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SIMPLE COSTING ANALYSIS AT FARR CERAMICS LIMITED

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BACKGROUND

FARR Ceramics started its journey in 2007, as an export-oriented business concern producing hard porcelain tableware for the international and local market. The factory is situated near Dhaka, Bangladesh and the plant are equipped with the latest state-of-the-art European ceramics manufacturing technology from Germany and Italy and decal printing technology from Japan. The factory has well-qualified and sound R & D team and dedicated workers. Many foreign technicians also work at the factory for supervision of the entire production process. The company intends quality and superior customer service.

FARR Ceramics, an ISO 9001:2008 certified company, has been able to develop and establish its own brand names: FARR Euro Fine Porcelain, FARR Fine Ivory and FARR High Alumina Porcelain. The brands have been priced within an affordable range for attracting the middle-class and upper middle-class customers abounding the local as well as foreign markets. The entire range of FARR products comply with the US FDA Standards and Proposition 65 (California State) requirements. FARR Ceramics has successfully made its mark in the ceramic tableware market at home and abroad by blending aesthetics, durability and innovation in design in one production house. It has also been very smart in popularizing its products within a very small span of time. The organization is a prominent entrepreneurial emblem of Bangladesh in the world arena.

Businesses, like FARR Ceramics that have high fixed costs must pay closer attention to the "what-if" situation before making any decisions, because implementing a wrong decision can be disastrous. With the help of Cost-Volume-Profit analysis managers at FARR Ceramics can understand these "what-if" scenarios and choose the best option out of the alternatives. Cost–volume–profit (CVP) analysis is a model to analyse the behaviour of net income in response to changes in total revenue, total costs, or both. CVP analysis requires that all product and period costs, should be classified as either variable or fixed cost.

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In this case study we first start by determining variable & fixed costs of FARR Ceramics and then figure out breakeven point and output level needed to achieve a target operating income for FARR Ceramics. Then we further analyse how the managers at FARR Ceramics use CVP analysis to make their decisions.

INTRODUCTION

Cost Volume Profit Analysis (CVP Analysis) is the study of the relationship between revenues, costs and profits of a business. The analysis is used to examine the relationship among the total volume of an independent variable, total costs, total revenues and profits for a time period. Cost-volume-profit analysis is useful in the early stages of planning because it provides an easily understandable framework for discussing planning issues and organizing relevant data.

Cost Volume Profit analysis (CVP) is one of the most hallowed, and yet one of the simplest, analytical tools in management accounting. In a general sense, it provides a sweeping financial overview of the planning process. That overview allows managers to examine the possible impacts of a wide range of strategic decisions. Those decisions can include such crucial areas as pricing policies, product mixes, market expansions or contractions, outsourcing contracts, idle plant usage, discretionary expense planning, and a variety of other important considerations in the planning process. Given the broad range of contexts in which CVP can be used, the basic simplicity of CVP is quite remarkable. Armed with just three inputs of data – sales price, variable cost per unit, and fixed costs – a managerial analyst can evaluate the effects of decisions that potentially alter the basic nature of a firm.

There are three main tools offered by CVP analysis:

- Contribution margin analysis, which compares the profitability of different products, lines or services you offer
- Breakeven analysis, which tells you the sales volume you need to break even under different price or cost scenarios
- Operating leverage, which examines the degree to which your business uses fixed costs, which magnifies your profits as sales increase, but also magnifies your losses as sales drop.

In this paper using CVP Analysis we have analysed the product of FARR Ceramics Limited to know whether the company is profitable or not by examining the interrelationships between its costs, revenues, production volume and profits. Also, we determined the breakeven point or level of operating activity at which revenues covered the company's all fixed and variable costs, resulting in zero profit. Knowing about this point is very crucial for the business,

because it is the point a company wants to reach as quickly as possible in order to cover all the costs and start making real profits.

