

A Study on Cost Modeling Analysis at Walchandnagar Industries Ltd.

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Abstract: The study on cost modeling at Walchandnagar Industries Ltd. delves into the critical aspects of cost analysis and modeling within the context of this esteemed industrial organization. Cost modeling plays a pivotal role in a company's strategic decision-making process, and this research aims to shed light on the methodologies, practices, and insights applied by Walchandnagar Industries Ltd. in managing its costs. This comprehensive analysis involves an exploration of the fundamental principles of cost modeling, encompassing both traditional and contemporary approaches. It examines how the company allocates and tracks costs across its various departments and operations, highlighting the intricacies of cost allocation methodologies employed. Through a blend of qualitative and quantitative analyses, the study offers insights into the impact of cost modeling on the company's financial performance, competitiveness, and overall sustainability. It assesses the outcomes of cost modeling initiatives and their alignment with the organization's broader objectives. Ultimately, this study not only provides a comprehensive overview of cost modeling practices at Walchandnagar Industries Ltd. but also offers valuable lessons and best practices that can be applied in diverse industrial settings. It underscores the importance of cost modeling as a strategic tool for enhancing efficiency, profitability, and competitiveness in today's dynamic business environment.

Keywords: ABC analysis, BEP analysis, Contribution, Cost modeling, CVP analysis, Margin of safety, Margin of safety ratio, PV ratio.

I. INTRODUCTION

To preserve funds and boost revenues, businesses must have a clear understanding of costs. Cost modeling enters the scene in this situation. It is the procedure by which businesses can

ascertain the ideal cost to produce a good and comprehend the most economical and efficient methods of producing goods. The goal of the cost modeling project is to examine the costing structure of the specific business and determine how target costing and activity-based costing may be utilised to reduce manufacturing costs and boost margins. Cost modeling's primary goal is to assist management in setting prices. Various costing methods and tools, including CVP analysis and break-even analysis, would be employed in the study. The area of management accounting known as cost accounting determines the budget and actual costs of an organization's activities, processes, departments, or products, as well as analyses variations, productivity, or the social use of funds. Cost accounting is a tool that managers use to help them make decisions that will lower costs and increase profitability. Cost accounting is a type of management accounting; hence it is not required to adhere to rules like GAAP because its major users are internal managers as opposed to external users.

II. LITERATURE REVIEW

Breakeven analysis is "the study of the interrelationships between costs, volume, and profit at various levels of activity." The term "breakeven analysis" is often used; however it is somewhat deceptive because it indicates that the sole interest is with the level of activity at which the breakeven point is reached. The breakeven point provides no profit or loss, despite the fact that the behaviour of costs and earnings at other levels is usually far more important. As a result, a more descriptive term, cost-volume-profit analysis, or CVP analysis, is commonly employed. An expense that needs to be covered is a cost-volume-profit analysis. Cost-volume-profit analysis is a methodical evaluation of the relationship between selling prices, sales and production volume, costs, expenses, and profits [1].

Break-even analysis model is created with some economic variables and a total fixed cost. It enables the investor to produce a number of choices from the fixed cost component

of the overall cost, from which the best one may be picked. The analytical technique can be used to assess possible prices, the effect of price changes, and the impact of expenses on profitability. The investigation also revealed that there is a direct association between BEP and interest rate, as well as an inverse relationship between salvage values and BEP. It is envisaged that proper use of this approach will aid the investor in making the appropriate decision. There is a link between salvage values and BEP [2].

Inventory goods are categorized using the ABC categorization system based on their financial worth to a company. Typically, Class 'An' items make up 10% to 15% of the overall inventory and represent 70% to 75% of the total yearly consumption value. Class 'B' items typically make up 15% to 20% of the entire inventory and represent 20% of the annual consumption value. Typically, the Class 'C' items make up 70% to 75% of the entire inventory and represent 5% to 10% of the overall yearly consumption value [3].

