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Product Costing of Fixed and Variable Costs Impact Analysis

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Abstract: This scientific article examines cost minimization and efficient product management within enterprises, alongside contemporary methodologies for cost determination.

Key words: Production costs, fixed and variable costs, costing, cost price.

Fixed costs are invariant to fluctuations in production volume. Irrespective of increases or decreases in output levels, the magnitude of fixed costs remains constant. For example, fixed costs include rent for some fixed assets, depreciation costs for some fixed assets, and so on.

Variable costs are directly related to changes in

Please provide the rest of the sentence so I can complete the translation for you. production. An increase in the volume of production requires a greater expenditure on variable costs. These include costs for chemicals, bottles, mineral and local medicines, food products, feed, wages, electricity, etc.

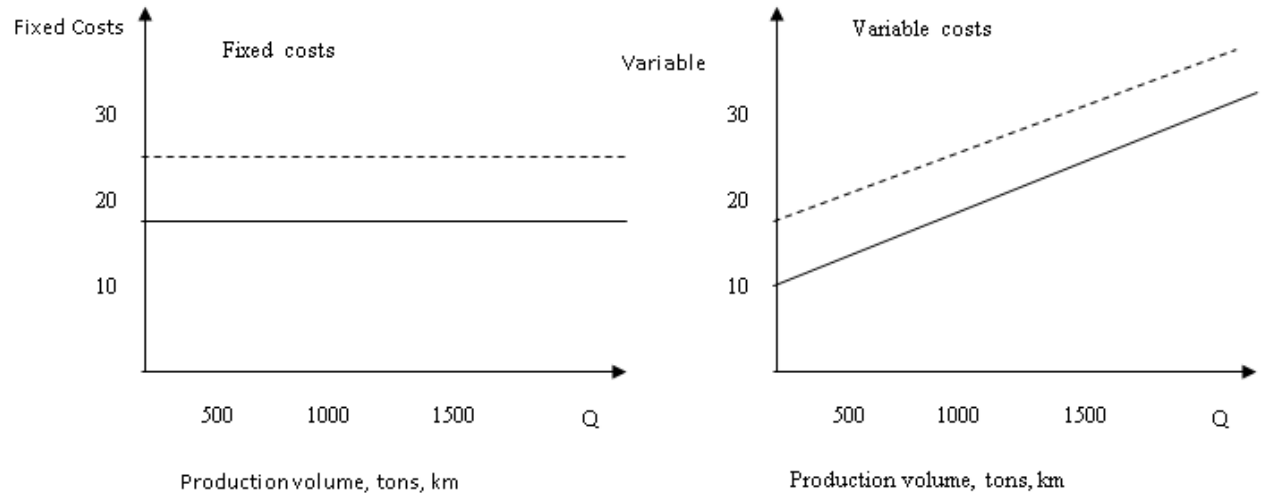

Figure 1. Movement of Fixed and Variable Costs

It's important to note that, when considering variable costs per unit of output on a graph, they exhibit an inverse relationship.