It is to be noted that from 2012 till 2015 the average production for FAAR Ceramics was around 8 million units per year. However, this was not enough to fulfil their market demand. For which they were seriously contemplating on expanding their production facility and ability. In 2016, they went for a massive expansion by establishing an additional line of production next to their existing facility which enabled them to increase their production units and meet market demand in the face of rising fixed costs.

PURPOSE OF STUDY

In this paper we have tried to outline some objectives which mainly focus on the profitability of FARR Ceramics limited.

The objectives of the study are:

- To identify and calculate the fixed and variable costs.
- To calculate contribution margin ratio, breakeven point in taka and margin of safety in taka.
- To prepare break even chart of FARR Ceramics Limited.

METHODOLOGY

Design

The data used in this study are compiled from FARR Ceramics Limited's website, annual reports, interviews and account reports. The data have been extracted, systemized, investigated and interpreted in this paper with proper reasoning, clarification and explanation.

Data Sources

All the relevant data regarding the study were collected from the annual reports of FARR Ceramics Limited.

FINDINGS AND ANALYSIS

Fixed Costs & Variable Costs

Expenses that must be paid no matter how many goods or services are offered for sale are called **fixed costs**. There are other types of costs that change with the number of products offered for sale. These are called **variable costs**.

In order to conduct the cost volume profit analysis, it is very important to understand the difference between fixed and variable costs. We identified FARR Ceramics Ltd.'s fixed and variable costs to have a better understanding about the company. The fixed and variable costs are listed below:

Table I: List of Fixed & Variable Costs

SL	Fixed Costs	Variable Cost
A	**Direct Material:**	
1		Raw Material
B	**Manufacturing Overhead:**	
2	Gratuity	Depreciation
3	Office expenses	Salaries, wages etc.
4	Insurance expenses	Power and fuel
5	Occupancy expenses	Packing materials
6	Lease rental	Transport expenses
7		Welfare expenses
8		Communication expenses
9		Travelling & conveyance
10		Handling & carrying expenses
11		Repairs & maintenances
12		General expenses
C	**Administrative Overhead:**	
13	Depreciation	Transport expenses
14	Salaries and allowances	Communication expenses
15	Gratuity	Travelling & conveyance expenses
16	Welfare expenses	Utilities expenses
17	Office expenses	Repairs & maintenances
18	Legal fees, prof. and other fees	General expenses
19	AGM expenses	Handling & carrying expenses

20	Occupancy expenses	
21	Audit fee	
D	**Selling & Distribution Expenses:**	
22	Promotional expenses	Transport expenses
23	Salaries and allowances	Travelling & conveyance expenses
24	Gratuity	Communication expenses
25	Advertising	Utilities expenses
26	Occupancy expenses	Handling & carrying expenses
27	Office expenses	Repairs & maintenances
28	Welfare expenses	General Expenses
29	Show room expenses	
30	Legal and professional fees	

Annual Sales of FARR Ceramics in Taka

Year	Amount in Taka
2012	1926745719
2013	1901444562
2014	1942350752
2015	1704567234
2016	1677657674

Major Fixed Costs

At any and all levels of output, the fixed costs of FARR Ceramics' Ltd. will always remain the same. The following table shows the percentage of total fixed cost used to cover the individual fixed cost components for the year 2016.

Table II: Major Fixed Costs

SL	Fixed Costs	Percentage
A	**Manufacturing Overhead:**	
1	Gratuity	10.17
2	Office expenses	4.01
3	Insurance expenses	2.12
4	Occupancy expenses	0.03
5	Lease rental	0.76
B	**Administrative Overhead:**	
6	Depreciation	5.68
7	Salaries and allowances	13.84
8	Gratuity	1.13
9	Welfare expenses	5.36
10	Office expenses	6.18
11	Legal fees, professional and other fees	0.19
12	AGM expenses	0.69
13	Occupancy expenses	0.81
14	Audit fee	0.4
C	**Selling & Distribution Expenses:**	
16	Salaries and allowances	11.85
17	Gratuity	0.92
18	Advertising	0.36
19	Occupancy expenses	2.88
20	Office expenses	2.73
21	Welfare expenses	1.52
22	Show room expenses	0.37
23	Legal and professional fees	0.05
24	Product research	0.1
25	Lease rental	0.38
	Total	100

