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## PROFIT MAXIMISATION AND OTHER KEY PERFORMANCE INDICATORS MEASUREMENT IN A MULTI PRODUCT MANUFACTURING COMPANY

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### **Abstract**

*This paper evaluates profit maximisation objective in a multi product manufacturing industry. The study used secondary data collated from annual reports of the case study analysed with the use of ordinary least square run on Econometric views. The result of the analysis shows that profit in a multi-product company is significantly related to the identified KPIs. It is recommended that business firm should not place too much emphasis on profit maximisation as if it is the only corporate objective of their company as this might sometimes portray a bad image to the public.*

**Keywords:** Profit maximisation, Organisation, Allocation of resources, Business objectives

### **INTRODUCTION**

As competition intensifies and businesses cope with the challenges in the 21<sup>st</sup> century, performance of business organisation and their objective continue to be in the spot light. Increased consumerism have raised question about the way in which organisation performance is to be measured, under a competitive market and their corresponding objectives. Thus, a definitive answer to this question is unavailable. Nonetheless, Baumol (1990) remarked that firms and their executive are often not clear about their objective; in fact, it is a common experience when interviewing executives to find that they will agree to every plausible goal about which they are asked. However, profit maximisation regardless of business firms area of operation and specialisation, is still the basic measure of organisational success which serve as an important catalyst of business growth and survival. Most business organisations especially manufacturing companies hence do make profit as their main objective, thereby placing little or no value on other objectives of organisation. Most companies corporate objective is based on optimal allocation of resources which is not only enough to lead to profit maximisation but rather an effective manipulation of the marketing mix that result to higher sales thereby leading eventually to profit. In maximising profit, the input-output relationship is crucial; either by maximising output for a given amount of input or minimising the use of input (and therefore reducing cost) for producing a given amount. Thus, profit maximisation ensures that firms utilise resources efficiently. More so, profit being a more reliable measure of firms' efficiency, places on manufacturers, and a great competitive pressure to carry full line product and maintain customer satisfaction which is usually determined by its product mix.

The aim of this paper therefore, is to evaluate profit maximisation objective in a multi product manufacturing industry with 7-up Bottling Company Plc as case study. It is expected that the result of the study will help the industry in making good policies as well contribute to the expanding body of literature in this area. The scope examines critically the impact of profit maximisation in a multi product manufacturing company.

## LITERATURE REVIEW

### Concept of Profit

To a layman, profit means all income that flow to an investor, but the Oxford Learners' Dictionary (1998) defines profit "as money gained in business especially the difference between amount earned and amount spent". Differently however, Dwivedi (2002) defined profit from an accountant and economist standpoint. To him, accountant's view of profit relates to the excess of revenue over all paid-out costs including both manufacturing and overhead expenses; while economist's view about profit is the return over and above the opportunity cost; which is the income that a businessman might expect from the second best alternative use of his resources. Furthermore, he postulates that accountant view of profit is more or less the same as net profit while and economist's view of profit is pure profit or just profit. From the definitions, it can be deduced that two (2) distinct concept(s) of profit exist in business decisions, which are the economic profit and the accounting profit. Importantly however, for all practical purposes in business activities, profit and/or business-income means profit in accountancy sense plus non-allowable expenses. As mentioned earlier, there exist two (2) important concepts of profit which are Accounting profit and Economic profit. Lipsey (1989), Dean (1990), Reekie (1988) and Dwivedi (2002) distinguish between the two (2) concepts. To them, the accounting sense of profit is the surplus of revenue over and above all paid-out cost that includes both the overhead expenses and manufacturing. When calculating accounting profit, only explicit or book cost, that is, the cost recorded in the book of account(s), are considered and may be calculated as follows:-

$$\text{Accounting Profit} = \text{TR} - (\text{W} + \text{R} + \text{I} + \text{M})$$

