randomly selected and interviewed.

In this study, multistage and purposive sampling techniques were employed. The first stage involved the identification of the poultry producers that registered with Uyo Local Government Area using their personal biodata and addresses kept in the LGA office. Though there are over 5,000 poultry keepers, about 1,533 were identified as registered poultry farmers in Uyo Local Government Area, (Ekpo, 2019). Therefore, the population of the study is 1,533 registered poultry producers. In the second stage, purposive sampling method was used to identify poultry producers that access and adopt a minimum of five (5) out of eight (8) related ICT facilities in their production activities. These ICT facilities include Computer/Laptop, Mobile Phone, Radio, Television, Internet Services, Mobile Banking/Online Marketing, Solar Panel/Inverter (UPS) and Robot/E-Guarding (CCTV). Hence, out of 1,533 registered producers which constituted the population of the study, only 225 poultry producers met the criteria of ICT adoption and were purposively selected for this study. Therefore, the sample size was 225 respondent producers.

3.3 Model Specification

In this model, technical efficiency is the dependent variable, and the socioeconomic factors are the independent variables. The term technical efficiency is empirically measured by decomposing the deviation into a random component (V_i) and an inefficiency component (U_i). The technical efficiency of an individual firm is defined in terms of the observed output (Yi) to the corresponding frontier output (Yi*) given the available technology: that is:

TE = Yi/Yi* = 1

$$\frac{\ln \beta_0 + \sum \beta_j \ln X_{ji} + V_i - U_i}{\ln \beta_0 + \sum \beta_j \ln X_{ji} + V_i}$$

so that, $= 0 \leq TE \leq 1$ **……1**

Yi = F (Xi; β) TE$_i$ **……2**

Where ***TE$_i$*** denotes the technical efficiency defined as the ratio of observed output to maximum feasible output. ***TE$_i$ =1*** shows that the *i-th* firm obtains the maximum feasible output, while $TE_i < 1$ provides a measure of the shortfall of the observed output from maximum feasible output. The main effort of this study is the estimation of the relationship between TE and the socioeconomic variables using GLS to indicate their possible influences on the efficiency and productivity of the production process of the industry. To achieve this objective, the numerical values of the TE of the individual producers are obtained from the deployment of Stochastic Frontier Model using a statistical tool called STATA, Version 17.

Therefore, the TE equation in terms of the socioeconomic variables is defined by:

$$\mathbf{TE_i = \delta_0 + \delta_1 Z_1 + \delta_2 Z_2 + \delta_3 Z_3 + \delta_4 Z + \delta_5 Z_5 + \delta_4 Z_{4i} + U_i} \quad \mathbf{3.}$$

Where:

TE$_i$ = Technical Efficiency.

Z$_1$ = Age of producers (in years).

Z$_2$ = Sex of the producers (1 = male; 0 = female),

Z$_3$ = Education background of the producers (in qualifications),

Z$_4$ = Marital status of the producers (1 = married; 0 = unmarried)

Z$_5$ = **P**oultry related ICT training (1 = trained; 0 = untrained).

Ui = Error Term.

3.4 Sources and Methods of Data Collection

The methods of data collection were the administration of questionnaires to the 225 respondents who were random selected with appropriate sampling methods. The choice of questionnaire is because it provides the most speedy and simplest technique of gathering data about groups of individuals scattered in a wide and extended field. In this method, questionnaire forms were distributed to the respondents concerned, with a request to answer the questions and return the questionnaire at an agreed time and place. The questionnaire was divided into three sections and designed in a way that encouraged the respondents to

respond adequately to the questions therein. The first segment entailed the introduction of the researcher as well as the assurance of the confidentiality of the information solicited for. The second section contained the biodata and socioeconomic information of the respondents which was considered as critical to the achievement of the objective of the study. The third and the last section contained the remaining questions. All the 225 respondents filled and returned the questionnaire as the researcher painstakingly went after them at the agreed time, date and place respectively.

4. Results and Discussion

This segment presents and discusses the socioeconomic characteristics of the respondents such as age, sex, marital status, educational background, farm size and ICT-related training. It also presents and discusses the results of GLS showing the effect of socioeconomic factors on technical efficiency and productivity of poultry industry in Uyo Metropolitan.

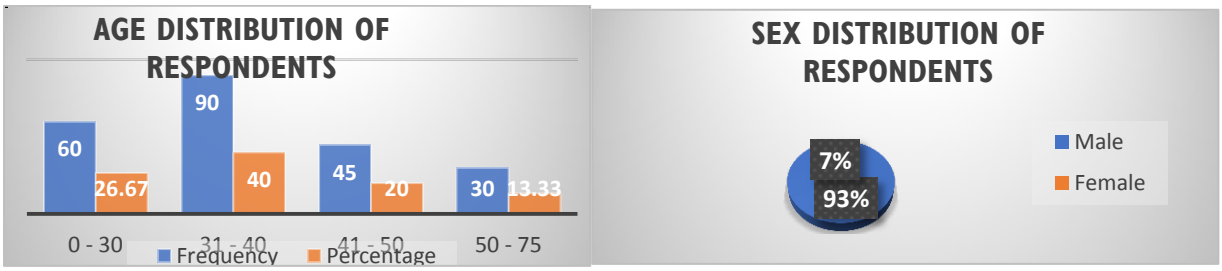
4.1 Socioeconomic Characteristics of the Respondents

The data collected from the respondents through the administration of questionnaire were subjected to empirical analysis and descriptive statistics are presented in the following tables and pie charts.

