
Profitability determinants of abattoir business in an emerging economy

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Abstract: This study investigates the determinants of profitability of abattoir business in an emerging economy with a particular reference to Ghana. Data for the study comprises both primary and secondary data. Primary data was collected via structured questionnaire from the management staff of an abattoir company who were purposively sampled. Secondary data was sourced from annual reports of the company for the period 2003–2014. The enterprise budget method was used to measure the profitability of the company over the period. Multiple regression models were used to identify factors influencing profitability of the company. The result showed positive correlation between operation profit/loss and cleaning and sanitation, salaries and wages, SSNIT contribution, depression expenses, and protective clothing. The results also identified low slaughter fees, increase in utility and import bills as major challenges that face the company. The study suggests that the company must diversify their business activities and lease some of the noncurrent assets to increased net income and profitability.

Keywords: profitability; abattoirs; meat industry; Kumasi, Ghana.

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1 Introduction

Every organisation exists to achieve its mission statement not only for survival but also for the sustainability of the organisation in the longer term. Among others that will bring this expectation to reality is how profitable that organisation will be. Profit holds an exalted place in business world and in economic theory. The need for profits imposes order and discipline on business organisations. This helps bring about cost-reducing innovations which in turn promote the efficient use of scarce resources. Profit motive also encourages savings and risk-taking, two indispensable elements of economic development. Fridson and Alvarez (2002) reported that profitability is a yardstick by which business people can measure their achievements and justify their claims to compensation. The basic accounting concept of profit is that: profit is equal to income minus expenses or profit is equal to revenue minus costs.

Collier (2003) said that business profitability is determined by the principle of matching income earned with the expenses incurred in earning that income. Income is the value of sales of goods or services produced by the business. Expenses are all the costs incurred in buying, making or providing those goods or services involved in operating the business. The profit (or loss) of a business for a financial period is reported in a profit and loss account. In order to survive and succeed in a competitive market enterprises must focus on maximising profit, or they will eventually be driven out of business (Hofstrand, 2009; Jorgensen, 2012). Hofstrand (2009) supports this claim by saying that only efficient enterprises stay in the market, and that less productive enterprises eventually exit the market. Basically, profitability is what is left of the revenue an enterprise generates after it settles all its expenses directly related to the generation of the revenue and other expenses related to the conduct of the enterprise's activities (Muriu, 2011).

Fridson and Alvarez (2002) said that no matter how meticulously an analyst carries out these computations, however, no calculation of profit can be satisfactory unless it passes a litmus test by differentiating between bona fide profits and accounting profits. After a company earns a bona fide profit, its owners are wealthier than they were beforehand. To underscore the point, there can be no bona fide profit without an increase in wealth. Bona fide profits are the only kind of profits that truly matter in financial analysis while the practical definition of an accounting profit is simple: An accounting profit is whatever the accounting rules say it is. Brierley (2016) noted that profitability analysis can aid decision making to identify profitable and unprofitable items in an organisation.

An abattoir is a place where livestock are killed under strict hygienic conditions and processed for human consumption. The abattoir enterprise generally has become very lucrative over the last decade. Studies conducted in the developed countries by Glen et al. (2001), McMillan and Wohar (2011), Goddard et al. (2005) and Cable and Mueller

(2008), all assessed the determinants of profitability in European meat industries and found significant association for profitability and market concentration. Goddard and Wilson (1999) and Schumacher and Boland (2005) study of determinants of profitability in the US livestock industry concluded on similar results. Conversely, researches relating to profit in the meat enterprise in Ghana are very few. Also, what these studies have in common is that they are based in economics that provide financial support or security for such enterprises (Gschwandtner, 2005; Odagiri and Maruyama, 2002). This study investigates the determinants of profitability of an abattoir company in Ghana.

In general the determinants of profitability are grouped into internal (company specific factors) and external determinants. The internal determinants are mainly influenced by the firm's management decisions whilst the external determinants reflect the macroeconomic and business conditions (Jorgensen, 2012).

The return on assets (ROA) and the return on equity (ROE) are the two most employed measures of profitability (Jorgensen, 2012). ROA shows how an enterprise is using the assets it owns to make income and is one of the most significant measures of profitability (Muriu, 2011). There have been extensive studies that have adopted ROA as a measure of profitability (Olweny and Shiphoo, 2011; Sufian, 2011). ROA expressed as a percentage is the income earned on the enterprise asset (Golin, 2001; Jorgensen, 2012).