Where TR = Total Revenue

W = Wages and Salaries,

R = Rent,

I = Interest, and

M = Cost of Materials

In contrary however, the economic concept of profit takes into account the implicit or imputed cost, which the accounting profit does not. The implicit cost is opportunity cost and opportunity cost is defined as the payment that would be necessary to draw for the factors of productions from their most remunerative alternative employment. Thus, pure profit may be defined as "a residual left after all contractual costs have been met, including the transfer costs of management, insurable risks, depreciation and payment to shareholders sufficient to maintain investment at its current level" and may be calculated as follows:-

$$\text{Economic /Pure Profit} = \text{TR} - (\text{EC} + \text{IC})$$

Where TR = Total Revenue

EC = Explicit Cost; and

IC = Implicit Cost

### Importance of Profit

Economic theorists have postulated the importance of profit, as explained by Reekie (1988) and Dwivedi (2002); Foremost, the survival of all profit-oriented firms in the long run depends on their ability to make a profit depending on the business conditions and the level of competition. This makes *profit indispensable for firms' survival*. Many other objectives of business firms such as maximisation of managerial utility function, maximisation of firm's growth, entry prevention and risk – avoidance and maximisation of sales revenue reiterated

depends wholly or partly on the primary objective of making profit. With this, *achieving other organisational objectives depends on firms' ability to make profit*. As compared to other business objectives, maximising profit assumption has been found to be a much more powerful premise in predicting certain aspects of a firm's behaviour. Thereby, *making profit as an objective of firm to have greater predicting power*.

Though not perfect, profit is the most efficient and reliable measure of the efficiency of a firm. That is, *profit is a more reliable measure of firms' efficiency*. Additionally, it serves as source of internal finance that assumes a greater significance when financial market is highly volatile

### Profits as a Controlling Measure

Dwivedi (2002) argued that an important managerial aspect of profit is its use in measuring and controlling performance of executives in a large business firms. Olatunji (2001) revealed that business executives most often deviate from profit objective by trying to maximise their own aims that they think in terms of promotion, job security and even larger perks which often conflict with firms profit making objectives. In order to control these deviationist tendencies and orienting managerial functions towards the profit objective, Dwivedi (2002) opined that top management should use "managerial decentralisation and control-by-profit techniques". He further stressed that managerial decentralisation can be achieved by changing over from functional division of business activities to a system of commodity wise division which permit managerial responsibilities to be fixed in terms of profit. This thereby gives room to certain amount to be spent and a profit target to be achieved by the particular division. Hence, profit is then a measure of executive performance, not the sales or quality. Additionally, he argued that this kind of reorganisation of management helps in assessing profit – performance of various product lines in a multi product firm and serve as a useful guide in reorganisation of the product lines.

### Problems in Measuring Profit

Earlier mentioned that for all practical purposes in business activities, business income is profit in accountancy sense or otherwise called accounting profit. This is because economic profit demands that the true profit of an investment or business can only be determined until the ownership of that investment or business has been fully terminated (Reekie and Crook, 1988). But then, the life of a corporation is seen to be eternal, thus this concept of business income is however, an 'unattainable ideal' and hence, of little practical use (Dean 1990). Suffice, then to say that, to measure accounting profit is not an easy task, ordinarily, one might feel that the balance sheet and profit and loss accounts of a firm provide all the necessary data to measure accounting profit but the main problem is deciding as to what should be and what should not be included in the cost. Therefore, three (3) specific items of cost and revenue pose conceptual problems of profit measurement; namely:

**Depreciation:** To an accountant, depreciation is an allocation of capital expenditure over time whereas an economist sees depreciation as capital consumption. The latter charges depreciation in two (2) ways; either the equipment to equate opportunity cost or the replacement cost will produce comparable earnings, while the former allocates historical cost of capital to equipments overtime; in other words, charging depreciation, is made under unrealistic assumptions of stable price and a given rate of obsolescence. In this regard therefore, various methods of charging depreciation over the lifetime of equipment exist and this ultimately results in different levels of profits to be reported by an accountant.

**Treatment of Capital Gain and Loss:** Gains and losses on capital are regarded as windfalls; and the fluctuations in the stock market price are the most common sources of windfall (Dwivedi, 2002). Dean (1990) suggests that "a sound accounting policy to follow concerning windfalls is never to record them until they are turned into cash by a purchase or sale of assets, since it is never clear until then exactly how large they are". However, in practice, some firms do not record capital gains until they are realised in monetary terms, but they do write off capital losses from the current profit. Thence, following accounting policy will provide one profit and if another method is followed, there will be another figure of profit.

**Current Vs Historical Cost:** Mostly, accountants prepare income statements in terms of historical cost rather than in terms of current price. The reasons advanced for these practices are that historical cost produces more accurate measurement of income and that it is less debatable with more objectivity than the calculated present replacement value. Thence, the accountant's approach obviously ignores certain important changes in earnings and losses of the firm such as understating assets during inflation and overstating such during deflation. Therefore, historical cost recording does not reflect such changes in values of assets and profit.

