

## Research Article

### Profitability Analysis of the Telecommunications Industry in Ghana from 2002 to 2006

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**Abstract:** This study looked at the profitability of the Telecommunications industry in Ghana from 2002 to 2006. This objective was accomplished by finding the correlation between any two of profitability non-ratio parameters such as NP, EBIT and so on and the correlation between any two of profitability ratio parameters such as NPM, ROA and so on. Trend analysis of all the ratio and non-ratio parameters was also done and the impact of assets, liabilities and revenue on NP, EBIT and GP were accessed. At the industry level, revenue increased 5 times by 2006, taking 2002 as base year. TA and NA increased 4 times each from 2002 to 2006. This was again shown by the perfect positive correlations that existed between the following pairs: NA and ROA, ROE and ROA and DE and DAR. Shareholders' equity increased with industry assets proportionately from 2002 to 2006. Industry NP increased considerably from 2002 to 2006. NPM also increased considerably from 2002 to 2005 and dipped in 2006. SB increased 13 times by 2006 with 2002 as base year. It was also found that SB correlates with the following parameters with correlation coefficient greater than 0.8: NP, TR, EBIT, TA and NA. Only TL recorded a negative correlation with SB with coefficient of -0.98. At the firm level, it was revealed that NCL had so much impact on NP. This information could be used by prospective investors, policy makers and the Government to make informed decisions about the industry.

**Keywords:** Assets, liabilities, profitability, revenue, subscriber, telecommunications

## INTRODUCTION

Profit making is one of the primary aims of setting up a business. Profits to a business entity is key, it is when good profits are declared that management think of salary increases, good working conditions and so on for the employees. Customers as well get their share in the form of improved customer service delivery, technological advancements, social corporate responsibilities and so on. Business expansion becomes easy for management once good profits are declared consistently. The going concern of the company is also assured. When profits are not declared, especially for a period of time, salary payment may be impacted negatively and this can even result in retrenchment of workers among other things.

The Telecommunications industry is one of the fastest growing industries in the world in terms of revenues and profits. There is no doubt that the Telecommunications industry in Ghana has contributed so much in terms of the growth of Ghana's Economy. Telecoms accounted for a third of GDP growth in Ghana in 2010 (WI June, 2011; MTN Annual Reports and Delta Partners Analysis, retrieved from Ghana Chamber of Telecommunications site- (WI June, 2011). In another source, it is recorded that nearly 40% of

mobile operators' revenues goes to government (WCIS, 2010), Ghana Statistical Service and Delta Partners Analysis, retrieved from Ghana Chamber of Telecommunications site- (WCIS, 2010). The mobile telecom subscriber base stood at 21, 381, 137 as at February 2012, a 9901.98% increase from 2001 (2001 subscriber base was 215928) (NCA Site, 2012).

The Telecom industry in India notched up US\$ 8.56 billion in revenues during the quarter ended December 31, 2009 helped by a recovery in earnings from both mobile and landline services. Revenues are estimated to grow at a Compound Annual Growth Rate (CAGR) of 26.6% from 2006 to 2011, touching US\$ 13.6 billion (Singh and Sukhija, 2010). In the U.S., the telecommunications sector drives more than \$1 trillion in annual revenue. Worldwide, the industry accounts for about \$3.5 trillion. As of mid-2007 there were over 2.3 billion cellular phone service subscribers worldwide. That number was expected to grow to nearly 4 billion by the end of 2011 (Normile, 2008). This expectation was exceeded and this is shown in the report of International Telecommunications Union (ITU) in 2011 stated below:

'At the end of 2011, there were 6 billion mobile subscriptions. That is equivalent to 87% of the world

population. This is a huge increase from 5.4 billion in 2010 and 4.7 billion mobile subscriptions in 2009. Mobile subscribers in the developed world has reached saturation point with at least one cell phone subscription per person. This means market growth is being driven by demand in the developing world, led by rapid mobile adoption in China and India, the world's most populous nations. These two countries collectively added 300 million new mobile subscriptions in 2010—that's more than the total mobile subscribers in the US. At the end of 2011 there were 4.5 billion mobile subscriptions in the developing world (76% of global subscriptions). Mobile penetration in the developing world now is 79%, with Africa being the lowest region worldwide at 53%' (ITU Statistics, 2012).

Consumer spending in Africa rose at a compounded annual rate of 16% to 2008 from 2005, according to McKinsey and Co. The consulting firm estimates that within five years, about 220 million Africans who now can meet only basic needs will join the middle class as consumers. Telecom is one of the continent's more robust industries as the cell phone market expands to include Internet access, mobile banking and retail transactions (WSJ, 2012). Mobile service also has brought telephones to people in remote areas that never had land lines.

Africa has about 400 million mobile subscribers, according to McKinsey and Co., which predicts that data and rural voice services will generate \$12 to \$15 billion in telecom revenue by WSJ (2012).

Telephone services broadly, not just mobile, generated \$40.5 billion in revenue in 2009, according to market researcher Euro monitor International (WSJ, 2012). Africa has the fastest growing telecoms industry. A new survey by Ernst & Young released on Thursday 5<sup>th</sup> February 2009 shows that between 2002 and 2007, the industry grew by 9.3% as opposed to Asia which recorded a 27.4% growth (IT News Africa, 2012).

Telecom has contributed significantly to the increase in Ghana's GDP over the last two decades and the prospects for the future are much greater than what we are currently witnessing. More and more people are hooking on to the various networks (MTN, Tigo, Vodafone, Expresso, Airtel) for voice, internet, data and video services. The competition has reached an alarming stage where rebranding, mergers and acquisitions are the order of the day. Technological advancements are inevitable due to the increased complexity of the customer; almost all the Telcos are now employing 3G technology.

All these changes in the industry are supposed to produce profits at the end of the day. There is again no doubt that the Telcos in Ghana are making profits due to the increasing trend of the number of people who on

daily basis hook on to the services provided by these Telcos and also the patronage of the services of existing customers (loyal and non loyal). Again, the financial statements of the Telcos reveal same. Secondly, the study tried to come out with a comprehensive profitability analysis of the telecoms industry in Ghana from 2002 to 2006 taking into consideration, a number of profitability measures.

The Telecoms industry is one industry that invests so much in equipment, infrastructure, logistics and software in order to deliver quality services to its customers. The sophistication of the consumer, the increased and rapid technological advancements and globalization leave the telcos with little option than to invest in the above mentioned items. These investments may not necessarily result in immediate gains for the Telcos, but they still would have to do them to remain in competition. Because of this, managers of Telcos are always confronted with issues of cost reduction in order to maximize revenues and profits. Managers, in trying to maximize profits are faced with a difficult situation as to what they actually have to concentrate or focus on; whether to focus on procuring state of the art equipment (increase assets-switching, transmission, roaming, etc equipment), focus on programs that will yield huge revenues (marketing of products and services, adverts, promotions, coming out with new products and services, etc.) focus on efficiently managing debt and cutting down cost and so on.

With the Ghana's Telecommunications industry in perspective, this study is aimed at exploring how these issues were handled and also how profitability was affected by balancing the levels of current assets, non-current assets, current liabilities, non-current liabilities and so on. The solution may not be found in procuring state of the art equipment, running programs to maximize revenues and so on and this is what this research work seeks to unravel. It is also aimed at revealing profitability trends in the industry over the years to inform decision making by investors and policy makers.

The general objective of this study is to access the profitability of the Telecommunications industry in Ghana from 2002 to 2006. This will be accomplished by looking closely at the following specific objectives:

- To access the correlation between any two of the following non-ratio variables: Net profit, Revenue, Earnings before interest and Tax, Gross profit, Total assets, Total liabilities, shareholder's equity (net assets) and subscriber base
- To access the correlation between any two of the following ratio variables: net profit margin, return

on assets, return on equity, equity multiplier, capital intensity, return on investment, debt to asset ratio and debt to equity ratio

- To access the trend of all the ratio and non-ratio variables listed above
- To access the impact of assets (current and non-current), liabilities (current and non-current) and revenue on net profit, earnings before interest and tax and gross profit

The hypotheses postulated to be proven or otherwise are stated as follows:

- H1:** Current assets have a positive impact or relationship on Net profits.
- H2:** Revenue has a positive impact or relationship on Net profits.
- H3:** Non-current assets have a negative impact or relationship on Net profits.
- H4:** Current assets have a positive impact or relationship on Gross profits.
- H5:** Revenue has a positive impact or relationship on Gross profits.
- H6:** Non-current assets have a negative impact or relationship on Gross profits.
- H7:** Current assets have a positive impact or relationship on earnings before interest and tax.
- H8:** Revenue has a positive impact or relationship on earnings before interest and tax.
- H9:** Non-current assets have a negative impact or relationship on earnings before interest and tax.
- H10:** Current liabilities have a negative impact or relationship on Net Profit.
- H11:** Current liabilities have a negative impact or relationship on earnings before interest and tax.
- H12:** Current liabilities have a negative impact or relationship on Gross Profit.
- H13:** Non-Current liabilities have a negative impact or relationship on Net Profit.
- H14:** Non-Current liabilities have a negative impact or relationship on earnings before interest and tax.
- H15:** Non-Current liabilities have a negative impact or relationship on Gross Profit.

