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Analysis of Dynamic Management Mode of Construction Project Cost

Wanyi Tang

School of Civil Engineering, Sichuan University of Science & Engineering, Zigong, 643002, China

Abstract: *During architectural engineering from decision-making to design and then to construction, the construction cost will be affected by many factors such as management and technology of engineering units, market price fluctuation and environmental problems, which will easily trigger out-of-control investment. With the intense market competition in the architectural industry, cost management in architectural engineering presents the trend of informationization, refinement, specialization and integration. With the help of advanced information technology, it realizes the informationization and intelligence of dynamic management. As for dynamic management, there are few domestic practices and theoretical achievements. Based on the dynamic management of architectural engineering cost, this paper intends to focus on the goal of maximizing project investment benefit and comprehensively apply the theoretical knowledge of cost control, so as to take corresponding organizational and technical equivalent measures at different stages to calculate, analyze and control the construction cost in each stage. It is of great significance to promote research on the dynamic management of the engineering cost.*

Keywords: *Architectural engineering cost; Dynamic management; Informatization*

1. Introduction

Construction cost includes the process from decision-making to completion settlement. Meanwhile, the dynamic management of construction costs involves the control of each stage during the whole process. At present, the domestic construction cost control mainly emphasizes the construction process control and completion settlement, while it attaches less importance to the decision-making, design control and construction budget. The active control in advance is less, while the passive control afterwards is more. Cost workers spend a lot of time in low-end cost management activities such as quantity calculation, price setting and quantity comparison, but the real control effect on cost management is not obvious. Such cost management has low effectiveness and low level of cost management for a long time, so it is necessary to jump out of the limitations of traditional cost management and conduct construction cost management in a more systematic and wide-area manner to improve the construction cost management in China effectively. Dynamic management of architectural engineering cost is a method of systematic management, which aims to deal with the influence of various uncertain factors on cost during the construction implementation. Dynamic management can monitor the change in construction cost in real time, adjust the management strategy timely, and ensure the smooth implementation of the construction. Meanwhile, dynamic management of the architectural engineering cost has been successfully applied in many projects.

The dynamic management of the architectural engineering cost aims to achieve the following goals. Firstly, it aims to ensure the rationality and economy of the construction cost. Secondly, it intends to find and solve the cost problem during the construction in time. Thirdly, it aims to promote the investment and social benefits of construction. Fourthly, it provides decision support for construction management and achieves win-win results for all parties in the construction. The dynamic management of architectural engineering cost is of great significance in practical application, which is not only beneficial to enhancing the economic and social benefits of engineering projects, but also effectively deals with uncertain factors and risks, helping to achieve win-win and cooperative relations among all parties in the project, providing scientific decision support for project management.

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2. Overview of dynamic management mode of architectural engineering cost

2.1 Basis of dynamic management of architectural engineering cost

During the whole process of construction, its economic, social and natural conditions change dynamically with various accuracy of the construction cost in each stage, which has different influence on the final cost of the construction. Dynamic management of construction cost is a method of systematic management, which aims to monitor and adjust the construction cost in real time according to the changing internal and external environment of the construction. It is market-oriented and data-based, which realizes the optimal allocation of resources through fine management of key elements such as cost, schedule and quality of architectural engineering. The dynamic management mode emphasizes the control of architectural engineering from design and construction to settlement completion, which needs scientific and reasonable regulation[1] (See figure 1).