On the other hand, some studies have used ROE as a measure of profitability as a ratio of net income (NI) to equity. It shows the income gained shareholders capital. The problem is that firms with high financial leverage tend to generate a higher ratio and this fails to reveal the true financial health of firms. Another problem is that ROE is affected by regulation (Hassan and Bashir, 2003; Naceur, 2003).

However, very few studies have used ROE in concurrence with ROA (Alkassim, 2005; Alrashdan, 2002). Many studies prefer ROA to ROE since ROE does not take into account financial leverage and the risks associated with it (Jorgensen, 2012; Muriu, 2011). In addition, according to Olweny and Shipo (2011) and Sufian (2011) firm's performances are estimated by profitability.

The internal determinants of profitability are influenced by the decisions taken by management. The internal determinants may include but are not limited to salaries and wages; utility and cleaning expenses; repairs; fuels; employees' insurance contribution; and, depending on the organisation, we may have packing and labelling also affecting profitability (Wongnaa and Awunyo-Vitor, 2013). Ayayi and Sene (2010) also noted that the size, operational efficiency, marketing strategies, management strategies, motivation and quality may also influence profitability of business entity. Although most studies have showed that it is difficult to assess some of the variables, most of them are derived from the balance sheets and income statement of the firms (Hermes and Lensink, 2007). Earlier studies have used financial ratios to calculate internal determinants (Jorgensen, 2012; Muriu, 2011).

The expense-to-income ratio is used for operating efficiency and is the ratio of operating costs over total generated revenues (Sufian, 2011). The main elements of operating cost are staff salaries, maintenance cost and other variable cost such as electricity, water utilities (Kosmidou, 2008). Some empirical studies have shown a negative connection with the cost of operation and profitability which means that when operational cost is high profit is lower and vice-versa (Kosmidou, 2008; Sufian, 2011).

The ratio of equity to total assets is used to estimate firms capital adequacy. When a ratio of equity to assets of a firm is high, the firm's need for seeking external funding is

lower which increases the profitability of the firm (Dissanayake, 2014). On the contrary, firms with lower capital adequacy are considered more risky relative to highly capitalised firms (Kosmidou, 2008; Vong and Chan, 2009).

The firm size is usually used to account for potential economies of scale in the entire industry. A few studies have shown that as size increases, profitability rises. A study by Stierwald (2010) claimed that larger firms benefit in relation to smaller firms in higher brand recognition, greater amounts of funds and resources, as well as economies of scale, where they were able to produce larger quantities at a lower per unit cost. A study by Geroski and Jaquemin (1998) show that firm age is a significant determinant of firm profits. Stierwald (2010) argued that a firm's age may serve as an approximation of intangible capital, such as market experience and reputation.

The external determinants measured conditions outside the control of the enterprise (Hassan and Bashir, 2003) and provide a certain level of conditions useful for the enterprise operations (Dissanayake, 2014). Legal, economic and political are some of the factors which are external because firms do not have control over them. The external factors may be grouped under industry-specific (i.e., represents financial structure of the firm) determinants and macroeconomic determinants (Cull et al., 2007). The industry-specific determinants are only specific to the industry under study. For example industry concentration, price elasticity and developments were some that represent industry-specific determinants (Kosmidou et al., 2005; Sufian, 2011). However, in this study, external factors were not considered because the external factors correlate closely with the internal factors. In addition the study is more interested in assessing how the internal factors influence profitability.

2 Methodology

The data for the study was sourced from staff of an abattoir company in Kumasi which was selected because of its operation and access to their ten years annual reports. In addition to the primary data collected from staff of the company, time series data was also extracted from the company's annual reports from 2003–2014.