A number of research questions to be investigated and answered by this work are as follows:

- Do revenues actually result in profits?
- Do assets result in profits?
- Did the profits of the Telecom Industry grow consistently?
- Does growth in subscriber base affect profitability?
- To what extent do the above ratio and non-ratio variables relate with each other?

- To what extent do liabilities affect profitability?

It is necessary that this research was done based on the following reasons:

- Relationships between profitability measures, ratios and subscriber base for the Telecoms industry in Ghana needed to be known so as to help management of Telcos take informed decisions on how to maximize profits.
- Factors that influence organizational profitability needed to be known so as to help Telcos manage these factors efficiently to improve upon profitability.
- Trends of profitability measures needed to be known to help Telcos do effective forecasts and also help in decision making.

Practically, the study was meant to help managers of Telcos take informed decisions aimed at maximizing profits and also make projections on profits.

Theoretically, the study was meant to contribute knowledge in the area of profitability of the Telecoms industry. It was specifically meant to contribute knowledge in the area of the dependence of organizational profitability on asset levels, liability levels and revenue levels.

Regression analysis could not be performed for the industry level analysis because the data available spanned from 2002 to 2006 (5 years in all), which was not appropriate for a model with 5 independent variables and 1 dependent variable.

The study did not take into consideration processes, activities, innovation and learning, the hard work of employees and so on in the regression model. Levels of assets, liabilities and revenues only show values in monetary terms. The study was done on the premise that with the right combination of assets, liabilities and revenues, profits could easily be realized. The same applies for the otherwise. The study was based on a pure quantitative analysis, without considering interviews and so on for any qualitative analysis.

Another assumption the study was based on is that, it is out of the management of these assets, liabilities and revenues that the levels (the values) are obtained. It therefore means that, the levels are as important as the management activities that finally determine them and for that matter, can be used for analysis.

## **MATERIALS AND METHODS**

### **Definition and explanation of terms:**

**Net assets:** Net assets (sometimes called net worth or shareholders equity) is the total assets minus total

outside liabilities of an individual or a company. For a company, this is called shareholders' preference and may be referred to as book value. Net worth is stated as at a particular year in time. Net worth is an important determinant of the value of a company, considering it is composed primarily of all the money that has been invested since its inception, as well as the retained earnings for the duration of its operation. Net worth can be used to determine creditworthiness because it gives a snapshot of the company's investment history. Also called owner's equity or shareholders' equity.

**Total Assets (TA):** In business, total assets consist of all assets of a company. An asset is defined in business as any items of ownership convertible into cash. Examples of assets include cash, notes and accounts receivable, securities, inventories, goodwill, fixtures, machinery, real estate and the like. All assets and the total cash value of the total assets, are reported on the company's balance sheet. Assets are defined by the Financial Accounting Standards Board and accounted for according to the Generally Accepted Accounting Principles. TA is made up of Current Assets (CA) and Non-Current Assets (NCA).

**Current Assets (CA):** A balance sheet account that represents the value of all assets that are reasonably expected to be converted into cash within one year in the normal course of business. Current assets include cash, accounts receivable, inventory, marketable securities, prepaid expenses and other liquid assets that can be readily converted to cash.

**Non-Current Assets (NCA):** A company's long-term investments, in the case that the full value will not be realized within the accounting year. Noncurrent assets are capitalized rather than expensed, meaning that the company allocates the cost of the asset over the number of years for which the asset will be in use, instead of allocating the entire cost to the accounting year in which the asset was purchased. Examples of noncurrent assets include investments in another company, intangible assets such as goodwill, brand recognition and intellectual property and property, plant and equipment. Noncurrent assets appear on the company's balance sheet.

**Total Liabilities (TL):** A combination of Noncurrent Liabilities (NCL) and Current Liabilities (CL). NCL are liabilities that are due to be repaid after more than one year. This is inclusive of bonds and long-term loans. It can also be looked as financing used to purchase or improve assets such as plant, facilities, large equipment

and real estate. CL are liabilities that are due to be paid within one year. These include short term debts, accounts payable and accrued liabilities.

**Total Revenue (TR):** The total amount of money (cash, account receivables or credit) received by a business in a specified period before any deductions for costs, raw materials, taxation and so on.

**Return on Assets (ROA):** An indicator of how profitable a company is relative to its total assets. ROA gives an idea as to how efficient management is at using its assets to generate earnings. Calculated by dividing a company's annual earnings by its total assets, ROA is displayed as a percentage  $ROA = \text{Net Profit} / \text{Total Assets}$ .

**Net Profit (NP):** In business, it is what remains after subtracting all the costs (namely, business, depreciation, interest and taxes) from a company's revenues. Net income is sometimes called the bottom line. Also called earnings or net profit. Basically,  $\text{Net Profit} = \text{EBIT} - \text{Taxes}$

**Gross Profit (GP):** A company's revenue minus its cost of goods sold. Gross profit is a company's residual profit after selling a product or service and deducting the cost associated with its production and sale. To calculate gross profit: examine the income statement, take the revenue and subtract the cost of goods sold. Also called "gross margin" and "gross income".

**Earnings Before Interest and Taxes (EBIT):** An indicator of a company's profitability, calculated as revenue minus expenses, excluding tax and interest. EBIT is also referred to as "operating earnings", "operating profit" and "operating income", as you can re-arrange the formula to be calculated as follows:  $\text{EBIT} = \text{Revenue} - \text{Operating Expenses}$ . In other words, EBIT is all profits taking into account interest payments and income taxes.

**Net Profit Margin (NPM):** Net Profit Margin tells you exactly how the managers and operations of a business are performing. Net Profit Margin compares the net income of a firm with total revenue achieved. The formula for Net Profit Margin is:  $\text{NPM} = \text{Net Profit} / \text{Revenue}$ .

**Return on Equity (ROE):** A measure of a corporation's profitability that reveals how much profit a company generates with the money shareholders have invested. Calculated as:

$$\text{Net Profit} / \text{Shareholder's Equity}$$

**Return on Investment (ROI):** In simple terms, it is the return on invested capital or the profit from an investment as a percentage of the investment outlay. In our context, using the financial statements,  $ROI = \text{Operating Income or EBIT} / \text{Book value of Assets or Shareholder's Equity}$ .

Book value of Assets = Assets-Liabilities (In other words, if you wanted to close the doors of the company, how much would be left after you settled all the outstanding obligations and sold off all the assets). Other parameters are defined below:

- Debt to Asset Ratio (DAR) = Total Liabilities/Total Assets
- **Capital Intensity (CI):** Measure of a firm's efficiency in deployment of its assets, computed as a ratio of the total value of assets to sales revenue generated over a given period. Capital intensity indicates how much money is invested to produce one dollar of sales revenue. Formula: Total assets/Total revenue. It is also known as the Asset Turnover Ratio
- **Equity Multiplier (EM):** This is the ratio of Total assets to Equity. This in simple terms gives us the indication of how much of the total assets represent shareholders interest
- **Debt to Equity (DE):** This is the ratio of Total Liabilities to Equity

### CONCEPTUAL AND THEORETICAL FRAMEWORKS

Conceptually, this study looks at profits generated as dependent on the levels of assets (current and non-current) of the company, levels of liabilities (current and non-current) and levels of revenues. The levels of these three broad components determine to a large extent the levels of profit maximization. Figure 1 which is the conceptual framework shows how these parameters are related.