The percentage of major fixed below:

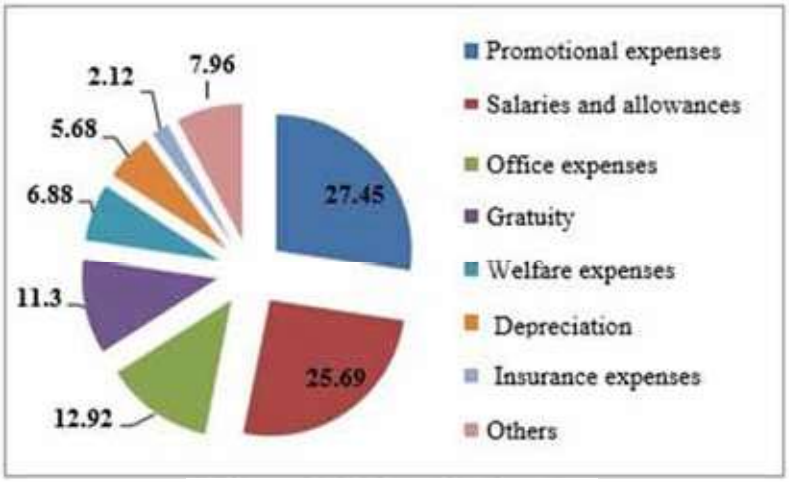

Figure I: Major fixed costs

The figure above shows that, out of the total fixed cost it spends the largest portion to cover the expenses of promotion and salaries. Other than these two the company's some other major fixed costs are office expenses, gratuity, welfare expenses, and depreciation and insurance expenses.

Total Fixed Cost

Fixed costs are cost that do not change in total with the change in the quantity of output produced by a firm within relevant range in the short run. They remain constant even when your revenues rise or fall. Total fixed cost is one part of total cost. Fixed costs are permanent and have to be incurred independent of the quality of goods and services produced.

Table III: Total Fixed Cost

Years	Total Fixed Cost
2012	89079122
2013	96401390
2014	102214877
2015	102313047
2016	174578342

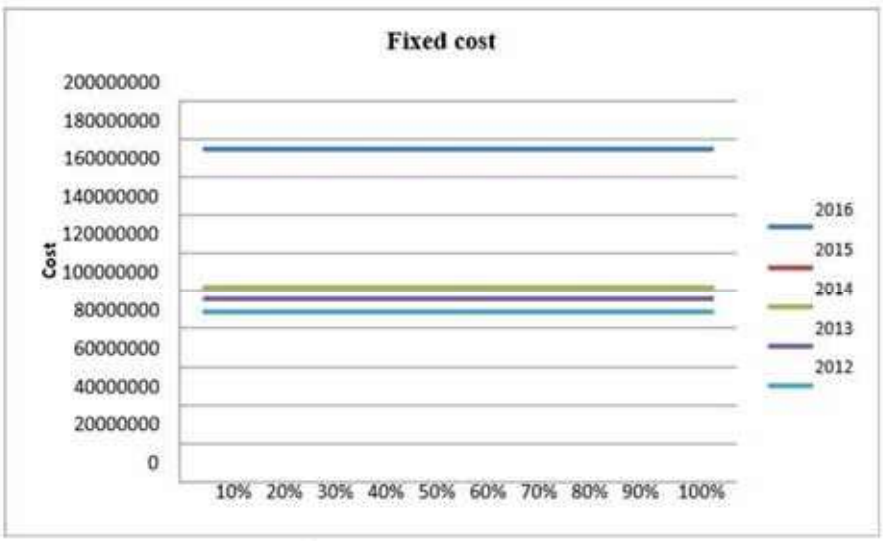

Figure II: Total fixed costs

The total fixed cost curve graphically represents the relation between total fixed cost incurred by FARR Ceramics in the short-run production of their product and the percentage of sales revenue. Because total fixed cost is fixed, the total fixed cost curve is a horizontal line. The costs increased steadily since 2012 to 2016. But after 2015 the fixed cost increased in a significant manner. This happened because during 2016 the company had gone for an expansion of production facility.