Researcher draws the conclusion that management can use cost volume and profitability analysis to compute profit yield from a specific number of selling goods based on the data. Managers can establish the minimum sales threshold required to achieve the desired profit using the cost volume profitability analysis. The study came to the conclusion that cost volume, profitability analysis is somewhat dependent on increased resource utilization, cut-off expenses, goodwill, and market share after analyzing various data related to the Salem steel mill [4].

Break even analysis is a great technique for determining whether or not your industry idea will be lucrative [5].

Break-even-point (BEP) analysis is essential to management since it calls for identifying a situation in which neither a profit nor a loss is realized. Manufacturers might respond to questions like: what are the minimal sales to create a contribution to cover corporate expenses and make a profit, and what is the safe operating margin, using the sales at BEP, both in terms of quantity and value. Understanding the BEP analysis ensures that management is aware of whether the business is in the loss or profit region and what steps should be done to refocus the business's operations [6].

Applying ABC analysis to an inventory situation reveals the significance of the items and the degree of control exercised over them [1].

This substantial body of research demonstrates that there are numerous plausible methods for performing multi-criteria ABC analysis in practical circumstances, some quite basic and others fairly difficult. Businesses can choose what they want based on their needs and capabilities [7].

III. OBJECTIVES OF THE STUDY

- To know the concepts of costing and various analysis.
- To analyse the cost sheet of Walchandnagar industry.

- To know the performance level of the company through break-even analysis.
- To know and analyse the company cost model by using tools like (CVP, ABC and margin of safety).

IV. DATA ANALYSIS

TABLE I: CONTRIBUTION = SALES - VARIABLE COST

Year	Sales	Variable Cost	Contribution
2012-13	9,52,86,089.92	4,61,77,732.63	4,91,08,357.29
2013-14	10,44,38,389.50	4,59,36,563.97	5,85,01,825.53
2014-15	12,32,41,919.14	6,63,86,137.08	5,68,55,782.06
2015-16	13,82,00,411.81	5,34,90,214.82	8,47,10,196.99
2016-17	12,38,01,902.18	4,33,82,662.22	8,04,19,239.96
2017-18	16,56,83,404.01	8,43,31,871.19	8,13,51,532.82
2018-19	18,28,12,473.18	10,71,93,784.01	7,56,18,689.17
2019-20	17,58,44,104.92	10,52,82,110.61	7,05,61,994.31
2020-21	10,42,24,790.31	5,72,93,386.60	4,69,31,403.71
2021-22	18,04,65,685.15	10,94,03,433.28	7,10,62,251.87

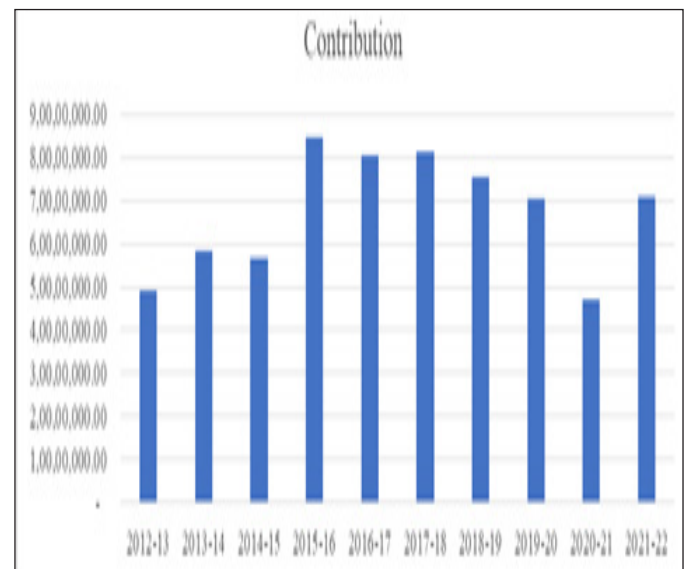


Fig. 1: Contribution

Interpretation

The graph up top shows the company's contribution over time. Typically, the contribution margin is big enough to cover all the fixed expenditures and help with the profit. In this case, the contribution has changed over time. Sales are low for the fiscal year 2012-13, but variable costs are significant, therefore contribution is likewise low. Contributions gradually rise until the 2017-18 fiscal year. The contribution has decreased starting in the 2018-19 fiscal year due to erratic sales and high variable costs.

