

Research on the Application of Market Pricing in Digitalization of Engineering Cost

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Abstract: Cost management is an important part of construction project management. The control of project investment by construction enterprises is mainly achieved through the control of project cost. With the promotion and application of digital technology in the field of construction, digital technology will be increasingly applied in cost management of construction projects, thereby improving their work efficiency. In this context, this article first analyzes the limitations of traditional quota principles in digital cost management, then explores the application of quota principles and market-oriented pricing in digital cost management, and finally looks forward to future development trends.

Keywords: Cost management, Project management, Engineering cost, Traditional quota, Digital technology.

1. Introduction

With the development of science and technology, digital technology has become an indispensable and important component of the construction industry. This trend is not only reflected in the intelligent upgrading of architectural design and construction management, but also deeply affects every aspect of engineering cost management, providing strong technical support for the transformation and upgrading of the industry [1]. Against the backdrop of rapid economic development in our country, the construction industry, as a pillar industry of the national economy, continues to expand in scale, with a surge in the number of construction projects and increasingly fierce market competition. In such an environment, how to effectively control investment costs and maximize project economic benefits has become the core proposition for the survival and development of construction enterprises [2]. The importance of engineering cost management, as a crucial aspect of project investment control, is self-evident.

Engineering cost management is not only related to the direct cost of the project, but also indirectly affects the progress, quality, and final profit of the project. Construction companies must accurately grasp and control project costs in order to remain invincible in the fierce market competition. The traditional quota principle, as the foundation of engineering cost management, has long played an important role in the industry. It is based on historical data and experience, and provides a basic framework for project budgeting by manually calculating cost estimates [3]. However, with the deepening development of the market economy, the price fluctuations of production factors such as materials, labor, and equipment have become increasingly frequent, and the limitations of the traditional quota principle have gradually become apparent. It is difficult to reflect market price changes in real time, resulting in significant deviations between cost estimates and actual expenditures, which affects the cost control effectiveness of the project [4].

The emergence of market-oriented pricing models has brought revolutionary changes to engineering cost management. This model is guided by market prices, collecting and analyzing market price information of various production factors, and dynamically estimating costs based

on the specific situation of the project [5]. Compared with the traditional quota principle, the market-oriented pricing model is more objective and accurate, and can reflect the impact of market price fluctuations on costs in real time, providing construction enterprises with more scientific cost control methods. However, the implementation of market-oriented pricing models is not an easy task, as it requires construction companies to have strong data collection, analysis, and processing capabilities, as well as keen market insights. For most construction companies, this is undoubtedly a huge challenge [6].

The widespread application of digital technology provides the possibility for construction enterprises to solve this problem. Digital technology, with its high efficiency, precision, and intelligence, is profoundly changing the face of engineering cost management. Through digital technology, construction enterprises can achieve real-time monitoring of market prices, timely obtain price information of various production factors, and provide accurate data support for cost estimation [7]. At the same time, digital technology can also help construction companies build cost databases, systematically organize and analyze historical project cost data, and provide valuable references for future project cost estimation.

In the practice of engineering cost management, digital technology plays a more important role. For example, through BIM (Building Information Modeling) technology, construction companies can achieve cost management throughout the entire project lifecycle. BIM technology integrates professional information such as architecture, structure, and equipment into a three-dimensional model, achieving information sharing and collaboration. On this basis, construction companies can accurately calculate the amount of work, predict cost changes, timely detect and correct cost deviations, and achieve effective cost control. In addition, digital technology can also help construction companies optimize resource allocation, improve resource utilization efficiency, and further reduce costs.

However, the application of digital technology in engineering cost management has not been smooth sailing. Construction companies need to overcome challenges such as technical barriers, data security, and talent shortages to fully leverage the advantages of digital technology. Therefore,

construction companies need to increase their investment in technology research and development, introduce and cultivate digital technology talents, and enhance their digital capabilities. At the same time, construction companies also need to strengthen cooperation with external institutions such as research institutions and universities to jointly promote the innovative application of digital technology in the field of engineering cost management.

2. The Limitations of Traditional Quota Principles in Digital Cost Management

The traditional quota pricing method is based on the calculation rules of engineering quantity, and uses quota sub items to calculate the engineering quantity. Its advantage is simplicity and practicality, but its disadvantage is that it has a large error and cannot reflect the price information of labor and machinery, especially when the market price fluctuates greatly, there is a significant gap between the calculated engineering quantity and the actual engineering quantity. In addition, the traditional quota pricing method also has the following limitations: (1) the traditional quota pricing method can only reflect the consumption of labor, materials, and machinery, and cannot reflect the price information of labor and machinery, especially when the market price fluctuates greatly, resulting in a large gap between the calculated quantity and the actual quantity of work; (2) The traditional quota pricing method cannot reflect the changes in labor and machinery prices. Due to the complexity of construction projects, there are many types of materials involved and prices fluctuate greatly. If market prices are not investigated and analyzed in a timely manner, it will lead to significant differences between actual labor and machinery consumption and quota consumption; (3) The traditional quota pricing method can only reflect the consumption of labor and machinery, and cannot reflect the usage of labor and machinery on the construction site, which is also not conducive to effective cost control of the project. Therefore, it is necessary to apply the principle of quota in digital cost management for cost control. Cost control is an important link in construction project management. The core of cost control is the control of engineering investment. It mainly manifests in the aspects of raising, using, and allocating funds for engineering projects. For example, in the early stages of construction projects, market prices can be used for price surveys and analysis to determine the best construction plan; In engineering project construction, the principle of quota can be used to determine reasonable construction costs; After the completion of the engineering project, market prices can be used for project settlement.

