Optimization of Cost Management Mode Based on Whole-Process Engineering Consulting

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Abstract: In the process of development and reform of engineering construction industry, the traditional cost management model exposes a series of problems, which affect the investment benefit of the project. This article focuses on the optimization of cost management mode based on whole-process engineering consultation. Through the methods of literature research and current situation analysis, this article analyzes the problems existing in the traditional cost management model in decision-making, design, bidding, construction and completion, such as investment estimation deviation, ineffective implementation of quota design and so on. Based on the whole process engineering consulting concept, optimization strategies are put forward from each stage, such as optimizing investment estimation by technical means in decision-making stage and promoting the deep integration of design and cost in design stage. The research results show that the optimized cost management model can effectively achieve accurate cost control and efficient collaboration at all stages. It has been proved by practice that this model can improve the level of cost management and provide a feasible path for engineering construction projects to realize scientific cost management under the background of whole-process engineering consultation.

1. Introduction

Under the background of continuous reform and development in the field of engineering construction in China, the traditional fragmented engineering consulting service model gradually exposed many disadvantages, which could not meet the needs of complex and changeable engineering projects [1]. As an innovative concept and mode of engineering consulting service, full-process engineering consulting is gradually becoming an important force to promote the high-quality development of engineering construction industry with its integrated and integrated service characteristics [2-3]. As one of the core links of engineering construction, project cost management is directly related to the investment benefit and cost control of the project [4]. However, the traditional cost management model often leads to the phenomenon of out-of-control cost and investment overrun due to the relative independence of each stage and poor information circulation [5]. Under the general trend of whole-process engineering consultation, how to optimize the cost management mode and improve the scientificity and effectiveness of cost management has become an important issue to be solved urgently [6].

The whole process of engineering consulting emphasizes the overall management of the whole life cycle of the project, covering all stages of project planning, feasibility study, survey and design, bidding and procurement, engineering construction, operation and maintenance [7]. This mode breaks the compartmentalization of traditional consulting services and provides a more comprehensive and systematic perspective for cost management [8]. Through the whole process of engineering consultation, the organic connection of cost management in each stage can be realized, and the cost risk caused by phase disconnection can be avoided.

In practice, the whole process engineering consultation has been applied in many large-scale projects and achieved good results. For example, some large-scale infrastructure projects in the world have effectively controlled the project cost, shortened the construction period and improved

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the overall quality of the project by implementing the whole process engineering consultation. In China, some pilot projects also show the positive influence of whole-process engineering consultation on cost management. However, at present, the whole process engineering consultation in China is still in the development stage, and the research on the optimization of cost management mode based on this is still insufficient, and the related theory and practice need to be further improved.

Based on this reason, it is of great theoretical and practical significance to carry out the research on the optimization of cost management mode based on whole-process engineering consultation, which will promote the transformation and upgrading of China's engineering construction industry and improve the project investment benefit.

2. Relationship between whole process engineering consultation and cost management

As a new engineering service mode, the whole process engineering consultation has the remarkable characteristics of integration and whole life cycle service. Its business scope is wide, covering all stages of project construction, from pre-project planning and feasibility study to design, bidding and procurement, construction supervision and operation and maintenance, with the aim of providing comprehensive and integrated professional consulting services for the project.

Cost management is a systematic activity of predicting, planning, controlling, and accounting for all costs required during the construction process of engineering projects. In the project decision-making stage, accurate investment estimation provides key basis for project feasibility; During the design phase, engineering costs are controlled from the source through methods such as quota design; Ensure the formation of reasonable contract prices during the bidding stage; Real time monitoring of costs during the construction phase and timely handling of cost deviations; The final cost accounting is accurately completed during the completion stage. The project quota design procedure is shown in Figure 1.

