
Research on the Optimization of Cost Management in Engineering Full-Process Consulting

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Abstract: Along with the development of market and professional development of building, full course project consultation mode is becoming the leading tendency. As the key part of the mode, cost management decides the investment yield and the construction quality control. Starting with the development background of full process engineering consultation, the basic concepts of consultancy and cost management are given, and the outstanding problems that exist in present cost-management practices, such as inadequate machinery, lack of co-ordination, and lack of expertise are discussed, as well as the basic principles for optimizing cost management, as well as suggesting a way to improve the quality of the system, as well as training personnel. The results of this study can be used to improve the quality of cost control and to cut down the cost of the whole course of the project.

Keywords: Whole-process engineering consulting; Cost management; Whole-process control; Optimization strategies

Online publication: March 26, 2026

1. Introduction

The large-scale development of building cause engineering to become more and more complicated. Traditional method of decentralized cost management cannot satisfy the needs of modern project, resulting in the appearance of the whole process consultation mode. Cost management covers the whole life cycle of a project, from decision making to building and settling, and forms a key part of full process consultation. Nevertheless, the existing cost management procedures for a number of projects have been hampered by fragmentation of procedures, late monitoring mechanisms, lack of interdisciplinary cooperation, and lack of institutional norms, which frequently lead to overspending and wastage of resources. Against this background, the study of optimal cost management in the framework of full process engineering consultation is of great practical significance to the standardization of industrial practices, the control of the investment in the project, and the improvement of the overall effectiveness of the project.

2. Overview of full-process engineering consulting and cost management fundamentals

2.1. Concept and scope of engineering full-process consulting services

Whole Process Consultation is a kind of integrated service mode, which consists of preplanning, investigation & design,

tender agent, cost consultation, construction supervising, and finishing clearing. It goes beyond the limits of a conventional single service consultancy that provides comprehensive services across the whole project life cycle, from starting and scheduling to finishing and delivering. It includes the decision-making stage, the design stage, the tender stage, the execution stage, and the finishing stage, which includes the different types of service, including technology, administration, and financial control.

Engineering Whole Process Consultation stresses the comprehensive, continuous, and systemic nature of the service. Instead of isolating the different stages of consultation, it coordinates all activities around the overall goals of the project. Through the integration of industrial resources, standardization of service agreements, and the alignment of workstreams, it is effective in dealing with problems like the lack of co-ordination among the various advisory services, ambiguity in the definition of duties, and duplication of work. This method is consistent with the prevailing tendency of large scale, complexity, and integration of building projects to become the leading orientation for the transition and progress of the project advisory sector.

2.2. Core characteristics of cost management under the full-process consulting model

The feature of cost management in an end-to-end service model is that it covers the whole life cycle of a project. It goes beyond the conventional post process of settling and valuation by incorporating cost control into the process of decision making and design, across all phases of construction. Following the closed loop method of managing the project, which consists of active prediction, real time monitoring and post project review, the model guarantees smooth and dynamic alignment between the estimate of the investment, the design, the layout of the building plan, the valuation of the contract, and the final balance, thus controlling the size of the investment and the cost of the project at its origin.

It is a combination of specialized cooperation and integration of management functions, which avoids the necessity of separate cost management procedures. Rather, it integrates deeply into the field of design, tender, oversight, and building management, allowing for a seamless exchange of information, coordination of work processes, and uniform standards for all specials. West, it is a combination of dynamic and accurate functionality that allows for the real time to be updated in accordance with the development of the building process, the price movements of the market and the changes in the design.

2.3. The practical value of integrating full-process consulting into cost management

The integration of full process consultation mode in cost management is effective in solving the shortcomings of conventional cost management, which puts priority on post and ignores initial phases. Through the establishment of an early stage of cost management, it is possible to optimize an investment and substitute a solution in the course of a project's programming and design stages, thus avoiding an overspend resulting from a duplication of a design or an unreasonable solution at the origin. This greatly increases the predictability and science of the management of projects' investment, resulting in a more effective global management of building projects ^[1].