From Fig. 1, the theoretical frameworks are constructed as in Fig. 2, 3 and 4. With the theoretical

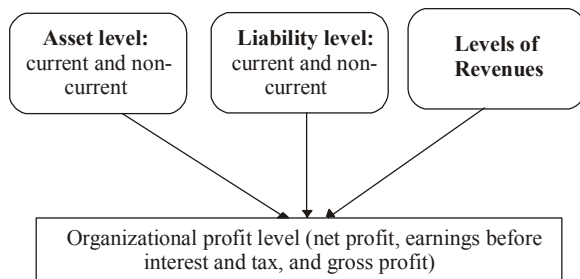


Fig. 1: Conceptual framework

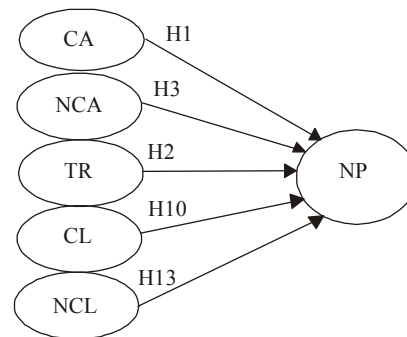


Fig. 2: Theoretical framework 1-dependent of Net Profit (NP) on parameters

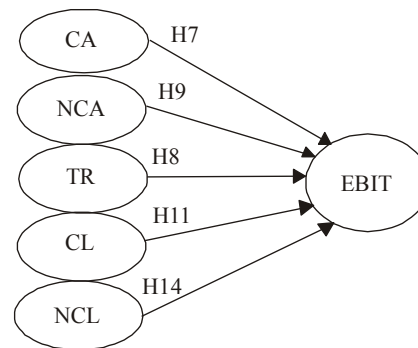


Fig. 3: Theoretical framework 2-dependent of Earnings Before Interest and Tax (EBIT) on parameters

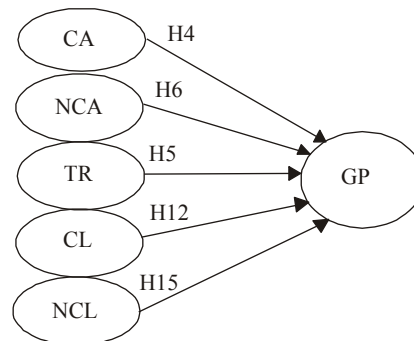


Fig. 4: Theoretical framework 3-dependent of Gross Profit (GP) on parameters

frameworks, we are looking at the relationships between each of the dependent variables Gross Profit (GP), Net Profit (NP) and Earnings Before Interest and Tax (EBIT), which are measures of profitability and the independent variables Current Assets (CA), Non-Current Assets (NCA), Total Revenue (TR), Current Liabilities (CL) and Non-Current Liabilities (NCL). The theoretical frameworks are shown below:

**Models:**

**Firm level analysis:** Multiple regression analysis was employed to find the relationships between the independent variables (Current Assets (CA), Non-Current Assets (NCA), Total Revenue (TR), Current Liabilities (CL) and Non-Current Liabilities (NCL)) and the dependent variables (Net Profit (NP), Gross Profit (GP) and Earnings Before Interest and Tax (EBIT)), as depicted in Fig. 2 to 4. In all, three equations were formed for the Telecom operator in question. One major operator (Ghana Telecom-now Vodafone) was chosen for the purpose of this research. One of the reasons being the availability of data from 2000 to 2008 needed for this research. The multiple regression models are as follows:

- $NP = CAX_1 + NCA X_2 + TR X_3 + CL X_4 + NCL X_5 + C_1$
- $EBIT = CAY_1 + NCA Y_2 + TR Y_3 + CL Y_4 + NCL Y_5 + C_2$
- $GP = CAZ_1 + NCA Z_2 + TR Z_3 + CL Z_4 + NCL Z_5 + C_3$

$C_1, C_2, C_3$  are constants and  $X, Y, Z$  with subscripts, coefficients.

Correlation analysis were also used for the parameters above and some selected ratio parameters (Net profit margin, Return on Assets, Return on Investments, Return on Equity, Debt to Asset Ratio, Equity Multiplier, Capital Intensity or Asset Turnover Ratio and Debt to Equity Ratio).

**Industry analysis:** Industry data from 2002 to 2006 were employed. With the industry analysis, no regression was performed. Instead, trend analysis, correlation analysis and so on were used. From 2002 to 2006, the mobile Telcos in operation in Ghana were Areeba-now MTN, Mobitel-Tigo, Kasapa-now Expresso and Ghana Telecom-now Vodafone. The mobile telecom industry therefore consisted of only the above companies.

Fifteen profitability and other important measures were taken into consideration for the purposes of the industry analysis. The measures were grouped into ratio and non ratio types. The non ratio measures are:

- Net profit
- Revenue
- Earnings before tax and interest
- Total assets
- Total liabilities
- Shareholders equity or net assets
- Subscriber base

The ratio measures too are as follows:

- Net profit margin
- Return on assets
- Return on investment
- Return on equity
- Debt to asset ratio
- Equity multiplier
- Capital intensity or asset turnover ratio
- Debt to equity ratio

**Research method:** This research adopted quantitative approach. Quantitative approach was employed because the study involves the systematic empirical investigation of organizational profitability phenomena via statistical, mathematical or computational techniques. The objective of quantitative research is to develop and employ mathematical models, theories and/or hypotheses pertaining to phenomena; which forms part of the scope of this work. Quantitative analysis was employed to test the various hypotheses, estimate parameter coefficients and also determine significance of parameters and models.

**Research format:** The research format is predominantly causal, but also has some descriptive and exploratory elements. It is a causal study because the study is interested in finding relationships as is demonstrated by the models above. Here we are look at concomitant variation-the degree to which a presumed cause (e.g., current asset) and a presumed effect (net profit) occur together or vary together. This is where hypothesis come in. If the stated hypothesis was that there is a positive relationship between current asset and net profit and it turns out to be false at the end of the day, after hypothesis testing, then the hypothesis is not supported.

Descriptive research, because the study is a statistical research that describes data using frequency charts and characteristics about the phenomenon of organizational profits and it answers questions what, when and how. Exploratory, because secondary data analysis is being employed in this study. Financial statements of Telcos in Ghana from 2002 to 2006 for industry level analysis and from 2000 to 2008 (that of Ghana Telecom, now Vodafone) for firm level analysis are being employed.

**Techniques/ tools/ approaches/ instrumentation/ devices:** Microsoft Excel was employed to run the descriptive as well as the inferential statistics. ANOVA

Table 1: Firm level regression output parameters

Item	Dependent variable (Y)	Independent variable (X)
1	NP	CA, NCA, TR, CL, NCL
2	GP	CA, NCA, TR, CL, NCL
3	EBIT	CA, NCA, TR, CL, NCL

- $EBIT = CAY_1 + NCA Y_2 + TR Y_3 + CL Y_4 + NCL Y_5 + C_2$
- $GP = CAZ_1 + NCAZ_2 + TRZ_3 + CLZ_4 + NCLZ_5 + C_3$

was also done for the regression analysis. The data type is ratio and hence very appropriate for multiple linear regression model, as was used in this study. Again, parametric analysis was very appropriate because of the ratio type of secondary data that was employed.

**Data collection methods:** Secondary data sources (financial statements of the Telcos in Ghana from 2002 to 2006 for industry level analysis and from 2000 to 2008 of Ghana Telecom, now Vodafone for firm level analysis) were the only sources employed for this study. No primary data was employed.

**Summary:** This work is restricted to the Telecom companies in Ghana. Industry analysis has to do with Telecom companies in Ghana from 2002 to 2006, namely Areeba-now MTN, Mobitel-Tigo, Kasapa-now Expresso and Ghana Telecom-now Vodafone. Firm level analysis has to do with only Ghana Telecom-Now Vodafone and data from 2000 to 2008 was employed for the analysis.

## DISCUSSION

**Firm level analysis:** As has already been established, from the theoretical frameworks (Fig. 2 to 4), one of the operators (Ghana Telecom, now Vodafone) out of the four from 2000 to 2008 was used for the purposes of this analysis. Two or even all the operators would have been appropriate for comparative analysis, but for lack of data, it was resolved that one be used and inferences made. The purpose of this analysis was to find the parameters which impact greatly on profitability of Telcos in Ghana. The parameters chosen for this analysis in accordance with the theoretical framework were Current Assets (CA), Non-Current Assets (NCA), Current Liabilities (CL), Non-Current Liabilities (NCL) and Total Revenues. These were the independent variables. The dependent variables, also the profitability measures were Net Profit (NP), Gross Profit (GP) and Earnings Before Interest and Tax (EBIT). In all four equations were formed for the regression analysis. These were:

- $NP = CAX_1 + NCA X_2 + TR X_3 + CL X_4 + NCL X_5 + C_1$

In all the three cases, N which stands for observations = 9. Number of parameters (K) is a combination of the independent variables and the dependent variable, which is equal to 6. Significance level of 5% or confidence level of 95% was used throughout. This implies for t stats, degree of freedom is  $N-K = 9-6 = 3$ . Parameter significance to a model is when t stats from computer output is greater than t stats from the tables (that is  $t^* > t$  from tables). p-value was also used alongside the t Stats to compliment it.

With the p-value, the standard value measured against, in this particular case where significance level is 5% is 0.05. If a parameter's p-value is less than 0.05, then that parameter is significant in the model. For F Stats, the numerator  $V_1 = K-1 = 6-1 = 5$  and denominator  $V_2 = N-K = 9-6 = 3$ . We say a model has overall model significance if F-stats ( $F^*$ ) from the computer output is greater than the one read from the tables. Significance F value from the computer output of ANOVA also was used to determine the overall significance. Significance F of less than 0.05 showed that the overall model was significant; otherwise it was not.