## PRODUCT MIX AND PORTFOLIO ANALYSIS: A LINK

Kotler (2003) asserts that in a multi-product firm, it is very natural for some products to be performing well while some may not be doing well in the market. Naturally, a multi-product firm has different products targeting different market segment. (Stanton, 1981) Some segment may show strong demand and solid loyalty to a company's products, thus yielding excess cash that are needed to sustain their markets, while others may demand heavy cash investment before their product objectives can be achieve. Moreover, adopting a portfolio analysis approach in a multi-product firm enable such organisation to channel resources at the corporate level, to those businesses that poses the greatest potential (Campell, Goold and Alexander, 1994). Perhaps, the most popular portfolio analysis technique is that of the Boston Consulting Group (BCG) matrix in Kotler (2003), which provide a graphic representation for an organisation to examine the different businesses in its portfolio on the basis of their relative market share and industry growth rate.

The BCG matrix was divided into four (4) cells and is termed as *Question mark (Problem child), Stars, Cash cows and Dogs*.

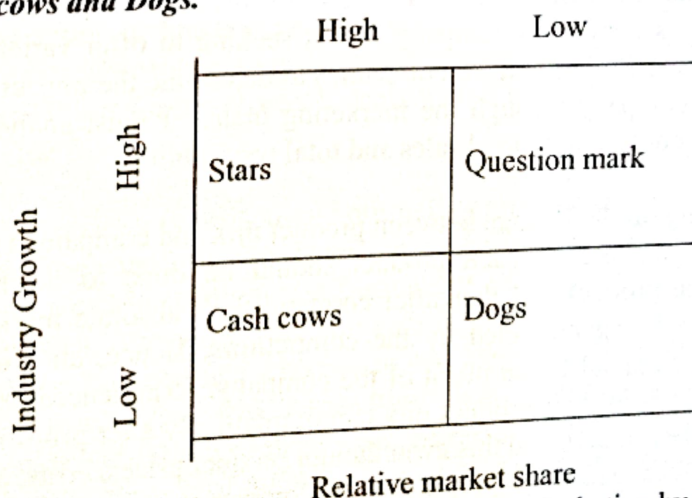


Fig: 1 Typical BCG Matrix adapted from Principle of Marketing by Kotler, 2003

Importantly, each of these cells represents a particular type of business units with each unit headed by a management staff responsible for its performance.

**Question marks:** These are those business units that operate in high-growth markets but have low relative market shares. They require large amount of cash to gain market share. Question marks are usually new products or services which have a good commercial potential that adopts an expansion strategy which must grow to become stars or retrenchment strategy to become dogs (Kotler, 2003). Relatively then, business unit at the question mark is the product that still gulp cash for advertisement, personnel and equipment to keep up with the fast growing market and possibly to overtake the market leader.

**Stars:** Are those products with high growth rate and high market share which may or may not be self sufficient in terms of cash flow. This cell corresponds closely to the growth phase of product life cycle (PLC) that generally pursues an expansion strategy to establish a strong competitive position with other company's product. The product in the star cell consumes whatsoever it generates for advertisement, to fight competition and to gain market share.

**Cash cows:** Business unit which generate large amount of cash but their rate of growth is slow. In terms of PLC, these are generally mature products which are reaping the benefit of the experience curve. The implication of the low growth is that there is little or no need for reinvestment of huge cash flow generated by the business unit through its high market share. These businesses can adopt mainly stability strategies where long-term prospects are exceptionally bright and limited expansion could be adopted (Kotler, 2003). Additionally, as cash cow products lose their attractiveness and tend towards a decline, a phased retrenchment strategy may be feasible.

**Dogs:** - These are products that have low growth and low market share. They neither generate cash nor require large amount of cash. In comparison to PLC, dogs are usually product in a declining stage; because at this stage the company is faced with cost disadvantage owing to a low market share. The best solution therefore, is that dogs should be retrenched so as not to create a drain on the company's resources.

### PRODUCT MIX AND MANUFACTURING FIRMS' PROFITABILITY

Profit maximisation is a strategic decision that other organisational decision(s) and/or objective(s) rest upon for their attainment. Dean (1990), Akpan (2003) and Kotler and Keller (2006) argued that adding more products to a firms' product mix will increase the profitability of such firm in as much as the firm's product line is shorter than competitors and that a too long product line, will only increase the firms' profit, if some products are dropped from the product line. To them, keeping a long and short product line respectively may be a strategic policy on its own for a company that is seeking to offer variety of product to its customer. They argued further that for companies to determine the impact of a product in the product line, such company through the marketing manager must analyse how much each constituent product contribute to total sales and total profitability.