At the same time, it removes the obstacles to information among the various advisory fields, allowing for a coordinated progress in the evaluation, design, tender and supervisory procedures. This will help to improve the effectiveness of cost control and the precision of accountings. Today, it will help standardize service standards in the engineering advisory industry, integrate cost-management processes and pricing methods, increase the professionalism of advisory services, protect the financial interests of all parties involved, where both project owners and contractors contribute to a sound regulatory, orderly and efficient operation.

3. Existing outstanding issues in cost management during full-process engineering consulting

3.1. Insufficient proactive involvement in cost management and disconnected control processes

In the majority of the present full process consultation programs, there is still a marked trend in the direction of post-

event execution. Employees tend to concentrate only on the tender and closing stages of the clearing process and are not sufficiently involved in the key preparatory steps like the decision making and the planning or designing process. As a consequence, there is no prior evaluation of the investment, the comparison of the economy plan and the budgetary control. Lack of an initial cost evaluation usually results in a design proposal that departs from the real needs of the capital, whereas later stages of the development are often subject to design modifications and additional on-site certification requirements, which in turn has contributed to the total cost of the project.

The separation of cost control among the different stages of the project continues to exist, with inefficient coordination of the investment estimation, the design budget, the construction plan budget and the closing balance. The cost findings of one stage do not constitute a solid foundation for the next stage of the process. Isolation and fragmentation of the cost information between stages, combined with the lack of consistency of the criteria, frequently result in disproportionate variations in the cost index and a lack of consistency in the pricing methods.

3.2. The collaborative mechanism among various professional consulting entities is inadequate

Full Process Consultation covers a wide range of expertise including design, cost estimate, tender, monitoring, and project management. At present, however, the majority of the advisory groups are working in a dispersed manner and do not have a strong internal coordinating mechanism. Experts usually concentrate exclusively on their personal duties and do not communicate regularly. Designers prefer the technical requirements to the economic feasibility, whereas the cost estimate is not familiar with the details of the design and the building technology ^[2].

Insufficient communication channels between the parties involved make it impossible to synchronize key data like project design blueprints, building plans, market prices, and variation orders in real time. This leads to information lag and asymmetry. Lack of a uniform flow of work flow and explicit accountability criteria results in cross-cutting between different subjects when they are confronted with cost conflicts, payment disputes, or variation pricing conflicts, which seriously affects the effectiveness and quality of overall cost management.

3.3. The application of information technology in cost management and its standardization level remain relatively low

Most of the full process consultancy companies depend on the conventional way to measure the cost of the cost, and use the BIM, the Large Data Cost Platform and the Market Price Information System. Collecting, quantifying and settling payments is mostly done by hand, which leads to inefficient performance and a high risk of human mistakes, omissions and misstatements. This method does not satisfy the actual requirements for accurate cost control for large and complicated projects.

There is still no single, integrated, integrated, standardized framework for the whole process of cost management. There are differences in the valuation basis, the cost structure, the control process, and the production of the output. There is a lack of standardization in the Cost Management Workflow, and there are inconsistencies in the format, the data criteria, and the need to examine the different phases. This, combined with diverse expertise among practitioners, has led to inconsistent and comparable cost outcomes, creating major challenges for the standardization of cost management within the whole process consultation model.

4. Principles for optimizing cost management in full-process engineering consulting

4.1. Principle of closed-loop management throughout the entire cycle

In order to achieve optimal cost management by means of end-to-end consultation, it is crucial to maintain a closed loop system for the whole life cycle. The method is intended to cover the entire life cycle of the project starting, finishing, and delivering, by incorporating the cost control into all key stages of the process: decision making, initial design, building layout, tendering, site building, and final settlement. It is a radical departure from the conventional cost-management

approach, which focuses on settling after a project rather than at an early stage. The concept of “Initiative Control” is based on “Active Control”, complemented with “Dynamic Process Monitoring” and “Post” Overview”, which provides “Hierarchical Restriction” and “Hierarchical Supervision” (“Level”) over the Cost Estimates, Design Budget Estimates, Building Plans Budgets, Contracts Prices, and Final Balance Payments. This creates a coherent and seamless closed loop system for integrated cost management.

