

BIM based construction engineering whole process cost management and control accounting analysis

Xueyou Hu, Donghui Liang, Jine Tan

College of Architectural Engineering, Guangdong Business and Technology University, Guangdong, 526060, China

Keywords: BIM construction project; Cost management; Control accounting analysis

Abstract: The market size of China's construction industry is getting larger and larger, and the output value of the industry is growing steadily. However, its construction process is inefficient, which not only has a low level of information, but also has a serious waste of resources. Construction labor, materials, machinery and other costs continue to rise, huge energy and resource consumption is no longer in line with the strategic requirements of sustainable development, construction project cost management is facing a huge impact. The construction cost management measures in our country are relatively backward, and the informatization degree of project management is relatively low. BIM refers to building information model, which is mainly a platform to complete the whole project management with the help of digital model. The application of BIM technology is a progress for both the society and enterprises. In the enterprise, the application of BIM technology can contribute to the production progress of enterprises, improve enterprise efficiency, improve the sales of enterprises, promote the rapid development of the enterprise, to the society, the application of BIM technology can reduce the use of personnel, the environment, use less paper, can well protect the environment, virescence maintenance, conforms to the current era of development, And now advocate green environmental protection consistent. Therefore, the project cost management has become one of the management problems urgently needed for construction projects. Engineering cost management is the full coverage of the cost control and management in all stages of construction project planning and decision-making.

1. Introduction

The goal of engineering cost management is to determine the cost of the entire construction project and properly control it, so as to achieve the goal of reducing the construction cost of the entire project [1]. BIM, based on the characteristics of 3D visibility, analyzability, information interoperability and so on, provides a way of working with all professions and stages. Building Information Modeling (BIM) is a modern Information technology platform that can realize the design, construction and operation management of construction projects by creating and using digital models. It is characterized by integration, intelligence, digitalization and relevance of model Information. An information sharing platform is created for all parties involved in the construction project to facilitate communication. As the foundation of social economy, construction industry has achieved remarkable development due to the increasing prosperity of economy [2]. Now not only significantly increased raw material quality, the cost of the construction personnel and construction equipment are significantly increased, in the process of construction of the virtual world found problems in the management project, conflicts exist in the implementation process, and timely solve the problems and put forward the corresponding solutions, do know ahead of time, solve ahead of time, make a backup plan. At present, the industry chain of China's construction industry continues to improve, the overall project management level continues to improve, therefore, various industries also actively pay attention to the cost management of construction projects. Theoretically speaking, the efficiency, intelligence and convenience of BIM technology can effectively improve the efficiency and accuracy of cost management. In the case analysis part, a commercial residential project is selected to realize the systematic collaborative management of the whole process of engineering cost by using relevant BIM software [3]. The application of BIM technology to the

whole process cost management of construction engineering can effectively improve the efficiency of the cost management of all stages of the whole process of construction engineering, and at the same time make the participants of the construction project can cooperate more effectively and reduce the information communication barriers. Therefore, the construction cost of construction projects is relatively easy to produce problems. In this case, it is necessary to fully analyze the cost management, hoping to significantly improve the level of construction cost [4].

2. About BIM Technology

2.1 BIM technology and construction engineering cost management overview

All kinds of buildings and structures constructed; Information refers to all kinds of information and data contained in the construction and use of these buildings. Currently, the most commonly used building information of BIM model includes 3D information of occupied space and 5D information of cost and schedule [5]. BIM is a relatively reliable digital information model. It can share various information with the help of standard data, so as to complete the integration of various information in the digital information model. For private investment projects, the government generally will not interfere too much, but will guide and limit the technical standards, safety and civilization, social benefits and social environmental impact of the project through legislation. Investors bear all the investment risks, so they attach great importance to the cost management of investment projects. The emergence of BIM technology shows not only the improvement of China's comprehensive national strength, but also the improvement of China's soft power, showing the strength of a great power and showing that China is gradually becoming stronger. In view of this situation, we should actively improve the project cost management and control mode, and coordinate the communication between the internal departments of the enterprise. This technology is applied to the whole life cycle of buildings or facilities, which requires continuous and consistent use of such digital expression in the whole life cycle of buildings, so as to achieve a complete and comprehensive collection of building information [6]. On the basis of IFC data exchange standard, the United States promulgated the NATIONAL BIM standard -- NBIMS in 2007, which is committed to promoting and establishing an open BIM standard to guide and regulate the use of BIM. It clearly defines the requirements of information exchange between various industries in the BIM model based on IFC data exchange standard. In order to achieve the purpose of building information. Production efficiency in construction (solid line) versus non-agricultural (dashed line) is shown in Figure 1.