TABLE II: PROFIT VOLUME RATIO = CONTRIBUTION/SALES X 100

Year	Contribution	Sales	P.V. Ratio (%)
2012-13	4,91,08,357.29	9,52,86,089.92	51.54
2013-14	5,85,01,825.53	10,44,38,389.50	56.02
2014-15	5,68,55,782.06	12,32,41,919.14	46.13
2015-16	8,47,10,196.99	13,82,00,411.81	61.30
2016-17	8,04,19,239.96	12,38,01,902.18	64.96
2017-18	8,13,51,532.82	16,56,83,404.01	49.10
2018-19	7,56,18,689.17	18,28,12,473.18	41.36
2019-20	7,05,61,994.31	17,58,44,104.92	40.13
2020-21	4,69,31,403.71	10,42,24,790.31	45.03
2021-22	7,10,62,251.87	18,04,65,685.15	39.38

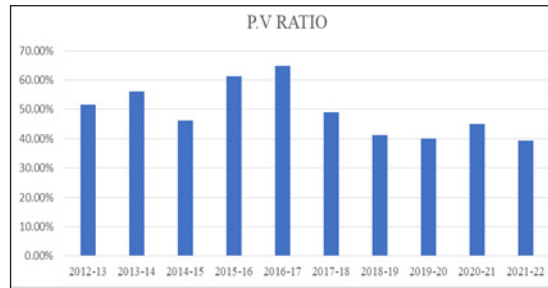


Fig. 2: PV Ratio

Interpretation

The company's P/V ratio for the previous ten years is shown in the graph above. The graph plainly demonstrates that the corporation has had a high P/V ratio overall for all ten years. The table shows that the P/V ratio was 51.54% in the fiscal year 2012-13 and climbed to 56.02% in the following year. Due to an increase in variable costs and a fall in contributions, it further decreased by 46.13% in 2014-15; however, it then increased again in 2016-17. The Profit volume ratio has been varying since 2017-18.

TABLE III: BREAK - EVEN POINT = FIXED COST/ CONTRIBUTION X SALES

Year	Fixed cost	Sales	Contribution	BEP
2012-13	2,14,46,100.55	9,52,86,089.92	4,91,08,357.29	4,16,12,368.61
2013-14	3,03,46,321.60	10,44,38,389.50	5,85,01,825.53	5,41,74,736.03
2014-15	3,77,95,969.47	12,32,41,919.14	5,68,55,782.06	8,19,27,424.87
2015-16	3,83,19,257.57	13,82,00,411.81	8,47,10,196.99	6,25,15,935.09
2016-17	3,43,11,891.00	12,38,01,902.18	8,04,19,239.96	5,28,21,655.31
2017-18	4,74,89,577.93	16,56,83,404.01	8,13,51,532.82	9,67,18,951.12
2018-19	4,69,08,250.43	18,28,12,473.18	7,56,18,689.17	11,34,03,357.92
2019-20	4,03,08,730.37	17,58,44,104.92	7,05,61,994.31	10,04,51,421.22
2020-21	3,02,72,847.65	10,42,24,790.31	4,69,31,403.71	6,72,29,636.21
2021-22	3,57,82,014.97	18,04,65,685.15	7,10,62,251.87	9,08,69,986.21

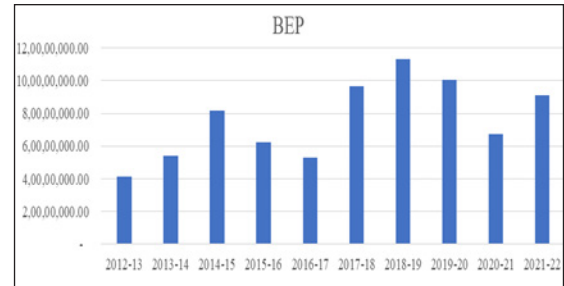


Fig. 3: BEP

Interpretation

The graph above shows that the company's break-even point climbed continually from the financial year 2012-13 to the financial year 2014-15. The break-even point, however, has declined in 2015-16 and has continued to fluctuate. When the break-even point is examined, it becomes clear that BEP is higher than sales. BEP is seen as a no-loss, no-gain scenario. If sales fall short of BEP points, the company experiences losses. Sales in this instance, however, are above BEP, therefore it is clear that the business is profitable.

