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IMPROVING ECONOMIC MECHANISMS FOR EFFICIENT RESOURCE UTILIZATION IN CONSTRUCTION ENTERPRISES

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Abstract

Efficient utilization of resources is a key factor in enhancing the competitiveness and sustainability of construction enterprises. The construction industry is characterized by high material intensity, labor dependency, and capital investment, making resource management a critical aspect of economic performance. This study examines existing economic mechanisms for resource utilization in construction enterprises and proposes ways to improve them. The research highlights the importance of optimizing material, labor, and technical resources through modern management approaches, including digital technologies such as Building Information Modeling (BIM). The paper also analyzes challenges faced by construction firms and offers recommendations for increasing efficiency and reducing costs. The findings contribute to the development of more effective economic strategies in the construction sector.

Keywords: construction industry, resource efficiency, economic mechanisms, cost optimization, BIM, productivity



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Introduction

The construction industry plays a vital role in economic development by creating infrastructure, generating employment, and supporting industrial growth. However, it is also one of the most resource-intensive sectors, consuming large volumes of raw materials, labor, and financial capital. Inefficient use of these resources leads to increased costs, delays, and reduced profitability.

In recent years, the need to improve resource efficiency has become more urgent due to rising material costs, environmental concerns, and increasing competition. Construction enterprises must adopt advanced economic mechanisms to ensure optimal resource allocation and utilization.

This study focuses on improving economic mechanisms that enhance resource efficiency in construction enterprises. Special attention is given to integrating modern management tools and digital solutions such as Building Information Modeling, which enable better planning, monitoring, and control of resources.

Literature Review

Resource efficiency in construction has been widely discussed in economic and management literature. Researchers emphasize that effective resource management directly impacts project performance and organizational sustainability.

According to modern economic theory, resource allocation efficiency is achieved when resources are distributed in a way that maximizes output while minimizing costs. In the construction sector, this involves optimizing the use of materials, labor, and equipment.

Several studies highlight the role of technological innovation in improving efficiency. The introduction of Building Information Modeling has significantly



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transformed construction management by enabling real-time data sharing and reducing errors.

Other scholars focus on economic mechanisms such as incentive systems, cost control models, and performance-based management. These mechanisms help align organizational goals with resource utilization efficiency.

Despite these advancements, many construction enterprises still face challenges in implementing effective resource management strategies due to lack of expertise, outdated technologies, and insufficient financial resources.

Methodology

This research employs a mixed-method approach combining qualitative and quantitative analysis. The study is based on:

- Analysis of statistical data from construction enterprises
- Review of existing economic models and management practices
- Comparative analysis of traditional and modern resource management approaches
- Case-based evaluation of construction projects

The research framework focuses on three main resource categories:

1. Material resources
2. Labor resources
3. Technical (equipment) resources

Each category is analyzed in terms of efficiency, cost, and productivity.

Results and Discussion

Material Resource Efficiency

Material costs account for a significant portion of total construction expenses. Inefficient material usage leads to waste, increased costs, and environmental impact.



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To improve efficiency, construction enterprises should:

- Implement precise material planning systems
- Use digital tools such as Building Information Modeling for accurate quantity estimation
- Establish strict inventory control mechanisms
- Promote recycling and reuse of materials

These measures help reduce waste and optimize procurement processes.

Labor Resource Optimization

Labor productivity is another critical factor influencing construction efficiency. Low productivity often results from poor planning, lack of skills, and ineffective management.

Improvement strategies include:

- Training and skill development programs
- Performance-based incentive systems
- Efficient workforce allocation
- Adoption of modern project management techniques

By enhancing labor productivity, construction enterprises can significantly reduce project duration and costs.

Technical Resource Utilization

Construction equipment and machinery represent substantial capital investments. Inefficient use of technical resources leads to idle time and increased operational costs.

Key improvement measures include:

- Scheduling and monitoring equipment usage
- Implementing maintenance management systems



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- Using digital tracking tools
 - Integrating equipment data into Building Information Modeling platforms
- These approaches ensure optimal utilization of machinery and reduce downtime.

Economic Mechanisms for Improvement

The study identifies several economic mechanisms that can enhance resource efficiency:

- **Cost management systems** – controlling and reducing expenses
- **Incentive mechanisms** – encouraging efficient resource use
- **Investment in innovation** – adopting advanced technologies
- **Risk management strategies** – minimizing uncertainties

The integration of these mechanisms creates a comprehensive framework for improving resource utilization.

Conclusion

Efficient resource utilization is essential for improving the economic performance of construction enterprises. This study demonstrates that the application of advanced economic mechanisms and modern technologies significantly enhances resource efficiency.

The use of digital tools such as Building Information Modeling plays a crucial role in optimizing material, labor, and technical resources. Additionally, the implementation of effective cost management and incentive systems contributes to sustainable development in the construction sector.

Future research should focus on developing industry-specific models and exploring the impact of emerging technologies on construction efficiency.



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