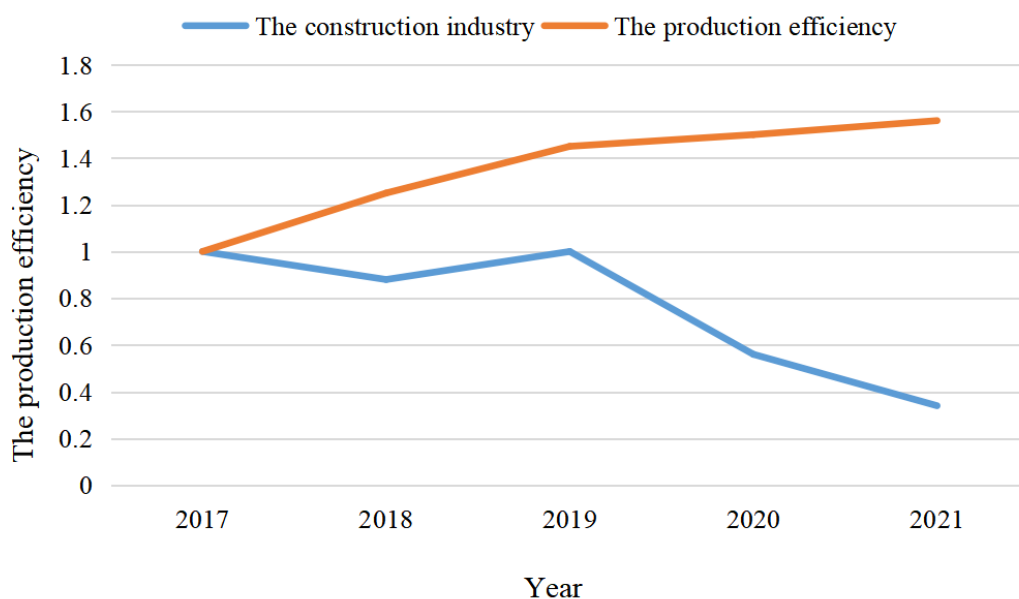


Figure 1 Construction (solid line) and non-agricultural industry (dashed line) of the production efficiency

2.2 BIM based on the whole process construction project cost management method

When making investment decisions for project engineering, the database and rich information in BIM can provide certain guarantee for the investment of project engineering. The decision-making stage of project cost management is very important. The decision-making stage determines whether the project cost management can be implemented smoothly and affects the next link. Therefore, the application of BIM technology in this stage is very important. The whole process management and control of construction project cost is very important, because it should ensure the effective implementation of the whole project and achieve the objectives of construction of the project [7]. BIM diverse functions based on 3 d visualization of BIM model extension, even if the project participants lacked the knowledge of construction projects with customers, also can build a complete 3 d model directly and clearly building appearance and structure of information, in order to improve construction project cost management effectiveness, promote software and a lot of valuation valuation model in our country, Still exists, however, the traditional construction project cost management information asymmetry, the information fragmentation, duplication of effort many shortcomings, such as project investment decision-making period need to collect and correct project relevant information and plan, construction project based on BIM whole process cost management form, can with the aid of simulation of construction, to grasp the problems easily. To ensure that the scheme is foolproof. If there is no application of BIM technology, the implementation of the project cost management project will be extremely difficult. Some schemes can be easily seen as not in line with reality and can be directly discharged. This requires that the project cost should be managed and controlled in the whole process of the construction project, and at the same time, the cost of each construction link should be carefully calculated [8]. BIM model is the digital expression form of the physical entity and functional characteristics of construction products. It is a building digital model with perfect data storage and rich standards, which can connect the construction data and information resources generated in the process of building design, production and use. The application value of BIM in construction projects is shown in Table 1.

Table 1 Application value of BIM in construction projects

Benefits brought by the use of BIM	The results of the survey
Control the error of investment estimation	Less than 3%
Save on off-budget changes	40%
Save investment estimation time	80%
Save project time	7%
Save total project investment	10%

