Research on BIM Technology’s Financing and Real Estate Project Financing under Large Data Background

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Abstract
Real estate enterprise financing is a complex of many factors. According to the present situation of the real estate financing in China, this paper sums up the main problems existing in the financing of the real estate. As the capital intensive industry with high risk, high investment and high return, real estate is the precondition for the normal operation of the enterprise, so it is essential for the financing capacity of the real estate business. In recent years after economic macroeconomic regulation and control, the overheated phenomenon of real estate investment has been alleviated, but also it has left some problems, such as further exacerbated. The real estate channels are too single, and the banks bear the risk of excessive problems. For construction industry information, large data has always been difficult to develop, and the nature of the industry also has a greater relationship. The complexity of the construction industry leads to the full application of the Internet and the difficulty of making big data is a productive force. In this context, how to set up a real estate financing system and meet the needs of China’s real estate market in the future is the main problem of real estate financing in China. This paper expounds the present financing situation and problems of real estate enterprises which are based on BIM technology, and this paper also analyses the causes of real estate enterprises’ financing difficulties. We can make some useful explorations, put forward some effective countermeasures and ideas, and hope to have some problems in the financing of real estate enterprises in Chinese construction significance.

Key words: Real estate, Enterprise financing, BIM, Financing problems.

1. INTRODUCTION

Large data age of the construction industry likes nuclear bomb in China. The global village has entered the era of large data, which is the information age, the Internet era of the upgraded version. The study shows that the construction industry is the largest data industry with the largest amount of data and the largest business scale, but it is also the industry with no data in the current industry. Even for the same size of the enterprise, the most data without the enterprise should be concerned. Of course, the construction industry information, large data has always been difficult to develop, and the nature of the industry also has a greater relationship. The complexity of the construction industry is resulting in the Internet which is fully applied, and large data into the technical difficulty of the production is very great. It also greatly reduces the impact of technology on the industry changes, so that conservative forces to long-term control of the industry. The traditional way of communication has been far from being able to meet the needs of the construction of modern large-scale projects, in practice, many of the claims and disputes in the final analysis are due to the error or incomplete information sent. How to create an integrated communication and coordinated environment for the construction of the project and improve the construction efficiency of the project has become a very important and urgent research topic in the field of project financing at home and abroad. With the development of China’s economy market, for state-owned enterprises or private enterprises financing is a problem. The real estate is regarded as a highly capital intensive industry, and the natural level of corporate financing has a higher demand. From the recent three years of development trend, the state of real estate regulation has increased year by year, China Banking Regulatory Commission officials said, we should increase the regulation of the real estate industry to prevent excessive growth in housing prices. China's central bank in charge of the "Financial Times" Wednesday also quoted the Shanghai Banking Regulatory Bureau Yan Qingmin two proposals that the proposed levy land value-added tax to adjust the land price of non-compliance growth in 2011, the state once again raised the mortgage interest rate. In this case, real estate development enterprises must face a very serious financing risk, to the sustained and healthy development of the enterprise.

