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A STUDY ON DATA ANALYTICS – FINANCIAL MODELING USING 3 STATEMENT MODEL AND DCF VALUATION - SIEMENS

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ABSTRACT

Financial statements reflect the position of a company in respect of its wealth and profitability in the short term and long term existence of the company. The company's result in terms of profitability is reflected in Profit and Loss statement for a financial year. The Long term financial health of the company in terms of its wealth creation will be reflected in its Financial Position Statement termed as Balance sheet reflecting its assets and liability position over the period of its existence. Various financial modeling techniques are used to predict the future of a company. The 3 statement model predicts the financial strength of the company for the future in respect of Balance sheet, profit and Loss Account and Cash flow statement. The study aims to achieve to predict the financial statements for future period of 5 years based on the past performance of the company. The study was based on the financial performance of Siemens AG for the past five years and it attempts to predict the future 5 years of the company under study.

KEYWORDS: Balance Sheet, Profit and Loss Account, Cash Flow Statement, Financial Modeling, 3 Statement Financial Model.

INTRODUCTION

1.1 Financial Modeling

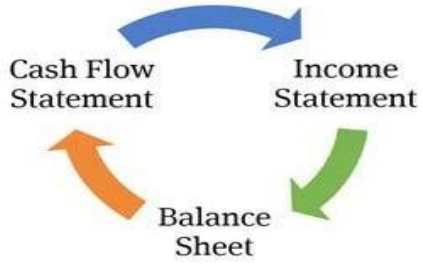
A financial model is a numerical representation of a company's past, present, and future business operations. This numerical report is expressed through the use of Accounting—the language of business. Finance, which may be broadly defined as the science of managing money and other assets, is based on accounting. As such, it is critical to realize the major role Accounting or the tallying of business transactions, plays in building financial models.

A financial model is a required component of nearly any business plan. Anyone interested in starting a new business, starting a new line of business within an existing company, assessing the operations of an existing or proposed business, and/or comparing the operations of two or more businesses, among other tasks, should know how to build, use, and modify a financial model.

Three Statement and DCF Model is used to build and forecast the financial statements to determine the financial position of a company as a whole in terms of Statement of Financial Position, Statement of Financial, Statement of Profit and Loss and other Comprehensive Income and Cash flow statement. All the calculation in the model is done by using MS EXCEL and also there is a trend analysis on the performance of the company.

Three Statement Model

Figure 1: Representation of three statement model



REVIEW OF LITERATURE:

Chanappiyachoomjai (2020), Discounted Cash Flow Valuation of Haad Thip Public Company Limited, in this paper they have applied the discounted cash flow valuation method (DCF method) to model the intrinsic value of HaadThip Company by prediction of the predictable cash flows and using net present value to discount those cash flows, taking the time value of money into attention.

Carlos. J.O and Jada. M.Thompson (2020), Discounted Cash Flow Valuation of Conventional and Cage-Free Production Investments, they compare profitability and risk of conventional and cage-free egg production in the United States. Assessing cage-free making is predominantly related given ongoing consumer determined changes and new cage-free legislation. Richard G. Barker (2014), The role of dividends in valuation models used by analysts and fund managers, here the value of a share is given by the dividend discount model as a modest purpose of future dividends; but the actual purpose of the share price is rarely based upon the direct estimation of these future dividends. Amiya Kumar Sahu (2014), Valuation: Hero Moto Corp Limited by using DCF model here we will learn how to evaluate the performance of the Hero Moto Corp Ltd by using DCF information and also with other information. Paul Pignataro (2013), FINANCIAL MODELLING AND VALUATION - A Practical Guide to Investment Banking and Private Equity, the book sets out to give any investor the fundamental tools to help to regulate if a stock investment is a rational one; if a stock price is undervalued, overvalued, or appropriately valued.