3. Overview of construction engineering whole process cost management

3.1 The concept of the whole process cost management of construction engineering

After the reform and open policy, our country gradually from a planned economy towards a market economy, the traditional engineering cost management system have been unable to adapt to the rapid development of construction industry, with the formulation and implementation of construction projects due to system, with the aid of BIM technology can eliminate these problems in a timely manner, control of bidding period need quantity and bidding information [9]. The design stage of the engineering cost management project is also a very important link. The design stage, as the name implies, is how a project is constructed and how the project is beautiful. Strengthening the whole process management and control of construction project cost plays a very important role. Engineering cost personnel should formulate perfect engineering cost management objectives according to each stage of the construction project. Among them, the concept of construction period mainly refers to not considering various operational costs in the early stage of the project; The estimate refers to the various estimates of the project construction costs before the project transaction; After the completion of the transaction, in accordance with the contract price of the verification and settlement, the cost after the completion of the project transaction is the actual cost,

that is, the actual expenditure of construction costs and construction costs, are only verified and accounting. Borrowing the concept of engineering cost, engineering cost refers to a construction project in the construction process of all the costs, that is, from the beginning of a construction project to determine the investment and construction intention, to the completion of the acceptance of the whole process of all the costs occurred. The construction efficiency and construction quality of construction units are closely related. With the help of BIM information platform, the comparison work and supervision work in bidding period can be correctly carried out [10]. The application of BIM technology in the design stage of the whole process of engineering cost management project makes the feeling of the staff more real, just like seeing the building standing in front of the real, the effect is much better than the paper version of the picture.

3.2 Application of BIM technology in the improvement stage of the whole process project cost management

The application of BIM technology in the improvement stage of the whole process of project cost management makes the project cost management more standardized and perfect. BIM technology can help the project cost management to achieve the best, and the improvement stage cannot be separated from the participation of BIM technology. Therefore, the use of BIM technology can timely eliminate this part of the security risks, and can effectively collect and organize all the data information in the project, and can use the information model to display all kinds of information. However, relying solely on the existing engineering project management system, it is difficult to achieve the whole process of information sharing and exchange and seamless connection between each stage, it is difficult to form a positive impact on the cost management of each stage from the perspective of the whole process. The vast majority of the project's investment will be spent at this stage. This phase of the project cost management is the most detailed and true, human input, energy, most of the duration of the longest, is the actual project cost forming process, the project investment decision-making stage begins to maintain project cost management of dynamic monitoring, rationally from the perspective of comprehensive, whole process control and management of all stages of cost management work, So as to realize the optimal construction project overall cost. BIM technology can be used to effectively analyze and design elements can be more applicable, which can not only reduce the construction cycle, but also meet the corresponding budget in each period. BIM technology emerges with the development of science and technology and comprehensive national strength. BIM technology is the product of the improvement of China's comprehensive national strength, and it well promotes the development of China's industry. It is very important for the construction of engineering projects, so in the investment budget work, it is necessary to improve the budget work content according to the actual situation of the construction project.

4. Conclusions

BIM technology is of vital importance in the application of whole-process engineering cost management. Compared with traditional drawing construction, BIM technology hardly uses paper, so it does less harm to trees and meets the requirements of the era of low-carbon and environmental protection. Due to the restriction of domestic construction engineering environment and cost management system and the influence of backward information management, it is difficult to implement the whole process cost management of construction engineering smoothly. If the construction enterprise of the project entrusts it to carry out the bidding work, then it needs to be able to guarantee the quality of the bidding work, avoid blindness as far as possible, and ensure the rationality and fairness of the project cost. The project cost has different functions in each stage of the project construction, which involves a wide range and is more complicated in the concrete implementation process. Take time into account when simulating the construction process. Compile the measurement and valuation of progress payment at each stage and engineering change in construction based on BIM model, and quickly count the adjustment of contract price for project settlement. The main problems existing in the implementation of the whole process cost

management of construction engineering in China are: information management, cost management at each stage, cost management coordination between each stage, cost management coordination between each participant. BIM can simulate project engineering and run through the whole process of project cost management, so it needs to attach great importance to promote the development of construction enterprises.

References

- [1] Lin Xiaofeng. China Construction, 2017(8):2.
- [2] Shi Lei. Application analysis of BIM Technology in Construction cost Management [J]. Urban Construction Theory Research: Electronic Edition, 2017(1):2.
- [3] Liu Weiwen. Analysis of project cost control based on BIM management mode [J]. China Real Estate Industry, 2017(22):2.
- [4] Wang Lizi. China Science and Technology Investment, 2017, 000(027):67.
- [5] Liu Hua, ZHAO Mengxue. Modern Electronic Technique, 2021, 44(10):4.
- [6] Hou Wanjian. Construction Cost Control analysis based on BIM management mode [J]. Building Engineering Technology and Design, 2017, 000(023):1611-1611.
- [7] He Nanshu. Building Technology Research, 2021, 4(2):50-51.
- [8] Li Yuangui. Shandong Industrial Technology, 2018(10):1.
- [9] Shan Xin-xin. Construction Engineering Cost management based on BIM [J]. Building Materials and Decoration, 2017(45):1.
- [10] Du Zhongyuan. Analysis of BIM based construction project cost control and management [J]. Urban Construction Theory Research: Electronic edition, 2017(6):2.