Therefore, the goal of engineering cost management is to achieve the expected investment goals while ensuring project quality and progress. Digital technology not only improves construction efficiency and quality, but also promotes the improvement of economic and social benefits for enterprises, enabling them to stand out in fierce market competition. Digital technology not only enables comprehensive collection, management, and analysis of engineering cost information, but also enables storage, transmission, and sharing of data. By comparing the data with existing data, it can be found that there are significant differences between these data. To address these issues, it is necessary to transform data into knowledge and apply it to the management process. The

following will provide a detailed introduction on how to apply the principle of quota in digital cost management to improve the management level of enterprises.

3. Application of Market-Oriented Pricing in Digital Cost Management

In the digital construction cost management, market-oriented pricing is a key link. By analyzing market price information, it is possible to accurately grasp market price information. Therefore, enterprises can improve their market competitiveness by analyzing market prices. Enterprises can determine the bill of quantities for bidding projects based on market price information and use it during bidding.

Therefore, in digital cost management, market-oriented pricing can fully play its role. For construction enterprises, compared with the traditional quota principle, market-oriented pricing has the following advantages:

Compared with traditional quota principles, market-oriented pricing is more accurate, transparent, and scientific. Under the traditional quota principle, the preparation of the bill of quantities requires reference to some statistical data and then certain adjustments in labor costs, which have a huge impact on the project cost. Under market-oriented pricing conditions, we can comprehensively grasp the changing trends of market price information through analysis and research of market price information.

Market pricing will conduct a comprehensive analysis of the bill of quantities, which is conducive to achieving the separation of quantity and price. Under the traditional quota principle, due to the inability to accurately reflect labor costs, enterprise quotations cannot truly reflect the actual situation. Under market-oriented pricing conditions, a comprehensive analysis of the bill of quantities can effectively prevent this phenomenon from occurring. This enables enterprises to provide themselves with the most authentic and objective engineering quantity list data.

Market pricing provides more options for bidders, enabling them to obtain the best profits while meeting bidding needs.

4. Future Development Trends

With the development and application of computer technology, digital engineering cost management will be further developed in the following areas:

(1) Standardization and refinement of engineering cost. With the continuous improvement of informationization in China's construction industry, digital engineering cost management will be further improved, making it standardized and refined.

(2) Construction of Engineering Cost Information Platform. With the continuous improvement of informationization in the construction industry, the construction of a digital engineering cost information platform will also become a key focus of future digital engineering cost management.

(3) Digital engineering cost consulting services. With the further development of China's construction industry, the number and scale of construction projects will continue to increase, and the market competition in the construction industry will become more intense. Digital engineering cost consulting services will provide a better development environment for the construction industry. Therefore, in the future, digital engineering cost consulting services will become an inevitable trend in the development of the construction industry.

5. Conclusion

China's construction industry is undergoing a transformation, shifting from labor-intensive industries to knowledge intensive industries, and from high cost and low added value to high cost and high added value. This requires us to utilize modern information technology for digital management in the construction industry. Currently, China's construction industry is in a critical period of transformation towards digitization and intelligence. Engineering cost is an important component of engineering projects and a crucial means for construction enterprises to control project investment. This article introduces the limitations of traditional quota principles in digital cost management, analyzes them, explores the application of market-oriented pricing in digital cost management, and finally looks forward to its future development trends. With the continuous improvement of the digitalization level in the construction industry, the limitations of traditional quota principles in digital cost management will gradually be improved. Digitization of engineering cost is an inevitable trend in the development of engineering cost management. Only by continuously improving the understanding of construction cost management by construction enterprises and enhancing their work level can we promote the healthy development of

China's construction industry.

References

- [1] Lü Chenggen. Discussion on the Development Trend of Informationization in Construction Project Management [J]. *Modern Project Management*, 2020, (10): 34-35.
- [2] Xu Jiangang. A Brief Discussion on the Application of Enterprise Informatization in Engineering Cost Management [J]. *China Transportation Construction Supervision*, 2020, (9): 25-26.
- [3] Li Pengfei. Several thoughts on the informatization of cost management in construction enterprises [J]. *Chinese Enterprise Management*, 2017, (3): 43-44.
- [4] Yang Baofeng. Exploration of Informationization Practice in Cost Management of Construction Enterprises - Taking a Municipal Engineering Project as an Example [J]. *Building Economy*, 2020, (6): 40-45.
- [5] Sun Xiuling. Limitations Analysis of Traditional Quota Principles and Digital Cost Management [J]. *Contemporary Economic Forum*, 2017 (6): 22-23.
- [6] Chen Junfeng. Progress and Trends in the Informationization of Engineering Cost Management Based on BIM Technology [J]. *China Railway Construction*, 2017 (7): 23-26.