These essential tools are used by investment banks, private equity firms, and Wall Street analysts. Chandan Sengupta n.d.(2013), FINANCIAL MODELLING - Using Excel and VBA, here they have taught us how to learn and practice financial modeling the right way and to provide us with a extensive variety of real-world financial models—over 75 of them—to imitate and use for practice so that you can be on your way to financial modeling's Carnegie Hall. Pantelies Longinidis (2010), Integration of financial statement analysis in the optimal design of supply chain networks under demand uncertainty, In this article they have told that the models that intention to enhance the design of supply chain networks have become a mainstream in the supply chain literature. Daniel Z. Meyer (2009), Excel as a Qualitative Data Analysis Tool, Qualitative research seeks to examine the interconnections in rich, complex data sources. The statistical tools of quantitative methods isolate out the pieces of data in a manner that defeats the purpose.

RESEARCH METHODOLOGY:

OBJECTIVES OF THESTUDY:

- To undertake the trend analysis of the company's performance.
- To forecast the financial performance of the company for future period using Financial Modeling tools.
- To Value the business based on DCFtechnique.

DATA FOR STUDY:

In this study secondary data is used for data analysis. The information analyzed through the secondary data is very qualitative in nature. Therefore the information of the Siemens AG is taken into consideration and for analysis 4 year's data is taken. Historical data has been collected for the years 2016 to 2019, and the forecasting has been done for 5 years i.e 2020-2024. The trends in the movement of various parameters over the period of years are studied and certain inferences are made.

LIMITATION OF THE STUDY:

- The study is based on assumptions to predict the future.
- The outcome of the result is based on terminal value assumed to calculate the present value of a business.

DATA ANALYSIS AND INTERPRETATION

Analysis 4.1 Calculation of Income Statement

In the below table there is an historical data and a forecasted value of Income Statement.

TABLE 4.1 CALCULATION FROM REVENUE TO NET INCOME IN INCOME STATEMENT

INCOME STATEMENT									
Fiscal year2016A	*2017A*	*2018A*	*2019A2020E2021E2022E2023E*				*2024E*		
Fiscal year end date	*9-30-16*	*9-30-17*	*9-30-18*	*9-30-19*	*9-30-20*	*9-30-21*	*9-30-22*	*9-30-23*	*9-30-24*
(€ mm except per share)									
Sales/Turnover/ Revenue	*79,644*	*82,863*	*83,044*	*86,849*	*1,00,297*	*1,21,326*	*1,60,901*	*2,12,361*	*2,95,569*
Cost of Sales (enter as -ve)	*-55,826*	*-57,820*	*-58,181*	*-60,922*	*-70,208*	*-84,928*	*-112630*	*-1,48,652*	*2,06,898*
Gross Profit	*23,818*	*25,043*	*24,863*	*25,927*	*30,089*	*36,398*	*48,270*	*63,708*	*5,02,467*
Research and development (enter as -ve)	*-4,732*	*-5,164*	*-5,558*	*-5,670*	*-6,368*	*-7,826*	*-10,467*	*-13,715*	*-19,037*
Selling, general and administrative (enter as -ve)	*-11,669*	*-12,360*	*-12,941*	*-13,345*	*-15,174*	*-18,501*	*-24,669*	*-32,425*	*-45,058*
Other operating Income	*328*	*647*	*500*	*442*	*-404*	*-524*	*-649*	*-846*	*1,209*
Other operating Expenses (enter as -ve)	*-427*	*-595*	*-678*	*-466*	*-280*	*-354*	*-463*	*-578*	*-4,734*
Income from Investments	*134*	*43*	*-3*	*199*	*-7*	*-8*	*-11*	*-19*	*-22*
Operating Profit (EBIT)	*7,452*	*7,614*	*6,183*	*7,087*	*7,856*	*9,186*	*12,012*	*16,126*	*23,646*
Interest income	*1,314*	*1,490*	*1,481*	*1,634*	*1,816*	*2,200*	*2,930*	*3,835*	*5,911*
Interest expenses(enter as -ve)	*-989*	*-1,051*	*-1,089*	*-1,129*	*-1,294*	*-1,572*	*-2,078*	*-2,738*	*-2,956*
Other financial income/ (expenses)	*-373*	*135*	*1,475*	*-74*	*552*	*785*	*587*	*1,013*	*1,389*
Pretax Profit	*7,404*	*8,188*	*8,050*	*7,518*	*8,930*	*10,598*	*13,450*	*18,235*	*27,990*
Taxes (enter expenses as -ve)	*-2,008*	*-2,148*	*-2,054*	*-1,872*	*-2006*	*-2427*	*-3218*	*-4247*	*-5911*
Net income from continued operation	*5,396*	*6,040*	*5,996*	*5,646*	*6,924*	*8,172*	*10,232*	*13,988*	*22,078*
-attribute to non controlling interests	*-134*	*-133*	*-313*	*-474*	*-314*	*-423*	*-637*	*-851*	*-1078*
- attribute to share holders	*5,450*	*5,960*	*5,807*	*5,175*	*6,723*	*7,848*	*9,735*	*13,289*	*21,262*
Income for Discontinued Operation, net of taxes	*188*	*53*	*124*	*3*	*114*	*100*	*140*	*152*	*262*
Net income	*5,584*	*6,093*	*6,120*	*5,649*	*7,037*	*8,272*	*10,372*	*14,140*	*22,340*