Major Variable Costs

As FARR Ceramics is a manufacturing company, out of the total variable cost it spends most of the money to cover those variable costs which falls under direct material and manufacturing overhead. The following table shows the percentage of total variable cost used to cover the individual variable components of the year 2016.

Total Variable Cost

A variable cost is a cost that changes in total with the change in volume but per unit cost remains fixed. Unlike a fixed cost, variable cost changes with the units change. This cost rises as the production output level rises and decreases as the production output level decreases. The total fixed costs of FARR Ceramics since 2012 to 2016 are shown below:

Table IV: Total Variable Cost

Years	Total Variable Cost
2012	1197175437
2013	1236060207
2014	1219078593
2015	1028435016
2016	1202656347

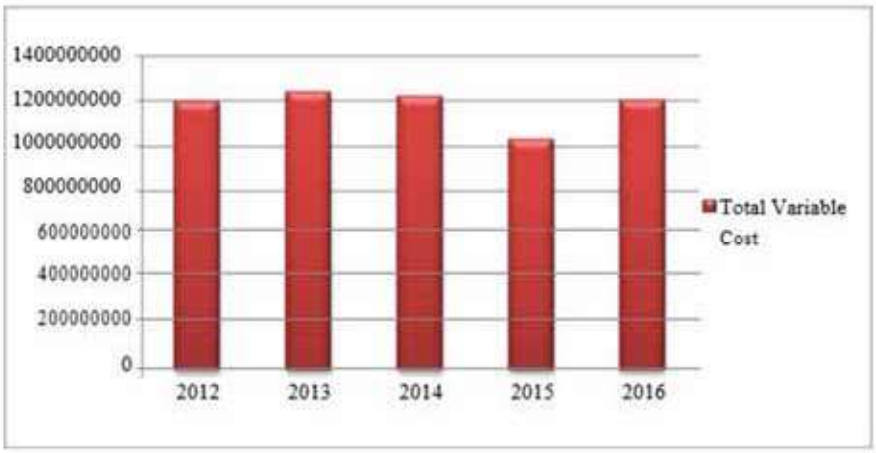

Figure IV: Total Variable costs

Figure IV shows that during the recent years the total variable costs of FARR Ceramics Limited haven't experienced much fluctuation except the year 2015. The variable cost of 2013 was slightly higher because the costs of wages, depreciation, power and packing materials increased a bit compared to the other years.

In 2015 there was a huge downfall in total variable cost due to change in variable cost per unit. The material cost per unit, variable labour cost, packing and power cost may go down in that year.

Contribution Margin

Contribution is the difference between sales and variable costs (expenses). Contribution represents the portion of sales revenue that is not consumed by variable costs and so contributes to the coverage of fixed costs. It represents the amount of income or profit the company made before deducting its fixed costs.

Table V: Contribution Margin of FARR Ceramics Ltd.

Years	Contribution
2012	729570282
2013	665384355
2014	723272159
2015	676132218
2016	475001327

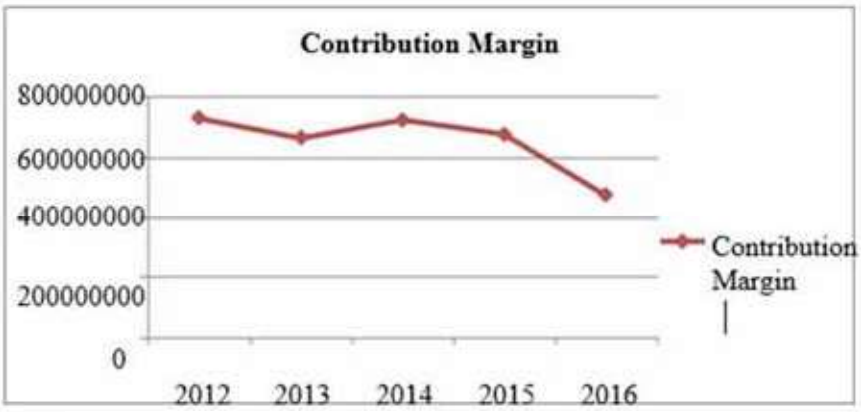

Figure V: Contribution Margin of FARR Ceramics Ltd.

