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Applying Mixed Cost Analysis Methods in Manufacturing Enterprises

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Abstract
Costs play an important role in corporate governance. Costs have many definitions and ways to classify costs because they depend on the costs incurred and the purpose of using the costs in corporate governance. In particular, the way of classifying costs according to the level of activity is that costs are divided into variable costs, fixed costs and mixed costs. Fixed costs are costs that do not change with the level of activity of the business. Variable costs are costs whose total changes when the level of activity changes, such as changing the number of units of product produced, the number of products consumed, or the number of hours worked, the number of machine operating hours. Mixed costs are costs that include both variable and fixed cost elements. This article presents mixed cost separation methods including maximum-minimum method, least squares method, multiple regression method, scatter plot method... At the same time, the article applies the methods mixed cost separation method in manufacturing enterprises serves to build norms, make estimates and manage costs in manufacturing enterprises.

Keywords: Mixed Costs, Fixed Costs, Variable Costs, Maximum-Minimum Method, Scatter Plot Method

1. Theoretical Basis

In financial accounting, costs include production and business costs incurred during the normal business operations of the enterprise and other costs. For management accounting, because the nature of management accounting is accounting that serves the decision-making process, the goal is towards the future, so costs from the perspective of management accounting are very diverse, the basis Different cost structures will serve different purposes. Costs in management accounting are very rich and diverse, they can be actual costs incurred such as costs in financial accounting, in addition there are also estimated costs which are costs that have not yet been incurred, Opportunity costs are costs that are not included in accounting books or they can be estimated costs of the business. Costs in management accounting are recorded and classified from many angles of information identification depending on the purpose of using cost information for corporate management. There are many ways to classify costs, including classifying costs according to operational functions, classifying costs according to cost elements, classifying costs according to the relationship between costs and cost collection objects, classifying costs according to the relationship between costs and cost objects. Type costs according to the relationship between costs and financial statements, classify costs based on the level of control of the administrator, classify costs according to the relationship between costs and level of activity... In The above classification methods classify costs according to the relationship between costs and the level of activity, which has many effects in cost management of enterprises. According to this classification, costs are divided into fixed costs, variable costs and mixed costs. However, mixed costs are costs that contain both fixed and variable cost elements. To control mixed costs, administrators must use methods to separate mixed costs into variable and fixed costs, such as the maximum-minimum method, least squares method, regression method. Multiples, scatter plot method... Enterprises base on each type of cost, the level of cost incurred and the importance of costs in production and business activities to choose the method of separating mixed costs for Fit. It is necessary to compare the costs of separating mixed costs with the benefits of the cost information obtained.

The maximum-minimum method is a mixed cost separation method used when there is a nearly straight-line relationship between costs and activity volume. According to this method, mixed cost analysis will be based on a survey of mixed costs arising at different levels of activity. Then select the highest activity level and the lowest activity level. The cost difference between the two levels of activity is divided by the difference in activity level to calculate the unit variable cost, from which the fixed cost will be calculated.

Implementation steps: Survey activity levels and costs incurred at different activity levels. Determine the highest level of activity and the lowest level of activity, calculate costs incurred at two levels. Determine unit variable cost according to the formula:

a = (Cost at highest level of activity - Cost at lowest level of activity) / (Highest level of activity - Lowest level of activity)

T or a into the equation:

Y = a. X + b (*)

In there:
a: Unit variable cost
b: Total fixed costs
X: Activity level
Y: Total mixed cost

After determining a and b, equation (*) is the mixed cost prediction equation. Enterprises that determine the level of activity will determine variable costs, fixed costs and total mixed costs. The maximum - minimum method is an easy to apply method and suitable for many businesses with low cost and efficiency.
The scatter plot method is a method of analyzing mixed costs into fixed costs and variable costs through the use of graphs. Enterprises will determine the activity levels and corresponding cost levels, then draw points on the graph with the vertical axis being the cost level and the horizontal axis being the activity level. Then draw a line through the points to determine the mixed cost function. The intersection of this straight line with the cost axis is the total fixed cost in mixed costs.

2. Research Methods

Data collection method: The article collects data from secondary data sources such as articles, textbooks and documents of manufacturing companies on the situation of analyzing mixed costs into fixed costs. fixed and variable costs serve the purpose of making estimates, building cost norms and cost management. With primary data, the article collects data through statistics and surveys of mixed costs in manufacturing enterprises, analyzing, synthesizing, evaluating and comparing to present the current situation. Mixed cost analysis in manufacturing enterprises.