TABLE IV: MARGIN OF SAFETY = SALES – BREAK-EVEN SALES

Year	Sales	Break-Even Sales	Margin of Safety
2012-13	9,52,86,089.92	4,16,12,368.61	5,36,73,721.31
2013-14	10,44,38,389.50	5,41,74,736.03	5,02,63,653.47
2014-15	12,32,41,919.14	8,19,27,424.87	4,13,14,494.27
2015-16	13,82,00,411.81	6,25,15,935.09	7,56,84,476.72
2016-17	12,38,01,902.18	5,28,21,655.31	7,09,80,246.87
2017-18	16,56,83,404.01	9,67,18,951.12	6,89,64,452.89
2018-19	18,28,12,473.18	11,34,03,357.92	6,94,09,115.26
2019-20	17,58,44,104.92	10,04,51,421.22	7,53,92,683.70
2020-21	10,42,24,790.31	6,72,29,636.21	3,69,95,154.10
2021-22	18,04,65,685.15	9,08,69,986.21	8,95,95,698.94



Fig. 4: Margin of Safety

Interpretation

The margin of safety for the company is shown in the graph above. It serves as the company's loss-absorbing reserve. The margin of safety was initially large from the years 2012-13; however, it then started to drop until 2014-15, when it dramatically increased and was maintained at nearly constant levels until the years 2019-20. The margin of safety is decreasing in 2020-21 as a result of weak sales. And the following year, sales increase and, presumably, the safety margin also rises.

TABLE V: MARGIN OF SAFETY RATIO = MARGIN OF SAFETY/SALES
x 100

Year	Margin of Safety	Sales	Safety Ratio
2012-13	5,36,73,721.31	9,52,86,089.92	56%
2013-14	5,02,63,653.47	10,44,38,389.50	48%
2014-15	4,13,14,494.27	12,32,41,919.14	34%
2015-16	7,56,84,476.72	13,82,00,411.81	55%
2016-17	7,09,80,246.87	12,38,01,902.18	57%
2017-18	6,89,64,452.89	16,56,83,404.01	42%
2018-19	6,94,09,115.26	18,28,12,473.18	38%
2019-20	7,53,92,683.70	17,58,44,104.92	43%
2020-21	3,69,95,154.10	10,42,24,790.31	35%
2021-22	8,95,95,698.94	18,04,65,685.15	50%

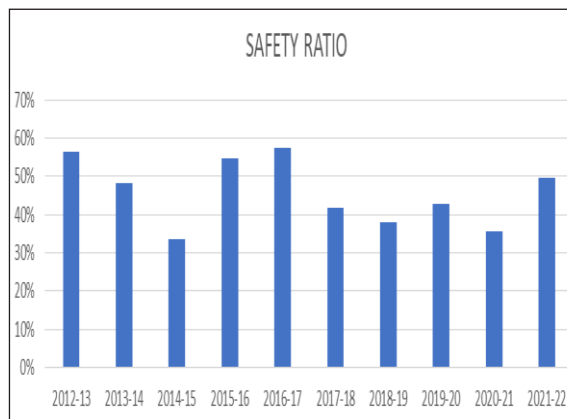


Fig. 5: Safety Ratio

Interpretation

According to the aforementioned graph, which shows the company's margin of safety ratio over the previous ten years, the company has an overall high margin of safety ratio. The margin of safety in this case ranges from 34% in 2014-15 to 57% in 2016-17. With a higher margin of safety, the business is better protected from a drop in revenue. A low margin of safety ratio means the business needs to make some modifications because it does not have a large buffer.