The figure shows that there was not much difference between the contribution margins of 2012 to 2015. But In 2016 an increase in variable costs caused the contribution margin to shrink.

Contribution Margin Ratio

Contribution ratio is the contribution margin divided by the sales amount. It is the percent of sales amount available to cover fixed costs. Once fixed costs are covered, the next amount of sales results in a company's profits.

Table VI: Contribution Margin Ratio of FARR Ceramics Ltd.

Years	Contribution Ratio (%)
2012	37.87
2013	34.99
2014	37.24
2015	39.67
2016	28.31

Table VI shows the contribution margin ratio, which is the percentage of each sales taka that is available to cover fixed costs and provide income.

Figure VI: Contribution Margin Ratio of FARR Ceramics Ltd.

In the Figure VI we can see that the contribution ratios from 2012 to 2015 were almost same. It shows that the contribution ratio was always moving between the ranges of 35 percent to 40 percent. That means theses portions of sales revenue were not consumed by variable costs and contributed to the coverage of fixed costs. The ratio was highest in 2015 compared to the other years because the variable cost per unit decreased significantly. But the contribution ratio of 2016 was much lower than the previous years, this happened due to an increase in variable costs and decrease in sales revenue. That means a large portion of the sales revenue was consumed by variable costs and caused a decrease in contribution ratio.

Break-Even Point in Taka

The break-even point represents the level of sales where net income equals zero. In other words, the point where sales revenue equals total variable costs plus total fixed costs, and contribution margin equals fixed costs.

Table VII: Break Even Point in Taka

Years	BEP in Taka
2012	23,52,23453
2013	27,55,11260
2014	27,44,76039
2015	25,79,10378
2016	61,66,66697

Table VII shows FARRs breakeven point of five years when their sales reached a volume at which producing products became profitable. At the break-even point, the company recovered its investments in production and began turning a profit with each additional sale.

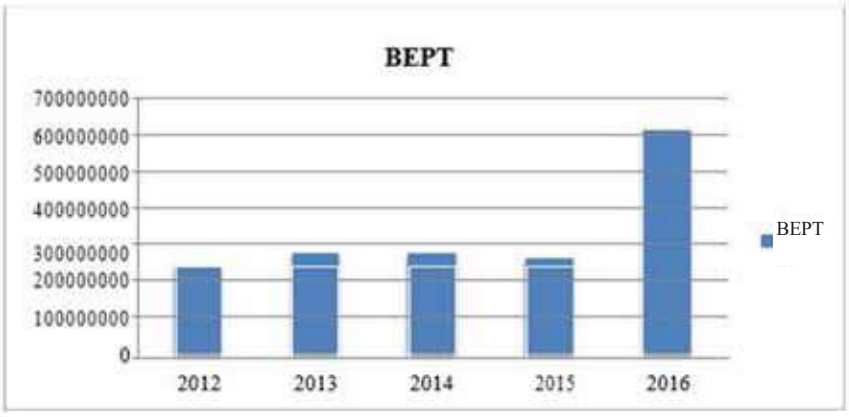

Figure VII: Contribution Margin Ratio of FARR Ceramics Ltd.

The Figure VII shows that the breakeven points were almost moving at the same level since 2012 to 2015.The BEP was lowest in 2012, this happened due to lower fixed cost and higher contribution margin. In 2016 the breakeven point went sharply upward. One reason was an increase in the company's fixed costs. A second reason for the increase in FARR Ceramic's break-even point was a reduction in the contribution margin, as a result of a greater proportion of lower contribution margin products were sold. Due to these reasons the breakeven point of 2016 was highest among the other years.