**Net Profit (NP):** Kindly refer to Table 1, 2 and 3 for this part of the analysis.

The model used was  $NP = CAX_1 + NCA X_2 + TR X_3 + CL X_4 + NCL X_5 + C_1$  and the output model was  $NP = 60171953.46 + 1.14CA + 0.028NCA + 0.079CL + 0.95NCL + 0.34TR$ . The hypothesis was stated as follows:

**H<sub>0</sub>:**  $X_1 = X_2 = X_3 = X_4 = X_5 = 0$

**H<sub>1</sub>:** At least one  $X_i \neq 0$

For the overall significance of the model, at least one of the coefficients must be different from zero. That is to say that at least one of the parameters should be linearly related to Y. Also, using the F test, if  $F^* > F_{v_1, v_2}$ , where,  $v_1 = k = 5 =$  number of independent variables,  $v_2 = n-k-1$  and  $n = 9$ , that is yearly data from 2000 to 2008, we say that the model does have some validity.

Table 2: Firm level regression output relations

Item	Relation (with all 4 independent parameters)
1	$NP = -60171953.46 + 1.14CA + 0.028NCA + 0.079CL + 0.95NCL + 0.34TR$
2	$GP = 6078804.159 - 0.28CA + 0.13NCA + 0.24CL - 0.02NCL + 0.59TR$
3	$EBIT = -50317408.01 + 1.21CA - 0.11NCA - 0.04CL + 0.72NCL + 0.22TR$

Table 3: Summary output for NP as dependent variable

t-stats				
Item	Independent variable and intercept	t-stat from output	t-stat from tables	Parameter significance
1	Intercept	-1.440	3.182	Not significant
2	CA	1.830	3.182	Not significant
3	NCA	0.057	3.182	Not significant
4	TR	0.252	3.182	Not significant
5	CL	3.810	3.182	Significant
6	NCL	1.140	3.182	Not significant
p-value				
Item	Independent variable and intercept	p-value form output	Standard p-value	Parameter significance
1	Intercept	0.245	0.05	Not significant
2	CA	0.164	0.05	Not significant
3	NCA	0.958	0.05	Not significant
4	TR	0.817	0.05	Not significant
5	CL	0.032	0.05	Significant
6	NCL	0.335	0.05	Not significant
F-stats				
F-stats from output		F-stats from tables		Overall significance (Sig. F = 0.00029)
305.99		9.014		Significant

1: For the t-stats, degrees of freedom are observations minus number of variables which is equal to  $9-6 = 3$ ; 2: Significance level = 5% or confidence level = 95%; 3: For the F-stats,  $V1 = \text{numerator} = \text{number of variables} - 1$  which is equal to  $6-1 = 5$  and  $V2 = \text{denominator} = \text{observations} - \text{number of Variables} = 9-6 = 3$ ; 4: For t-stats, parameter is significant if t-stats from regression output is greater than t-stats from tables; 5: For p-value, parameter is significant if p-value from regression output is less than 0.05; 6: For overall model significance, F-stats from computer output must be greater than F-stats from tables. Significance F should also be less than 0.05;  $R^2: 0.998$ ; Adjusted  $R^2: 0.995$

Table 4: Summary output for GP as dependent variable

t-stats				
Item	Independent variable and intercept	t-stat from output	t-stat from tables	Parameter significance
1	Intercept	0.086	3.182	Not significant
2	CA	-0.270	3.182	Not significant
3	NCA	0.160	3.182	Not significant
4	TR	0.450	3.182	Not significant
5	CL	-0.040	3.182	Not significant
6	NCL	1.180	3.182	Not significant
p-value				
Item	Independent variable and intercept	p-value form output	Standard p-value	Parameter significance
1	Intercept	0.94	0.05	Not significant
2	CA	0.80	0.05	Not significant
3	NCA	0.88	0.05	Not significant
4	TR	0.68	0.05	Not significant
5	CL	0.97	0.05	Not significant
6	NCL	0.32	0.05	Not significant
F-stats				
F-stats from output		F-stats from table		Overall significance (Sig. F = 0.0122)
24.52		9.014		Significant

1: For the t-stats, degrees of freedom is observations minus number of variables which is equal to  $9-6 = 3$ ; 2: Significance level = 5% or confidence level = 95%; 3: For the F-stats,  $V1 = \text{numerator} = \text{number of variables} - 1$  which is equal to  $6-1 = 5$  and  $V2 = \text{denominator} = \text{observations} - \text{number of Variables} = 9-6 = 3$ ; 4: For t-stats, parameter is significant if t-stats from regression output is greater than t-stats from tables; 5: For p-value, parameter is significant if p-value from regression output is less than 0.05; 6: For overall model significance, F-stats from computer output must be greater than F-stats from tables. Significance F should also be less than 0.05;  $R^2: 0.976$ ; Adjusted  $R^2: 0.936$



$F_{v1,v2}$  is read from tables and  $F^*$  is the computer output. Significance F (p-value of overall significance) can also be used to test the overall significance. If the significance F from the computer output is less than 0.05, then we reject the null hypothesis and say that at least one of the coefficients is different from zero and for that matter the model is significant.

From the output and from Table 3, significance F is 0.00029 which is far less than 0.05. This implies the model has overall significance (none of the coefficients is zero).

We therefore reject the null hypothesis and accept the alternate hypothesis. Parameter wise, only NCL is significant with p-value of 0.032.  $R^2$  and Adjusted  $R^2$  are respectively 0.998 and 0.995.

With these values of  $R^2$  and Adjusted  $R^2$ , we can conclude that the regression line is a fitting line, good for forecasting, with a higher percentage of the variation in the dependent variable explained by the independent variables. The significance of NCL in the model also shows that NCL impacts on NP more than any of the remaining independent parameters. NCL has a negative value and so the higher the value of NCL, the lower the value of NP. This again shows how management of Telcos must manage the levels of NCL if they are to make profits. Servicing of loans and other facilities can erode away all gains and must be managed well. CA and NCA all have positive impacts on NP, but are insignificant. This implies that no matter how assets are increased, if liabilities are not checked, profit making will become a mirage. Revenues also impact on NP positively, meaning the higher the revenue, the higher the net profit; it is however insignificant. CL compared to NCL impacts little on NP. This is because CL has temporal effect, but NCL has long term effect. With the discussions above, we look again at the initial hypotheses that were constructed:

- H1:** Current assets have a positive impact or relationship on Net profits.
- H2:** Revenue has a positive impact or relationship on Net profits.
- H3:** Non-current assets have a negative impact or relationship on Net profits.
- H10:** Current liabilities have a negative impact or relationship on Net Profit.
- H13:** Non-Current liabilities have a negative impact or relationship on Net Profit.

H1, H2, H10 and H13 have been proven to be true, whereas H3 has been proven to be false. Non Current Assets (NCA) has a positive impact on Net Profit and not the other way round.

**Gross Profit (GP):** Kindly refer to Table 1, 2 and 4 for this part of the analysis.

The model used was  $GP = CAZ_1 + NCAZ_2 + TRZ_3 + CLZ_4 + NCLZ_5 + C_3$  and the output model was  $GP = 6078804.159 - 0.28CA + 0.13NCA + 0.24CL - 0.02NCL + 0.59TR$ . The hypothesis was stated as follows:

- H<sub>0</sub>:**  $Z_1 = Z_2 = Z_3 = Z_4 = Z_5 = 0$
- H<sub>1</sub>:** At least one  $Z_i \neq 0$

For the overall significance of the model, at least one of the coefficients must be different from zero. That is to say that at least one of the parameters should be linearly related to Y. Also, using the F test, if  $F^* > F_{v1,v2}$ ; where  $v1 = k = 5 =$  number of independent variables,  $v2 = n-k-1$  and  $n = 9$ , that is yearly data from 2000 to 2008, we say that the model does have some validity.  $F_{v1,v2}$  is read from tables and  $F^*$  is the computer output. Significance F (p-value of overall significance) can also be used to test the overall significance. If the significance F from the computer output is less than 0.05, then we reject the null hypothesis and say that at least one of the coefficients is different from zero and for that matter the model is significant.

From the output and from Table 4, significance F is 0.0122 which is less than 0.05. This implies the model has overall significance (none of the coefficients is zero). We therefore reject the null hypothesis and accept the alternate hypothesis. Parameter wise, none of the parameters is significant.  $R^2$  and Adjusted  $R^2$  are respectively 0.976 and 0.936.

With these values of  $R^2$  and Adjusted  $R^2$ , we can conclude that the regression line is a fitting line, good for forecasting, with a higher percentage of the variation in the dependent variable explained by the independent variables. Taking the parameters one after the other, NCL which has a negative value, when increased, will impact on GP positively. CL which is also negative, when increased will impact on GP negatively. CA has a negative impact on GP and NCA and TR have a positive impact on GP. The parameter which is somehow close to significance is TR with p-value 0.32 (the lowest among the parameters). This shows that GP is largely impacted by revenues. In other words, the higher the revenues, the higher the probability of GP going up. With the discussions above, we look again at the initial hypotheses that were constructed:

- H4:** Current assets have a positive impact or relationship on Gross profits.
- H5:** Revenue has a positive impact or relationship on Gross profits.