Aaker (1988) writing on the linkage between product mix and company's profitability argued that a sales-profit analysis of each product should be done to determine the strategic importance of some product and thereafter compare their absolute market share with their equivalent products being marketed by the competitors. Hence, an effective product line management is very crucial to the profit of the company. Experienced executives intuitively know that subtle shifts in their product mix can dramatically alter profit results in any given financial period. They understand this even though product prices, costs, and total unit output remain virtually unchanged from a prior period. Companies have even been known to blame bad quarters on the unexpected shift in the product mix that ate up planned profits. Given the

financial impact product mix shifts can make it is disconcerting that many companies cannot precisely measure the profit swings that changes in their product mix causes. Why? Because traditional measurement approaches that arise from accounting systems are typically not capable of rigorously isolating and quantifying the cash and profit impact of mix variances. Consequently, very few companies have a disciplined method of proactively managing their product portfolios to maximise cash, profit, and return on assets. Management teams shocked by an attack of the 'mix monster' shouldn't be. After all, as the business adage goes, "You can't manage what you can't measure" (KCW Associates, 2013).

It is suffice to say that, innovative procedures that allow management to precisely measure and manage product mix profitability are possible. It may be counterintuitive, but increasing cash and profit by managing mix is not simply a matter of selling more of the higher margin products. Margin per unit is necessary but in itself is insufficient information when attempting to maximise the profitability of a product mix. Optimising the mix also requires full transparency in the cash contribution per production minute generated by each product. Akpan (2003) was of the opinion that, margin information sends confusing and conflicting signals to a company's sales, marketing, finance, and operations teams. To solve the puzzle of optimizing product mix profitability both margin per unit and the speed that those margins are flowing through the asset base must be taken into account. Armed with a perspective that takes both margin and production speed into account, a company can pursue product mix strategies that truly maximise cash, profits, and Return On Assets (ROA). To improve mix, a manufacturing firm must first be able to define, isolate and measure the amount of cash and profit change generated as a result of a mix shift. Next, the management team must employ a system and process for improving mix by focusing the organisation on the products that generate the highest return for shareholders.

## MARKETING STRATEGY AND MANUFACTURING FIRM'S PROFITABILITY: A LINK

Kazmi (2002) argued that firms could not be successful above the strategy they employ in pursuing their profitability objective. Manufacturing firms, all over the world, employ one or more strategies in accomplishing their goals and objectives. The pattern of decision that a firm takes in order to attain its objectives is called strategy. Strategy formulation can take place at more than one level in an organisation, depending on its size and shape. A large, divisionalised company or a diversified company, for example, would have to plan strategy on at least two, and possibly three levels; these levels are: *Corporate level* which represent an overarching plan of action or function performed by different business units, *Business level* which represent a comprehensive plan providing objective for business units which make up the organisation, and *Function level* which deals with a relatively restricted plan providing objective for a specific function.

A company organised on unitary lines would normally formulate strategy at the corporate and business unit levels, where the latter would encompass profit and/or major cost centres within the business. Only a small or medium-size business is likely to be able to rely solely on a corporate level approach. The profit that will accrue to manufacturing firm will, to a very large extent, depend on how the firm chooses to operate in the competitive business world. Porter (1980) argued that a firm could choose from three (3) generic strategies in competing for profit in business world. These strategies are *overall cost leadership*, *differentiation* and *focus*. He opined that the clearest of the three strategies is *cost leadership*, where a firm sets out to become the low-cost producer in its industry. What this means is that for firms to be able to achieve their profit maximisation objective, quality products, with features

comparable with that of their competitors should be made available to their customers at lower price than what is obtainable in the industry. The second strategy, according to Porter, is *differentiation*, which means finding one or more unique attributes for which customers are prepared to pay a premium price, and positioning the firm to provide those attributes. This is another pattern that a firm can choose to achieve its profit maximisation objective. Here, according to Porter, the company will do everything within her reach to distinguish its product(s) from that of other competitors in the market. These features and attributes, to Porter, will surely lead to higher cost which will make the company to charge higher price than the industry price.