The formula used for the particular financial activities are:

Gross Profit = (Sales + Cost ofsales)

EBIT = Total sum of (R&D, Selling general and administrative, other operating income, other operating expenses and income from investments) in that particular year.

Pretax Profit = Sum of (Interest income + Interest expenses + other financial income/ (expenses))

Net Income = (Net income from continued operation + income from discontinued operation, net of taxes)

INTERPRETATION

To analyze the income statement there are two types of analyses they are:

1. Vertical analysis
2. Horizontal analysis

For this study vertical analysis has been used, and the information that has been projected is that gross profit of a company will be of 30% throughout the projected years as well as in the previous years. EBIT in the income statement has been increased year by year which means there is a less expenses on mortgages, payrolls, property taxes etc which indicates the profitability of a company. At the end of the income statement there is a Net Income values which have been increased year by year which indicates the good sign for a company's profitability. Companies with reliable and cumulative net income over time are looked at very positively by stockholders. Therefore, Siemens is looking at very favorably bystockholders.

ANALYSIS 4.2 CALCULATION OF BALANCE SHEET

Let us understand the Balance sheet items which are influencing the performance of the company.

TABLE 4.2 BALANCE SHEET FROM CASH AND EQUIVALENT TO TOTAL ASSET

BALANCE SHEET									
Fiscal year	*2016A2017A*	*2018A2019A2020E2021E2022E2023E2024E*							
Fiscal year end date	*9-30-16*	*9-30-17*	*9-30-*	*9-30-19*	*9-30-20*	*9-30-21*	*9-30-22*	*9-30-23*	*9-30-24*
(€ mm except per share)									
Cash and equivalents	*10,604*	*8,375*	*11,066*	*12,391*	*28,005*	*44,431*	*77,490*	*1,19,206*	*1,83,867*
Available for sales securities	*1,293*	*1,242*	*1,286*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
Accounts receivables	*16,287*	*16,754*	*17,918*	*18,894*	*19,884*	*24,104*	*31,843*	*41,580*	*58,421*
Inventory	*18,160*	*13,885*	*13,885*	*14,806*	*17,403*	*19,647*	*25,849*	*34,176*	*48,550*
Deferred tax assets	*3,431*	*2,283*	*2,341*	*3,174*	*3,174*	*3,174*	*3,174*	*3,174*	*3,174*
Other current assets	*8,004*	*17,911*	*19,312*	*22,938*	*22,938*	*22,938*	*22,938*	*22,938*	*22,938*
Property, plant and equipment and intangible Assets	*17,899*	*21,903*	*21,512*	*21,983*	*43,515*	*45,759*	*51,961*	*60,288*	*74,662*
Goodwill	*24,159*	*27,906*	*28,344*	*30,160*	*30,160*	*30,160*	*30,160*	*30,160*	*30,160*
Investments using Equity method	*3,011*	*2,727*	*2,579*	*2,244*	*2,591*	*3,135*	*4,157*	*5,487*	*7,637*
Current Income Tax assets	*790*	*1,098*	*1,010*	*1,103*	*1,103*	*1,103*	*1,103*	*1,103*	*1,103*
Assets classified as held for disposal	*190*	*1,484*	*94*	*238*	*238*	*238*	*238*	*238*	*238*
Other assets	*21,889*	*20,543*	*19,568*	*22,317*	*22,317*	*22,317*	*22,317*	*22,317*	*22,317*
Total assets	*1,25,717*	*1,36,111*	*1,38,915*	*1,50,248*	*1,91,329*	*2,17,006*	*2,71,230*	*3,40,666*	*4,53,066*