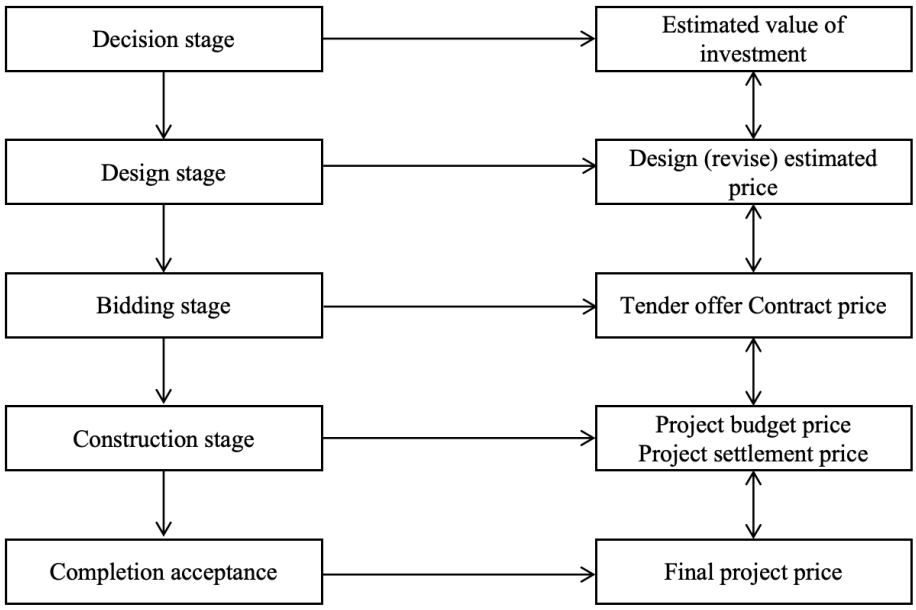

Figure 1: The corresponding relationship between the stage division of the whole construction process and the project cost

2.2 Implementation method and steps of dynamic management of architectural engineering cost

To implement the dynamic management of construction project cost, the following methods should be adopted: first, establish a sound dynamic management system and clarify the responsibilities of each department; second is to strengthen the prediction and control of project cost, early warning and formulate countermeasures; Third, strengthen communication and coordination with all relevant parties to ensure the timely transmission and sharing of information; The fourth is to use modern information technology means to improve management efficiency. The implementation of the dynamic management of construction cost should follow the following steps: first, determine the target, clear the scope of management; The second is to collect data and analyze the factors affecting the cost; The third is to formulate the implementation plan and clarify the management focus of each stage; The fourth is the implementation plan, to monitor the implementation process; Fifth, evaluate the effect and make continuous improvement.

2.3 Principles of dynamic management of construction cost

The dynamic management of construction cost requires the staff to control the construction progress, construction cost, and construction quality dynamically to ensure that the entire project is in a stable and controllable range and that the entire project cost work is reasonable. In the management process, enterprises should also regularly review the dynamic management of construction cost. The regular review is mainly to carry out comprehensive, detailed and in-depth inspection and supervision on the dynamic management of construction project cost, and solve the problems in time. This is the inspection of the quality of the construction unit itself and the construction equipment and technical

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level, and is also an important means to ensure the authenticity and objectivity of the dynamic management of the construction cost. Its management will run through the whole construction project, including the early decision-making stage and the settlement stage completion. Scientific and reasonable arrangements are made for all aspects of the construction project as a whole, and dynamic management of the whole process of the construction project implementation is finally achieved[2]. This requires a comprehensive analysis of all aspects of the data, such as field visits to the construction site, market price surveys, etc., through these data to analyze the current trend of market prices, and then combined with the construction requirements of construction enterprises, reasonable construction plans. In addition, the environment around the construction site can be scientifically and reasonably assessed, and the mechanical equipment used by the construction enterprise should also be monitored in real time. The staff need to conduct detailed investigations and statistics within the construction enterprise to ensure that its data truly and effectively reflect the actual situation of the current project. The staff should also do a good job of investment estimation, which is the most important core work in project cost management. The investment estimation is completed by the construction enterprise to compile the investment estimation report. Investment estimation plays a very important and critical role, which can not only provide a good foundation for project cost management, but also guide project construction effectively[3].

3. Factors affecting the dynamic management of architectural engineering cost

3.1 Personnel quality and innovation

The quality of personnel is one of the critical factors affecting the dynamic management of construction cost, including the professional level, work experience and responsibility of managers, technicians and construction personnel. If the quality of personnel is insufficient, it may lead to management confusion, decision-making errors and technical problems, thus affecting the accuracy of the project cost. With the continuous development of science and technology, new technologies and processes continue to emerge in construction engineering. Technological innovation may bring higher production efficiency and lower costs but also higher technical risks and investment costs. Therefore, technological innovation is also one of the important factors affecting the dynamic management of construction cost.