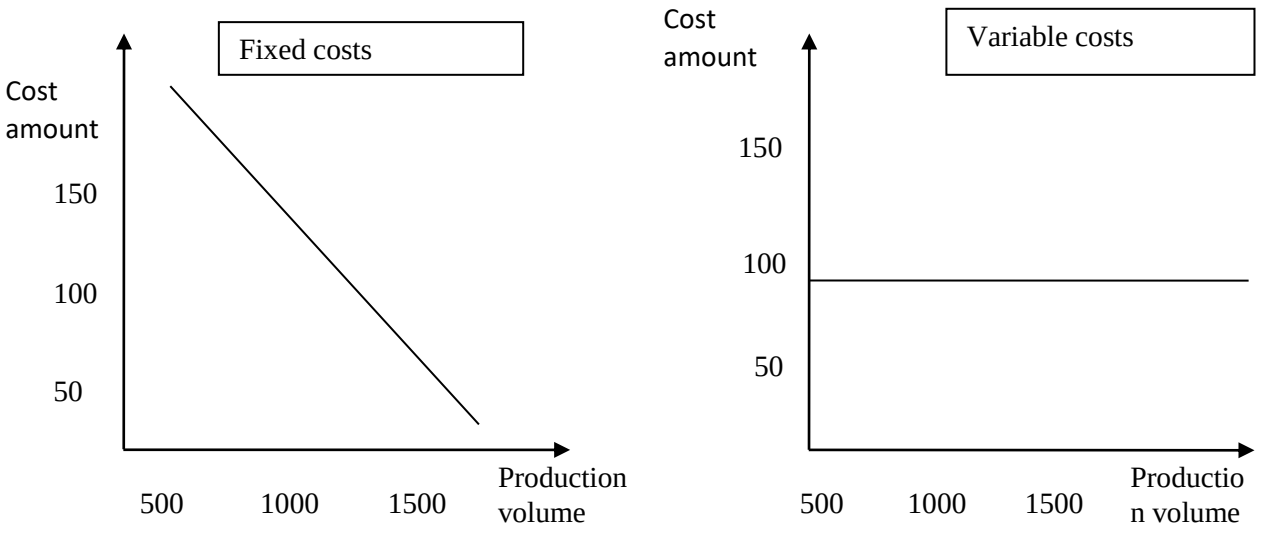

Figure 2. Fixed and Variable Costs per Unit of Output

From the above figures, we can conclude that fixed costs remain constant regardless of the volume of production, while fixed costs per unit of output decrease as production volume increases. Variable costs, on the other hand, increase as the volume of production increases, but the cost per unit of output remains constant.

Table 1. Total Production Costs and Cost per Unit of Output in Relation to Production Volume

Production Volume, Units	Total Production Volume, million soum			Cost per Unit of Output, thousand soum		
	Fixed costs	Variable costs	Total	Fixed Costs	Variable Costs	Total
500	50	40	90	100	80	180
1 000	50	80	130	50	80	130
1 500	50	120	170	33	80	113
2 000	50	160	210	25	80	105
2 500	50	200	250	20	80	100

With a fivefold increase in production volume, fixed costs per unit of output decreased fivefold, reducing the cost from 180,000 soum to 100,000 soum.

There are also expenses that exhibit characteristics of both fixed and variable costs. These expenses are called semi-variable or semi-fixed costs.

Semi-variable costs possess elements of both variable and fixed costs. A portion of these costs changes with variations in production volume, while another portion remains constant over time, independent of the level of activity.

For instance, the monthly subscription fee for a phone service is considered a fixed cost. However, the variable portion of the cost is dependent on the number and duration of long-distance and international calls made.

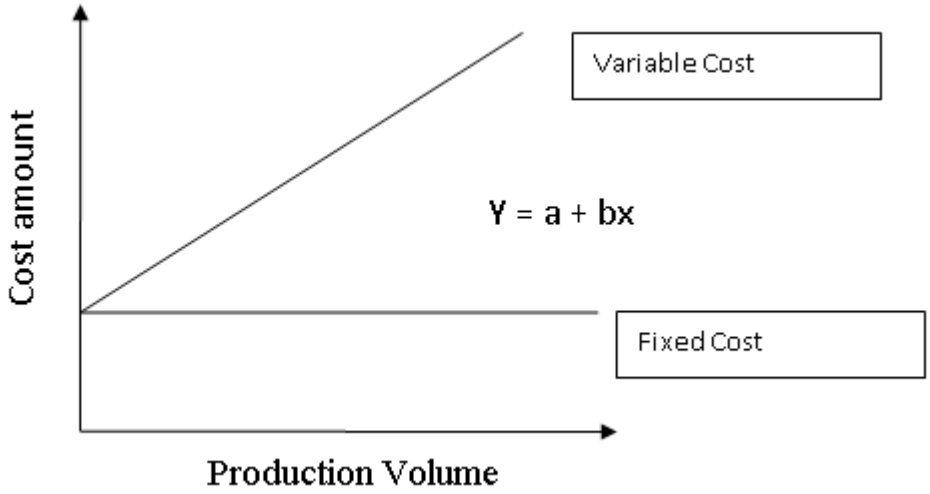

Figure 3. Semi-variable Costs

Figure 7 calculates the total cost formula (straight line) as Y = a + bx. In this expression:

b - variable costs;

a - fixed costs;

x - production volume.

Semi-fixed costs depend on the production volume but do not change proportionally to it. They increase in steps, meaning they remain constant up to a certain production volume, then increase with a change in volume and remain constant again up to another production level.

For example, a company uses trucks to transport its products. Each truck is rented for 500 soum and transports 500 pairs of shoes per month. When production volume exceeds 500, it becomes necessary to rent another truck, which increases the rental fee. (Figure 4).