Strictly implement the full-process management approach encompassing scientific pre-event forecasting, precise in-process regulation, and comprehensive post-event review and analysis. During the project preliminary phase, conduct in-depth investment calculations, economic comparison of alternatives, and control of budget-based design to establish investment ceilings at the source. In the construction phase, prioritize dynamic monitoring and management of design changes, on-site certification, progress payment disbursements, and fluctuations in building material market prices to prevent cost overruns. In the completion phase, rigorously perform settlement audits, analyze cost deviations, and conduct comprehensive cost reviews throughout the entire project lifecycle.

4.2. Principle of integrated professional collaboration

The integration of specialized cooperation is a key rule to optimize the whole process of consultation cost. It is essentially to dismantle the operating obstacles and messages between different specialized advisory departments, such as design, cost estimate, tender, monitoring, and managing, and to create a comprehensive, comprehensive service concept that departs from the conventional, self-contained, self-contained business model. This includes coordination of goals, execution procedures, and monitoring criteria for all specialized advisory activities, setting up periodic, institutionalizing inter-discipline communication mechanisms, and making sure that experts participate fully in all stages of the project. As a result, the project plan and the cost estimation proceed in parallel, the tender procedure is seamlessly linked to the cost control, and the project management and the cost control work in an effective way.

Focusing on maximum total investment yield and optimal project management as common key goals, we have standardized implementation standards, cost estimates, and delivery requirements in all fields of expertise. We set up an effective information sharing platform to ensure that engineering data, technology documents, and regulation are seamlessly integrated, as well as a clear workplace. Through integrated inter-discipline cooperation, we optimize the project design plan, precisely specify the number of items, and regulate the design modification and site validation procedures^[3].

4.3. The principle of information technology empowering refined management

Optimizing cost control should be carried out in full compliance with IT, so as to achieve fine control. Through the use of modern digitized information technology, it has changed the conventional widespread cost management mode, advanced BIM technique, large data cost analysis system, cloud management platform, and so on, to realize integrated functions, which include smart number computation, real time statistical analysis of cost data, dynamic update of the market price of construction materials, and managing the cost file on-line and managing the cost documents on line. Effective information technology is a substitute for conventional manual computation and statistics, which greatly decreases the possibility of human mistakes, omissions, or inaccuracies, thus increasing the accuracy of the computation and the total operating efficiency in order to satisfy the demands of large, complicated projects.

With the help of IT, we are making steady progress in improving our cost management. This includes the description and breakdown of the Cost Control Point, the Review Process, the Management Standards, and the Performance Measurement of the Project. We carry out accurate, individual, and detailed accounting for key issues like quantitative measure, material price control, change order review, and schedule payment.

5. Implementation path for optimizing cost management in full-process engineering consulting

5.1. Improve the standard and institutional framework for whole-process cost management

Depending on the state of the whole process consultation pattern, the industrial challenges, and the project management requirements, the industry regulators and the engineering advisory bodies shall develop a common methodology for cost control, a uniform pricing policy, and a requirement for the preparation of an integrated whole process advisory service. It shall set out the development criteria, audit procedures, audit targets, and assessment criteria for the different stages of the project, as well as the definition of key elements, operating requirements, and accountability limits at the planning, design, construction, and settlement phases, as well as a clear, uniform, and workable system framework for the standardization of the whole process of cost management throughout the sector.