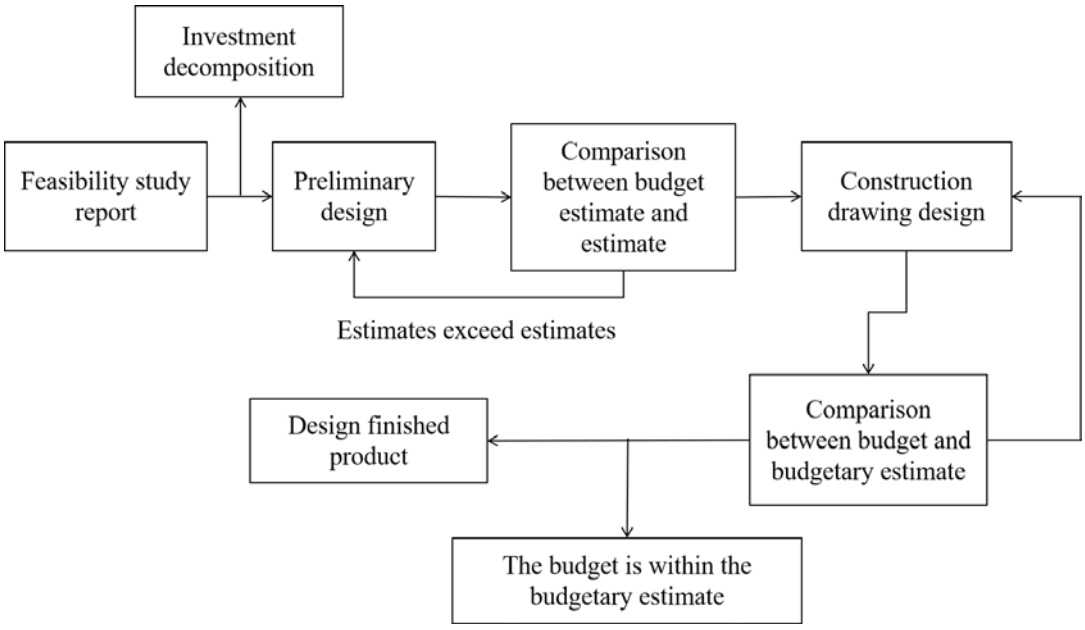

Figure 1 Project quota design

The whole process of engineering consultation is closely linked with cost management. On the one hand, the whole process engineering consultation provides a broad platform and system environment for cost management. By integrating consulting services at all stages, information sharing and collaborative work can be realized, so that cost management can be effectively connected at all stages, avoiding information islands and repetitive work, and improving the efficiency and accuracy of cost management. For example, in the pre-project planning, the engineering consulting team can combine market research and project positioning to provide a

reasonable investment estimation basis for cost management. On the other hand, cost management is the key support for the whole process of engineering consultation to achieve project objectives. Reasonable cost control is helpful to ensure the smooth progress of the project within the budget and realize the economic benefit goal of the project. If the cost is out of control, it will affect the achievement of other goals such as project progress and quality. In a word, they are interdependent and promote each other, and jointly guarantee the successful implementation of the project.

3. Problems of existing cost management mode

In the decision-making stage, the problem of investment estimation deviation is more prominent. As an important basis for project decision-making, investment estimation plays a decisive role in the subsequent cost control of the project. However, in practice, due to the lack of comprehensive and accurate basic data, some cost personnel failed to fully consider factors such as price fluctuations and policy changes that may occur during the project construction, resulting in a large gap between the investment estimate and the actual cost. Futhermore, some projects have not fully compared and selected multiple schemes in the decision-making stage, and only rely on experience or simple estimation to determine the investment quota, which makes the estimation lack of scientific and rationality.

In the design stage, the quota design was poorly implemented. The purpose of quota design is to control the preliminary design according to the approved investment estimate, and then control the construction drawing design according to the general estimate of the preliminary design, so as to ensure that the construction project does not exceed the investment quota under the premise of meeting the use function. However, the actual situation is that design units often pay more attention to the safety and aesthetics of design, ignore the cost control and fail to design strictly according to the quota design requirements. In addition, communication and cooperation between designers and cost personnel are insufficient, and cost personnel fail to provide cost information feedback for design in time, which leads to frequent changes in design schemes and an increase in project cost.

In the bidding stage, the phenomenon of collusion affects the cost. The bid-rigging behavior has seriously damaged the fair competition environment in the bidding market, making the winning bid price unable to truly reflect the reasonable cost of the project. Some bidding enterprises collude with each other to obtain the qualification of winning the bid by raising the bid or lowering the bid, and then increase the cost by changing the visa and other means after winning the bid to seek illegitimate interests. Futhermore, the tender documents are not rigorous, the bill of quantities is not clearly described, and the pricing rules are not clear, which also provides an opportunity for unfair competition of bidders, resulting in the cost deviating from the reasonable range.