Table 5: Summary output for EBIT as dependent variable

t-stats				
Item	Independent variable and intercept	t-stat from output	t-stat from tables	Parameter significance
1	Intercept	-0.52	3.182	Not significant
2	CA	0.84	3.182	Not significant
3	NCA	-0.09	3.182	Not significant
4	TR	-0.06	3.182	Not significant
5	CL	1.26	3.182	Not significant
6	NCL	0.32	3.182	Not significant
p-value				
Item	Independent variable and intercept	p-value from output	Standard p-value	Parameter significance
1	Intercept	0.640	0.05	Not significant
2	CA	0.460	0.05	Not significant
3	NCA	0.930	0.05	Not significant
4	TR	0.950	0.05	Not significant
5	CL	0.297	0.05	Not significant
6	NCL	0.769	0.05	Not significant
F-stats			Overall significance (Sig. F = 0.0054)	
F-stats from output	F-stats from tables			
43.114	9.014	Significant		

1: For the t-stats, degrees of freedom is observations minus number of variables which is equal to 9-6 = 3; 2: Significance level = 5% or confidence level = 95%; 3: For the F-stats, V1 = numerator = number of variables minus 1 which is equal to 6-1 = 5 and V2 = denominator = observations minus number of Variables = 9-6 = 3; 4: For t-stats, parameter is significant if t-stats from regression output is greater than t-stats from tables; 5: For p-value, parameter is significant if p-value from regression output is less than 0.05; 6: For overall model significance, F-stats from computer output must be greater than F-stats from tables. Significance F should also be less than 0.05; R<sup>2</sup>: 0.986; Adjusted R<sup>2</sup>: 0.963

Table 6: Firm level non-ratio parameter correlation

	NP	GP	EBIT	CA	NCA	CL	NCL	TR
NP	1.00							
GP	-0.67	1.00						
EBIT	0.99	-0.65	1.00					
CA	-0.11	0.58	-0.03	1.00				
NCA	-0.56	0.85	-0.51	0.81	1.00			
CL	0.00	-0.43	-0.07	-0.89	-0.80	1.00		
NCL	0.89	-0.87	0.85	-0.54	-0.85	0.40	1.00	
TR	-0.38	0.87	-0.33	0.87	0.94	-0.79	-0.75	1.00

- H6:** Non-current assets have a negative impact or relationship on Gross profits.
- H12:** Current liabilities have a negative impact or relationship on Gross Profit.
- H15:** Non-Current liabilities have a negative impact or relationship on Gross Profit.

H5 and H6 have been proven to be true, whereas H4, H12 and H15 have been proven to be untrue or false.

**Earnings Before Interest and Tax (EBIT):** Kindly refer to Table 1, 2 and 5 for this part of the analysis.

The model used was  $EBIT = CAY_1 + NCA Y_2 + TRY_3 + CLY_4 + NCL Y_5 + C_2$  and the output model was  $EBIT = -50317408.01 + 1.21CA - 0.11NCA + 0.04CL + 0.72NCL + 0.22TR$ . The hypothesis was stated as follows:

- H<sub>0</sub>:**  $Y_1 = Y_2 = Y_3 = Y_4 = Y_5 = 0$
- H<sub>1</sub>:** At least one  $Y_i \neq 0$

For the overall significance of the model, at least one of the coefficients must be different from zero. That

is to say that at least one of the parameters should be linearly related to Y. Also, using the F test, if  $F^* > F_{v1, v2}$ ; where  $v1 = k = 5 =$  number of independent variables,  $v2 = n-k-1$  and  $n = 9$ , that is yearly data from 2000 to 2008, we say that the model does have some validity.  $F_{v1, v2}$  is read from tables and  $F^*$  is the computer output. Significance F (p-value of overall significance) can also be used to test the overall significance. If the significance F from the computer output is less than 0.05, then we reject the null hypothesis and say that at least one of the coefficients is different from zero and for that matter the model is significant. From the output and from Table 5, significance F is 0.0054 which is less than 0.05. This implies the model has overall significance (none of the coefficients is zero). We therefore reject the null hypothesis and accept the alternate hypothesis. Parameter wise, none of the parameters is significant. R<sup>2</sup> and Adjusted R<sup>2</sup> are respectively 0.986 and 0.963. With these values of R<sup>2</sup> and Adjusted R<sup>2</sup>, we can conclude that the regression line is a fitting line, good for forecasting, with a higher

Table 7: Firm level ratio parameter correlation

	NPM	ROA	ROI	ROE	DAR	EM	CI	DE
NPM	1.00							
ROA	1.00	1.00						
ROI	-0.93	-0.93	1.00					
ROE	-0.98	-0.97	0.96	1.00				
DAR	0.61	0.60	-0.53	-0.62	1.00			
EM	0.36	0.36	-0.12	-0.37	0.12	1.00		
CI	-0.01	-0.06	-0.01	-0.02	0.29	-0.03	1.00	
DE	-0.36	-0.36	0.12	0.37	-0.12	-1.00	0.03	1.00

percentage of the variation in the dependent variable explained by the independent variables. Taking the parameters one after the other, NCL which has a negative value, when increased, will impact on EBIT negatively. CL which is also negative, when increased will impact on EBIT positively. CA has a positive impact on EBIT and NCA a negative impact. TR also has a positive impact on EBIT. The parameter which is somehow close to significance is NCL with p-value 0.297 (the lowest among the parameters). This shows that EBIT is largely impacted by NCL, as is in the case of NP. In other words, the higher the levels of NCL, the higher the probability of EBIT going down. With the discussions above, we look again at the initial hypotheses that were constructed:

- H7:** Current assets have a positive impact or relationship on earnings before interest and tax.
  - H8:** Revenue has a positive impact or relationship on earnings before interest and tax.
  - H9:** Non-current assets have a negative impact or relationship on earnings before interest and tax.
  - H11:** Current liabilities have a negative impact or relationship on earnings before interest and tax.
  - H14:** Non-Current liabilities have a negative impact or relationship on earnings before interest and tax
- H7, H8 and H9 have been proved to be true, whereas H11 and H14 have been proved to be untrue or false.

**Firm level correlation analysis:**

**Non-ratio correlation analysis:** Kindly refer to Table 6 for this analysis. From Table 6, we find the correlation between any two parameters of the non-ratio parameters (CA, NCA, CL, NCL, TR, EBIT, GP and NP). EBIT and NP have the highest or strongest positive correlation of coefficient 0.99, almost 1. This means that EBIT and NP move together in the same direction; the higher the EBIT, the higher the NP and the lower the EBIT, the lower the NP. The next in line is the correlation between TR and NCA, with coefficient 0.94. This also means that the higher the NCA, the higher the TR and they move in the same direction. NP is correlated with NCL with a coefficient of 0.85. This is quite strong and significant, as was seen with the regression analysis. The positive coefficient of 0.85 is however, misleading. This is because it is not as

if the higher the NCL the higher the NP. NCL can only take negative values, but NP can take both negative and positive. Hence, in interpreting the coefficient value of 0.85, it must be noted that the negative sign of NCL automatically makes the relation a negative one.

This means that the higher the NCL, the higher NP approaches negative and the lower the NCL, the higher the NP approaches positive. The same analysis goes for the correlation between EBIT and NCL where the coefficient is also 0.85. The correlation between GP and TR is 0.87, which is quite strong. This was proven by the regression analysis, which revealed TR to be nearing significance in the model with GP as dependent variable.

Apart from NCL, GP and EBIT, any other combination of NP and the other parameters reveal a very poor correlation, either positive or negative and this was proven by the regression analysis. Again, apart from NCL, GP and NP, any other combination of EBIT and the other parameters reveal a very poor correlation, either positive or negative, which was also proven by the regression analysis. With GP, the best match is TR followed by NCA and NCL, which was again proven by the regression analysis.

**Ratio correlation analysis:** Kindly refer to Table 7 for this analysis. Only NPM and ROA and DE and EM have perfect correlation of coefficient 1, positively and negatively respectively. This means that for NPM and ROA, the more revenues reflect in net profit, the more we can assume that assets too are being utilized or converted profitably. In other words, effective and efficient use of assets results in profitability, because revenues are not chopped off by expenses as a result of inefficient use of resources. On the other way round, the wider the NP and Revenues are apart, the smaller the ratio NPM and that suggests that assets are not being utilized well to produce profits. With DE and EM, we can say that the higher the liability to assets ratio; in other words, the more liabilities outweighs assets, the more shareholders wealth dwindle. The next association which is also quite strong is the association between ROE and NPM, with a correlation coefficient of -0.98.

This simply implies that, all things being equal, if profits are far less than revenues, shareholders suffer. In other words, shareholders gain when there are enough profits. Other associations which are also quite strong are ROE and ROA, ROI and NPM and ROI and ROA, with correlation coefficients -0.98, -0.93 and -0.93 respectively. CI recorder very low correlation coefficients with all the other parameters. The same applies to DE, except the correlation between DE and EM which recorded a coefficient of -1 as established already.

