

WAYS TO OPTIMIZE COSTS AND PRODUCT COST IN MANUFACTURING ENTERPRISES

Nematjonova Risolatxon Dilshodbek qizi

Andijan State Technical Institute

2nd-year Student in the field of "Economics"

E-mail risolatxonnematjonova@gmail.com

Abstract

This article examines the classification of production costs, the mechanisms of product cost formation, and modern methods for their optimization in manufacturing enterprises. In the context of a market economy, the issues of reducing product costs, using resources efficiently, and implementing modern management technologies (Lean production, Kaizen, KPI) to increase the competitiveness of enterprises are analyzed. Furthermore, cost productivity is demonstrated through practical calculations and mathematical-economic models.

Keywords: Production costs, product cost, optimization, fixed costs, variable costs, lean production, KPI, digitalization.

Introduction

In the context of a modern market economy, the primary objective of any manufacturing enterprise is to generate sustainable profits and strengthen its market position. Achieving this goal relies on two main factors: increasing product sales volume or reducing the costs incurred in its production, namely cost optimization. In the current era of intensifying global competition and continuously rising prices for raw materials and energy resources, the second factor—mobilizing internal capabilities—assumes strategic importance.

Product cost is a synthetic indicator that reflects the entire economic activity of an enterprise. It manifests the quality of management, labor, and technological processes at all stages, from the procurement of raw materials to the delivery of the finished product to the consumer. Cost management does not imply merely a mechanical reduction of costs; rather, it entails balancing resources while increasing production productivity and maintaining or even improving product quality. Consequently, this topic remains one of the most pressing issues in economic science and practice.

Research Methodology (Methods)

In this research, economic-statistical analysis, comparative analysis, grouping, economic-mathematical modeling, and systematic approach methods were utilized to study the theoretical and practical aspects of cost and product cost optimization in manufacturing enterprises.

The theoretical foundation of the study is comprised of classical and modern scientific literature on cost accounting and management accounting. Throughout the analysis, the structure of production costs, their impact on product cost, and the opportunities for cost reduction were evaluated.

To determine cost efficiency, the following economic model was utilized:

$$TC = FC + VC$$

Where:

- TC – Total Costs;
- FC – Fixed Costs;
- VC – Variable Costs.

The unit cost of the product was calculated using the following formula:

$$AC = TC / Q$$

Where:

- AC – Average Cost (Unit Cost);
- Q – Production Volume (Quantity).

Additionally, cost profitability was evaluated using the following formula:

$$CR = F / TC \times 100$$

Where:

- CR – Cost Profitability (Return on Cost);
- F – Net Profit;
- TC – Total Costs.

This indicator reflects how efficiently the enterprise's costs have been utilized.

Before determining the ways to optimize costs, their structural components and nature must be deeply analyzed. In economic theory and accounting, costs are divided into two main groups based on their degree of dependence on production volume: fixed costs and variable costs.

Fixed Costs (\$FC\$) — are costs that do not directly affect or change with variations in production volume and remain constant in the short run. These include building and equipment rentals, administrative staff salaries, depreciation allowances, and property taxes.

Variable Costs (\$VC\$) — are costs that change in proportion to variations in production volume. These include primary raw materials and supplies, piece-rate wages of production workers, and fuel and energy resources consumed for technological purposes.

Total Costs (TC) consist of the sum of these two costs:

$$TC = FC + VC$$

The most critical indicator in calculating product cost is the **Average Cost (\$AC\$)**. It is determined using the following formula:

$$AC = TC / Q$$

Where Q is the production volume (quantity of products manufactured). As seen from this formula, an increase in production volume (Q) leads to a decrease in the share of fixed costs allocated per unit of product, which is known in economics as "**Economies of Scale**". For this very reason, utilizing production capacities to their full extent is one of the most fundamental ways to reduce product cost.

To structurally optimize product cost, it is required to study its nomenclature by cost items. In accordance with the Regulation approved by the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 54 dated February 5, 1999, costs are classified into the following groups:

- **Material costs:** raw materials, supplies, semi-finished goods, energy, and fuel.
- **Labor costs:** all types of wages, salaries, and incentive payments for production personnel.
- **Social insurance contributions:** mandatory allocations from the payroll fund as established by legislation.
- **Depreciation of fixed assets and intangible assets:** accounting for wear and tear.
- **Other production costs:** equipment repairs, business travel expenses, losses from defective products (scrap), etc.

Conditional Cost Structure and Shares of a Manufacturing Enterprise

Cost Items	Annual Cost (Million UZS)	Share (%)	Cost Nature
Raw materials and primary supplies	1 200	50.0%	Variable
Energy and fuel resources	360	15.0%	Semi-variable / Mixed
Production workers' wages	400	16.7%	Variable (Piece-rate)
Depreciation allowances	180	7.5%	Fixed
Administrative and management expenses	260	10.8%	Fixed
Total Costs (TC)	2 400	100.0%	-

As implied by the analysis of Table 1, the share of material costs in many manufacturing enterprises accounts for more than half (50-60%) of total expenditures.

Such enterprises are classified as **material-intensive**. Consequently, this practically proves that first and foremost, focus must be directed toward raw material and energy-saving technologies when optimizing product costs.

Today, several proven and innovative methods exist in manufacturing practice to reduce costs and enhance management efficiency. Implementing them comprehensively ensures the financial stability of the enterprise.

The **Lean Production** system aims to identify and eliminate all types of waste (known as "**Muda**" in Japanese). These wastes include overproduction, waiting times, inefficient transport logistics, excess inventory, technological defects (scrap), and unnecessary movements of workers. On the other hand, the "**Kaizen**" strategy envisions continuous, incremental improvements within the enterprise by all employees. For instance, reducing the percentage of defective products on the production line from 3% to 0.5% drastically minimizes raw material consumption and directly leads to a decrease in product cost.