Margin of Safety in Taka

Margin of safety is used in break-even analysis to indicate the amount of sales that are above the break-even point. The Table represents the marginal safety of the FARR ceramics.

Table VIII: Margin of safety

Years	MST
2012	1691522266
2013	1625933302
2014	1667874713
2015	1446656856
2016	1060990977

Margin of Safety is the amount of sales which generates profit. In other words, sales beyond Break Even Point are known as Margin of Safety. It is calculated as the difference between total sales and the break-even sales.

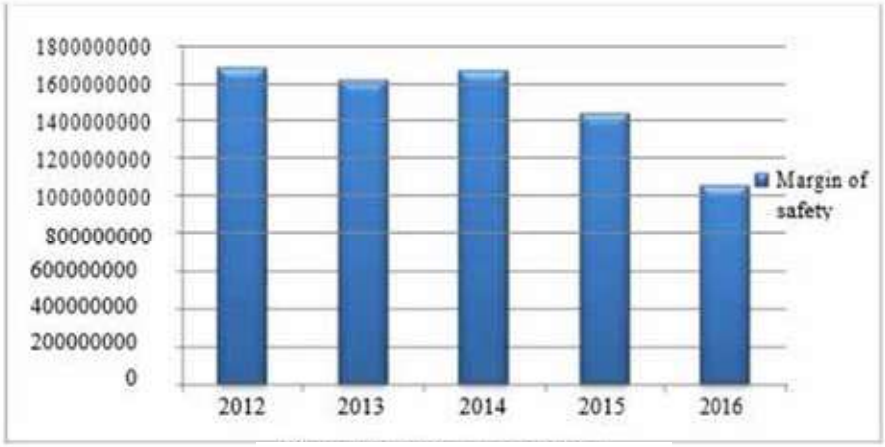

Figure VIII: Margin of safety

The figure represents the marginal safety of FARR ceramics since 2012 to 2016. The size of margin of safety is an extremely important guide to the financial strength of a business. From 2012 to 2014 the marginal safety was large enough, which indicates that during those years BEP was much below the actual sales, that means business was in a sound condition and reduction in sales would not have affected the profit of the business. After 2014 the margin of safety of the company started to decrease. The margin was lowest in 2016 this happened due to an increase in the breakeven point and any decrease in sales volume could have cause a loss to the company.

Net Income

Net income refers to net earnings calculated as sales less cost of goods sold, admin expenses, selling and marketing expenses, operating expenses, depreciation, interest and taxes. The following table represents the net income of FARR Ceramics from the year 2012 to 2016.

Table IX: Net Income

Years	Net Income
2012	640491160
2013	568982965
2014	621357282
2015	573819171
2016	300422485

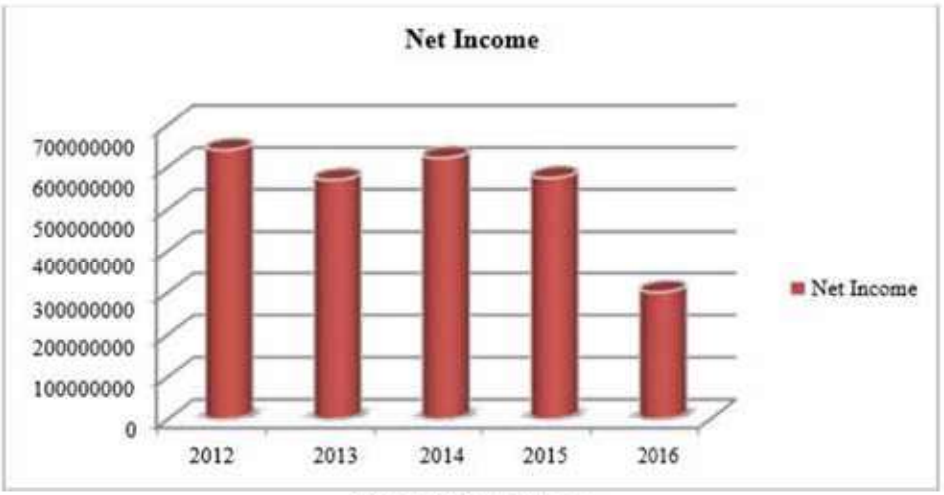

Figure IX: Net Income

The figure shows that the net income of each year was almost same till 2014. The income was highest in 2012 because the expenses were lower compared to the sales revenue. After 2015 the net income started to decrease and in 2016 it reduced significantly. This happened because the company's fixed cost increased significantly in the year 2016 due to excess production and sales beyond the relevant range.