**Industry level analysis:** As stated earlier, the industry level analysis took care of the profitability analysis of the Ghanaian mobile Telecommunications industry from 2002 to 2006. During this period, the Telcos that were in operation are Mobitel (now Tigo), Areeba (now MTN), Ghana Telecom (now Vodafone) and Kasapa (now Expresso). The analysis concentrated on what actually happened in terms of profitability measures over these years. The analysis serves as a knowledge repository for the industry in terms of profitability and other performance measures. It was grouped into three sections namely:

- Profitability measures-non ratio analysis
- Profitability measures-ratio analysis
- Profitability measures-percentage analysis using a base year (2002 was chosen to be the base year)

**Profitability measures-non ratio analysis combined with the percentage analysis using a base year (2002):** Here we considered a number of measures which are listed below:

- Net profit
- EBIT
- Total revenue
- Total liabilities
- Total assets
- Net assets
- Subscriber base

From Fig. 5 to 11, all the measures or indicators listed above increased consistently from 2002 to 2006. In 2002, the industry however, recorded a loss in net profits. By 2006, the industry's revenue had increased by 5 times, taking 2002 as the base year. Total assets increased by about 4 times, total liabilities by about 4 times, net worth or net assets by about 4 times and subscriber base by about 13 times. Figure 12 to 16 reveal these percentage increases. This shows clearly

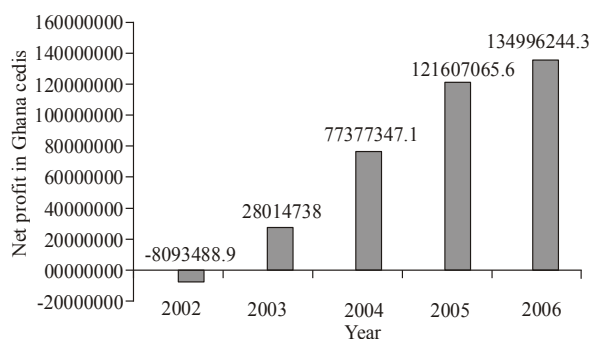


Fig. 5: Industry net profit from 2002 to 2006

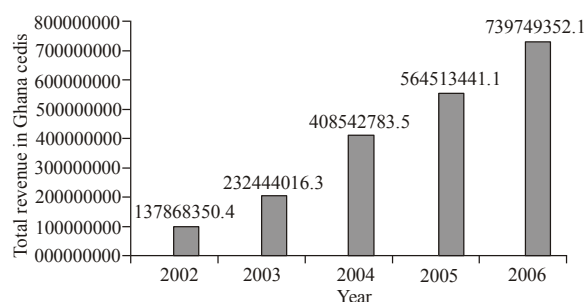


Fig. 6: Industry total revenue from 2002 to 2006

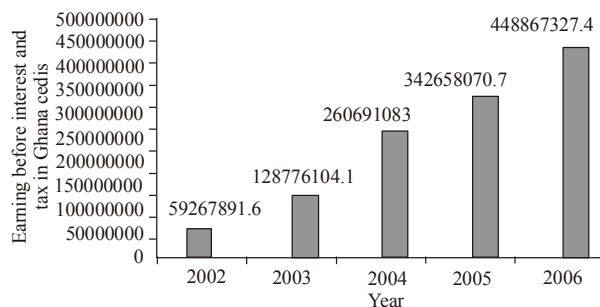


Fig. 7: Industry earnings before interest and tax from 2002 to 2006

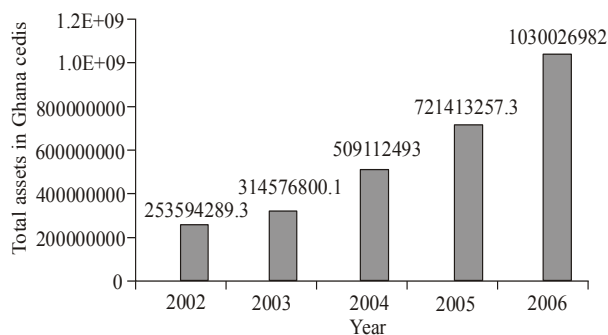


Fig. 8: Industry total assets from 2002 to 2006

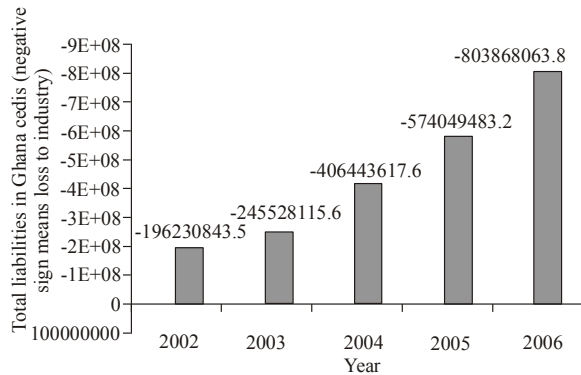


Fig. 9: Industry total liabilities from 2002 to 2006

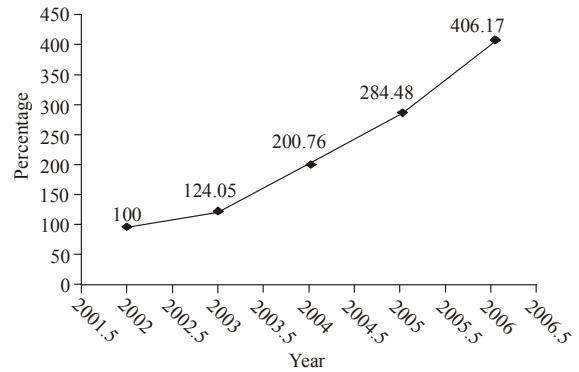


Fig. 13: TA% of base year (2002) from 2002 to 2006

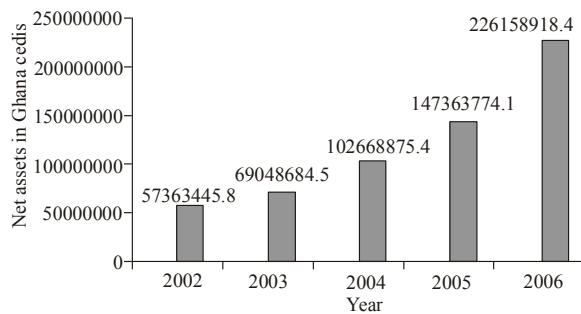


Fig. 10: Industry net assets from 2002 to 2006

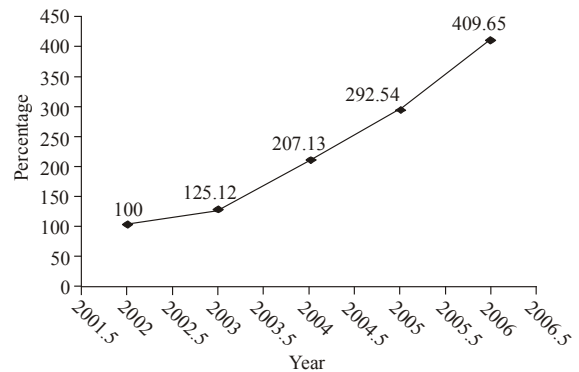


Fig. 14: TL% of base year (2002) from 2002 to 2006

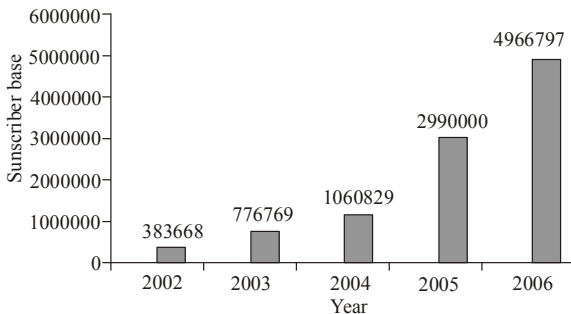


Fig. 11: Industry subscriber base from 2002 to 2006

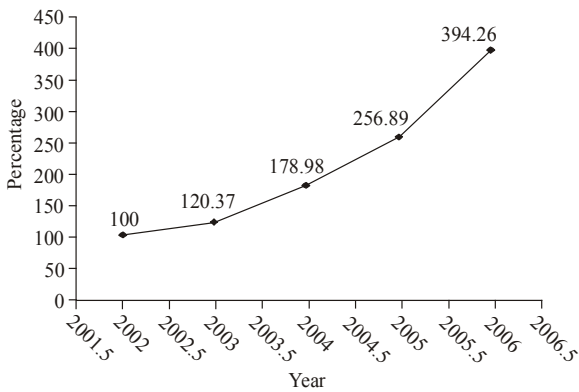


Fig. 15: NA% of base year (2002) from 2002 to 2006

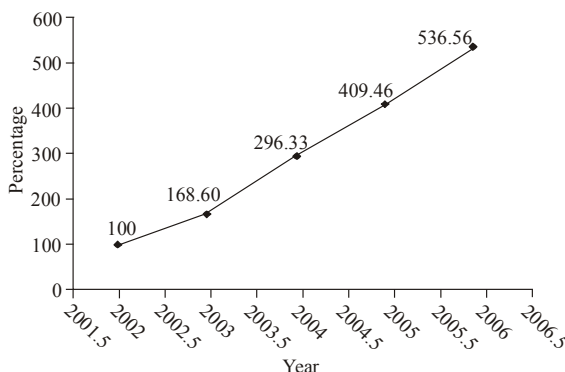


Fig. 12: TR% of base year (2002) from 2002 to 2006

that the industry on a whole has not performed badly at all. 2002 was the only year the industry did not do well; this could be the fact that the industry was young and as such much expertise had not been obtained with regards to how to maximize profits when it comes to mobile telecommunications. It could also be as a result of the poor performance of one or two of the Telcos that make up the industry.