Descriptive statistics and enterprise budget were used to analyse the primary data collected while the time series data was analysed using regression. If the data series is non-stationary then regression analysis would yield spurious results. Spurious regression results exist when the test statistics show a significant relationship between variables under study in the regression model, even though no such relationship exists between the variables (Greene, 2003). Thus the result of the regression analysis may appear good but would not lead to appropriate economic judgment. Thus in this study the unit root test was undertaken using the augmented Dickey-Fuller (ADF) test, to assess the stationarity level of the data series. The ADF approach is used because it controls for higher-order correlation by adding lagged difference terms of the dependent variable. The ADF test is specified as follows:

$$\Delta Y_t = b_0 + \beta Y_{t-1} + \mu_1 Y_{t-1} + \mu_2 Y_{t-2} + \dots + \mu_p Y_{t-p} + \varepsilon_t \quad (1)$$

where Y_t represents time series data on profitability indicators of the abattoir and the other independent variables over the period, b_0 is the intercept term, β is the coefficient of interest in the unit root test, μ_i is the parameter of the augmented lagged first difference

of Y_t to represent the p^{th} -order autoregressive process, and ε_t is the error term. In carrying out the unit root test, the study seeks to test the hypothesis that:

$$H_0 : \beta = 0, \text{ Non stationary (there is unit root)}$$

$$H_1 : \beta \neq 0, \text{ Stationary (no unit root)}$$

The decision rule involves comparing the computed ADF value with critical values which influence acceptance or rejection of the hypothesis. When the result gives a lower value of the computed (ADF) statistic as compared with the MacKinnon critical values, the null hypothesis of non-stationarity in the data series is not rejected. If the null hypothesis is rejected, then the time series data is stationary, hence no unit root.

The study employed multi-regression equation to determine the factors that influence the profitability of the abattoir.

The estimated equation was specified as:

$$\begin{aligned}
 OPL_{it} = & \alpha_i + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{5t} \\
 & + \beta_6 X_{6t} + \beta_7 X_{7t} + \beta_8 X_{8t} + \beta_9 X_{9t} + \beta_{10} \ln X_{10t} + \varepsilon_t
 \end{aligned} \tag{3}$$

where

- X_1 salaries and wages (in cedis)/annum
- X_2 cost on electricity/water (in cedis)/annum
- X_3 risk cost (cost of cleaning and sanitation in cedis)/annum
- X_4 cost of plant repair and maintenance (in cedis)/annum
- X_5 cost of fuel and gas
- X_6 cost of protective clothing
- X_7 cost of packaging and labelling
- X_8 employees SNNIT contributions
- X_9 cost of marketing expenses
- X_{10} cost of plants consumables and marketing

3 Results and discussion

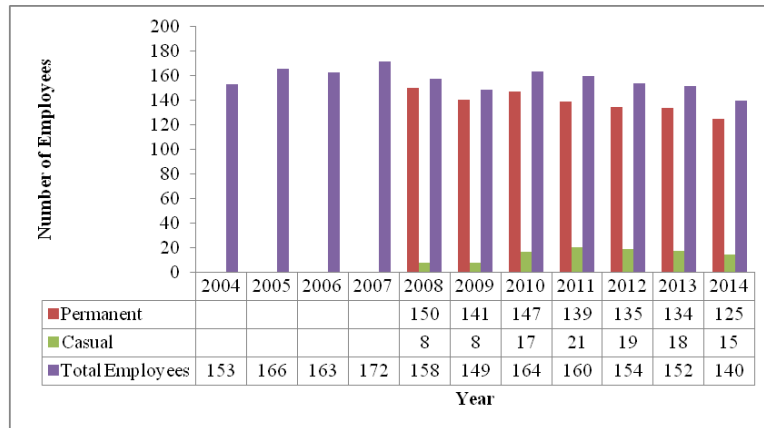
3.1 Socio-economic characteristic of the respondents

The types of labour used in this study were full time (permanent) labour and casual labour. Casual employees according to the Ministry of Employment are mostly people employed for six months mainly for minor jobs. Full time or permanent workers are employed permanently for more than a year and more. The number of employees in this

study refers to the total workforce (employed by the Kumasi abattoir). The total numbers of employees employed by abattoir are presented in Figure 1. An employment trends analysis of Kumasi abattoir shows a slight downward trend between 2003 and 2014. The

full time staff consisted of 153 to 125 permanent employees and 8 to 15 casual employees (Figure 1). The result implies that red meat industry has been adequate in providing jobs for new entrants into the labour market. This expansion underlines the importance of the industry as a source of local job creation