The whole process consultancy company is expected to build a complete ISCM with its operating frame. They should specify the standard work flow to manage the whole process, set out clearly the tasks and powers of the task, implement a multi-tiered audit mechanism, and set up a performance appraisal protocol. At every phase, they should clearly define the roles of the Cost Experts, main Action Sites, Critical Checks, and Quality Requirements. Special attention shall be paid to the enforcement of the Limitation Design Management System, a phased approval procedure for modifications to and from site to site, as well as a three-tiered evaluation system for cost estimation.

5.2. Establishing a multi-disciplinary collaborative cost control model

The whole process consultancy company is expected to overcome the obstacles that exist within the professional sector through the establishment of a special multi-discipline cooperation platform. The platform brings together the engineering experts in the field of design, cost estimate, tender, monitoring, and project management to create a comprehensive PQC service group. Through the implementation of an integrated project management method, the company is able to deal with the problems of fragmentation in the workflow and the lack of cross-disciplinary communication. There is a need to set up a periodic dialogue and consultation system that allows multidisciplinary groups to carry out a common assessment of key cost-control milestones, such as the design of the project, the drafting of the draft, the modification of the building, and the clearance of the accounts. This will guarantee synchronized optimization of project solutions, accurate quantification, and uniform pricing standards, promoting in-depth integration and coordination between all specialist groups^[4].

The concrete duties of every profession should be clearly identified throughout the whole cost management process, setting up an inter-profession cooperative assessment and accountability system that connects the efficiency and consistency of cost-control with the individual performance measures, thus forcing all experts to work together in an effective and efficient manner, resulting in an integrated cost-control framework with complete employee involvement, end to end, and clear accountability.

5.3. Upgrading cost management methods through information technology

Overall, we will push for a comprehensive implementation of BIM across the whole PM, making full use of 3-D Modeling, Parameter Modeling, and Cooperative Workflow. This makes it possible to accurately calculate the 3-D amount of a project, detect the drawing conflict in time, and calculate the amount accurately in real time. In addition, BIM models help to correlate and coordinate design, build, and cost information in an integrated manner, allowing for dynamic cost adjustments and real time monitoring throughout the life cycle of a project. Through the implementation of the special Large Data Cost Information Service Platform, we can gather and update the price of construction materials, labor and machine market, as well as the cost index of the same item.

Set up an enterprise cloud-based cost management system that enables full digitization of the whole cost chain, from preparing, checking, approving, and filing. The system allows for electronic filing of cost records and a smooth flow of data over the entire life cycle of a project, which makes it possible to simplify the transfer of cost data at all stages. At the same time, specialized IT training is offered to cost managers, with emphasis on strengthening the key capabilities

of BIM, large data cost analysis, and skilled at the use of digital valuation software. This fosters a professional team that can respond to the requirements of DQM, thus enabling a comprehensive improvement in cost-management practices by means of digital techniques, as well as increasing the effectiveness, precision and intelligence of the computation in the whole process of consultancy cost management.

6. Epilogue

The cost management based on full course consultation mode is a key part of the project's investment control, which has a direct impact on the cost, the efficient distribution of resources, and the standardization of industrial development. In this article, we explain the basic idea and actual value of full process consultation and cost management, and point out the problems of late control interference, lack of specialized cooperation, and the lack of digitization. It also suggests improving policies at system norms, cooperation mechanisms, and the development of digital infrastructure.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Zhang Q, 2024, Dynamic Management and Control Measures of Construction Cost. *Architecture Engineering and Science*, 5(4): 200–203.
- [2] Zhan Q, 2025, Research on Engineering Quantity List Pricing and Project Cost Management of Construction Enterprises. *Journal of Architectural Research and Development*, 9(3): 136–142.
- [3] Shen C, Meng P, Shen J, et al., 2025, A Construction Cost Estimation System Based on Case-Based Reasoning and Exponential Smoothing. *Journal of Building Engineering*, 113: 114120–114120.
- [4] Yu S, 2025, Data Processing of Whole Process Cost Management in Building Engineering Based on AI. *Intelligent Decision Technologies*, 19(3): 1464–1476.

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