3.2 Material price

Material price is one of the main factors affecting construction cost. Since construction projects require a large amount of building materials, fluctuations in the price of materials will significantly impact the cost of the project. If the price of materials rises, it may lead to an increase in the cost of the project, thus affecting the investment efficiency of the project[4].

3.3 Delay in construction period

Time delay is another important factor affecting the dynamic management of construction cost. If the project is not completed on time, additional costs may be incurred, such as late fines, increased labor costs and rental fees. In addition, delays can affect the project's delivery time and return on investment.

3.4 Construction change and investment decision

Construction change is a common factor affecting the dynamic management of construction cost. Due to the complexity and particularity of construction engineering, construction change often occurs, which may lead to the increase or decrease of engineering quantity and the adjustment of construction scheme. Construction changes can add additional costs and therefore require effective management and control. Whether the investment decision is correct or not is directly related to the investment benefit of the project and the profitability of the enterprise. The factors that need to be considered in investment decision-making include market demand, project benefit, financing cost, etc. The changes of these factors may have an impact on the project cost.

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3.5 Policies, regulations and economic environment

Policies and regulations are one of the external factors that affect the dynamic management of construction cost. The change of policies and regulations may have a direct or indirect impact on the project cost. For example, the adjustment of tax rates, the adjustment of land policies, and the introduction of environmental protection regulations may have an impact on the project cost. In addition, economic environment is one of the macro factors that affect the dynamic management of construction cost. The change of economic environment will affect the market demand, inflation, interest rate and other factors, thus affecting the project cost. For example, economic growth may lead to rising labor costs and rising material prices, thus increasing the cost of engineering.

4. Optimize the dynamic management mode of construction cost

4.1 Lay a good foundation for the dynamic management of project cost

The dynamic management of construction project cost needs to be based on the following foundations, first, a scientific and reasonable engineering cost accounting method, which is the basis for dynamic management, it is necessary to establish a perfect engineering cost accounting system to ensure the accuracy and timeliness of accounting. The second is accurate market prediction, which can accurately predict key factors such as material prices and labor costs, and provide a basis for dynamic management. The third is comprehensive project information management, which can realize comprehensive information management of the whole process of the project, including project progress, material use, personnel allocation, etc. In addition, in the decision-making stage of the dynamic management implementation process, it is necessary to formulate a scientific and reasonable project cost scheme according to the specific needs and objectives of the project, and evaluate the possible risks. In the design stage, it is necessary to carry out a detailed design according to the plan formulated during the decision-making stage. At the same time, it is necessary to conduct a strict review of the design scheme to ensure that it meets the cost requirements of the decision stage. In the construction phase, strict construction management should be carried out according to the design scheme and budget. For various changes in the construction process, it is necessary to record and deal with them in time. In the completion stage, the final project cost accounting needs to be carried out according to various records and changes in the construction process (See figure 2).

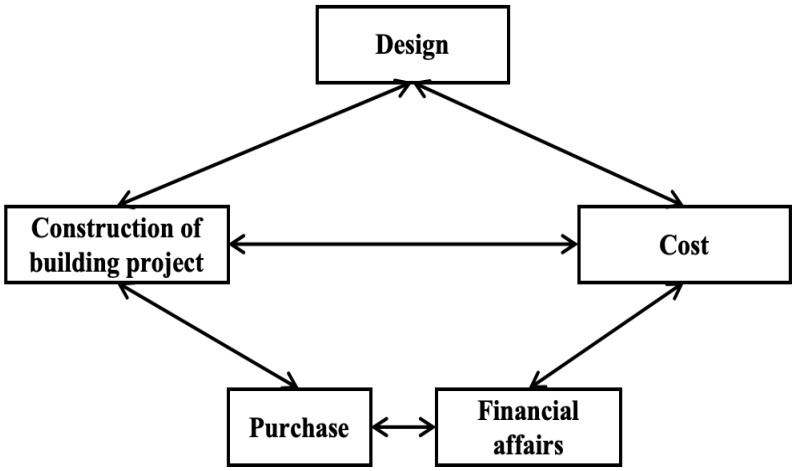

Figure 2: Multi-link work intersections[5]

