



Study on the Optimization Method of Management Strategy to Improve the Economy of Industrial Products

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Abstract. In view of the behavior of enterprises to increase the valuation cost by adjusting the allocation of human resources, the price composition of products priced by the working hour proportion method, the direct material cost proportion method and the output value proportion method was analyzed, and the product price formula was established. According to the relationship between the cost ratio and the product price element during this period, it can be found that the enterprise has the human resource allocation requirements when obtaining the maximum priced product price, that is, the optimal product economy, which can provide a reference for the optimal design of management strategy to improve the economy of industrial products.

Keywords: Human Resource Allocation, Product Economy, Management Strategy.

1 Introduction

When the product is priced, the manufacturing cost and period cost in the unit price of the product are allocated to the product cost according to a certain proportion of all the manufacturing costs and period expenses incurred by the production enterprise in the production cycle of the product[1,2].

Manufacturing expenses refer to the indirect costs incurred by the enterprise in the production of products and the provision of labor services, including water and electricity costs, depreciation of fixed assets, amortization of intangible assets, employee remuneration of management personnel, labor protection expenses, relevant environmental protection expenses stipulated by the state, and shutdown losses during seasonal and repair periods[3,4]. According to the major categories, it can be divided into indirect material costs, indirect labor costs, depreciation costs, low-value consumables costs and other expenses.

Period expenses include administrative expenses, selling expenses, financial expenses, and research and development expenses. Management expenses refer to the various expenses incurred by the administrative department of the enterprise for the

organization and management of production and business activities. Sales expenses refer to the various expenses incurred in the process of selling goods and materials and providing labor services. Financial expenses refer to the expenses incurred by the enterprise to raise funds required for production and operation, etc., and when the interest income exceeds the interest expenses, the financial expenses are negative. R&D expenses refer to the expenses paid by enterprises for research and development of a project [5,6].

Under the condition that the total of all manufacturing expenses and period expenses incurred by the enterprise is a certain condition, the enterprise management expenses increase, the proportion of enterprise period expenses increases, and the manufacturing expenses of the enterprise decrease, and the manufacturing rate of the enterprise decreases. Since the product is priced, the product manufacturing cost is a part of the product manufacturing cost and is the base for calculating the period cost, because the product working hours are a certain value, the increase in the proportion of enterprise expenses during the period will not necessarily cause the increase in the cost of product pricing, and on the contrary, the decrease in the proportion of expenses during the enterprise period will not necessarily cause the reduction of the cost of product pricing.

After the analysis of product economy, the enterprise through the overall planning of the department setting, adjust the staffing of the enterprise, part of the management positions directly involved in the production are set up in the administrative department, the indirect costs incurred in these positions are classified as management expenses, increase the proportion of the enterprise's period costs, or part of the management personnel who are not directly involved in the production are set up in the production department, improve the proportion of the company's manufacturing costs. Therefore, this paper analyzes the human resource allocation behavior of enterprises based on the product pricing cost formula, so as to provide a theoretical basis for enterprises to optimize management strategies and improve product economy.

2 The Economy of the Product When the Working Hours Proportion Method Is Adopted

2.1 A Subsection Sample

When the working hours proportion method is adopted, the product price = [direct cost + product working hours quota * direct labor hours rate + product working hours quota * total manufacturing cost / total enterprise working hours) * (1 + after-sales service fee ratio) * (1 + period cost ratio)] * (1 + profit margin). Where, the product pricing cost be P , the direct cost is C , the product man-hour quota is D , the direct labor hour rate is L , the total manufacturing cost is Z , the total man-hours of the enterprise is S , the after-sales service cost ratio is W , the total period cost is Q , the total manufacturing cost of the enterprise is T , and the profit margin is Y .

There is

$$P=(C+D*L+D*Z/S)*(1+W)*(1+Q/T)*(1+Y) \quad (1)$$

The direct cost of the product C , the fixed amount of product working hours D , the direct labor hour rate L , the total working hours of the enterprise S and the total manufacturing cost T of the enterprise are all fixed values, and the sum of the total manufacturing costs Z and the total period costs Q is the fixed value, and the total manufacturing costs Z and the total period costs Q can be collected through the reasonable allocation of enterprise resources. In this case,

$$P=[C+D*L+D*(N-Q)/S]*(1+Q/T)*(1+W)*(1+Y) \quad (2)$$

Sorted out

$$P=[(-D*Q^2+C*S+D*L*S+D*N-T)*Q/(T*S)+C+D*L+D*N/S]*(1+W)*(1+Y) \quad (3)$$

With P as the dependent variable and Q as the independent variable, P is the first derivative of Q

$$P'(Q)=(-2D*Q+C*S+D*L*S+D*N-D*T)/(T*S) \quad (4)$$

When $P'(Q)$ is 0, P obtains a maximum.