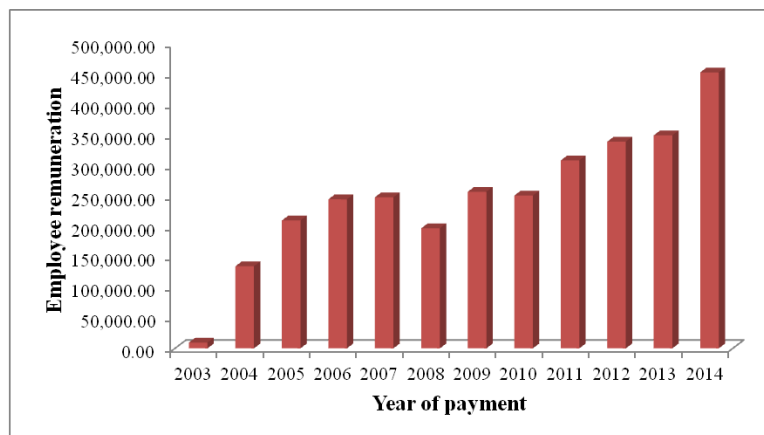
Figure 1 Number of employees in Kumasi abattoir (2003–2014) (see online version for colours)



Source: Authors' 2015.

Figure 2 presents the remuneration for employees from 2003–2014. The current minimum wage paid to employees in Ghana according to the Ministry of Employment is 5 cedis (\approx US\$ 2). The remuneration of employees in this study is placed under variable costs. The result shows that Kumasi abattoir paid permanent employees GH¢ 9,634.07 in 2003 and more than GH¢ 453,069.43 in 2014.

Figure 2 Employee remuneration at Kumasi abattoir (see online version for colours)



Source: Authors 2015

Table 1 Kumasi abattoir profitability measurement

Year	Profitability indicators									
	Net profit (GHC)	Total cost (GHC)	Gross margin profit (GHC)	Total revenue (sales income) (GHC)	Net income (GHC)	Profitability index	Rate of return on investment	Rate of return on variable cost (%)	Operation ratio (%)	Operation profit/loss
2003	258,888	480,910	185,718	500,040	403,699	0.81	83.9	6.09	1.00	19,130
2004	(29,452)	663,453	206,357	655,662	520,929	0.80	78.5	(1.73)	1.00	(7,790)
2005	(133, 251)	880,109	264,137	861,757	660,762	0.77	75.1	(3.07)	0.63	(18,352)
2006	20,700	975,693	331,336	100,622	76,157	0.76	78.1	4.52	1.2	30,526
2007	18,611	946,186	292,688	971,665	723,647	0.75	76.5	(3.75)	1.2	25,479
2008	(47,790)	1,023,924	261,588	948,226	750,986	0.79	73.3	(11.02)	1.10	(75,698)
2009	17,133	1,395,921	298,855	1,392,896	1,135,768	0.82	81.4	(0.28)	1.00	(3,028)
2010	(97,923)	1,319,456	371,567	1,207,035	956,198	0.79	72.5	(12.72)	1.10	(112,421)
2011	153,701	1,503,481	638,573	1,617,106	1,308,523	0.81	87.0	13.10	0.86	113,625
2012	131,811	2,698,235	802,611	2,835,371	2,491,636	0.88	92.3	12.02	0.64	137,136
2013	(64,820)	3,115,238	719,214	2,969,300	2,629,949	0.89	84.4	(12.63)	0.68	(145,938)
Average		1,500,261				0.88	88.3	(0.95)	0.93	

Source: Field data, 2015

3.2 Costs and returns associated with abattoir operations

The principal activity of Kumasi abattoir is the processing of red meat and slaughter of animals for the local market for a service fee. The fees charged should be sufficient to pay for direct cost, variable cost and general and administrative expenses and the remaining as profit.

The profitability indicators used in this study include net profit (NP), total cost (TC), gross margin (GM), NI, PI, rate of return on investment (ROI), rate of return on variable cost (RVC) and operating ratio (OR):

- *Net profit:* The NP of Kumasi abattoir was calculated by subtracting TC from total revenue (sales income). The results in Table 2 show that in the year 2004 (GH¢ 29,452), 2005 (GH¢ 133,251), 2008 (GH¢ 47,790), 2010 (GH¢ 97,923) and 2013 (GH¢ 64, 820) the NP was negative. However, in 2003 (GH¢ 25888), 2006 (GH¢ 20,700), 2007 (GH¢ 18,611), 2009 (GH¢ 17, 133), 2011 (GH¢ 153, 701) and 2012 (GH¢ 131, 811) recorded a positive NP respectively.

The finding is in line with a study by Sufian (2011) and Olweny and Shipo (2011). According to their respective studies assessing farm profitability can be achieved through the following four measures; ROA, ROE, net farm income (NFI), and operating profit margin. The studies suggested NFI ratios could increase the profitability of agricultural related activities resource.

