Implementation Strategies for Whole-Process Cost Consulting in Construction Projects

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Abstract: This paper focuses on the implementation strategies for whole-process cost consulting in construction projects. It first proposes establishing a professional organizational structure and team collaboration mechanism, covering the clarification of role positioning and strengthening cross-departmental collaboration. Subsequently, it elaborates on the application of advanced technological tools and digital management methods, including the promotion of BIM technology and the construction of big data analysis and intelligent decision-making systems. Then, it emphasizes optimizing the whole-process control system, proposing control points for key stages such as design, bidding, construction, and completion. Finally, it underscores the importance of perfecting the risk prevention and control system and emergency plans, involving the identification of risk points and the formulation of response strategies. The aim is to provide comprehensive and effective implementation guidance for whole-process cost consulting in construction projects.

1. Introduction

Whole-process cost consulting for construction projects is a professional service that runs through various stages such as project design, bidding, construction, and final account settlement. It aims to achieve effective control of project investment and optimal allocation of resources through scientific methods and means. Its core lies in dynamic management, risk prevention and control, and value creation. It requires the integration of multi-dimensional strategies encompassing technology, economics, and management to ensure the project is completed with high quality within the budget. The following sections systematically elaborate on the implementation strategies for whole-process cost consulting from four aspects: organizational structure, technological tools, process control, and risk prevention and control.

2. Building a Professional Organizational Structure and Team Collaboration Mechanism

2.1 Clarifying Role Positioning and Responsibility Division

Whole-process cost consulting work is complex and involves numerous links. Establishing a matrix management structure of "Project Manager + Professional Groups" is key to efficiently advancing the project. The project manager, as the core hub, undertakes the important task of overall coordination. They must not only maintain close communication with the owner to accurately grasp their needs and project objectives but also coordinate relationships among various parties such as design and construction to ensure seamless connection and smooth progress of all project phases. Professional groups are divided according to project stages, such as a decision-making group, design group, construction group, etc. Each group is further subdivided into roles like economic analysis, contract management, and cost control, forming a work system with clear responsibilities and comprehensive coverage. The decision-making group plays a key role in the early project stage, leading the preparation of feasibility study reports, conducting comprehensive assessments of the project's economic rationality and technical feasibility, and strictly reviewing investment estimates to provide a reliable basis for project decisions. The design group deeply participates in the design process, using professional knowledge to conduct economic comparisons of different design schemes, proposing optimization suggestions from a cost control

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perspective to ensure the design scheme achieves optimal cost while meeting functional requirements. The construction group focuses on the construction phase, monitoring dynamic costs in real-time, accurately accounting for each expense[1], strictly managing change events, rigorously reviewing the necessity and rationality of changes to avoid unnecessary cost increases, and ensuring project costs remain controllable.

2.2 Strengthening Cross-Departmental Collaboration and Information Sharing

To enhance overall project efficiency, it is necessary to establish regular communication mechanisms. Through regular meetings, all parties report work progress, existing problems, and solutions, enabling timely transmission and sharing of information. Thematic seminars are held for in-depth discussion of key issues and technical challenges within the project, pooling wisdom to jointly seek the best solutions. During the design phase, the early involvement of cost personnel is crucial. Leveraging their deep understanding of cost data and rich experience, they evaluate design schemes from an economic perspective and propose practical optimization suggestions, avoiding potential cost overruns in the design phase. During the construction phase, the cost consulting team interfaces with the engineering department in real-time on matters such as progress payments and change visas. Timely and accurate communication ensures progress payments are reasonable and compliant, avoiding errors or delays due to information lag. For change visas, both parties jointly review their authenticity and rationality to prevent false changes and unreasonable costs, effectively controlling expenses. Utilizing information platforms like BIM collaborative management platforms enables real-time data sharing and updates[2]. Personnel from all parties can access project information anytime, anywhere, breaking down information barriers, improving collaborative work efficiency, and providing strong support for the smooth progress of the project.

3. Applying Advanced Technological Tools and Digital Management Means

3.1 Promoting BIM Technology for Whole Life-Cycle Management

BIM (Building Information Modeling) technology, as a revolutionary force in the construction industry, highly integrates a project's geometric shape, physical characteristics, and functional information, providing comprehensive, multi-dimensional visual support for cost consulting work. In the early project planning and design stages, using BIM models allows for the precise and automatic extraction of various quantities. Compared to traditional manual calculation methods, this not only significantly reduces human error but also greatly improves calculation efficiency, allowing cost personnel to devote more energy to cost analysis and optimization work. During the construction phase, the advantages of BIM technology become even more prominent. By simulating construction progress and resource consumption, potential conflicts and problems during construction can be identified in advance, such as pipeline clashes or unreasonable construction sequences[3]. Based on this, construction organization design can be optimized accordingly, construction sequences and resource allocation, effectively avoiding rework and waste during construction, and ensuring smooth project progress. In the project operation and maintenance (O&M) phase, the BIM model can be deeply linked with equipment information, maintenance records, and other data. O&M personnel can quickly locate equipment, understand its operational status and maintenance history through the model, plan maintenance schedules in advance, address potential faults promptly, extend equipment service life, thereby reducing the O&M costs throughout the project's entire life cycle.