In this case,

$$Q=(C*S+D*L*S+D*N-D*T)/2D \quad (5)$$

If the proportion of the cost of the period is q , then $q=Q/T$, and the above formula is substituted,

$$q=(C*S/D/T+L*S/T+N/T-1)/2 \quad (6)$$

That is, there is an optimal period expense ratio, which can make the pricing cost of the company's main products reach a maximum value. Through the rational allocation of enterprise resources and the allocation and aggregation, the proportion of period expenses can be as close as possible to the optimal proportion of period expenses, and the pricing cost of the main products of the enterprise can be increased as much as possible.

It can be seen that when $C*S/D/T+L*S/T+N/T>1$, the proportion of expenses during the period when the pricing cost of the main products of the enterprise reaches the maximum value is positive, and vice versa is negative. Because the proportion of the sum of total labor costs, total manufacturing costs and total administrative expenses in the total manufacturing costs of general enterprises changes less, and the difference between the working hours quota and direct cost of different products is large, when the working hour quota of the priced product is relatively small and the direct cost is relatively high, the optimal period expense ratio is positive; When the fixed amount of working hours of the priced product is relatively large and the direct cost is relatively low, the optimal period expense ratio is negative, because the general enterprise period expenses are positive, at this time, it is necessary to make the period expense ratio as low as possible through reasonable aggregation.

Set an enterprise with a total manufacturing cost of 50 million yuan, the sum of total manufacturing expenses and total management expenses of 15 million yuan, a total

of 100,000 hours of working hours, a fixed number of working hours for priced products of 2,000 hours, a labor rate of 60 yuan/hour, a manufacturing fee rate of 50 yuan/hour, a direct material cost of 700,000 yuan for priced products, a special fee of 80,000 yuan for priced products, a proportion of after-sales service costs of 1%, and a profit margin of 3%.

Figure 1 shows the relationship between the price of the product and the proportion of expenses during the period.

According to Eq. (1), the price of the product is the largest when the proportion of the period cost is 10%. In this example, when the sum of manufacturing costs and period costs is 100 and the intercept is 24, that is, when the direct cost exceeds 240,000 yuan, the optimal period cost ratio is greater than 0, when the sum of manufacturing costs and period costs accounts for 30% of the total manufacturing cost, the optimal period cost ratio is 10%, and when the sum of manufacturing costs and period costs accounts for 40% of the total manufacturing cost, The optimal period fee ratio is 15%.

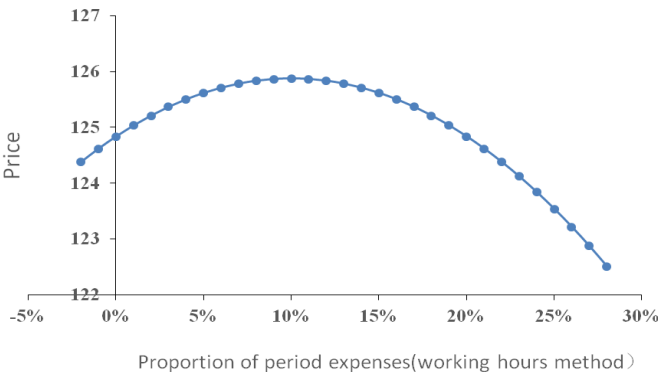


Fig. 1. The relationship between the product price and the proportion of period expenses with the working hours method

Therefore, in order to achieve the highest product pricing target, the proportion of management expenses to the total manufacturing cost should be met by adjusting human resources, rationally allocating the size and personnel of the department that spends manufacturing costs and the department that spends management costs, so that the proportion of management expenses to the total manufacturing costs can meet the maximum value of product pricing.