Break-Even Chart Analysis

The break-even analysis helps in finding out the relationship of costs and revenues to output. It enables the financial manager to study the general effect of the level of output upon income and expenses and, therefore, upon profits. This analysis is usually presented on a break-even chart. It helps in understanding the behaviour of profits in relation to output. Such an understanding, among other things, is significant in planning the financial structure of a company. To understand the profitability nature of FARR Ceramics Limited we have created break-even chart for the years of 2012 and 2016.

In these break-even charts, the concepts like total fixed cost, total variable cost, and the total cost and total revenue are shown separately. It will also give an idea about the extent of profit or loss to the firm at different levels of activity.

The figures below shown are the graphical representation of the break-even analysis of 2012 and 2016 in the forms of a chart. The sales units are shown on the horizontal axis and costs and revenue on vertical axis.

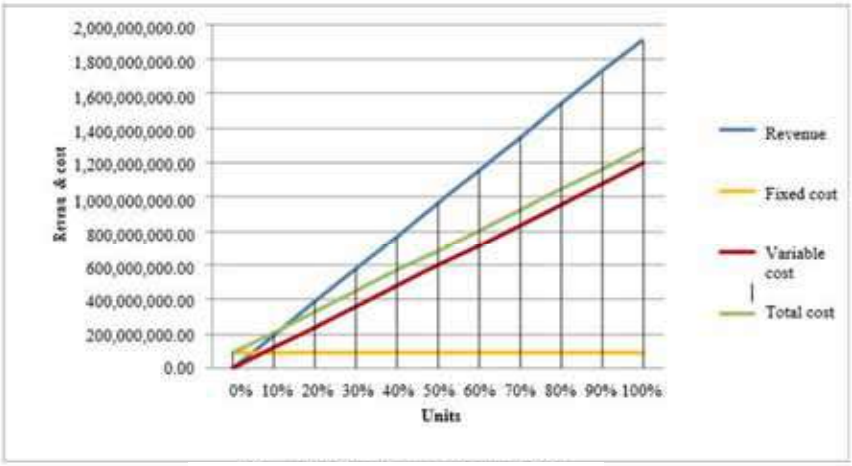

Figure X: Break-even chart of 2012

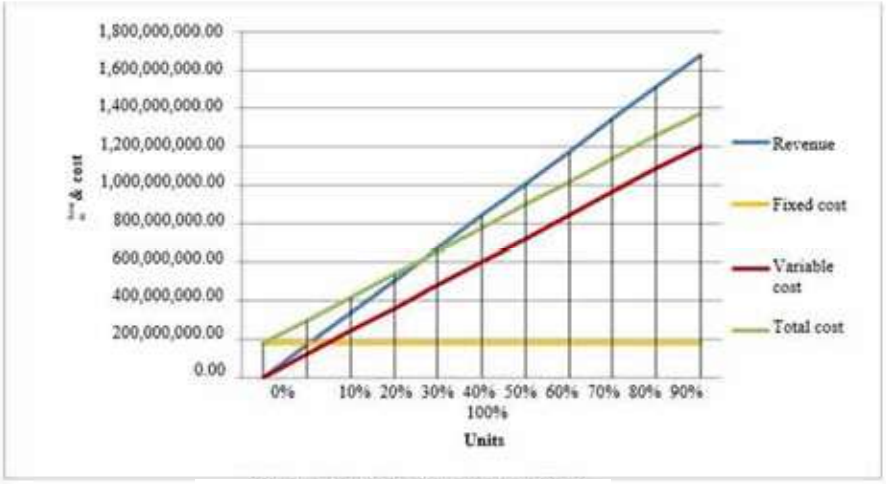

Figure XI: Break-even chart of 2016

Here we can see that the fixed costs stayed the same regardless of how many units the company sold during those years. From the fixed costs lines show that the fixed cost of 2016 was much higher than 2012. The Variable costs are dependent on production output. From these charts, we can see that the variable cost line of both the years were almost at the same. The total expenses lines show that they have a positive or upward slop that indicate the effect of increasing variable expenses with the increase in sales units. Total cost amount of 2016 was higher compared to the year 2012. The total revenue lines and the total expenses lines crossed each other. The point at which they crossed each other is the break-even point of 2012 and 2016. Notice that the total expenses line is above the total

revenue line before the point of intersection and below after the point of intersection. It tells us that the business suffers a loss before the point of intersection and makes a profit after this point. The break-even point in the above graphs are TK. 23,52,23453 for 2012 and TK. 61,66,66697 that agrees with the break-even point computed using equation and contribution margin methods above.

Now if we compare the charts of 2012 and 2016, it can be seen that the difference between the total expenses lines and the total revenue lines before the point of intersection (BE point) is the loss area. This area reduces as the number of units sold increases. It means every additional unit sold before the break-even point reduces the loss. The loss area of the company started to increase after 2012. This happened due to a decrease in sales revenue after the year 2012 in a continuous manner. Again, the difference between the total expenses line and the total revenue line after the point of intersection (BE point) is the profit area. Notice that this area increases as the number of units sold increases. It means every additional unit sold after the break-even point increases the profit of the business. It can be seen that the profit area decreased in a significant manner in 2016. This happened due to higher fixed cost and lower contribution margin.