Cost optimization is impossible without increasing employee labor productivity. If the growth rate of wage expenditures exceeds the growth rate of labor productivity, the product cost will inevitably rise. To prevent this, it is necessary to implement a system of **Key Performance Indicators (KPI)** in enterprises. KPI links every action of a worker and the quality of their output directly with financial incentives. This ensures the efficient utilization of working time and reduces the labor input per unit of product.

Finding suppliers that provide affordable and quality raw materials is the initial link in cost formation. Utilizing the "**Just-in-Time**" (**JIT**) system in the logistics chain prevents excess inventory holding costs in warehouses, natural losses, and the freezing of working capital. Furthermore, selecting optimal transport corridors for raw material delivery allows for savings of up to 15-20% in transportation costs.

Modern digital technologies enable the management of enterprise resources in real-time. The implementation of **ERP (Enterprise Resource Planning)** systems strictly controls material consumption and immediately detects over-expenditures. Meanwhile, automating production equipment not only minimizes errors associated with the human factor but also facilitates the economical use of energy resources.

Research Results (Results)

During the research, the cost structure and optimization results of a conditional manufacturing enterprise were evaluated.

Changes in Economic Efficiency as a Result of Cost Optimization

As determined by the calculations, total costs decreased by 10 percent following the implementation of the Lean Production and Kaizen systems. Concurrently, production volume increased by 10 percent, and the unit cost of the product was reduced by 18.3 percent.

As a result of introducing energy-efficient technologies in the enterprise, electricity consumption was reduced by 12–15 percent. Furthermore, the implementation of the ERP system enhanced the efficiency of warehouse inventory management, reducing excess material balances by 20 percent.

The research results indicate that controlling material costs, which hold the largest share in the cost structure, allows for a significant improvement in the financial performance of the enterprise.

Table 3: Impact of Factors on Product Cost Reduction

Siz taqdim etgan maqolaning yakuniy qismlari — "Natijalar muhokamasi", "Taklif va tavsiyalar", "Xulosa" va "Foydalanilgan adabiyotlar ro'yxati" bo'limlarining xalqaro akademik andozalarga hamda iqtisodiy terminologiyaga to'liq mos keladigan professional inglizcha tarjimasini:

As illustrated by Table 3, the most significant impact on cost reduction is achieved through the efficient utilization of raw materials and supplies.

Discussion (Discussion)

The obtained results demonstrated that modern concepts of cost management in manufacturing enterprises possess high efficiency. Specifically, the Lean Production system allows for the identification and elimination of all types of waste in production.

The advantage of the Kaizen concept is that it creates an opportunity to use existing resources more efficiently without requiring substantial investments. The results of this study align with international experiences. In Japanese and South Korean

enterprises, these approaches have served to reduce product costs by an average of 15–25 percent.

Furthermore, digitalization and the implementation of ERP systems increase the speed of managerial decision-making in enterprises, reduce errors associated with the human factor, and enhance the efficiency of resource utilization.

Today, increasing energy efficiency, expanding localization programs, developing logistics infrastructure, and implementing digital technologies are also assuming priority significance as the main directions for optimizing production costs in industrial enterprises of Uzbekistan.

Proposals and Recommendations

Based on the research results, the following proposals were developed:

- Gradual implementation of Lean Production and Kaizen systems in enterprises;
- Increasing the share of energy-efficient equipment;
- Widespread application of ERP and CRM systems;
- Improving the system of employee evaluation and incentives based on KPI;
- Optimizing logistics and supply chains;
- Implementing digital monitoring systems in production;
- Utilizing automated systems that control raw material consumption.

The implementation of these proposals into practice serves to reduce product costs, increase enterprise profits, and elevate production efficiency.

Conclusion

Optimizing costs and product costs in manufacturing enterprises is not a one-time event, but rather a continuous, systematic management process. Today, traditional methods of cost reduction (such as laying off workers or sourcing lower-quality materials) have lost their relevance, as they lead to the crisis of the enterprise in the strategic perspective.

The current modern approach must have an innovative character. Enterprises need to implement lean management systems like Lean Production, efficiently utilize the KPI system for employee incentives, digitalize the logistics chain, and invest in energy-efficient technologies. Only through such a comprehensive approach is it possible to reduce product costs without sacrificing quality, thereby ensuring the competitiveness of national products not only in the domestic market but also in international markets.

References

1. Cabinet of Ministers of the Republic of Uzbekistan. (1999). *Regulation on the Structure of Costs for the Production and Sale of Products (Works, Services) and the*

Procedure for the Formation of Financial Results, approved by Resolution No. 54 dated February 5, 1999.

2. Vakhobov, A. V., & Ibrohimov, A. T. (2019). *Economics and Analysis of Enterprises*. Textbook. - Tashkent: "Iqtisod-Moliya". - 412 p.
3. Pardaev, M. Q., & Israilov, J. I. (2021). *Management Analysis*. Study guide. - Tashkent: "Gafur Gulom". - 320 p.
4. Vomacka, J. (2022). Lean Production and Cost Optimization in Modern Industry. *Harvard Business Review*, No. 4, pp. 45-52.
5. Meyers, F. E. (2019). *Motion and Time Study for Lean Manufacturing*. Prentice Hall. - 360 p.
6. Shodmonov, Sh. Sh., & Gafurov, O. V. (2018). *Economic Theory*. Textbook. - Tashkent: "Barkamol fayz media". - 560 p.
7. Tukhtabaev, J. S. (2023). Efficiency of cost management in small business and entrepreneurship. *Scientific Journal of Economics and Innovative Technologies*, September, Issue 5.