3 The Economy of the Product when the Direct Material Cost Ratio Method is Adopted

When the direct material cost ratio method is used, the product price = (direct material cost special cost direct material cost * total direct labor cost / total direct material cost direct material cost * total manufacturing cost / total direct material cost) * (1 after-

sales service cost ratio) * (1 total period cost / total manufacturing cost of the enterprise)] * (1 profit margin). Let the product pricing cost be P , the direct material cost is A , the special cost is B , the total direct material cost is M , the total direct labor cost is R , the total manufacturing cost is Z , the after-sales service cost ratio is W , the total period cost is Q , the total manufacturing cost of the enterprise is T , and the profit margin is Y . There is,

$$P = (A+B+A*R/M \ A*Z/M) * (1+Q/T) * (1+W) * (1+Y) \quad (7)$$

The direct material cost A and special cost of the product in the pricing year are B , the total direct material cost M , the total direct labor cost R , and the total manufacturing cost T of the enterprise are all fixed values, and the sum of the total manufacturing costs Z and Q total period costs Q is a fixed value, and the total manufacturing costs Z and the total period costs Q can be collected through the reasonable allocation of enterprise resources. In this case,

$$P = [A+B+A*R/M+A*(N-Q)/M] * (1+Q/T) * (1+W) * (1+Y) \quad (8)$$

Sorted out

$$P = [-A*Q^2/(T*M) + (A*M+B*M+A*R+A*N-A*T)*Q/(T*M) + A+B+A*R/M \ A*N/M] * (1+W) * (1+Y) \quad (9)$$

With P as the dependent variable and Q as the independent variable, P is the first derivative of Q ,

$$P'(Q) = (-2A*Q + A*M + B*M + A*R + A*N - A*T)/(T*M) \quad (10)$$

When $P'(Q)$ is 0, P obtains a maximum. At this time,

$$Q = (A*M + B*M + A*R + A*N - A*T)/2A \quad (11)$$

If the proportion of the cost of the period is q , then $q = Q/T$, and the above formula is substituted,

$$q = [(A+B)/A*M + R + N - T]/2T \quad (12)$$

When the proportion of the period expense is this value, the pricing cost of the main product of the enterprise can reach the maximum value. It can be seen that the higher the special expenses and the less the direct material costs in the direct cost of the pricing products, the higher the proportion of period expenses that can make the pricing cost of the main products of the enterprise reach the maximum, and the lower the vice versa. When the ratio of the total direct material cost to the total direct cost is less than the ratio of the direct material to the direct cost of the priced product, the proportion of period expenses corresponding to the maximum product price is negative. For the example in this article, when the total direct material cost accounts for 95% of the total direct cost, the proportion of period expenses corresponding to the maximum product price is 1.67%. This is shown in Figure 2.

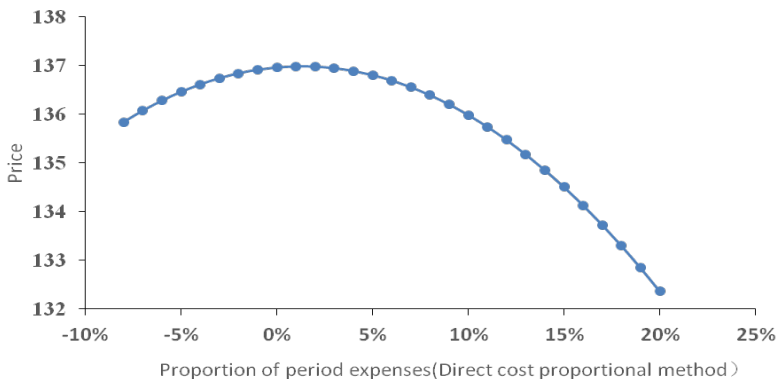


Fig. 2. The relationship between the product price and the proportion of expenses in the period with the direct cost ratio method

Similarly, when the direct cost proportion method is used for the calculation of indirect cost allocation, it is also possible to adjust human resources, reasonably allocate the size and personnel of the department that spends manufacturing costs and the department that spends management costs, so that the proportion of management expenses to the total manufacturing cost meets the maximum value of product pricing.

4 The Economy of the Product when the Output Value Ratio Method is Adopted

When using the output value ratio method, the product price = (1 profit margin) * (1 after-sales service cost ratio) * (1 period expense ratio) * direct cost / [1 - (1 profit margin) * (1 after-sales service cost ratio) * (1 period cost ratio) * (direct labor ratio manufacturing cost ratio)]. Let the product pricing cost be P , the profit margin is Y , the after-sales service cost ratio is W , the total period cost is Q , the direct cost is C , the total direct labor cost is R , the total manufacturing cost is Z , and the total manufacturing cost of the enterprise is T .

$$P = (1+Y) * (1+W) * (1+Q/T) * C / (1 - (1+Y) * (1+W) * (1+Q/T) * (R/T + Z/T)) \quad (13)$$