TABLE VI: DOL = CONTRIBUTION\EBIT, CONTRIBUTION = SALES
– VARIABLE COST, EBIT = CONTRIBUTION – FIXED COST

YEAR	CONTRIBUTION	EBIT	OPERATING LEVERAGE
2012-13	4,91,08,357.29	2,76,62,256.74	1.78
2013-14	5,85,01,825.53	2,81,55,503.93	2.08
2014-15	5,68,55,782.06	1,90,59,812.59	2.98
2015-16	8,47,10,196.99	4,63,90,939.42	1.83
2016-17	8,04,19,239.96	4,61,07,348.96	1.74
2017-18	8,13,51,532.82	3,38,61,954.89	2.40
2018-19	7,56,18,689.17	2,87,10,438.74	2.63
2019-20	7,05,61,994.31	3,02,53,263.94	2.33
2020-21	4,69,31,403.71	1,66,58,556.06	2.82
2021-22	7,10,62,251.87	3,52,80,236.90	2.01

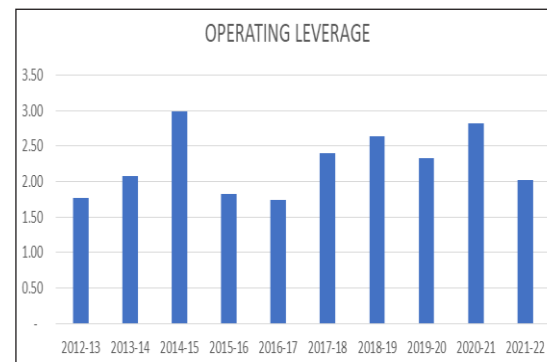


Fig. 6: Operating Leverage

Interpretation

The above graph reveals that the company operating leverage. The Company operating leverage is initially in 2012-13 is low because fixed cost is high compare to remaining financial years. During the year 2013-14 DOL is 2.08 and increased in next year further continuously decrease in 2015-16 and 2016-17 further it goes on fluctuating.

TABLE VII: A ANALYSIS

Year	Row labels	Types	Total value	Quantity	A % of total value
2017-18	A	1,340.00	55,97,653.68	1,64,256.03	70%
2018-19	A	911.00	85,64,876.32	3,13,144.16	77%
2019-20	A	820.00	87,95,832.96	1,57,193.85	81%
2020-21	A	665.00	49,91,851.95	1,90,908.03	66%
2021-22	A	562.00	56,07,180.42	4,99,698.95	56%

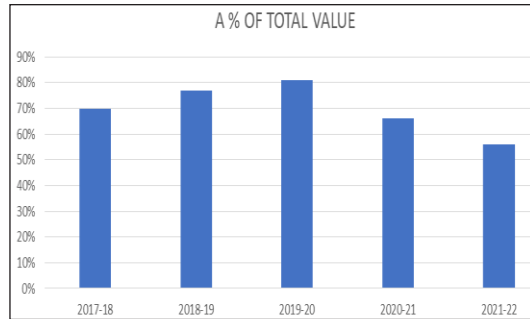


Fig. 7: A Analysis

Interpretation

The company's five-year average percentage of the overall value of the ABC analysis is shown in the upper bar graph. A percentage of total value was 70% in the years 2017–18; this grew to 77% in 2018–19; 81% in 2019–20; further declined to 66% in 2020–21; and will eventually drop to 56% in 2021–22.

TABLE VIII: B ANALYSIS

Year	Row labels	Types	Total value	Quantity	B % of total value
2017-18	B	401.00	17,77,404.10	35,992.52	22%
2018-19	B	336.00	21,51,385.71	30,383.14	19%
2019-20	B	262.00	15,53,395.94	15,623.86	14%
2020-21	B	343.00	21,56,835.18	37,459.62	29%
2021-22	B	336.00	40,81,773.89	56,253.73	40%

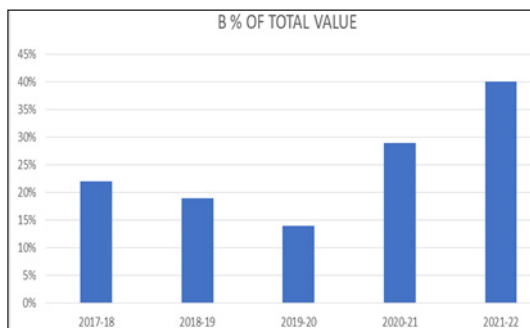


Fig. 8: B Analysis

Interpretation

The company's five-year B% of overall ABC analysis value is shown in the upper bar graph. The B% of total value was 22% in the years 2017–18; it then declined to 19% in the following

years; it will then decrease to 14% in the following years; it will then climb to 29% in the following years; and finally, it will reach 40% in the following years.