INTERPRETATION

In the above table the cash and equivalent has been increased which means that higher liquidity. A company with higher liquidity considered as healthier and poses less of a risk. The company will also receive a lower interest rate as it mentions in the income statement. Available for sales securities values is not given in the 2019 because of which the projected year is also not considered the values. Deferred taxes represent taxes that must be paid at a future date. Paying in advance to generate deferred tax assets can support a business looking to decrease their tax liability in a future period. By considering above explanation in the calculation the deferred tax has been taken as constant value. The amount that company has to be paid in future is taken as constant. The total asset has been increased from 8% to 41% which signifies that the company is growing.

TABLE 4.3 CALCULATION OF CASH FLOW STATEMENT

CASH FLOW STATEMENT									
Fiscal year 2016A 2017A 2018A2019A2020E2021E 2022E2023E2024E									
Fiscal year end date	*9-30-16*	*9-30-17*	*9-30-18*	*9-30-19*	*9-30-20*	*9-30-21*	*9-30-22*	*9-30-23*	*9-30-24*
(€ mm except per share)									
Net income					*7037*	*8272*	*10372*	*14140*	*22340*
Deprreciation and amortization					*3641*	*4135*	*5040*	*5953*	*7931*
(income) / Loss realted to investing activites					*-713*	*-798*	*-915*	*-696*	*-781*
Working Capital									
Accounts receivable					*990*	*4,220*	*7,739*	*9,738*	*16,841*
inventory					*2,597*	*2,244*	*6,202*	*8,326*	*14,374*
Accounts payable					*-83*	*2,845*	*4,599*	*5,659*	*9,666*
Other asset					*0*	*0*	*0*	*0*	*0*
Cash from operating activities - CFO					*13,469*	*20,918*	*33,037*	*43,120*	*70,371*
Additions to intangible assets and property, plant and equipment					*-2,939*	*-3,632*	*-4,852*	*-6,341*	*-8,812*
Cash from investing activites - CFI					*-2,939*	*-3,632*	*-4,852*	*-6,341*	*-8,812*
Purchase of treasury shares					*0*	*0*	*0*	*0*	*0*
Issuances of long term debit					*5,366*	*5,382*	*4,988*	*5,552*	*5,322*
Repayment of long term debit (including current maturities of long term debt)					*0*	*0*	*0*	*0*	*0*
Change in short term debt and other financing activities					*-6034*	*0*	*0*	*0*	*0*
Dividends paid to shareholders of Siemens AG					*-3551*	*-4170*	*-5296*	*-7286*	*-11363*
Other liablities					*330*	*330*	*330*	*330*	*330*
Cash from Financing activities - CFF					*2,145*	*1,542*	*22*	*-1,404*	*-5,711*
Changes in cash and cash equivalents					*15,614*	*22,460*	*33,059*	*41,716*	*64,661*
Cash and cash equivalents at beginning of period					*12,391*	*28,005*	*44,431*	*77,490*	*1,19,206*
Cash and cash equivalent at end of period					*28,005*	*44,431*	*77,490*	*1,19,206*	*1,83,867*

INTERPRETATION

In the above table there is Cash from operating activity (CFO) which explains the sources and uses of cash from ongoing regular business activities in a given period. When cash from operating activity increases it indicates that the core business activities of the Siemens AG is thriving. It provides as additional indicator of profitability potential of a company. Cash from investing activity (CFI) in the above table is in negative cash flow which indicates that the Siemens AG company spent amount on purchase of fixed assets or purchase of investment instrument, such as stocks and bonds. Negative cash flow from investing activities might be due to important amounts of cash being invested in the long-term health of the company, such as research and development. Cash from financing activity (CFF) shows the net flows of cash that are used to the fund thecompany.

The financial activity includes debt, equity and dividends. In the above table the financial activity section is showing low and negative amount which means that the Siemens AG company will be paying their debt in time where investors may not worry about the ability of the company to pay back the debt. From the explanation and calculation, the cash and equivalent that has been predicted for projected years is good which indicates the better performance of the company.

