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DELIVERING QUALITY SCIENCE TO THE WORLD

Study on Project Cost Risk of Construction Project Based on BIM Technology

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Abstract: BIM is a new technology emerging in the construction industry in recent years. This paper combines BIM technology with project cost risk management and explores the suitability of BIM technology for engineering construction cost risk management. Based on the identification of project cost as a basis, the advantages and characteristics of BIM technology for cost risk system are described. Analyzed the risks and causes of the construction cost in each stage of project implementation, and put forward the use of BIM technology to make corresponding control of the project cost in each period of the project. Combined with the actual situation of the cost management in each time period, a comparison is made. Perfect countermeasures for using BIM technology to control project cost risk have strong practical significance.
Keywords: BIM, Project Cost, Risk Management.

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1. INTRODUCTION

In recent years, with the gradual development and improvement of the market economy system, the construction industry has developed rapidly. This imposes more requirements on buildings, requiring buildings not only in terms of practical functions, but also in terms of appearance and comfort to meet everyone's requirements. It poses higher challenges to construction projects [1]. Through practice, we know that using BIM technology in construction projects can control risks well. With the continuous deepening of domestic BIM research, using BIM technology to manage project cost risk is a big development trend in the future [2].

2. THEORY RELATED TO BIM TECHNOLOGY

2.1 The concept of BIM

BIM technology actually refers to the building information model. It can express the physical and functional characteristics of the project through numbers, and can share knowledge resources, and can provide greater help for the entire process of the project facilities. During each period, project participants use BIM to enter, save and modify data information, which in turn helps their responsibilities to work together. In short, BIM technology is mainly the use of computer technology to build construction projects through programming in the conceptual design stage can be completed building model [3].

2.2 Benefits of BIM Technology

BIM technology is based on 3D technology. Compared with CAD technology, BIM technology has obvious spatial advantages [4].

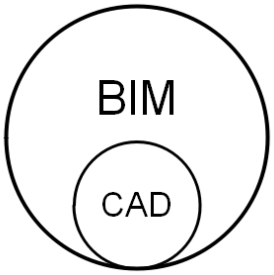

Fig 1 The connection between BIM and CAD

The use of BIM technology can demonstrate the overall project environment and internal structure from a multi-dimensional perspective, allowing all participants of the project to have a strong sense of sense of the project; use BIM technology to express the time axis of the project from a multi-dimensional perspective. It helps to show the time and status of each link of the project. We only need to change the construction time of the project to be able to grasp the situation of the project and timely know the various conditions of the construction project [5]. In addition, BIM technology can find out the existing collision problem through the strong internal structure design of the project, and use the corresponding technology to find the problem and handle it, which can save more time and money.

2.3 The main factors of using BIM technology

(1) Hardware condition factors

With the rapid development of computer technology, BIM technology has been promoted, and the performance of computers has been continuously improved, which in turn has led to the progress of related industries. BIM technology has a relatively high requirement for computer hardware. It requires the computer's CPU to have strong computing power and the graphics card's GPU speed is faster [6]. With the rapid progress of network technology, the hardware at this time fully meets the hardware requirements of BIM and can ensure the normal operation of BIM software, which solves the hardware conditions for the development of BIM technology.

(2) Software Condition Factors

To promote BIM technology development, in addition to hardware requirements, software support is also required. In the past, software manufacturers focused on the development of 2D technology. Later, they gradually transitioned to 3D imaging technology and developed many corresponding software products. BIM technology is very important for the construction engineering industry. This technology includes a lot of software, which involves various participants, various professions, and various project stages. According to the application object of BIM technology, it is classified into three dimensions; each project stage; each participant; each application level.

3. RESEARCH ON PROJECT COST RISK OF CONSTRUCTION PROJECT BASED ON BIM

3.1 Analysis of Construction Project Cost Risk Management Based on BIM Technology Construction Project

(1) Application Analysis of Project Cost Risk Management in Design Phase

BIM has the characteristics of visualization. It can use the visualization of images and graphics to enable the participants of the construction project to better coordinate and communicate based on design intentions and results. BIM technology can greatly reduce the cost risk in the design stage for the future. The foundation for the better development of the project is that it saves time, convenience, and accuracy compared to the traditional model.

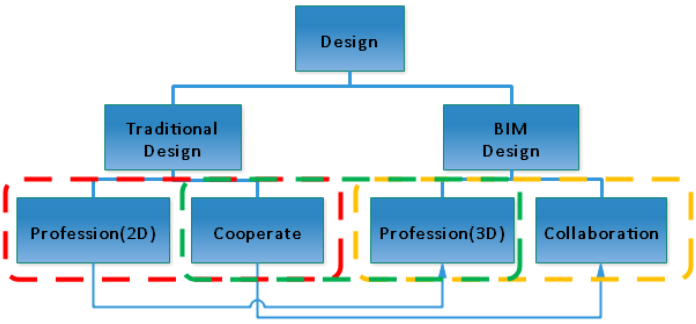

Fig 2 The difference between the traditional design and the BIM technology in the preliminary design phase

(2) Application Analysis of Project Cost Risk Management in Bidding Stage

The use of BIM technology at the tendering stage can increase the cost management level in the bidding stage. The use of BIM technology in the tendering stage of the project can accurately and quickly calculate the quantity list of the project and reduce the occurrence of miscalculation and missing items, so as to reduce the disputes caused by the project volume problem in the later period. Moreover, the use of BIM technology can enable the bidding management department to better supervise the bidding process, avoid as much as possible corruption and fraud in the tendering process, and enable the tendering process to proceed smoothly.