3.2 Constructing Big Data Analysis and Intelligent Decision-Making Systems

Establishing a comprehensive and detailed project cost database is the foundation for conducting big data analysis. This database integrates massive data resources such as historical project data, real-time market price information, and industry benchmarks. Using advanced machine learning algorithms, accurate cost prediction models can be built. For example, using regression analysis algorithms, the relationship between the unit price of concrete and various influencing factors can

be deeply analyzed to accurately predict its future fluctuation trends, providing a scientific basis for project material procurement decisions. Through cluster analysis methods, contract terms can be meticulously classified and risk-assessed, quickly identifying high-risk contract terms and formulating response strategies in advance to effectively avoid contract risks. Furthermore, it is necessary to develop intelligent auditing tools that use advanced algorithms to automatically compare bill item characteristics with pricing standards[4]. These tools can quickly and accurately identify errors and non-standard practices in bill preparation, significantly improving audit efficiency and accuracy, reducing the subjectivity and omissions of manual audits, and ensuring the quality and reliability of cost consulting work.

4. Optimizing the Whole-Process Control System and Key Node Control

4.1 Design Stage

The design stage has a decisive impact on project cost. Implementing Limited Cost Design with the investment estimate as the upper limit can effectively control design indicators for various disciplines. For example, specifying specific indicators such as cost per square meter of building area and steel content in structures, refining cost control targets for each discipline and each link. During the design process, designers must strictly adhere to the cost limit indicators while meeting project functional and quality requirements to avoid exceeding the budget estimate. Introducing Value Engineering analysis methods, through systematic analysis of project function and cost, uncovers potential points for value improvement. Achieving necessary functions at a lower cost, or significantly improving function by appropriately increasing cost, thereby achieving the best match between function and cost. Through Value Engineering analysis, the design scheme is optimized, effectively reducing project cost and improving project cost-effectiveness while ensuring quality[5].

4.2 Bidding Stage

In the bidding stage, the preparation of tender documents is the core link. Clarifying the pricing basis, risk allocation, and price adjustment mechanisms are key contents. For example, regarding the risk of material price fluctuations, reasonably stipulate adjustment rules, such as "when the price fluctuation of steel exceeds ±5%, the excess part shall be adjusted according to the actual steel price," to avoid disputes caused by price fluctuations. Establish a bid clarification mechanism, organizing professionals to conduct a comprehensive review of bid documents. Focus on reviewing whether the technical solution is feasible and whether the quotation is reasonable, eliminating unbalanced bids or bids below cost, ensuring the fairness of the bidding process and the smooth implementation of the project. After contract signing, promptly conduct briefings on key clauses. Explain important contents such as payment methods and change procedures in detail to all project parties to ensure a consistent understanding of contract terms, avoiding conflicts and disputes during execution due to misunderstandings, and safeguarding the smooth progress of the project.

4.3 Construction Stage

Cost changes frequently during the construction phase, making it necessary to establish a dynamic cost tracking table. Compare actual costs with the budget variance monthly, use data analysis techniques to deeply analyze the causes of variances, such as rising material prices, increased quantities, or low construction efficiency. Based on different causes, formulate practical corrective measures, adjust cost plans timely, and ensure costs remain controllable.

For change events, strict control is essential. Review the necessity of changes to avoid unnecessary cost increases; carefully calculate change costs to ensure accuracy and reasonableness; standardize the approval process, strictly following the prescribed procedures. Resolutely eliminate the phenomenon of "designing while constructing while changing," prevent cost loss of control due to chaotic change management, and ensure the project is completed successfully within the budget.

4.4 Completion Stage

In the completion stage, settlement auditing is the last line of defense for cost control.

Carefully check the contract scope to ensure settlement content is consistent with the contract agreement; rigorously review change visas and claim justifications to prevent duplicate billing or false reporting of quantities. Through strict settlement auditing, accurately determine the final project cost, protecting the legitimate rights and interests of both the construction unit and the contractor. Post-project evaluation after completion is indispensable. Comprehensively summarize the lessons learned in the cost management process, analyzing successful practices and existing problems. Transform these lessons learned into valuable intellectual assets, providing reference for subsequent projects, continuously improving the cost management system, and enhancing the enterprise's cost management level and market competitiveness[6].