- *Total costs:* The total sums of direct, variable costs and general/administrative expenses in Kumasi abattoir are referred to as TC. TC in this study was calculated by adding the total variable costs (TVC), total direct costs (TDC) and total general/administrative expenses. TVC in this study include plant and marketing consumables, fuel/gas, electricity and water, protective clothing, cleaning and sanitation, salaries and wages, packaging and labelling, marketing expenses used in the processing of the red meat, salaries and wages, employees SNNIT contribution, depreciating expense. The average TC (for the ten years under review) of the abattoir was GH¢ 1,500,261 as presented in Table 1.
- *GM profit:* Jorgensen (2012) define the GM as the difference between the total volume of sales and the direct and variable costs. Therefore, GM in this study was calculated by subtracting total direct and variable costs from total sales income. In this study GM profit/loss analysis was done to determine which year gave the highest returns with respect to direct and variable costs of activities carried out by the abattoir. The highest returns in respect of variable costs of operation was achieved in the year 2012 (GH¢ 802,611) and followed by 2013 with GM profit of GH¢ 719,214 as presented in Table 1.

The study finding is in consistent with study undertaken by Muriu (2011). According to Muriu (2011) profit margin may be improved if volume of sales goes up. When this happens, the business can raise profit as they manage the factors within their control. Thus, by improving abattoir efficiency and sales, and reducing costs by using optimal levels of inputs the abattoir would be more profitable.

- *Net income:* The NI serves as a proxy for the profitability of the abattoir. NI of Kumasi abattoir was determined by subtracting salaries/wages from total sales income. The highest NI (GH¢ 2,629,949) in Table 1 was achieved in the year 2013.
- *Profitability index:* The profitability index (PI) was determined by dividing NI (subtracting total sales income from salaries/wages) by total revenue (total sales income). Sales income represents the value of goods invoiced to customer during the year net of discounts and returns. In Kumasi abattoir, the financial statements are prepared under the historical cost conversion. Table 1 presents the results of PI. PI was used in this study as an investment appraisal ratio which measures the percentage of NP per one Ghana cedi of sales. According to the results in Table 1, Kumasi abattoir shows the average PI of positive 0.88 over the entire ten years. This indicates that for every Ghana cedi earned as revenue, 88 pesewas were returned to Kumasi abattoir as NI hence very profitable. The result is consistent with studies by Phiri (2012) where PI was employed as an investment appraisal ratio to measure the percentage NP per one Malawian Kwacha (MKW) of sales. The results of Phiri (2012) recorded a PI of 0.99 which indicated that every MKW earned as revenue, 99 Malawian Tambala were returned to the farm as NI. However, the results were contrary to Bano et al. (2011) which recorded 0.07 and 0.16 PI. Bano et al. (2011) results indicated that for every Pakistani Rupee earned as revenue, 7 and 16 Paisas were returned to farm as NI.
- *Rate of ROI:* The rate of ROI was calculated as a percentage ratio of NI to TC. ROI ratio in this study was used to estimate net earnings per one Ghana cedi investment. The average ROI for the abattoir over the period of ten years was GH¢ 88.3, which indicates that Kumasi abattoir capital assets were declining by 30 pesewas per every cedis capital invested.
- *Rate of RVC:* The rate of RVC (percent) was determined by subtracting total revenue (sales income) from TC divided by TVC. According to Phiri (2012), rate of RVC is a profitability indicator which measures net earnings per cedis spent on variable cost. The average RVC for Kumasi abattoir was negative (−1.0%). The results show that the higher ratios of variable and fixed costs to total revenue sales lower the profitability of the abattoir. This finding was contrary to that of Hofstrand (2009) where the use of limited resource by controlling their variable costs brought efficiency and subsequently profit.
- *Operating ratio:* OR is a profitability indicator which measures percentage of variable cost per one Ghana cedi sale (Phiri, 2012). The average OR for Kumasi abattoir was 1.0 (100%). This result indicates that for every cedis sale, the percentage of variable cost was 100% respectively. The results further reveal that the OR in 2011, 2012 and 2013 was 0.86 (86%), 0.64 (64%) and 0.68 (68%) respectively. The changes in OR for the different years can be attributed to prices of the inputs of variable cost such as electricity, labour cost, water cost and other variable cost during a respective years under review.