TABLE IX: C ANALYSIS

Year	Row labels	Types	Total value	Quantity	C % of total value
2017-18	C	601.00	5,90,659.25	6,793.10	7%
2018-19	C	445.00	4,66,974.69	6,473.95	4%
2019-20	C	433.00	4,71,311.37	5,107.25	4%
2020-21	C	411.00	3,85,001.45	3,483.25	5%
2021-22	C	375.00	4,12,025.16	4,067.25	4%

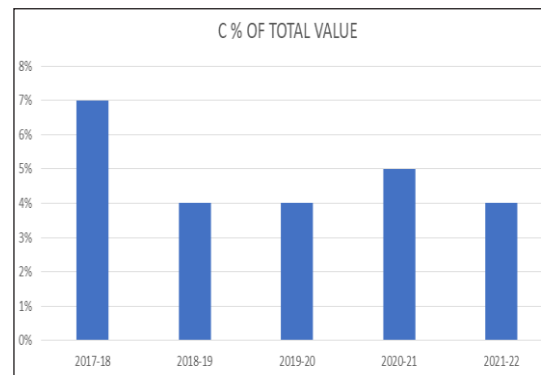


Fig. 9: C Analysis

Interpretation

The company's five-year C% of total ABC analysis value is shown in the above bar graph. The C% of total value was 7% in 2017–18; however, it fell to 4% in 2018–19; it will remain at 4% in 2019–20; further, it will climb to 5% in 2020–21; and finally, it will fall back to 4% in 2021–22.

TABLE X: CVP ANALYSIS OF PROJECTED FINANCIAL YEAR 2022-23

Sl.No	Particulars	2017-18	2018-19	2019-20	2020-21	2021-22	FY 2022-23
1	CONTRIBUTION	81351533	75618689	70561994	46931404	71062252	82980000
2	BREAK-EVEN POINT	96718951	113403358	100451421	67229636	90869986	128368282
3	MARGIN OF SAFETY	68964453	69409115	75392684	36995154	89595699	71631718

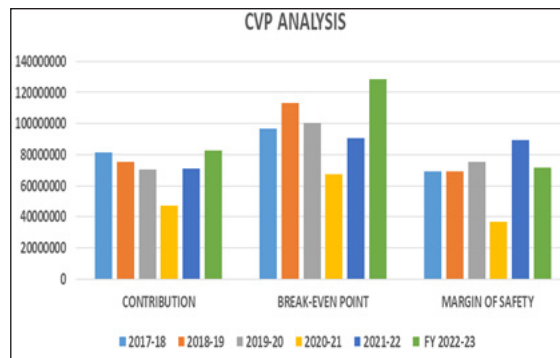


Fig. 10: CVP Analysis

TABLE XI

SL.NO	PARTICULARS	2017-18	2018-19	2019-20	2020-21	2021-22	FY 2022-23
1	P.V RATIO	49.10%	41.36%	40.13%	45.03%	39.38%	41%
2	MARGIN OF SAFETY RATIO	42%	38%	43%	35%	50%	35.82%
3	OPERATING LEVERAGE	2.40	2.63	2.33	2.82	2.01	2.79