With financing problems real estate enterprises have to strengthen real estate development, management and service activities. The real estate industry is a leading industry of the national economy, and it has a leading role in other economic sectors. Real estate growth can stimulate the development of the entire national economy, China has more than 30,000 real estate development enterprises, whose investment in 2015 has reached at 7010.6 billion yuan, up 39.4% over 2014, higher than the same period fixed asset investment growth (36.7%) 3 percentage points, the real estate industry's contribution to the national GDP. And an indirect contribution rate of about 15% is driving a large number of related industry developments, and stimulated the investment and consumer demand. Real estate based on its own specialties, in its development and consumption process cannot
do without financial support. In other words, the process of real estate development is essentially an investment process, that is, the effective investment of funds and value-added recovery process, there is no funds or there is no real estate, therefore, real estate development companies most concerned about is financing. Real estate is full of interests and risks coexisting in the industry which has a capital-intensive, high-income, high-risk, and high-yield industry. With the changes in China's real estate investment and financing system and the central bank on the housing development loans and residential mortgage loans and other policies introduced the introduction of the policy, the financial sector threshold gradually increased, coupled with the implementation of land bidding policy, the core of real estate enterprises Competitiveness is no longer confined to the product itself, the capital strength of the enterprise and the industry as a whole to the healthy development of the decisive force. Real estate enterprises are possible to establish a sound multi-channel real estate financing system to get enough financial support. China's real estate investors or buyers often loans to finance. Bank is the most direct impact of the real estate business financing channels. At present, coupled with the bank's view of loan risk, the government's financial tightening policy has reduced the financing channels for real estate developers, and the traditional financing channels cannot meet the needs of real estate development enterprises. Real estate business loans less, the proportion of indirect financing is the current real estate business financing which is a significant feature. Multi-channel financing helps to become a real estate business survival and development must pass through the road. At present, in the research of information system theory, the vast majority of domestic research will focus on the theoretical research of the whole system architecture. China's construction industry information, at best, for the construction of project management process provides some tools, but not for China's construction project management to bring a fundamental change. In recent years, as a new direction for the development of building information technology, BIM has grown from an ideal concept to today's application tools, which has brought many opportunities and challenges to the whole construction industry.

2. THE RELEVANT KNOWLEDGE

2.1. BIM technology

BIM is a "visual" digital building model based on the most advanced 3D digital design solutions that provide "simulation and analysis" for designers, architects, developers, and users. For architects, the application of BIM not only requires the design tool to achieve from two to three-dimensional transformation, but also we have to be in the design phase of the implementation of collaborative design, green design and sustainable design concepts. Its ultimate goal is used to make the entire project in the design, construction and use of various stages are able to effectively save energy, save costs, reduce pollution and improve efficiency.

Figure 1. BIM in real estate applications

The so-called building information model (BIM), refers to the real information, through the simulation of digital information building is here, the connotation of information is not only the geometrical description of visual information, also contains lots of non geometric information, such as the material of the fire resistance rating, material transfer coefficient, component cost, purchasing information. In fact, BIM is a virtual building
in a computer through digital technology and a building information model that provides a single, consistent, logical building information library.

2.2. BIM+ Intelligent buildings

With the rapid popularization of BIM technology in our country, the impact of BIM technology on the construction industry is far-reaching, and that BIM technology will bring the following major impact on the construction industry.

1) Bring the construction industry into the big data Era

The construction industry has decided that the construction industry is the big data industry. But so far, the industry is the least data. The important reason is that the construction product is a single product production, and each product quantity of data mass can show. BIM technology will give me the ability to do that.

2) Transparency of the construction industry

The reason for the preceding is that the construction industry has by far been the most opaque industry. BIM brings the transparency of the industry, the relevant managers and management departments have a strong information symmetry ability, many project management, enterprise management and industry management problems will be solved. This is also in the period of rapid growth in the industry, BIM technology promotion is one of the most important resistance, the industry will also be slow in the future, become the biggest driving force.

3) Visualization of building technologies

Building technology, from 2D to progress to 3D, has been going on for thousands of years. The progress of this 1D is unprecedented revolutionary progress. Coupled with the dimension of time, the management and technical experience brought about by 4D construction technology is indescribable.

4) Accelerate the integration of industrial evolution, change the industrial ecology

The current ecology of China's construction industry is primary, and the market concentration is very low, which brings confusion to the industry. Economies of scale BIM technology for the construction industry have played a strong support, and it will promote the integration of the industry to speed up, accelerate the upgrading of market concentration.

5) Internet

The construction industry is a typical remote management, and a construction company's project can be spread all over the world. Internet Project Management of construction enterprises too, and in the past can not only rely on bidding management, contract system, flight inspection. In the future, a virtual building is in the clouds, and all management decisions are familiar with remote projects.

6) Speeding up the process of building industrialization

Building industrialization is another magic weapon of low carbon construction, and it is also the only way for the sustainable development of construction industry. To realize the industrialization and industrialization of the construction industry, the support of BIM technology is too important, which can greatly accelerate the pace of industrialization.