(3)Analysis of Project Cost Risk Management at Construction Stage

The use of BIM technology at this stage, because of BIM's visual characteristics, allows participants to understand the project situation with the image, can make the results of the review of the drawings improve; because of the simulatable features of the BIM technology, it can let the planning of the

construction organization design simulation run In order to find deficiencies, adjust and optimize; in the project construction stage, frequent changes in the project, the use of BIM technology, according to its relevance, will no longer have to waste a lot of labor in the one by one to change due to changes in the project before and after, to avoid affecting the use of Progress, increase costs [7].

3.2 The Impact of BIM Technology on Cost Risk Management

(1) Application of BIM Technology in Project Cost Risk Management

From the technical perspective, there are still big problems in applying BIM technology. Because BIM software lacks perfect modeling function, it is not compatible with the past and data, thus increasing the workload of designers, lacking the accuracy of model detection methods, making the design biased and further increasing the construction risk. It is also necessary to gradually improve the open information sharing platform. Due to lack of sufficient learning resources, lack of skilled software operators and experts, insufficient practical experience and academic exchanges, and lack of detailed training courses, industry leaders and policy departments did not publish corresponding standards, and designers could hardly use them in a short period of time. The software was promoted mainly because it did not build a complete workflow, which increased the workload of the designers, and the project participants did not adapt to this collaborative work mode. The participants did not complete the software and greatly improved the promotion. The difficulty of this technique [8].

(2) Advantages of Cost Risk Management Based on BIM Technology

In order to solve the problems existing in the risk management methods of the previous construction projects, the best way is to enhance the timeliness, through BIM.

The technology can precisely solve the problem of timeliness. After BIM modeling, it has a sound data information warehouse, which can provide objective, accurate, and comprehensive data information for decision-making, which helps project managers to quickly and accurately find the desired risk management information, so that they can quickly find hidden risks. As soon as possible to make corresponding risk response measures to improve the real-time risk management and information, improve the efficiency of management [9].

3.3 The Countermeasures of Construction Project Cost Risk Management Based on BIM

(1) Change thinking mode

Designers must change their thinking mode from 2D to 3D, and they have to adapt gradually. The global construction industry is the same. In particular, many old employees have developed a flat thinking mode. To adapt to BIM's 3D thinking mode, it must be achieved through learning. The 3D design of BIM is mainly to be modeled in 3D space. It must be understood during the analysis of 3D models. If you master the BIM technology, the resistance will naturally disappear [10].

(2) Strengthening research and development of domestic BIM technology products

Currently, there are only several BIM technology softwares in the domestic construction market, and no domestic BIM technology software is found yet. The technical products involved in the current BIM project are not domestic. The foreign BIM technology products are not only inconvenient to use, but also do not meet the domestic construction industry standards[11]. Therefore, if we want to realize

the localization of BIM technology, we must strengthen the research and development of domestically produced BIM technology products. Nowadays, the key scientific and technological breakthroughs in the country have included the topic of "research and application of key technologies for information technology in the construction industry" and are the focus of the future.

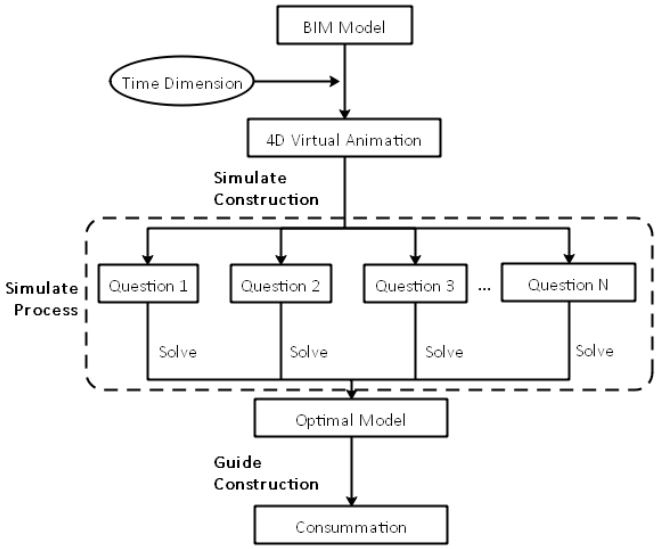

Fig 3 BIM-based project construction progress management process

(3) The government strengthens BIM promotion and formulates industry BIM standards

According to the overseas BIM promotion practice, we can find that the government plays a key role in the application and promotion of BIM technology. Therefore, the government should grasp the current development trend of the construction industry and cooperate with relevant scientific research institutions and universities to work out and meet together. The domestic actual BIM standard [12], through the use of BIM in the corresponding large-scale projects to identify the existing problems, and continue to improve and improve BIM standards, the mandatory promotion of BIM, this can be obtained from the construction industry to BIM We attach great importance to strengthening the awareness of BIM applications and further promote the rapid development of the domestic construction industry through BIM technology.

4. SUMMARY

On the basis of management integration, this paper discusses the principles of using BIM technology in the process of engineering construction projects. Using BIM technology in cost management, it is easy to get the required project data information, which is easy to control project costs; BIM technology is virtual 3D models and 5D relational databases help control costs and ensure project progress. The use of BIM technology facilitates collaboration in all aspects, and also enables sharing of data information and greatly improves work efficiency.

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