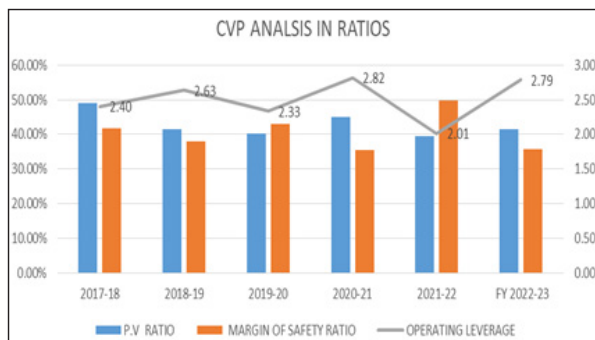


Fig. 11: CVP Analysis in Ratios

V. FINDINGS

- This study reveals that the company's sales progressive from the year 2012-13 to 2019-20. But reduced in the year 2020-21. Further financial during the year 2021-22 again sales improved.
- Variable cost is almost high in every year compared to fixed costs, in the year 2020-21 contribution is low because of low sales.
- The profit volume ratio of the company is high and also company is having high profit margin. It represents that the company is earning a satisfactory profit from its sales.
- The break-even point is satisfactory, while analysing the break-even point we can see that BEP is higher level from

value of sales BEP is considered as no loss no profit. If the sales are below the points of BEP the company is suffered from losses. But in this case sales are above the point of BEP, so obviously company is in profit.

- While analysing the margin of safety, it represents the company buffer against the losses. We can see that the company is having high margin of safety because there is no poor performance in sales.
- A high margin of safety ratio means the company has more security from decline in sales, a low margin of safety ratio indicates the company does not have wide buffer and needs to make some changes. It shows the percentage of sales through which the company gets the profit. Here the company is having high margin of safety ratio. Almost margin of safety ratio cross 50%.
- While analysing the operating leverages the fixed costs is low, variable costs is high. We can see that the company is having high DOL a business that generates sales with a high gross margin.
- While analysing ABC analysis of 5 years, types, the total value and quantity of product is very high A category, in B category these factors are in medium range and in C category these factors are low range. From the above analysis company can identify the most valuable products to match their customer's demand, control and allocate resources effectively and increase the sales.
- In the projected Profit and loss account 2022-23 revenue from operations is provided by finance manager.
- While calculating the total average, the percentage of particular expenses is required and has been calculated by using below mentioned formula:

$$\text{Particular expenses} / \text{Revenue from operations} * 100$$

- Projected profit and loss account for FY 2022-23 has been calculated from the average percentage of last five years profit and loss account.
- Projected cost sheet for the year 2022-23 the production numbers 900000 is provided by finance manager. Cost sheet has been projected on the basis of projected profit and loss account 2022-23.
- In Projected cost sheet for the year 2022-23 company is in high profit because sales has increased and expenses are reduced. Company has the capacity to cover all the expenses to get profits.

VI. SUGGESTIONS

Following are the few suggestions for improvement of efficiency in all spheres.

- Would like to suggest that the margin of safety can be improved by improving the contribution margin through reducing the variable costs.

- Company can increase production by reducing the wastage of raw materials; thereby company can increase the sales.
- It is apt to install latest machines with new technology for high productivity with quality and accuracy.
- There is scope for advertising strategies to improve the performance of the company.
- Company should adopt updated technologies and try to manufacture the improved digital gauges.
- Demand for the gauges is very high in market but supply of the gauges is very low as such it is suggest to the company to enhance manufacturing of gauges in the proportion of demand.
- It is suggested that company should maintain the criteria of ABC analysis for types of products for inventory management.
- It is observed that different units of the company are performing in indifferent levels of profits. The profit of Dharwad unit is always in progress from year to year. This distinguished performance is neutralized because of common sharing by other units.

VII. CONCLUSION

The study offers information about the firm's operations and financial situation. The business has given all the information and data needed to complete the project successfully. According to the studies, the finance department is effectively carrying out its duties. All of the primary departments are collaborating and keeping up with business-related operations. Using tools and techniques the project sought to "Cost modeling" and Cost volume profit analysis at the Walchandnagar Industries. ABC analysis with the goal of determining the connection between the company's cost, volume, and profit. This study assisted in creating predicted cost sheets and profit and loss statements for the financial years 2022 and 2023, allowing for the forecasting of profits and the avoidance of avoidable expenses. The study clearly shows that the company has a strong overall performance in terms of profitability. But even so, careful

cost-control measures that improve the business's operational efficiency can help it perform at its best. By lowering variable costs, the business is able to lower costs while increasing sales due to product quality and potential growth.

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