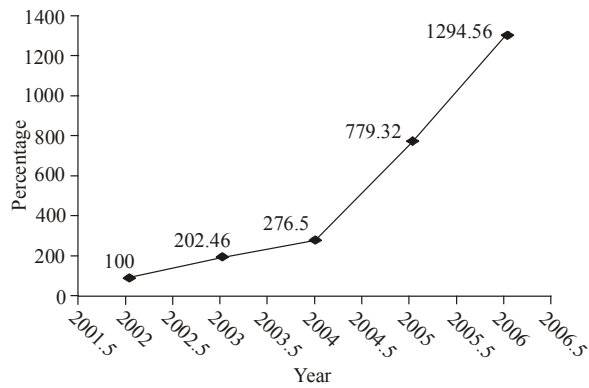


Fig. 16: SB% of base year (2002) from 2002 to 2006

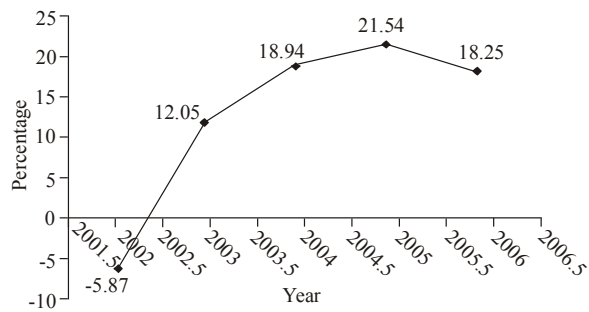


Fig. 17: Industry NPM from 2002 to 2006

**Profitability measures-ratio analysis:** Here we considered a number of measures which are listed below:

- Net profit margin
- Return on assets
- Return on investments
- Return on equity
- Debt to access ratio
- Equity multiplier
- Capital intensity or asset turnover ratio
- Debt to equity ratio

From Fig. 17, Net Profit Margin increased consistently from 2002 to 2005 and then came down at 2006. This shows that, even though profits of 2006 were more than that of 2005, the margin of profit for 2005 was better. This means that the profits generated for 2005 on a cedi of revenue was higher than in 2006. It also means that 2005 was the best year from 2002 to 2006 in terms of profit margin. Again from Fig. 18, Return on assets for 2005 was higher than all the other years. This clearly means that in 2005, many profits were generated from the assets of the industry more than the other years, notwithstanding the fact that the assets of 2006 were greater than that of 2005. In terms of profit margin and return on assets, year 2004 was even better than 2006. The industry therefore did very

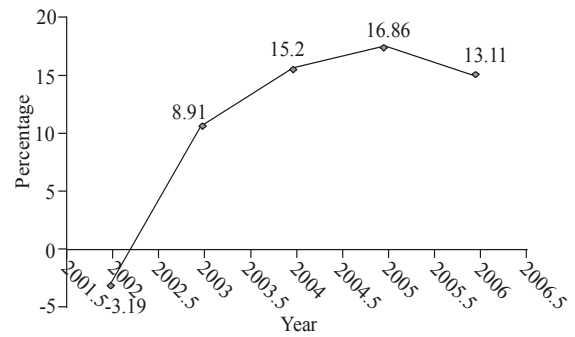


Fig. 18: Industry ROA from 2002 to 2006

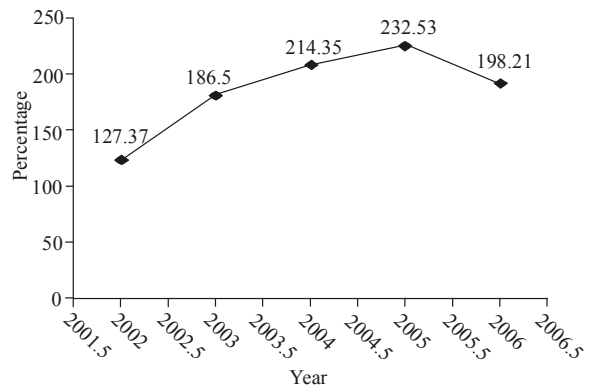


Fig. 19: Industry ROI from 2002 to 2006

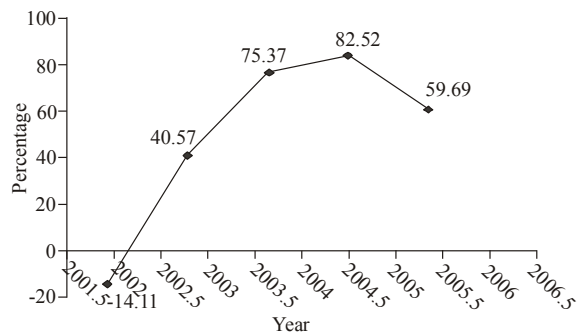


Fig. 20: Industry ROE from 2002 to 2006

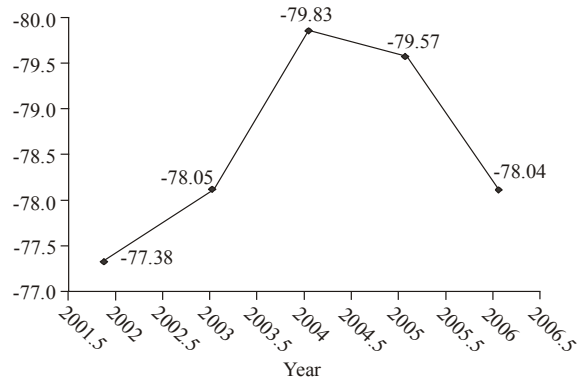


Fig. 21: Industry DAR from 2002 to 2006

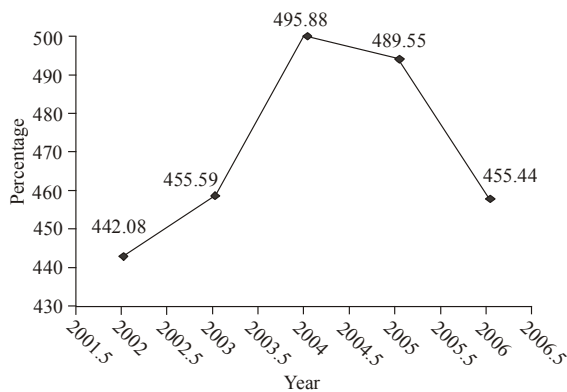


Fig. 22: Industry EM from 2002 to 2006

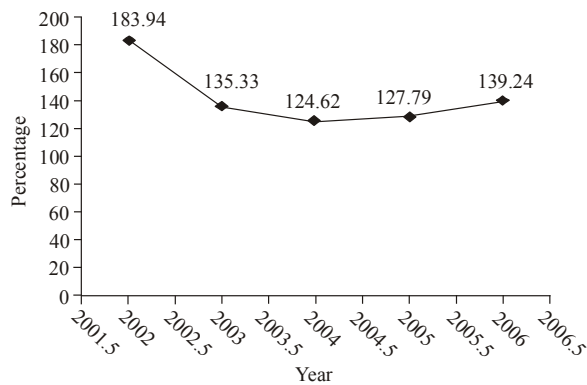


Fig. 23: Industry CI from 2002 to 2006

well in 2004 and 2005 and dipped in 2006. In Fig. 19, the same trend is reported. 2005 did extremely well in return on investment, followed by 2004 and then 2006. This means shareholders in the industry had more value for their investment in 2005 than in any other year from 2002 to 2006. Return on equity is almost the same as return on investment in this particular case, the only difference is the fact that return on investment points to EBIT, whereas return on equity points to Net Profit (Fig. 20). In view of that, it is expected that the results for return on investment will be replicated in return on equity. 2005 proved to be the best year followed by 2004 and then 2006. Shareholders had more value for their money, which could reflect in bigger dividends being paid in 2005, all things being equal (Fig. 21).

