

Research on Cost Management in the Whole Process of Construction Project based on BIM

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Abstract: With the rapid development of national economy, China's requirements for construction projects are more and more strict, which is a project with high energy consumption and construction cost. Therefore, the change of policy will greatly affect the whole process management of the project. However, BIM can minimize the whole process cost of construction project. Firstly, this paper analyzes the value of BIM in cost management and its application in the whole process. Then, this paper puts forward some problems in BIM application. Finally, some suggestions are put forward.

1. Introduction

Modern construction industry has become the pillar industry of our national economy. However, the traditional construction engineering is a high energy consumption, low efficiency industry, which seriously restricts the successful transformation and upgrading of China's construction enterprises. Construction engineering is a fragmented industry structure, which requires the participation of many participants. However, most construction enterprises lack of integrated chain management structure, which will seriously hinder the information sharing and circulation of many project parties. Therefore, China's construction industry has always been a kind of extensive, high-energy consumption industry. However, BIM Technology will fundamentally avoid the loss of horizontal information, which will increase the correct transmission of information by all project parties. Through BIM, we can complete the whole process cost management at a lower cost, which will strictly control the cost control of construction and construction.

2. The Value of BIM in cost Management and its Application in the Whole Process

2.1 Value of BIM in cost management

Construction engineering is the most important kind of engineering project, which is a multi-party and long cycle process. Construction project is a complex project, which brings up the complexity of cost management. In the traditional cost management, the construction company can't effectively coordinate the information transmission between many construction parties and inspection units, which is the main phenomenon of cost out of control. Therefore, we must coordinate the information transmission of many construction parties and inspection units, which will become an urgent problem in cost management. However, BIM brings a new course to the construction industry, which can regard the whole process of cost as a system engineering. As a result, BIM has pushed builders to a new level. Every stage of cost management is not isolated. It is a system management that affects each other. Among them, the most important is the early planning stage, which determines the form and scale of architectural engineering design. At the same time, the design stage will greatly affect the ease of construction, which will have a significant impact on the construction stage. However, the maintenance and operation in the construction phase will affect the success of early decision-making. Therefore, construction engineering is a complex system engineering project.

2.2 BIM application in the whole process cost management

In the whole process of construction cost management, BIM is a comprehensive application software, which is not applied to a single stage. The cost management of the whole process is the cost management of the whole life cycle of the project, which includes all costs from the preliminary planning stage to the end of the construction stage. The whole process cost management flow chart based on BIM is shown in Figure 1. Among them, in the early planning stage, we must pay attention to the influencing factors of the project cost, which will affect the project cost of the whole project cycle. Therefore, we can screen similar historical projects in BIM information base, which will help us to estimate the influence degree of each influencing factor. Finally, we will get accurate investment estimates by comparing different construction projects. In the design stage, we can extract relevant design modules through BIM, which will speed up the design modeling optimization. Combined with BIM, we can calculate the construction period and capital investment of the project. Through the dynamic analysis and control of cost, we will save the cost and duration of the whole construction project.

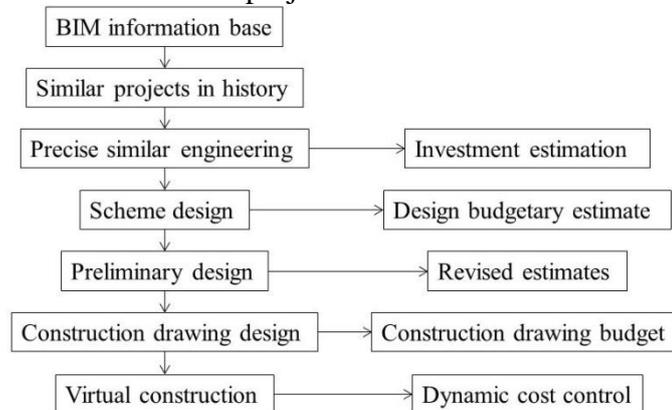


Figure 1: The whole process cost management flow chart based on BIM

3. Problems in the application of BIM in the whole process cost management

This paper is based on the field survey. 1000 formal questionnaires were sent out, 981 effective questionnaires were sent out, and the effective rate was 98.1%.

3.1 Lack of professional talents

The whole process cost management based on BIM is a new management software, which requires the management personnel to have high professional quality and information technology ability. However, some employees are not fully competent for the whole process of cost management. Some employees can't fully control the whole process management in the project life cycle, including decision-making, design, bidding, construction, completion acceptance, etc. According to the survey results, the main problem is lacking of cost management knowledge and experience, accounting for 63.5%. The second is lacking of active management ability, accounting for 51.0%. Details are shown in Figure 2.