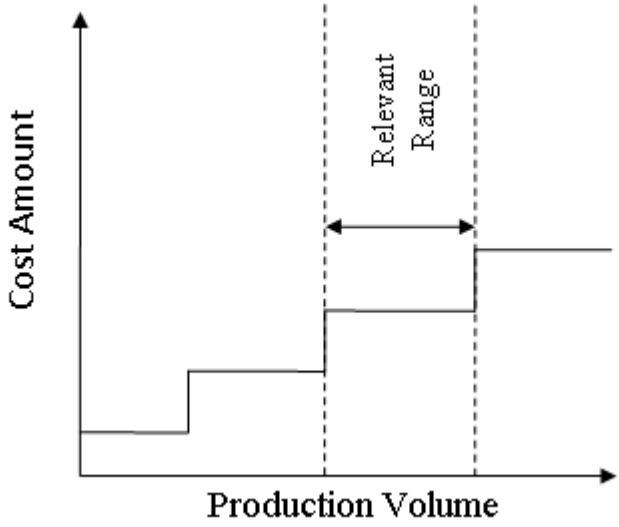

Figure 4. Semi-fixed Costs

It is essential to separate semi-variable and semi-fixed costs into their individual components. The following approaches are used to categorize a company's expenses as either fixed or variable:

1. Engineering Method
2. Accounting Method
3. Graphical Method
4. Minimum and Maximum Point Method
5. Least Squares Method

For effective organization and management of a company's operations, it is essential to know the average production cost (APC) per unit of output. Average costs are calculated by dividing the total cost amount by the production volume of the company. Similarly, average fixed costs (AFC) and average variable costs (AVC) are distinguished.

The main goal of a company's operations is to generate profit and continuously increase its amount. This leads to the use of the concept of marginal costs.

Marginal costs (MC) refer to the costs incurred for producing each additional unit of output relative to the calculated and actual production volume.

To **lower** product costs for the company, it is essential to **analyze** the **expense components** of specific product categories against the **projected figures** for the reporting year and the **previous year's data.** This analysis helps identify reasons for excessive costs and determine ways to reduce them. Comparing data with similar enterprises having the same specialization reveals the company's achievements and shortcomings.

The cost per unit of output is determined using the following formula:

Ci = Ai / VBПi + Bi

Where:

Ci - cost per unit of output;

Ai - total fixed cost amount;

VBПi - production volume of the product;

Bi - variable costs in the cost per unit of output;

Table 2. Sources Related to the Cost of "A" Type Products

Indicators	Notation	Plan	Actual	Difference from Plan (+,-)
1. Production Volume, Units	**$VBП_i$**	6760	6040	-720
2. Fixed Costs, thousand soum	A_i	7912	8056	+144
3. Variable Costs, soum	**B_i**	3800	4100	+300
4. Cost per Unit of Output, soum	**C_i**	4970.4	5433.7	+463.3

Cost per Unit of Output:

According to Plan = $\frac{7912}{6760}$ + 3800 = 4970.4 сўм

Actual = $\frac{8056}{6040}$ + 4100 = 5433.7 сўм.

Table 3. Analyzing the Impact of Factors on Cost per Unit of Output through the Chain-Link Method

Turnover Frequency	Factors			Cost per Unit of Output Ci
	$VBП_i$	**A_i**	**B_i**	
I Plan	Plan 6760	Plan 7912	Plan 3800	Plan 4970.4
II Conditional №1	Actual 6040	Plan 7912	Plan 3800	Conditional №1 5110
III Conditional №2	Actual 6040	Actual 8056	Plan 3800	Conditional №2 5133.7
IV Conditional	Conditional 6040	Conditional 8056	Conditional 5433.7	Conditional 5433.7

Difference of Cost per Unit of Output from Plan:

5433.7 – 4970.4 = +463.3 сўм

Including:

a) Change in Production Volume:

5110 – 4970.4 = +139.6 сўм

a) Change in Total Fixed Cost Amount:

5133.7 – 5110 = +23.7 сўм

a) Change in Total Variable Cost Amount:

5433.7 – 5133.7 = +300 сўм

Table 4. We will place the results of the factors affecting cost in the following table:

Indicator	Plan	Actual	Difference from Plan (+,-)	Including		
				Production Volume	Fixed Costs	Variable Costs
Cost per Unit of Output, soum	4970.4	5433.7	+463.3	+139.6	+23.7	+300

Calculation Procedure:

"V" Product

8-устун = 12 000 000/10 000 + 2 800 = 4 000 сўм

9- устун = 12 000 000/13 300 + 2 800 = 3 700 сўм

10- устун = 20 482 000/13 300 + 2 800 = 4 340 сўм

11-устун = 20 482 000/13 300 + 3200 = 4 800 сўм

The classification of business entity expenses into variable and fixed costs creates opportunities for significant management decisions. Therefore, their accurate allocation indirectly impacts management decisions. This is because the analysis results are directly linked to these indicators.