The third strategy is *focus*. Basically, this means choosing a market segment (or group of segments) with a view to attaining a competitive advantage in meeting the wants of that segment (or group). A focus strategy can be broken down into sub-strategies, one focusing on obtaining a cost advantage, and the other based on developing a differentiation advantage. If a firm can achieve sustainable cost leadership or differentiation in its segment, and if the segment is structurally attractive, then it will become an above-average performer in its industry (Cole, 1997). From the ongoing discussion, we discover that firms can compete for profit in the market place by following a clearly defined pattern of action, which every member of the organisation knows about. Cost leadership requires following what a firm knows how to do best and doing at the lowest cost. This will enable the firm to command a greater proportion of the market, which in turn lead to its profitability. Differentiation involves offering distinctive product (s) to the market by a firm (Akpan, 2003), which definitely will attract high-income level people as its customer. From there, the firm generates higher revenue, from which profit comes. And a firm following focus strategy will be one that has limited resources to compete within the market place. It therefore, faces a small portion of the market and focuses on either cost leadership or differentiation in achieving its profit-making objective.

## METHODOLOGY

For the objective of this paper to be achieved quantitatively, the annual report of seven-up bottling company chosen as a case study due to her multiple range of products were gathered. The needed data obtained are in relation to Profit, Cost of sales, Turnover and the company's Promotional expenditure (i.e. Key Performance Indicators for ten (10) years given the availability of data). The data were summarised and statistically analysed using quantitative method of correlation analysis in determining the relationship between profit maximisation and the following KPIs (sales, cost of sales and promotional expenses) with corresponding degree of association, while the hypotheses were tested using the t- distribution. The hypothesis tested is stated below:

### Hypothesis

H<sub>0</sub>: KPIs are not statistically significantly related to the Profit in multi-product company

## Data Presentation and Analysis

Table 1: Key Performance Indicators

| Year  | Profit after Tax ('000) | Cost of Sales ('000) | Turnover ('000) | Promotional Expenditure ('000) |
|-------|-------------------------|----------------------|-----------------|--------------------------------|
| 1997  | 249,856                 | 2,937,831            | 4,389,174       | 1,739,427                      |
| 1998  | 273,801                 | 3,477,321            | 4,805,847       | 1,974,242                      |
| 1999  | 290,053                 | 3,943,760            | 5,722,602       | 2,082,525                      |
| 2000  | 337,621                 | 4,320,261            | 6,759,936       | 2,183,948                      |
| 2001  | 396,761                 | 4,948,321            | 8,091,236       | 2,383,081                      |
| 2002  | 1,151,091               | 7,235,908            | 11,843,756      | 2,788,125                      |
| 2003  | 1,383,764               | 8,385,674            | 14,222,786      | 3,640,001                      |
| 2004  | 1,143,995               | 8,750,432            | 14,937,371      | 3,781,493                      |
| 2005  | 954,296                 | 9,105,721            | 17,346,662      | 3,978,475                      |
| 2006  | 1,049,146               | 9,535,440            | 17,834,539      | 4,045,763                      |
| Total | 7,230,384               | 62,640,669           | 105,953,909     | 28,598,080                     |

Source: Annual Business Report for 7up Bottling Plc (1997-2006).

## Data Analysis

The data in the table 1 above was analysis using the Ordinary Least square run on Econometric view. The result (output) is shown in the table below.

Table 2: Ordinary Least Square (Econometric views)

Dependent Variable: PAT

Method: Least Squares

Date: 03/22/13 Time: 10:22

Sample: 1997 2006

Included observations: 10

| Variable           | Coefficient | Std. Error            | t-Statistic | Prob.  |
|--------------------|-------------|-----------------------|-------------|--------|
|                    | t           |                       |             |        |
| C                  | 511963.7    | 363195.3              | -1.409610   | 0.2083 |
| COST               | 0.666119    | 0.153018              | 4.353197    | 0.0048 |
| TURNOVER           | 0.204511    | 0.083705              | 2.443223    | 0.0050 |
| PE                 | 0.269516    | 0.332474              | 1.810638    | 0.0045 |
| R-squared          | 0.943632    | Mean dependent var    | 723038.4    |        |
| Adjusted R-squared | 0.915448    | S.D. dependent var    | 450310.2    |        |
| S.E. of regression | 130940.1    | Akaike info criterion | 26.69204    |        |
| Sum squared resid  | 1.03E+11    | Schwarz criterion     | 26.81308    |        |
| Log likelihood     | 129.4602    | F-statistic           | 33.48129    |        |
| Durbin-Watson stat | 1.915958    | Prob(F-statistic)     | 0.000383    |        |