Table 1: Distribution of Respondents by Age and Sex

Variable	Frequency	Percentage
Age (Years)		
< 30	60	26.67
31 – 40	90	40
41 – 50	45	20
>50	30	13.33
Sex		
Male	210	93.33
Female	15	6.67

Source: Field Survey, 2020.



Source: Field Survey, 2020.

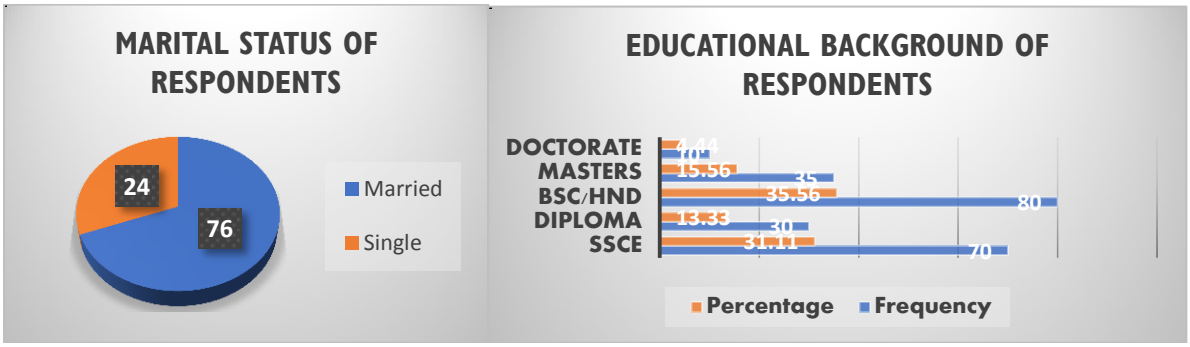
Figure 1: Distribution of Respondents by Age and Sex

The data depicted in Table 1 and Figure 1 revealed that almost two third (60 %) of the respondents have their ages ranged between 31 and 50 years, while the remaining one third is shared by less than or equal to 30 and above 50, respectively. This implies that most of the poultry farmers sampled are in their productive age and this is expected to have a positive influence on the technical efficiency of poultry production process. The result also shows that most (93 %) of the sampled respondents are male, while a paltry 7 % are female. This implies that majority of the poultry farmers in the study area are male, a statistic that indicates that male folks are more involved in poultry farming than their female counterparts in the study area. This is expected as the traditional production method which is the predominant method in the study area requires a lot of strength and time. Also, male counterpart can easily live in the farms without fear of harassment and molestation by invaders than the females, thereby impacting technical efficiency and productivity.

Table 2: Distribution of Respondents by Marital Status and Educational Background.

Variable	Frequency	Percentage
Marital Status		
Married	171	76
Unmarried	54	24
Educational Background		
SSCE	70	31.11
Diploma	30	13.33
First Degree	80	35.56
Second Degree	35	15.56
Doctorate	10	4.44

Source: Field Survey, 2020



Source: Field Survey, 2020.

Figure 2: Distribution of Respondents by Marital Status and Educational Background

On marital status, a moderately high percentage (76 %) of the respondents are married, while 24 % of them are single as shown in Table 2 and Figure 2 respectively. This implies that most of the poultry farmers sampled are married and a pointer that they are responsible and capable in handling poultry management schedules effectively and efficiently. It also implies that majority of the farmers have opportunity of family labour in their poultry farms. From the same Table 2 and Figure 2, most of the respondents are reasonably educated as almost 70 % of them have at least a diploma with only about 30 % having SSCE and below. This implies that the poultry farmers in the study area are literate, and this is expected to influence their tendency to adopt modern production technologies to improve their poultry productivity. This is an indication that the respondents are knowledgeable in the use of appropriate ICT facilities in respect to poultry production. These findings tally with Som (2017) and Omolayo (2016) findings that majority of poultry farmers are literate with different educational backgrounds, and it is expected to have positive and significant impact on their production efficiency. Alam (2016) had earlier reported that there is positive correlation between education and acceptance of innovation among farmers.