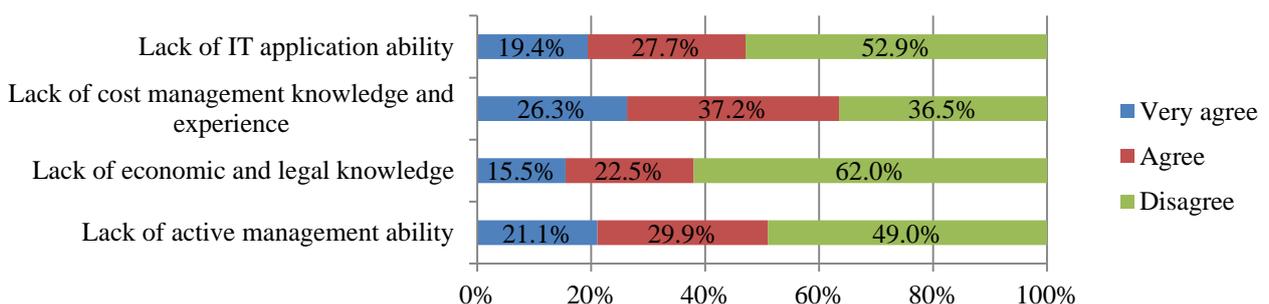


Figure 2: Low level of cost management in the whole process of the project

3.2 Obstacles of BIM cost management application mode

BIM is a new project cost management mode, which requires a new procurement mode matching. At present, integrated project delivery mode (IPD) is the most widely used procurement mode, which brings together many participants, including construction unit, design unit, construction unit, material and equipment suppliers, etc. However, the law and system of IPD in our country is not complete, which still has many problems in our country. According to the survey results, the main problem is trust barriers, accounting for 66.1%. The second is risk taking barriers, accounting for 52.9%. Details are shown in Figure 3.

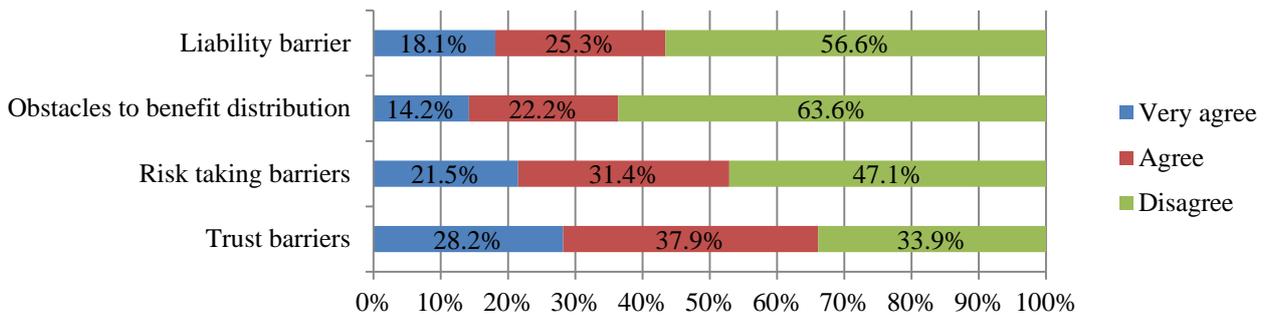


Figure 3: Obstacles of BIM cost management application mode

4. Suggestions on improving the cost management of BIM in the whole process

4.1 Advocate the application mode of "government support + owner advocacy"

We should advocate the BIM application mode of "government support + owner advocacy". Therefore, the government should formulate the implementation standards and guidelines for BIM cost management in the whole process. Only with the support of the government can BIM be widely used in the construction industry. Through the mode of "government support + owner advocacy", the owner will take the lead in using and promoting BIM application. Through the dynamic cost management of BIM, the owner and cost management personnel will better control the whole process management of the project. Only in this way can we guarantee the application of BIM in the whole process cost management, which will improve the controllability of project cost.

4.2 Promote localization of BIM, IPD and other software

We must establish the whole process cost management system based on BIM, which will improve the cost controllability of construction enterprises for engineering projects. Therefore, we need to realize BIM based information sharing platform, which includes BIM Technology software, cost management software, project management software, etc. Therefore, the localization of BIM and IPD software will become the most important problem. Through the localization of software technology, we will better realize the whole process cost management. At the same time, BIM software and IPD software should also be coordinated and unified with the existing cost software in China, which will facilitate the acceptance of BIM by construction cost personnel in China.

4.3 Strengthen the training of professional talents

Construction enterprises must strengthen the professional quality training of cost management professionals, which will increase the professional ability of professionals. By strengthening the training of BIM software technology, cost management personnel will have the basic literacy of BIM. Through the training of BIM professionals, we will set up a BIM cost management team with the participation of all participants. Through full participation, we will promote the application of BIM. At the same time, we will increase professionals who are proficient in BIM Technology and cost management. Only in this way, the construction enterprises can realize the information

exchange platform based on BIM. Through the development of BIM cost management measures, construction enterprises will realize the whole process cost management based on BIM.

Conclusions

The application and promotion of BIM bring revolutionary changes to the construction industry. BIM is a technical platform for data sharing, which provides data parameterization and collaboration. Through BIM, we can associate the building model with the entity, which will be more convenient for us to check the engineering information. Traditional cost management has been unable to meet the requirements of the times. Through BIM, we will enhance the whole process cost management of construction projects, which improves the comprehensive market competitiveness of construction enterprises.

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