In the construction stage, cost control lacks dynamics. Under the traditional cost management mode, the cost control in the construction process often focuses on post-event accounting, lacking real-time monitoring and dynamic adjustment of costs. The construction unit failed to establish an effective cost early warning mechanism, and failed to find out the cost overruns of personnel, materials and machines in the construction process in time and take measures to correct them. In addition, the management of engineering change is not standardized, and the phenomenon of random change occurs from time to time, and the change approval process is cumbersome, which leads to the failure of timely and accurate accounting of change costs.

At the completion stage, the settlement audit is not rigorous. Completion settlement is the last link of project cost management, and it is very important to determine the final cost of the project. However, in actual work, there are many problems in settlement audit. On the one hand, some auditors' professional ability is insufficient, and their understanding of relevant policies, regulations and pricing norms is not deep, which leads to inaccurate audit results. On the other hand, there is a game of interests between the construction unit and the construction unit in the process of settlement audit. In order to obtain more profits, the construction unit often overestimates the project quantity and high unit price, but the construction unit fails to effectively identify and correct these problems.

4. Cost management mode based on whole process engineering consultation

In the context of whole process engineering consulting, in order to effectively solve the many problems of traditional cost management models, a new cost management model needs to be constructed to achieve precise control and efficient collaboration of costs in each stage. The cost management mode of whole process engineering consulting is shown in Figure 2:

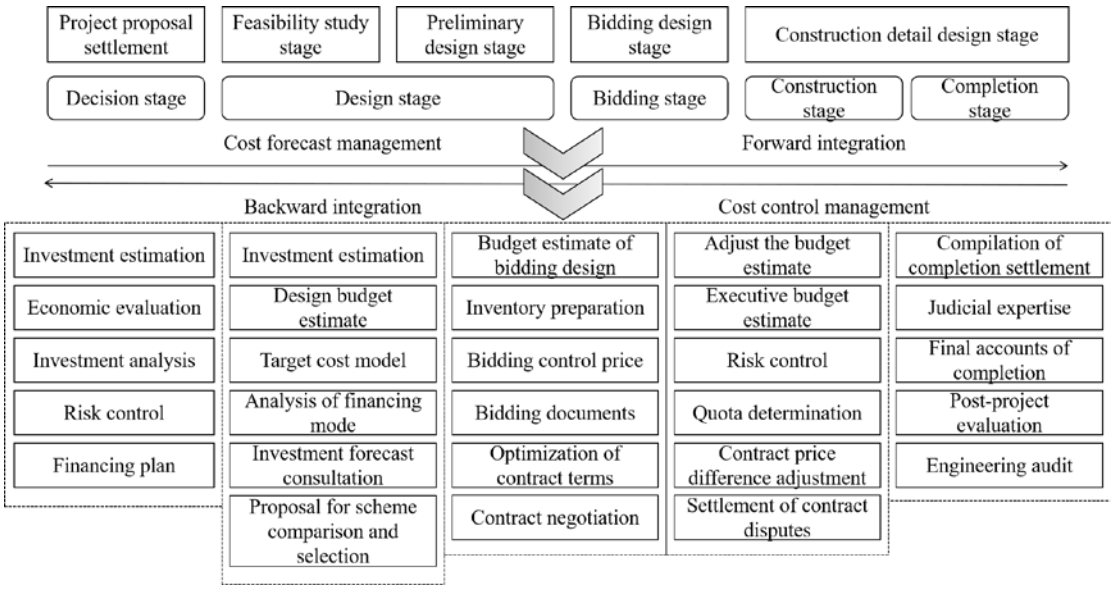

Figure 2 Cost management mode of whole process engineering consultation

4.1 Optimization of investment estimation in decision-making stage

Investment estimation in the decision-making stage sets the basic framework for the project cost. At this stage, the whole process engineering consulting team should fully collect all kinds of basic data, including market price information and similar project information. Futhermore, the introduction of multi-scheme comparison mechanism can comprehensively assess different schemes from multiple dimensions such as technology, economy and environment. With the help of comprehensive weighing method, the optimal scheme can be selected, so as to ensure that the investment estimation meets the functional requirements of the project and is economical and reasonable.