7) Intelligent buildings

BIM+ Internet systems are indispensable to the realization of intelligent buildings. BIM will be built as a platform for building data and operation and maintenance data, helping to achieve a more humane and low carbon vision of smart building systems. To realize a smart city, it is necessary to digitize the city or build a digital city. BIM builds up a digital model of each building and adds up to a city level building database, enabling many city level applications. The BIM database will become a key database for smart cities.
2.3. Progress and risk sharing of real estate project financing

As a pillar industry of the national economy, the real estate industry plays an important role in the
development of the national economy. The real estate industry is a typical capital intensive industry, the
development of large scale of investment, long period, the real estate value of expensive features make the
amount of funds in real estate development, the huge investment needs, and is eager to expand production, so
the financing has become a concern of real estate developers. There is a real estate enterprise, the problem of
financing.

1. Major financing channels for bank loans are the main source of real estate funds, real estate enterprises
in China on the banks of the over dependence on real estate once the economic fluctuations occur, the risk of
real estate enterprises will be transformed into the bank’s financial risk, thereby affecting the financial security
of the country. As the interest rates on bank loans have increased, the repayment pressure has become larger. On
the other hand, because of the large number of property projects, banks have many restrictions and loans are not
as easy as they used to be.

2. Other financing channels in other financing channels, the development potenti
al of the real estate trust,
but investment in the company’s own situation from the trust, companies generally flawed governance structure,
liquidity problems such as legal and policy constraints, trust products, and trust plans to issue, remote
management and approval by foreign capital more stringent, which restricts the development of the real estate
trust. Equity financing is not only large amount of financing, but also a strong financing capacity, making the
company’s profitability improved substantially, the growth of value has greater potential. But only a few large
companies listed the strength of the patent, for the majority of real estate enterprises, financing threshold is high,
such as the debt rate is not higher than 70% of the provisions to make many enterprises to reach the market
requirements. As the traditional financing channels are single, the average debt ratio of China’s real estate
enterprises is above 74.7%. As a result, the number of direct listed enterprises is very small. Other channels
include overseas property funds, but there are still obstacles to investment in overseas property funds in china.
On the one hand, for most enterprises, they do not have the core competitiveness in the world, and they cannot
arouse enough attention from the Overseas Investment Corp. In addition, the policy is not supported.

Quite a few college students do not have a good habit of saving, when the end of the month, students often
find their own spending which has exceeded its plans. There is no prior good planning, some students who use
the Internet platform online shop and e-commerce practice, want to use their spare time to earn living expenses
and other practices. We should be cautious, and the online shop is a kind of financial management. The
education investment is the real investment for the students to improve their own knowledge and cultivate their
character.

3. MODEL ESTABLISHMENT

3.1. Create a BIM-based project financing database

The cost of 5D relational database, so that the actual cost data into the 5D relational database, cost
summary, statistics, split the corresponding instant available. The unit of the man-machine unit price as the main
data into the actual cost of BIM, there is no contract to determine the unit price of the project, according to the
budget price to enter. The actual cost data, the timely replacement of the actual data. The actual cost of BIM in
the cost takes the contract price and corporate quota consumption as the basis. With the progress of the actual consumption, quota consumption will be different to timely adjustment. By monthly inventory of the actual consumption, we can adjust the actual cost data. To the actual consumption of the final adjustment of data, and not to financial payment as the standard, the material fee of financial payment has a variety of situations, payment does not enter the financial payment for the cost Statistical methods will not reflect the actual situation, and there will be serious errors.

Using BIM three-dimensional model, adding time and cost dimension to build 5D building model, to achieve dynamic real-time monitoring, you can make more reasonable arrangements for funding plans, personnel planning, material planning and mechanical planning. In the BIM model, each component is given parameterized information, such as schedule, material, location, working hours consumption, process scheduling. Combination of component information helps to provide a strong technical support. The application of BIM technology can significantly improve the efficiency of cost management and promote the overall improvement of project cost management level. Figure 3 shows BIM 5D building financing model. In the traditional cost management, the cost information of the constructed project is difficult to be used quickly and effectively, and these materials have great effect on the future investment in the project. BIM parameterized model combined with the network technology can be a detailed summary of these data through the database and save, when you need to find the analysis, you can quickly find, so that the sharing of data more convenient. The BIM database, which is formed by the continuous accumulation of historical data about the project, enables the enterprise to form the BIM model of the proposed project in the process of cost management in conjunction with the relevant standards to quickly reference the historical data.