5. Perfecting the Risk Prevention and Control System and Emergency Plans

5.1 Identifying Whole Life-Cycle Risk Points

Throughout the project life cycle, it is necessary to comprehensively and meticulously sort out the project risk list from key dimensions such as policies and regulations, market fluctuations, technical changes, and contract disputes. At the policies and regulations level, increasingly stringent environmental requirements mean that if a project fails to keep up with policy changes during construction, it may face risks of work stoppage and rectification, not only delaying the schedule but also incurring additional costs. Regarding market fluctuations, material prices are affected by various factors such as supply-demand relationships and international situations; significant price increases will directly push up project costs and squeeze profit margins. For technical changes, complex and variable geological conditions may lead to significant discrepancies between actual conditions and the survey report, potentially rendering the original design scheme unfeasible and necessitating major changes, resulting in cost increases and schedule delays. Contract disputes cannot be ignored either; ambiguous clauses may lead to different interpretations of contractual obligations and rights, resulting in claims and affecting the smooth progress of the project[7].

5.2 Formulating Risk Response Strategies

For identified high-risk items, scientific and reasonable response strategies need to be formulated. For common and impactful risks like material price fluctuations, a combination of strategies can be used. For risk transfer, purchase relevant insurance to transfer part of the risk to the insurance company; for risk sharing, sign lump-sum contracts with suppliers, clearly defining the sharing ratio of price fluctuations in the contract; for risk retention, set up a dedicated risk reserve to cope with possible cost increases. Additionally, it is necessary to set reasonable risk thresholds, such as triggering an early warning when material price increases exceed 10%. Once the warning is triggered, immediately initiate corresponding response measures, such as adjusting procurement plans or renegotiating prices with suppliers, to minimize the impact of risks.

5.3 Building a Dispute Resolution Mechanism

Disputes are difficult to completely avoid during project execution. If handled improperly, they can seriously impact project cost and schedule. Therefore, building an efficient and reasonable dispute resolution mechanism is crucial. The contract is the guideline for project implementation and should clearly specify the dispute resolution method. Priority should be given to reaching agreement through friendly consultation, which is low-cost, efficient, and helps maintain cooperative relationships. If consultation fails, third-party mediation can be introduced, leveraging neutral and professional third parties to facilitate a settlement between the parties. When mediation also fails to resolve the issue, choose arbitration or litigation according to the contract agreement[8]. Arbitration is characterized by its professional nature and finality; litigation possesses authority and enforceability. Furthermore, clearly agreeing on dispute handling time limits is key. Setting reasonable deadlines avoids prolonged disputes and prevents continuously increasing costs and schedule delays due to lengthy dispute resolution processes, ensuring the project can proceed smoothly as planned and achieve its intended objectives.

6. Conclusion

Whole-process cost consulting for construction projects requires a systematic approach to coordinate work across all stages. Through strategies such as professional organization, digital tools, refined control, risk prevention and control, and value creation, project investment objectives can be achieved. In the future, with the accelerated digital transformation of the construction industry, the cost consulting industry needs to further integrate technologies such as BIM, big data, and artificial intelligence to enhance the level of service intelligence and provide more efficient and accurate cost management solutions for construction projects.

References

[1] Zhang Jinyin, Zhang Qin. Implementation Strategies for Whole-Process Cost Consulting in Highway Construction Projects[J]. Transport Manager World, 2025(18): 49-51.

[2] Liu Yang. Discussion on Implementation Strategies of Cost Management for Whole-Process Engineering Consulting in EPC Projects[C] // Committee of Intelligent Learning and Innovation Research, China Intelligent Engineering Research Society. Proceedings of the 2025 Academic Exchange Conference on Artificial Intelligence and Engineering Management. Shanghai Tongji Engineering Consulting Co., Ltd. Shenzhen Branch, 2025: 152-154.

[3] Zhang Gongfa. Research on Management Strategies for Whole-Process Cost Consulting in Construction Engineering Projects[J]. Engineering Technology Research, 2025, 10 (7): 143-145.

[4] Cao Yingying. On the Strategies for Whole-Process Cost Consulting Management in Construction Engineering Projects[J]. Ju Ye, 2025 (3): 109-111.

[5] Jin Ming. Analysis of Strategies for Whole-Process Cost Consulting Management in Construction Engineering Projects[J]. Ju Ye, 2024 (2): 162-164.

[6] Wang Yang, Wang Yue, Yin Yilin. Practice of Digital-Intelligent Whole-Process Engineering Consulting for Guangyang Island Ecological Civilization Construction[M]. Chongqing University Press, 2023.05: 295.

[7] Zhang Jiangbo, Gao Tengfei, Fang Junsheng, et al. Whole-Process Engineering Consulting: Operation and Maintenance Stage[M]. Chemical Industry Press, 2022, 01: 247.

[8] Zhang Jiangbo, Xu Xudong, Guo Jiazhen, et al. Whole-Process Engineering Consulting: Construction Stage[M]. Chemical Industry Press, 2021, 12: 162.