Table 2 Descriptive statistics of the variables used in the regression model

<i>Variables</i>	<i>Mean</i>	<i>Min</i>	<i>Max</i>	<i>SD</i>
LnOPL	-0.73	-12	12	1.12
Ln X ₁₀ (plant/marketing)	10.82	10	12	0.60
Ln X ₅ (fuel/gas)	11.27	10	13	0.79
Ln X ₂ (electricity/water)	11.45	11	12	0.522
Ln X ₄ (plant repairs/maintenance)	10.55	10	11	0.52
Ln X ₆ (protective clothing)	10.09	7	12	1.64
Ln X ₃ (cleaning/sanitation)	9.18	8	10	0.60
Ln X ₁ (salaries/wages)	12.18	11	13	0.60
Ln X ₈ (SSNIT contribution)	9.00	0	11	3.03
Ln X ₁₁ (depreciation expense)	10.36	7	11	1.433
Ln ₇ (package/labelling)	9.09	8	11	1.221
Ln ₉ (marketing expenses)	8.55	7	10	1.036

Source: Field data 2015

Table 2 presents the descriptive statistics of the various indicators employed in this empirical analysis to explain the data. Operating profit/loss ranges from -12% to 12% with a standard deviation of 1.12. Generally, the differences in standard deviation figure for all variables are small compared to the mean which signify that financial statements are consistent in their evaluation. SSNIT contribution has the highest standard deviation of 3.03% which signify uneven number of employers engaged by the abattoir. Operating profit/loss has the least mean of -0.73%. The negative sign accompanying the operating profit/loss signifies a loss, implying that the abattoir after paying all variable cost, was operating at a loss.

3.3 Correlation among the variables used in the regression analysis

Table 3 presents the correlation coefficient between the independent variables. The results suggest the highest positive correlation coefficient of 0.94 exists between log of salaries and wages and log of fuel and gas. The results indicate a strong relationship between salaries and wages and fuel and gas signifying multicollinearity. According to Greene (2003) a correlation value of above 0.80 indicates multicollinearity. Multicollinearity provides an indication that either salaries and wages or fuel and gas share much information about operating profit/loss hence the study analysis is unable to distinguish the effects of one over the other. This means that one of the independent variables has to be removed from the analysis and the regression analysis performed again. The least correlation is between log of SSNIT contribution and log of plant and market consumables of -0.06. The negative correlation coefficient implies that as SSNIT contribution increases, plant and market consumables decreases and vice versa.

Table 3 Correlation matrix

Variables	LnOperation profit/loss	Plant/marketing	Fuel/gas	Electricity/water	Plant repairs/maintenance	Protective clothing	Cleaning/sanitation	Salaries/wages	SSNIT contribution	Depreciation expense	Package/labelling	Marketing expenses
LnOperation profit/loss	1.000											
Plant/marketing	-0.65	1.000										
Fuel/gas	-0.09	0.33	1.000									
Electricity/water	-0.13	0.61*	0.64*	1.00								
Plant repairs/maintenance	-0.22	0.66*	0.58*	0.47	1.000							
Protective clothing	-0.07	0.32	0.68*	0.53*	0.29	1.000						
Cleaning/sanitation	0.05	0.65*	0.52*	0.66*	0.61*	0.59*	1.000					
Salaries/wages	0.05	0.38	0.94*	0.66*	0.61*	0.69*	0.73*	1.000				
SSNIT contribution	0.20	-0.06	0.25	0.38	-0.19	0.72*	0.16	0.22	1.000			
Depreciation	0.04	-0.61	-0.10	-0.51	-0.43	-0.27	-0.66	-0.20	-0.16	1.000		
Packages/labelling	-0.21	0.25	0.18	-0.23	0.71	-0.30	-0.16	0.11	-0.54	0.436	1.000	
Marketing expenses	0.22	-0.15	0.54	0.05	0.13	-0.89	0.15	0.47	-0.10	0.26	0.69	1.000

Notes: * Significant at 10%; **significant at 5%; ***significant at 1%

Source: Field data 2015

The result further suggest a positive correlation between past values of operation profit/loss and the following independent variables (cleaning and sanitation, salaries and wages, SSNIT contribution, depression expenses, protection clothing). Conversely, past values of operations profit/loss values has an inverse correlation with plant and marketing consumables, electricity and water, fuel and gas, plant repair and maintenance, packaging and labelling and market expenses. The results findings show that the lower the correlation coefficient between any pair of the independent variables, the lower the multi-collinearity and vice versa.