Many sources directly categorize specific cost elements as either variable or fixed. However, it's essential to remember that various costs with similar features can differ in their nature. For example, consider rental expenses. A sudden surge in production volume may necessitate an increase in the number of rented machines or necessitate renting additional warehouse space due to a significant increase in finished goods production resulting from multi-shift operations. This means that once production reaches a certain level, the cost amount changes. In such cases, rental expenses are not considered fixed costs but rather semi-fixed costs.

Table-5. Characteristics of Cost Item Classification

Cost Items	Variable	Fixed	Semi-fixed, Semi-variable
Raw Material Costs	+		
Petroleum Products			+
Fuel and Energy for Technological Purposes	+		
Wages	+	+	
Depreciation		+	
Taxes, Fees, and Other Mandatory Payments		+	+
Allocations for Collective Needs	+	+	

Maintenance and Servicing of Fixed Assets			+
Services of Auxiliary Farms	+		+
Other Costs		+	+
Losses from Defects			+
General Production Costs		+	+
General Administrative Costs		+	+

Accurate allocation of these costs is crucial because information about variable and fixed costs is essential for many aspects of a company's operations. For instance, the decision to produce semi-finished raw materials in-house or purchase them externally is made by analyzing the variable costs associated with that component. If the variable costs of producing semi-finished goods are higher than the cost of purchasing them from an external source, then the company chooses to purchase those raw materials in semi-finished form. Conversely, if the variable costs of in-house production are lower, the company may decide to produce that component internally.

Another issue addressed by analyzing variable and fixed costs is the decision to continue production of a product to the next stage or stop production at the first or second stage and sell the product. This issue also considers the variable costs of production at all subsequent stages and compares them to the selling price without considering those costs.

In the first scenario, if the profit generated by incurring those costs is significantly higher than the revenue obtained from selling the product in semi-finished form, the company will continue production to the final stage. In the second scenario, if the difference between the selling prices of the finished product and the semi-finished product is smaller than the variable costs of finishing the product, it is more advantageous for the business entity to sell the product in semi-finished form. For example, grain-processing companies might sell their finished product as flour to another grain processing company instead of selling it in its finished form.

Careful market analysis is necessary in this case, as the company needs to find buyers for its product in advance, whether it is finished or semi-finished, and establish relationships through contracts. Only then will it be possible to produce and sell the necessary products based on these contracts.

Reducing the cost of products manufactured by enterprises and effectively managing them requires the implementation of modern cost-accounting systems. The "direct costing" system is considered a new system for our country's accounting system and is widely used in economically developed countries today.

Using this model necessitates a clear division of costs into direct and indirect, primary and secondary, fixed and variable costs, thereby addressing strategic tasks of management. The main goal of the "Direct Costing" system is to separate company costs into fixed and variable costs based on changes in production volume.

Initially, only variable costs were included in the cost calculation, while fixed costs were excluded from the company's financial results. The name "Direct Costing System" itself originates from this approach. Later, the "Direct Costing" system evolved into an accounting system where costs were solely calculated based on direct variable costs.

The main advantages of the "Direct Costing" accounting system are:

- Simplified and Accurate Cost Calculation: The Direct Costing system simplifies cost calculation by focusing solely on variable costs, which are directly tied to the production of each unit. This eliminates the need to allocate fixed costs to specific products, resulting in a more accurate reflection of the actual cost of producing individual items.

- Elimination of Complex Cost Allocation: Direct costing avoids the complex calculations involved in allocating fixed costs across different product types. This simplifies the accounting process and reduces the likelihood of inaccuracies.
- Enhanced Profitability Analysis: Direct costing provides a clearer picture of profitability by separating fixed and variable costs. This allows businesses to calculate the break-even point, determine the sales volume required to cover all costs, and analyze the profitability of various products more effectively.
- Improved Decision Making: Direct Costing provides valuable insights for making informed decisions regarding pricing, production, sales, and investment. It allows for better understanding of how costs behave and helps prioritize strategies based on this understanding.
- Flexible Cost Management:

Direct costing presents a more realistic picture of the true cost of producing a product because it considers only the direct costs associated with producing each unit. This leads to more informed pricing decisions.

Conclusion

In a market-driven economy, every business entity must function with a thorough grasp of marketing principles. Ignoring consumer preferences, market trends, and the overall market situation can not only significantly impact a company's profitability but also lead to its eventual closure.

Here are the key questions a manager should be asking during the marketing process:

- What kind of product should I manufacture?
- How much should I produce?
- Who am I producing for?

What should be the price of my product?

The answers to many of the questions above can be found by analyzing fixed and variable costs. Therefore, it's clear that analyzing fixed and variable costs in management accounting is crucial for making sound management decisions. Improving the analysis of variable and fixed costs and their wider application can have a positive impact on the financial performance of businesses and, in turn, the economic conditions of our country.

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