4.2 Strengthen the information management of project cost

With the development of information technology, information management of engineering cost has become a trend. By using professional engineering cost software, work efficiency and accuracy can be greatly improved. At the same time, through the establishment of a database, various historical data can be stored and analyzed to provide reference for future projects. First of all, in the dynamic management of construction cost, information collection and processing is a crucial first step. This process includes the comprehensive collection, classification, and sorting of all kinds of data and materials during the

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project implementation. Using the information management system (IMS), information can be updated and shared in real time, providing accurate basic data for subsequent data analysis. Secondly, in order to effectively manage massive data, it is necessary to establish a construction cost database. The database needs to cover cost information at all stages of the construction project, so that historical data can be analyzed to make more accurate predictions of current and future costs. The maintenance of the database is also very important, including data backup, update and cleaning to ensure the integrity and accuracy of the data. At the same time, using the historical data in the database, the in-depth statistical analysis can reveal the key factors affecting the project cost and their changing rules. For example, analyzing the impact of material price fluctuations on cost can provide powerful data support for decision-makers and formulate a more reasonable cost management strategy. In addition, based on the results of data analysis, a prediction model can be built to predict the cost of future construction projects. This feature is very helpful in preventing cost increases caused by price increases. In addition, the forecast data can also be used as a reference basis for decision-making, helping the project team to make more scientific and reasonable decisions. Finally, the construction project involves multiple participants, and the collaborative work of all parties can be realized through the information management platform. Through the platform, all parties can share data and exchange information in real time, improve work efficiency and reduce communication barriers caused by information asymmetry.

4.3 Improve the efficiency and accuracy of dynamic management of project cost

(1) Strengthen personnel training

Although information technology plays an important role in improving work efficiency and accuracy, the human factor cannot be ignored. Therefore, it is necessary to regularly train and assess the staff to improve their professional quality and work ability. This includes training in the updating of the theoretical knowledge of engineering cost, proficiency in the use of software, sensitivity to market dynamics, etc.

(2) Optimize the management system

Perfect management system is an important guarantee to improve the efficiency and accuracy of dynamic management of project cost. This includes establishing clear job responsibilities, standardizing work processes, and establishing effective oversight mechanisms. By optimizing the management system, we can ensure that all work is carried out in an orderly manner, reduce confusion and duplication of work, and thus improve work efficiency and accuracy.

(3) Dynamic material management

Material cost is an important part of engineering cost, so the management of materials is very important. Through the dynamic monitoring of the material market, timely grasp the material price, supply and other information, in order to purchase at the best time. In addition, a material database should be established to track and record the use of materials in real time to avoid waste and error.

(4) Strengthen departmental communication

Project cost dynamic management involves many departments, so good departmental communication is very important. Regular department meetings should be held to share and discuss the progress of the project, existing problems and solutions. At the same time, information sharing between departments should be strengthened to ensure that all departments have a consistent understanding of the project and avoid errors and delays caused by poor information.

5. Conclusion

The construction period of a project is long, and the factors affecting the cost at each stage are different, as well as the degree of influence. To do a good job in the dynamic management of the whole process of cost, it is not only necessary to comprehensively control the factors affecting the cost at each stage of the whole process, but also to dynamically manage and systematize all kinds of information affecting the cost. Managers should have global thinking in the time and space dimensions of the whole process, carry out an overall grasp, and maintain attention and dynamic management of each stage, each cost detail and cost information

With the progress of science and technology and the development of society, the dynamic

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management mode of construction project cost will continue to evolve and innovate. In the future, we can foresee the following development trends: First, the application of big data and artificial intelligence technology will further enhance the refinement of dynamic management; Second, informatization will accelerate the information transmission and sharing of all relevant parties; Third, the concept of green environmental protection will be more deeply integrated into the project cost management.

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