## Discussion of Result

From table 2 above, the result shows that COST, TURNOVER and PE have a positive relationship with PAT. Their coefficients show that a unit increase in COST, TURNOVER and PE, leads to 0.6662, 0.20451 and 0.26952 units respectively increase in PAT. Using the t test to test for the significance of the individual variables, the result shows that the variables

COST, TURNOVER and PE are statistically significant in explaining the change in PAT given their t values of 4.353, 2.443 and 1.887 which are greater than the tabulated t-value of 1.860 using 8, as the degree of freedom at 95% significance level.

The F statistics which shows the group significance of the variables shows that all the explanatory variables are jointly statistically significant in explaining the change in the PAT give the calculated F sat of 33.48129 which is greater than the tabulated value of 5.39. The Co-efficient of the correlation(r) is given as 0.971. This figure indicates that there is a high positive relationship between the identified KPIs and profit. It as well indicates that any movement or increment in the KPIs also bring about movement in the same direction in profit level, except in year 2005. The r-square which measures the coefficient of determination gave a result of 0.944. This which indicates that identified KPIs (Turnover, Cost of sales, Promotional expenditure) explains about 94.4% of the variance while the remaining 3.6% is explained by some other variables. The Durbin Watson statistics of 1.915958 suggests no presence of positive serial autocorrelation given that if DW lies between 1.5 and 2.5; there is no positive autocorrelation and if below 1.5, there is positive autocorrelation (Gujarati, 2004).

### Evaluation of Hypothesis:

From the result of the analysis presented above, we evaluate our hypothesis.

H0: Profit in a multi-product company not significantly related to the identified KPIs.

Decision: Given that all the variables are individually significant in explaining the change the PAT and F sat shows that the variables are jointly significant in explaining change in PAT, we accept the alternative hypothesis that profit in a multi-product is statistically significantly related to the identified KPIs and reject the null hypothesis.

### Policy implication:

Based on the result obtained from our analysis, a major policy implication of it that policy measures to promote profit maximisation requires a control on these key indicators but more emphasis should be place on the COST given that it has more impact and more significant as compare to the other indicators on the PAT. This does not mean that, other identified KPIs should not be given consideration but emphasis should be place on COST reduction as supported by the principle of management by exemption.

### CONCLUSIONS

Generally, organisation recognizes the importance of other organisational objective but settle in adopting profit maximisation objective has there topmost objective because their attainment rest upon profit. This is evident by the diverse performance indicators employed by them. This paper empirically has the belief that profit maximisation is one of the most important organisational objectives to adopt in other to survive and grow for the continued business opportunities.

The result of this paper has shown that for a maximum profit to be achieved certain parameters need to be in place and these are:

*Intensive marketing activity:* For maximum profit to be achieved firms' must embark on an intensive and aggressive marketing activity and the manipulation of the various marketing mix for higher sales and turnover.

*Customer satisfaction:* In relation to the above parameter, satisfying the target market or producing what consumers want, will definitely bring about increase sales through exchange process thereby translating to increase sales.

*Variant product:* Additionally, various products to a firms' product mix will bring about increase in profitability of such firm in as much as the firms' product line is shorter than competitors product.

## RECOMMENDATIONS

Based on the findings of this study, the following recommendations are hereby made: As a matter of policy, a business firm should not place too much emphasis on profit maximisation as if it is the only corporate objective of their company as this might sometimes portray a bad image to the public. Instead, organisation should produces what the consumers want and strive towards satisfying such needs i.e. identify, create and offer products of value to the market for a consideration. Since it has been proved statistically that the manipulation of the various marketing mix has a great significant relationship with profit; it is strongly recommended that the company should focus more on the manipulation of marketing mix so as to increase their market share which will eventually result in maximum profit. No firm can measure whether she is maximising profit or not, without handling the problem being associated with ascertaining what revenue and cost should be included in their books of record; thence, concerted effort should be directed towards identifying and determining when their revenue timing will be and what method to be used in ascertaining cost thereby improving corporate performance. Though, in the analysis, the company's cost of sales brought about a change in profit level, this may not be true as the percentage change vis-à-vis the profit is not significant, hence the company should look for ways in reducing such cost.

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