The direct cost of the product C , the profit margin Y and the proportion of after-sales service cost W in the pricing year are the set value, the total direct labor cost R and the total manufacturing cost T of the enterprise are fixed values, the sum of the total manufacturing cost Z and the total period cost Q . N is the fixed value, and the total manufacturing cost Z and the total period cost Q can be collected through the reasonable allocation of enterprise resources. In this case,

$$P = (1+Y) * (1+W) * (1+Q/T) * C / (1 - (1+Y) * (1+W) * (1+Q/T) * (R/T + (N-Q)/T)) \quad (14)$$

Sorted out

$$P = [(1+Y) * (1+W) * C + (1+Y) * (1+W) * C * Q/T] / (1 - (1+Y) * (1+W) * (-Q^2/T^2 + (R+N-T)/T^2 * Q + (R+N)/T)) \quad (15)$$

With P as the dependent variable and Q as the independent variable, P is the first derivative of Q

$$P'(Q) = [(1+W) * C/T] / (1 - (1+Y) * (1+W) * (-Q^2/T^2 + (R+N-T)/T^2 * Q + (R+N)/T)) + [(1+Y) * (1+W) * C + (1+Y) * (1+W) * C * Q/T] / (1 - (1+Y) * (1+W) * (-Q^2/T^2 + (R+N-T)/T^2 * Q + (R+N)/T))^2 * ((1+Y) * (1+W) * (2Q/T^2 + (T-RN)/T^2)) \quad (16)$$

When $P'(Q)$ is 0, P obtains a maximum. In this case,

$$Q = (1 - (1+Y) * (1+W)) * T/2 \quad (17)$$

If the proportion of the cost during the period is Q , then $q = Q/T$, substituting the above formula

$$q = (1 - (1+Y) * (1+W)) / 2 \quad (18)$$

It can be seen that the proportion of period expenses that can make the pricing cost of the main product of the enterprise reach the maximum value is negative, that is, the enterprise with higher interest income may make the product pricing cost reach the maximum value when the output value ratio method is used for pricing. For the example in this article, the after-sales service fee ratio is 1%, the profit margin is 3%, and the optimal period expense ratio is -2.015%. This is shown in Figure 3. Since the period expenses of a general enterprise are positive, when the enterprise adopts the output value proportion method for valuation, it should be reasonably collected to make the proportion of period expenses as low as possible.

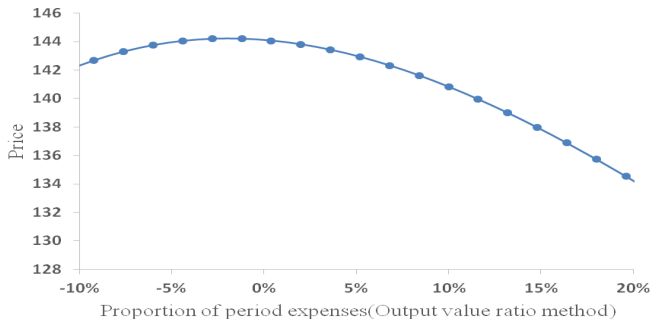


Fig. 3. The relationship between the product price and the proportion of period expenses with the direct cost ratio method

For example, when the proportion of expenses during the period is 10%, the price of the product is 1.258 million yuan, the price of the product is 1.3599 million yuan, and the price of the product is 1.4083 million yuan. It can be seen that when the proportion of direct cost to product price cost is high, the maximum product price can be obtained by using the output value proportion method, and the economy is the best,

and the product price is the lowest and the worst economy is calculated by using the working hours proportion method.

5 Conclusions

In order to analyze the method of improving the cost of product pricing by optimizing and adjusting the allocation of human resources. The price composition of products priced by the working hours proportion method, the direct material cost proportion method and the output value proportion method is analyzed, and the product economic analysis formula is established.

According to the product economy analysis formula, the proportion of enterprise period expenses corresponding to the optimal product economy is obtained when different valuation methods are obtained.

Through specific examples, the proportions of period expenses corresponding to the maximum price of denominated products when an enterprise adopts the working hour proportion method, the direct material cost proportion method and the output value proportion method are 10%, 1.67% and -2.015% respectively.

When the proportion of the enterprise's expenses during the period is 10%, the product prices when the working hours proportion method, the direct material cost proportion method and the output value proportion method are 1.258 million yuan, 1.3599 million yuan and 1.4083 million yuan respectively.

Therefore, according to its own reality, enterprises should maximize the benefits of their main products as the goal, adopt the most appropriate pricing method and rationally allocate enterprise resources, optimize and adjust human resources, and realize the optimal economy of the main products of the enterprise and the maximization of the overall interests of the enterprise.

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