Production capacity

The production details of FARR Ceramics in the years 2012 to 2016 is given. They produce three categories of finished products which are A, B and C. A Categories are completely export oriented, B categories are also export oriented but sometimes released in local market whereas C categories are only for the local market.

	Category A (In Units)	**Category B (In Units)**	**Category C (In Units)**	**Total (In Units)**
2012	2776547	345567	2446787	5568901
2013	3000089	455000	2334576	5789665
2014	3109987	510000	3564740	7184727
2015	3456447	526000	3675660	7658107
2016	3778657	655000	3887650	8321307

From the above table, we can see that the expansion in 2016 has had a positive impact on the number of units being produced, which was a constraint that was being faced by the company till 2015 to meet market demand.

CONCLUSION

CVP analysis provides a comprehensive picture of the profit structure which enables management to distinguish between the effect of sales volume fluctuations and the results of price or cost changes upon profits. It is essential that the results from break-even analysis are interpreted correctly and the information is effectively utilized to make better, informed business decisions. The break-even analysis of FARR Ceramics Limited reveals that the company is profitable. But the profitability decreased in a significant manner after 2012 and in 2016 it generated the lowest net income among the five years. Profit performance of FARR Ceramics can be improved by increasing sales volume, by increasing selling price, by decreasing variable costs and by decreasing fixed costs. Or else if the breakeven point continues to increase in this manner than in future the company has to face loss.

CASE QUESTIONS

- Using the data given in the case calculate contribution margin per unit for the year 2012-2016.
- Calculate break-even point in units for the year 2012-2016.
- Calculate margin of safety in units for FARR Ceramics for the year 2012-2016.
- Compute degree of operating leverage for the year 2012-2016. How does it help a manager to predict the change in net operating income provided the change in sales volume is given?
- What is the main difference between gross margin and contribution margin? Which one is the main focus of CVP analysis? Explain briefly.
- Determine the possible impact of the followings on margin of safety calculation assuming other things remains constant and each of the situation is independent.
    i. Increase in fixed cost
    ii. Increase in per unit variable cost
    iii. Increase in per unit sale price
- Please discuss why the fixed costs were steadily increasing from the year 2012 to 2015.

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