Table 3: Distribution of Respondents by Sector (Size of Farms) and ICT Training

Variable	Frequency	Percentage
Categories (Size of Farms)		
Traditional	152	67.56
Commercial	55	24.44
Industrial	18	8
ICT Proficiency		
Trained	100	44.44
Untrained	125	55.56
Source: Field Survey, 2020		

Source: Field Survey, 2020

Figure 3: Distribution of Respondents by Sector (Size of Farms) and ICT Training

Table 3 and Figure 3 revealed that the sampled poultry farmers essentially fall under traditional sector (68 %) with small sizes of farms littered around the study area. This is followed by commercial sector while the industrial sector poultry farmers are very few but large in size and scale of activities. In addition, the same Table 3 and Figure 3 presented that the respondents that have received ICT-related training (44 %) are fewer than the untrained counterparts (56 %). The untrained farmers only rely on a wide range of farming experience acquired over the years, depending on when they started. Ojo (2003) argued that the higher the farming experience, the more the farmer would have gained more knowledge and technological ideas on how to tackle farm production problems and the higher would be his output and income. However, on the contrary, the acceptance and utilisation of ICTs might be slowed down and delayed by majority of poultry farmers who are yet to receive ICT-related training.

Table 4: Multiple Regression Model Results Showing Effect of Socio-Economic Variables on Technical Efficiency of Poultry Industry in Uyo Metropolis

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. regress bc Age Sex Married Qualification Training
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Source	SS	df	MS	Number of obs	=	225
				F(5, 219)	=	10.84
Model	1.56033786	5	.312067571	Prob > F	=	0.0000
Residual	6.30379464	219	.02878445	R-squared	=	0.1984
				Adj R-squared	=	0.1801
Total	7.8641325	224	.035107734	Root MSE	=	.16966

bc	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
Age	.0046406	.0011636	3.99	0.000	.0023472	.0069339
Sex	.0118217	.0299403	0.39	0.693	-.0471864	.0708298
Married	-.0071555	.0293883	-0.24	0.808	-.0650757	.0507647
Qualification	.0168622	.004372	3.86	0.000	.0082455	.0254789
Training	.0331137	.025296	1.31	0.192	-.0167411	.0829686
_cons	.2506028	.0894779	2.80	0.006	.0742548	.4269509

Source: Author's Computation, (2021) STATA Version 17.

Table 4 above depicts the results of the effects of the socioeconomic variables on technical efficiency of poultry production of the study area. Based on the result, only the coefficients of age (0.0046) and educational qualification (0.017) variables were statistically significant at 1 % level of significance (0.000). All the dichotomous variables were not statistically significant. However, the overall regression results with F-statistics value of 10.84 and p-value of 0.000 respectively indicates reasonably good fits. Accordingly, the study therefore rejects the null hypothesis and concludes that socioeconomic characteristics impact technical efficiency and productivity of poultry industry in Uyo Metropolis.

5. Conclusion and Recommendations

The study represents a novel attempt to research on the effect of socioeconomic variables on technical efficiency and productivity of poultry industry in Uyo Metropolis. The socioeconomic characteristics of the respondents indicated that poultry production in the study area is male dominated, who are still in their active ages and abled bodied, suitable for improved poultry productivity. The poultry owners and their

workers are mostly married with high academic qualifications. On the average, the poultry producers in Uyo Metropolis make use of ICT facilities in their production processes as adoption of ICTs was a critical factor in their selection as sample respondents. However, less than 50 per cent of them had not undertaken ICT-related poultry management and production training which affect their level of awareness of some ICTs as sources for receiving poultry production information and emerging technologies.

It was further discovered that the coefficients of age and educational qualification were positively related to technical efficiency and productivity. That is, age of the farms/farmers and increasing the number of employees with higher university degrees could enhance technical efficiency and productivity. Sex, marital status, and ICT-related training were not statistically significant. That is, they did not have influence on technical efficiency during the study period. Generally, the overall result was statistically significant as the F-stat was high (10.8) and p-value, 0.0000. These findings suggest that employing labour within the age bracket of 30 – 50 years and higher academic qualifications has a proclivity to increase technical efficiency and productivity of poultry production in the study area.

The foregoing submission is a clear indication that the main objective of the study which was to investigate the effect of socioeconomic factors on technical efficiency and productivity of poultry industry in Uyo Metropolis of Akwa Ibom State has been realised in that it has revealed the socioeconomic factors that affect technical efficiency and productivity in Uyo Metropolis. The limitation of the study is its restriction to the use of cross-sectional data which inadvertently imposed on the researcher, very scanty and incomplete records. It was only Year 2019 that the 225 respondents provided an acceptable and manageable data set for the study.

It is recommended that:

i. Poultry farm owners should make conscious efforts to employ workers between 30 – 50 years of age to enhance their production capacity.

ii. Poultry farm owners should make conscious efforts to invest more in education and skill acquisition training for their staff to enhance their production capacity.

iii. Poultry workers should show more interest in acquisition of higher education to enhance their poultry production endeavours.

iv. Poultry workers should embark on the acquisition of ICT-related, records keeping and management technique training to impact technical efficiency and productivity of poultry industry.

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