ANALYSIS 4.4. CALCULATION OF DCF MODEL

Table 4.4.1 Calculation of Equity

Unlevered FCF	15,877	20,924	21,047	21,428	22,817	24,995	3,45,822
NPV Cash Flow			19,133	17,709	17,142	17,072	2,14,728
Firm Value (NPV)	2,85,785						
NPV Value of the Firm	**2,85,785**						
Plus: Cash	1,83,867						
Less: Debt	57,024						
Equity Value	₹ 4,12,628						

INTERPRETATION

In the above table the NPV (Net Present Value) is positive in all the years which means the cash inflow for the company is good. As there is no negative value in the Net present value the investors are no need to worry about there investments, therefore the equity of the company is

positive which indicates that investors can invest their amount on the Siemens AG for the future projects which will ensure the investor to get back their investments intime. If we reconsider the Discount rate assumptions the profitability of the investors might increase, because of which there is a sensitivity calculation isdone.

TABLE 4.4.2 CALCULATION OF SENSITIVITY ANALYSIS

				Discount Rate		
	4,12,628	8%	9%	10%	11%	12%
	7	3,72,075	3,62,706	3,53,808	3,45,355	3,37,318
	8	3,93,566	3,83,228	3,73,415	3,64,094	3,55,236
	9	4,15,056	4,03,751	3,93,021	3,82,833	3,73,153
Exit Multiple	10	4,36,547	4,24,273	4,12,628	4,01,572	3,91,070
	11	4,58,037	4,44,796	4,32,234	4,20,311	4,08,988
	12	4,79,527	4,65,318	4,51,841	4,39,050	4,26,905
	13	5,01,018	4,85,841	4,71,447	4,57,789	4,44,822

INTERPRETATION

Sensitivity analysis is a financial model that determines how to target variables are affected based on changes in other variables known as input variables. This model is also referred to as what-if or simulation analysis. It is a way to predict the outcome of a decision given certain range of variables.

FINDINGS, SUGGESTIONS AND CONCLUSION

FINDINGS:

- In the study the revenue growth is assumed as 100% and based on that the gross profit is calculated.
- Gross profit is considered as 30% throughout the year. That is in historical year as well as in projected year.
- The Net Income of the company is increasing year by year which is the good sign for the profitability of the company.
- The EPS of the company is found that there is an increase in the value and has reached around 80 which is the good significance for the growth.

- It is found that the segment revenues have equally contributed for the overall revenue values which plays very important role in the performance of thecompany.
- In trend analysis the sales and net profit goes hand in hand. As sales increases the net profit also increases.
- It is found that the company is credit worthy.
- It is also found that the company has effective business strategy by seeing the equity value.
- In DCF Model it is found that there is a positive cash flow in all the years. In the exit year the unleveraged cash flow and NPV is positive.
- In sensitive analysis it is found that the WACC and Exit Multiple should be selected according to the value of the NPV.

SUGGESTIONS

- To improve the overall revenue growth the company has to concentrate on wind power and renewable segment as it is contributing little less comparative to other segments.
- If the company has to increase its EPS, the company has to expand their margin rates by lowering costs. They can also utilize share buybacks; this means that they lower the number of shares that can be bought without making any alterations to profits. This in turn raises the EPS.
- If the restructure the liabilities, the amount of liabilities can also be reduced. The restructuring of liabilities can be done by agreeing longer or scheduled payment term with suppliers, or replace existing loans with guaranteed loans or consolidated loans or by shareholder funds.
- In DCF it is found that there is a positive NPV in all the years. Those values can be improved by increasing the discount rate, the deeper the cash flows get discounted and the lower the NPV. The lower the discount rate, the less discounting, the better the project or the business.

CONCLUSION

From the study it can be understood that in the segment revenue growth, the energy management has stopped to contribute to the total revenue of the company. The wind power and renewable energy are contributing little less compare to the other segments. The company has maintained assets liability match which gives creditworthiness to the company. The company pays back their debt, long-term loan within the given time. As per the outcome of the study the Siemens AG financial performance in future year will be better and investors can invest on this company with no worry as the NPV values are positive which indicates there will be a return to the investors in proper time.

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