3. Actual Situation and Solution

Among cost classification methods, cost classification according to cost behavior plays an important role in providing information for the decision-making process. According to this classification, costs are divided into fixed costs, variable costs and mixed costs. Businesses need to separate mixed costs into fixed costs and variable costs. In manufacturing enterprises, there are many types of mixed costs such as testing costs, oxygen tank exchange costs, warehouse security service fees, air compressor pump costs, compressed air filter cups, and other costs. gasoline, stationery... Enterprises will group costs into groups with similar arising characteristics and choose the appropriate level of activity. Enterprises will choose mixed cost analysis methods. It is appropriate to separate mixed costs into fixed costs and variable costs. This article presents the application of mixed cost separation methods in practice in animal feed processing enterprises.
Maximum-minimum method. This is a simple method to separate mixed costs into fixed and variable costs by calculating costs incurred at activity levels. During statistical periods, select maximum and minimum points to Calculate unit variable costs. Then use the data at the highest and lowest activity levels to calculate fixed costs. This article analyzes the group of fuel costs used at the production workshop with the selected activity level being the number of operating hours. Gasoline cost data for the first 6 months of the year is as follows:

Table 1: Gasoline costs for 6 months

Month	Number of machine operating hours (hours)	Total electricity cost (VND)
January	840	275,025,750
February	**760**	264,251,002
March	**870**	290,245,000
April	796	283,658,000
May	860	288,698,200
June	780	268,597,580
Add:	**4,906**	**1,670,475,532**

Using the maximum-minimum method, we can calculate:

$$\text{Biến phí đơn vị} = \frac{290,245,000-264,251,002}{870-760} = 236,309$$

$$\text{Định phí} = 290,245,000 - 236,309 * 870 = 84,656,107$$

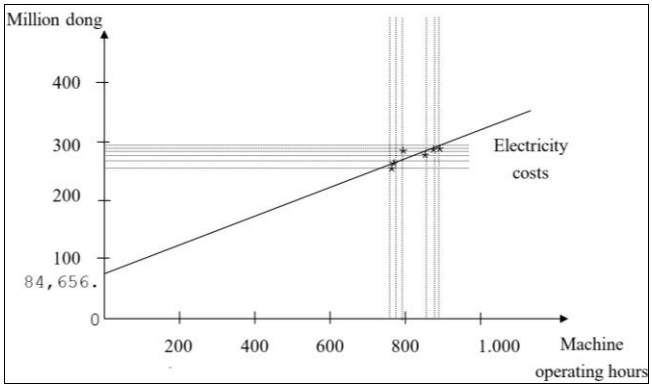
Thus, based on the maximum - minimum method, the variable cost of electricity for one hour of machine operation can be calculated as 236,309 VND/machine hour. Fixed monthly electricity cost is 84,656,107 VND.
From there, the equation representing electricity costs at the workshop can be determined as:

Y= 236,309. X + 84,656,107

In there:
Y: Electricity cost
X: Number of hours the machine operates.

By analyzing electricity costs into fixed costs and mixed costs, it is possible to evaluate the situation of using electricity costs at the production workshop, the electricity used to run machinery is 236,309 VND/hour. Machine, but the fixed electricity bill of 84,656,107 VND/month is too high. Enterprises need to review the situation of using electricity at the factory without having to directly run production machines such as electricity for lighting, ventilation, air conditioning, fans... to ensure that the electricity costs incurred are reasonable for production results. At the same time, based on the equation representing electricity costs as a basis for estimating electricity costs for the following periods, as a basis for building a system of cost norms and cost estimates.
Scatter plot method. This method relies on expenses incurred in previous months to represent points on the graph. The article uses data on electricity costs from January to June to represent on a scatter graph with:
+ Ox axis: Represents the level of activity as the number of hours the machine operates

+ Axis oy: Represents electricity costs



Graph 1: Graph representing gasoline costs

After representing the points on the graph, draw a straight line between the observation points. This line is the electricity cost line you need to find. The cost line cutting the ox axis is the point that determines the fixed cost of 84,656,108 VND. From there, variable costs can be determined:

$$\text{Biến phí đơn vị} = \frac{264,251,002 -}{760} = 236,30$$

From there, the equation representing electricity costs at the workshop can also be determined:

Y= 236,309. X + 84,656,107

Looking at the cost graph, we can also see the correlation between the independent variable (mixed cost: electricity cost) and the dependent variable (activity level is the number of hours the machine operates). On the graph shown, the points reflecting electricity costs at different levels of activity are close to the straight-line representing electricity costs. This reflects that there is a correlation between electricity costs and machine operating hours, and analyzing the correlation between electricity costs and machine operating hours is meaningful. The graph also shows that the point representing April's electricity costs is above and farthest from the cost curve, proving that April's electricity costs need the administrator's attention to determine the cause of the cost. Increased compared to the remaining months. A difference will require the administrator's attention to determine the cause and take timely remedial measures.

4. Conclusion

Classifying costs according to activity level plays an important role in estimating production and business costs in general and overall estimating in particular and serves to analyze the relationship between costs and blocks. Quantity - profit. According to this classification, costs are divided into fixed costs, variable costs, and mixed costs. The article has proposed methods for separating mixed costs into fixed costs and variable costs. However, each method has its own advantages and disadvantages suitable to each business operating condition, scale and need. Business information needs. Depending on the actual conditions, ability and need to use information, each business will choose mixed cost separation methods to suit the actual conditions of the business, to ensure the provision of information. Reliable, timely and appropriate costs, while ensuring efficiency principles.

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