3.3.1 Test of stationarity

In order to avoid spurious regression, the data was analysed to find the level of stationarity. The result is shown in Table 4. ADF test was used to test for the level of stationarity. The Philips-Perron (PP) test was also applied to augment the ADF test since it has the ability to correct for serial correlation and heteroskedastic error term. The result shows that all the variables were non-stationary at the level except operating income which was level-stationary at 5% significant level. However, all the non-stationary series became stationary first differencing except fuel/gas expenses and protective clothing.

Table 4 Results of the unit root test

Variable	ADF unit root test		PP unit root test	
	Level	1st differenced	Level	1st differenced
Plant marketing	-2.443	-4.229***	-2.440	-4.406***
Fuel/gas	1.153	-1.666	1.274	-1.666
Electricity/water	-1.173	-8.146***	-0.902	-11.257***
Plant repairs maintenance	-1.913	-3.633***	-1.955	-3.570***
Protective clothing	-0.034	-2.374	0.412	-2.274
Cleaning sanitation	-2.111	-9.474***	-2.090	-7.739***
Salaries/wages	-1.510	-3.082**	-1.532	-3.106**
SSNIT contribution	0.125	-5.626***	0.848	-5.040***
Depreciation expense	-2.410	-3.107***	-2.332	-3.240**
Package/labelling	-1.833	-3.159**	-1.941	-3.220**
Marketing expenses	-0.723	-2.720*	-1.007	-2.729*
Operation profit and loss	-3.332**	-2.990*	-3.391**	-2.833*
Net income	0.108	-3.336**	0.649	-3.365**

Notes: *Significant at 10%; **significant at 5%; ***significant at 1%

Source: Field data 2015

3.4 Factors affecting profitability in the Kumasi abattoir

The results of the multiple regression analysis on the factors influencing profitability of Kumasi abattoir are shown in Table 5. The results show that about 86% of the variability in the GM and operating profit/loss was explained by the factors included in the model. That is, these factors highly explain variations on the level of profit. Fuel and gas

expenses and expenses on protective clothing were excluded from the regression estimation because they were neither level stationary nor first differenced stationary. Also marketing expenses and expenses on clothing were omitted from the model since they were highly correlated.

Table 5 Results of the regression analysis

<i>Variables</i>	<i>Coefficients</i>	<i>t-statistics</i>
Plant/marketing	-2.050	-1.78*
Electricity/water	-0.195	-0.19
Plant repairs maintenance	1.136	0.59
Cleaning sanitation	5.964	2.55**
Salaries/wages	0.550	0.523
SSNIT contribution	1.568	0.31
Depreciation expense	1.125	1.67
Package/labelling	0.039	0.07
Adjusted R-squared	86%	

Notes: * and ** represent significant levels at 10% and 5%, respectively.

Source: Field data, 2015

Two out of the eight factors included in the model were significant. These are plant/marketing consumables and cleaning and sanitation. This means that these factors must be given utmost consideration in any decision aimed at improving the GM or profit in the abattoir enterprise.

Six of the independent variables plant repair and maintenance (1.136), cleaning and sanitation (5.964), wages and salaries (0.550), SSNIT contribution (1.568), depreciation expenses (1.125) and packaging and labelling (0.039) of these factors had positive coefficients, that is they move in the same direction. This might be explained that constant working of machines and equipment, cleaning and sanitation, packaging and labelling, etc., made the dressed animal product purchase appealing that customers patronised their services and are prepared to pay for the services and payment of salaries of workers boost workers morale to give out their best. Though these variables have positive relationship with profits on cleaning and sanitation was significant.

Electricity/water expenses conformed to the theoretical expectation of a negative sign suggestion. Thus, profit and electricity and water expenses move in the same direction. Marketing expenses (-0.19) are expected to increase awareness for the product in order to increase sales and therefore profit. However, a negative relationship between marketing expense and profit may mean that there were little quantity of the animals being brought from farmers for slaughtering and process. Also plant and marketing expenses had a negative and significant effect on profit. This calls for relook at the marketing strategies employed by the Kumasi abattoir.