Figure 22 revealed that year 2004 recorded the highest equity multiplier, followed by 2005. This ratio tells us of how much of invested money yields assets for the industry. It also tells us of the value conversion of investments by shareholders into assets. Figure 23 tells us of how assets of the industry helped in the area of revenues. The ratio is known as capital intensity. Very high values of capital intensity means that the

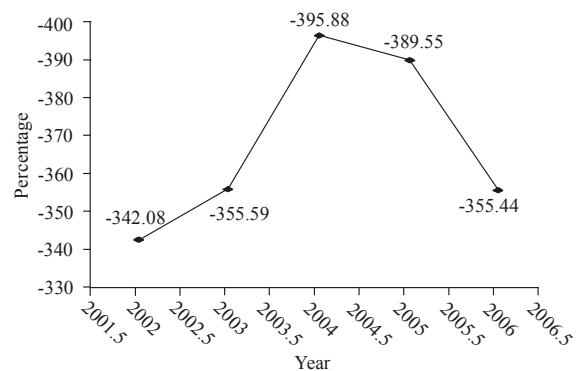


Fig. 24: Industry DE from 2002 to 2006

industry could not leverage on the assets of the industry to generate revenues. Conversely, low values means that the industry made very good use of the available assets to generate revenues. In the light of the above, year 2004 performed very well, followed by 2005 and then 2006; 2002 performed badly (Fig. 24).

#### Industry correlation analysis:

**Non-ratio correlation analysis:** Kindly refer to Table 8 for this analysis. Industry wise, there was a perfect correlation of coefficient of 1 between EBIT and TR. This is expected, as the higher the revenues, EBIT automatically is also high, once taxes and interests have not been deducted. TL and TA also have a perfect relationship of -1 correlation coefficient. This also means that more assets, less liabilities. This is reasonable since the assets are supposed to be converted into profitable use for liabilities to be paid off. NA and TA resulted in a perfect correlation coefficient of 1, implying that shareholders worth increased at the same pace with the increase in assets from 2002 to 2006. All other coefficients are greater than 0.9 and are either positive or negative, with the exception of Subscriber Base (SB) and NP which is 0.89. This is not bad, but it simply means that profits affected subscriber base from 2002 to 2006, but not significant compared with the other parameters. SB was related with all the parameters positively except with TL which is negative. Of course, if the liabilities are too high, it will ultimately affect service delivery and customers generally lose confidence in the industry as a whole.

**Ratio correlation analysis:** Kindly refer to Table 9 for this analysis. Perfect correlation exists between the following pairs of parameters: ROA and NPM, ROE and ROA, EM and DAR, DE and EM and DE and DAR. Their correlation coefficients are 1, 1, -1, -1 and 1, respectively. ROA and NPM of coefficient 1 means that from 2002 to 2006, anytime profits were close to revenues, meaning that liabilities were on the low side,

efficient use of assets had contributed much to that profit. The reverse is also true. This simply means that assets are of great importance to realizing profits at the end of the day. It also means that during the period from 2002 to 2006, the efficient use of the assets of the industry resulted in huge revenues. ROE and ROA of coefficient 1 simply means that net assets are positively proportional to total assets; in other words shareholders equity from 2002 to 2006 grew proportionally with the assets of the industry. This same interpretation can be given to the relation between DE and DAR of correlation coefficient 1. ROE and ROI of correlation coefficient 0.99 means that from 2002 to 2006, NP increased considerably with EBIT. Given that NP increased considerably with EBIT during this period, we can conclude to support the earlier claim that shareholders equity increased with assets of the industry by considering the relation between ROI and ROA with correlation coefficient 0.99. The lowest correlation coefficients of 0.75 and -0.75 were recorded for the relations EM and NPM and DE and NPM.

### CONCLUSION AND RECOMMENDATIONS

Industry level profitability analysis revealed significant information for the Telecommunications industry in Ghana from 2002 to 2006. This information is important for investors who would like to come and invest in the industry in Ghana; to know how the industry performed and also is likely to perform now and in the future.

Industry regulators, the Government, as well as policy makers need these highlights to make informed decisions for the industry. Some of the notable highlights from this research work are as follows:

- By 2006, the industry's revenue had increased by 5 times, taking 2002 as the base year. This was a positive development for the industry.

- Total assets and net assets increased by 4 times each from 2002 to 2006. This was again shown by the perfect positive correlations that exist between the following pairs: NA and ROA, ROE and ROA, DE and DAR. This means that shareholders equity increased from 2002 to 2006 with increase in assets of the industry. This is a positive development which gives hope to investors who would like to invest in the industry.
- Industry net profit increased considerably from 2002 to 2006, even though 2002 recorded a loss. NPM also increased considerably from 2002 to 2005 and dipped in 2006. Even though profits of 2006 were higher than that of 2005, NPM for 2005 was better than of 2006. This simply means that the profits per one cedi of revenue for 2005 were better than that of 2006.
- Subscriber Base (SB) increased 13 times by 2006 with 2002 as a base year. Again, this is enough justification for investors who would like to invest in the industry. It was also found that SB correlates with the following parameters with correlation coefficient greater than 0.8: NP, TR, EBIT, TA and NA. Only TL recorded a negative correlation with SB with correlation coefficient of -0.98. This simply means that, to ensure increase in SB, the focus should be on effective management of resources or assets to generate huge revenues to be reinvested to improve upon service delivery. Huge liabilities must be avoided.

At the firm level, it was revealed that NCL had so much impact on NP. It was the only significant parameter in the regression model. This implies the control of non-current liabilities is key to making profits.

Table 8: Industry level non-ratio parameter correlation

	NP	TR	EBIT	TA	TL	NA	SB
NP	1.00						
TR	0.98	1.00					
EBIT	0.99	1.00	1.00				
TA	0.94	0.99	0.98	1.00			
TL	-0.95	-0.99	-0.98	-1.00	1.00		
NA	0.91	0.98	0.96	1.00	-0.99	1.00	
SB	0.89	0.95	0.93	0.98	-0.98	0.99	1.00

Table 9: Industry level ratio parameter correlation

	NPM	ROA	ROI	ROE	DAR	EM	CI	DE
NPM	1.00							
ROA	1.00	1.00						
ROI	0.98	0.99	1.00					
ROE	0.99	1.00	0.99	1.00				
DAR	-0.76	-0.82	-0.85	-0.85	1.00			
EM	0.75	0.80	0.84	0.84	-1.00	1.00		
CI	-0.96	-0.96	-0.95	-0.95	0.79	-0.78	1.00	
DE	-0.75	-0.80	-0.84	-0.84	1.00	-1.00	0.78	1.00



The author recommends for other researchers to embark on the same form of analysis with more years in perspective; probably from 2002 to 2011. Data acquisition is difficult and it is the main limitation for this work. If data is gathered from 2002 to 2011 and used for the analysis, the outcome of the study will present a more comprehensive view of the profitability of the industry.

#### APPENDIX

##### List of acronyms and abbreviations:

CI	: Capital Intensity
CAGR	: Compound Annual Growth Rate
DAR	: Debt to Asset Ratio
DE	: Debt to Equity
EBIT	: Earnings Before Interest and Tax
EM	: Equity Multiplier
GDP	: Gross Domestic Product
GP	: Gross Profit
NA	: Net Assets
NP	: Net Profit
NPM	: Net Profit Margin
ROA	: Return on Assets
ROE	: Return on Equity
ROI	: Return on Investment
SB	: Subscriber Base
TA	: Total Assets
TL	: Total Liabilities
TR	: Total Revenue

#### REFERENCES

IT News Africa, 2012. Africa's Telecom Industry Is Fastest Growing. Retrieved from: [http:// www.itnewsafrica.com/2009/02/africas-telecomindustry-is-fastest-growing/](http://www.itnewsafrica.com/2009/02/africas-telecomindustry-is-fastest-growing/), (Accessed on: April 27, 2012).

- ITU Statistics, 2012. Retrieved from: <http://mobithinking.com/mobile-marketing-tools/latest-mobile-stats>, (Accessed on: March 01, 2012).
- NCA Site, 2012. Retrieved from: [http:// www.nca.org.gh/ downloads/ Mobile-Voice-Subscription-trends-December-2011.pdf](http://www.nca.org.gh/downloads/Mobile-Voice-Subscription-trends-December-2011.pdf), (Accessed on: April 27, 2012).
- Normile, C., 2008. Ingres Insights-Business Intelligence for the Telecommunications Industry. Improving the Bottom Line and Controlling Expenses, USA.
- Singh, K. and S. Sukhija, 2010. A Study of Profitability Performance. Telecommunication Co., India.
- WCIS, 2010. Ghana Statistical Service and Delta Partners Analysis: Ghana Chamber of Telecommunications Site. Retrieved from: <http://gct.axoninfosystems.com/?pid=2&cid=13&xp=1> (Accessed on: March 27, 2012).
- WI June, 2011. MTN Annual Reports and Delta Partners Analysis: Ghana Chamber of Telecommunications Site. Retrieved from: <http://gct.axoninfosystems.com/?pid=2&cid=13&xp=1>, (Accessed on: March 27, 2012)
- WSJ, 2012. Telecom Giants Battle For Kenya. Retrieved from: [http:// online.wsj.com/ article/SB10001424052748704514504575612012681373530.html](http://online.wsj.com/article/SB10001424052748704514504575612012681373530.html), (Accessed on: April 18, 2012).