4.2 Innovation of cost control in design stage

The design stage has a decisive influence on the project cost. In the whole process engineering consulting mode, the deep integration of design and cost control should be promoted. On the one hand, it is needed to clarify the responsibility of design units in cost control, and bring cost indicators into the design performance appraisal system, so as to urge designers to actively pay attention to cost constraints. On the other hand, the method of combining quota design with value engineering should be implemented. Under the framework of quota design, the function of the design scheme is analyzed by using the principle of value engineering, and the project cost is reduced by optimizing the design details on the premise of meeting the functional requirements of the project. For example, through the comparison and selection of multiple schemes in the aspects of building structure and material selection, the quality and function of the building can be guaranteed, and the cost control goal can be effectively realized.

4.3 Improvement of cost management in bidding stage

The bidding stage is a crucial step in determining the contract price. The whole process engineering consulting team needs to carefully prepare the bidding documents, clarify the description of the bill of quantities and pricing rules, reduce vague terms, and avoid bidders taking advantage of loopholes to make unbalanced quotations. Futhermore, it is needed to strengthen the qualification review of bidding enterprises, strictly examine their performance and reputation, and

prevent the occurrence of bid rigging and collusion. In the assessment process, a scientific and reasonable assessment method should be adopted. In addition to focusing on the bidding price, a comprehensive assessment of the construction organization design, technical solutions, and other contents should also be conducted to ensure that the winning bidder has good performance capabilities and can provide reasonable quotations, ultimately making the contract price truly reflect the actual value of the project.

4.4 Refined cost management during the construction phase

The construction phase is the key and difficult point in the cost control process. The whole process engineering consulting should establish a dynamic cost monitoring mechanism to timely detect cost deviations and issue warnings. Futhermore, it is needed to strengthen engineering change management and strictly implement the change approval process. For necessary changes, it is needed to assess their impact on cost in a timely manner and implement them based on sufficient argumentation from relevant parties. In addition, by optimizing the construction organization design and arranging the construction schedule reasonably, the cost increase caused by rushing or idling can be avoided, thereby achieving refined management of construction costs.

4.5 Complete settlement review during the completion phase

Completion settlement review is a crucial step in determining the final cost of a project. This process needs to be undertaken by experienced auditors with strong professional skills, and strictly follow the contract agreement, relevant policies and regulations, and pricing standards. The audit work should strengthen the review of completion materials to ensure that all materials are true, complete, and effective. If disputes arise during the review process, it is needed to organize sufficient communication and negotiation among relevant parties such as the construction unit and the construction unit; If necessary, third-party professional institutions can be introduced for appraisal to ensure the accuracy and fairness of settlement audit results.

5. Conclusions

In this article, the optimization of cost management mode based on whole-process engineering consultation is studied, the problems of traditional cost management mode in each stage are analyzed, and the optimization mode of cost management adapted to whole-process engineering consultation is constructed.

In the decision-making stage, through comprehensive data collection, advanced technology prediction and multi-scheme comparison, the investment estimation is more scientific and reasonable, which lays a good start for cost management. In the design stage, the integration of design and cost should be strengthened, and the method of combining quota design with value engineering should be adopted to control the cost from the source. In the bidding stage, the bidding documents should be carefully compiled, the bidding enterprises should be strictly examined, and the bid assessment should be scientific to ensure the reasonable contract price. In the construction stage, fine cost control is realized by means of dynamic cost monitoring and strict change management. At the completion stage, professionals will be selected for strict audit to ensure accurate and fair settlement results.

The optimized cost management model closely revolves around the whole process of engineering consultation, breaks down the barriers of various stages of the traditional model, and realizes the organic connection and coordinated operation of all links. The practice shows that this mode can effectively solve the problems existing in the traditional mode, significantly improve the efficiency and accuracy of cost management, and effectively improve the project investment benefit. However, with the continuous development of the engineering construction industry, new technologies and new ideas are constantly emerging. In the future, it is needed to continue to pay attention to the industry dynamics and further improve the cost management model based on the whole process engineering consultation.

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