The finding derived from this study is consistent with past studies by Anang et al. (2013) which found that for limited resource and other small farms to become more profitable, controlling their variable and fixed costs is more effective than other measures considered. Their study further shows that the higher ratios of variable and fixed costs to total value of agricultural production lower the profitability of limited resource farms.

3.5 *Challenges faced by management*

The results from documentation review shows that the abattoir's operation is one of the many renowned and classified agricultural businesses. It is said to be classified for reasons that concern public health and life especially the safety of the people who consume meat. It is also a business and must be handled as an industrial business to manage resources equitably, efficiently and optimally to make profit. An abattoir's operation hinges on capital intensive structural components both in cost and in fixed assets and variable cost items for running the plant.

Usually abattoirs all over the world thrive on two parameters, i.e., either it is subvented/supported by government, boroughs or counties they serve or it is operated privately to make profit as a business entity. However, the results from the interview with the finance manager revealed that Kumasi abattoir company opted for the latter option and so its operational sustainability depends upon its profitable growth trends during its operational periods when its plant and machinery are new and providing optimal cost to its running cost.

The study identified the following as major challenges that face KACL over the years. The main challenges currently are:

- The low slaughter fees appropriated below the marginal cost of its operations.
- Spiral increases, i.e., higher proportional increment of utility bills on water and power consumption imposed by the utility companies.
- Import bills on plant consumables or saw blades and machinery parts and high implied depreciation annual provisional expenses.
- Frequent government conventional controls on minimum wage, which resonate with cost of living in the country. These badly impinge on the company's limited financial resources every year.

4 **Conclusions and recommendation**

NP margin is an indicator of how efficient a company is and how well it controls its costs. The low profit margin recorded by the company in some of the years under review indicates a decline in sales that erased profits and resulted in a net loss. Likewise, the higher profit margin for the other years showed increase in sales thus the company was more effective in converting revenue into actual profit. The implication for mixed results showed by NP means that management of the company should review its abattoir pricing policies, cost structure and service efficiency to avert net loss.

The highest returns in respect of variable costs of operation, NI recorded for 2012 and 2013, suggest that management improved the abattoir efficiency and sales, and reduced costs by using optimal levels of inputs that made the abattoir more profitable. The results of PI and rate of ROI of 0.88 for Kumasi abattoir over the ten years period confirmed that the abattoir pricing policies, cost structure and service efficiency had improved, the NI will increase therefore improving the fortune of the company.

The negative result implication on RVC for Kumasi abattoir suggests that when the cost of certain items in the variable cost goes up irrespective of sales volume then the

profit margin is affected. The results show that higher ratios of variable and fixed costs to total revenue sales reduce the profitability of the abattoir.

The results of the multiple regression analysis indicated that about 96% of the variability in the GM and operating profit/loss was explained by the factors included in the model. That is, these factors have substantial effects on the level of profit. Two out of the ten factors included in the model were significant at 5%, these were plant/marketing and cleaning and sanitation. This means that these factors must be given utmost consideration in any decision aimed at improving the GM or profit in the abattoir enterprise. Two plant/marketing (−2.050) and cleaning and sanitation (5.964).

Though packaging and labelling had positive effects on profit, they were, however, not significant. Fuel/gas (−0.27) conformed to the theoretical expectation of a negative sign suggesting that as more of the resource is utilised, without an increase in the volume of dressed animals processed, profit would decrease. Another reason is the increased global price crude oil until late 2014 when it started to decline. Likewise as more plant/marketing consumables (−1.57) were used, the profit reduced. Marketing expenses (−0.19) are expected to increase awareness for the product in order to increase sales and therefore profit. However, a negative relationship between marketing expense and profit may mean that there were fewer the animals being brought by farmers for slaughtering and processing. Depreciating cost (−0.15) also conformed to the a priori expectation of a negative sign. High depreciating cost may be due to obsolescence of machines and equipment. As revealed in the study, most of the processing equipment is old.

The paper suggests that if Kumasi abattoir diversify their business activities, their business is likely to experience increased NI and returns to operation ratio. The profit margin can be improved if management adjust upward the current service fee to reflect current market price, and reduce input cost such as variables cost of electricity/water, salaries/wages by purchasing new processing equipment to replace old ones. In such conditions, the abattoir can raise profit margin if they manage the factors within their control. Finally the abattoir can lower its debt-to-asset ratios and increase the profitability of abattoir resources which are limited by leasing some fixed assets such as unused land and machines and equipment to minimise the need for capital financing.

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