![BIM 5D building financing model](image)

**Figure 3. BIM 5D building financing model**

BIM technology can be applied to the engineering estimation from the decision-making stage to preliminary estimates, the design phase of the revised estimate and construction budget change the engineering measurement, construction process, visa payment schedule, arrange and plan funds deviation analysis finally, the whole process of project completion of the data collection and settlement management of the construction cost, Application of BIM in construction cost management is shown in figure 3. Therefore, BIM and the construction process of the whole process of cost management combined to take full advantage of BIM's unique advantages and value. It can effectively improve the efficiency of the various stages of management efficiency, enrich the cost of management measures and means, and the establishment of various stages of cost management The dynamic link, effectively control the total cost of construction projects. Similar to the project-related cost indicators, rapid and accurate production of business standards, to minimize the professional cost of the loss of technicians brought about by some unnecessary work and cost increases. Based on the BIM unified cost information management platform, can be a very good data sharing and exchange.

Financing cost control ability greatly improved. The actual cost of BIM model through the Internet focused on enterprise servers. Financing strategic departments, the financial sector can share the actual cost of each project data, data size can also be mastered to the component level. The implementation of the headquarters and the project department of information symmetry, headquarters cost control ability to strengthen. Figure 4 is the main tool for project financing phase and BIM. BIM in the domestic development is a long process, cannot be achieved overnight. Implementation of the enterprise from the concept, awareness, application of a multi-level understanding of BIM is a business process, rather than the nature of technology, so as to avoid errors, through
BIM implementation of all aspects of the organization to improve the quality of architectural design, reduces costs, innovative collaborative workflow, Mining and achieving greater business value.

### Figure 4. The main tool for project financing phase and BIM

#### 3.2. BIM model to achieve the sharing of financing information

The building information model is only a method, not a technology, and it needs to match the technical support to effectively implement these technologies, including CAD, object-oriented CAD, and parametric architectural model. The research shows that these three technologies for the platform to achieve the building. The effect of the information model is shown in Figure 5. CAD technology is based on graphics; in the design process CAD technology is very effective to support automatic drawing, greatly reducing the human and financial resources.

### Figure 5. BIM and financing information run through all stages of the building

The construction industry uses such software for more than a decade, such as AutoCAD. It uses layer classification and the need to add some additional information to the architectural design, through the use of software development kits can expand the scope of application of CAD packages, such as budget. But even with software development kits, the final drawing only includes the graphical information needed to actually build a project, and a lot of other information does not become part of the drawing, and the manual adjustment of these drawings and design data is for large projects. So that CAD technology can hardly be used to implement the building information model.

### 4. MODEL RESOLUTION AND ANALYSIS

#### 4.1. Risk sharing
The real estate project partners Changing means that the establishment of real estate Project Company, due to the company's external objective and internal subjective changes in the project company led to changes in the internal form of organization. Change can be understood from two aspects. First, the real estate project partner change is the project company through the introduction, replacement, rejection. It changed the original project company in the composition of private partners, and the real estate project company changes by the organizational form. The change is in the form of the same organization, such as the original partner through consultation which has entered into a new contract. So it is necessary for us to re-establish consent of the project company's rights and obligations of the new partnership real estate project internal cooperation. The game is reduced to three-stage dynamic games. Because both sides know that each round, there will be a little loss, so let the two sides of the negotiations for too long, so that the others get earlier.

4.2. Real Estate Project Risk Sharing Scheme

Under the premise of the actual quality of service and the quality of service provided by the agreement, the social investors have almost no difference under the agreement. When the price cannot bring their own reasonable profits, the public sector should provide reasonable compensation to the social investors. Investors have excess profits, and we should be returned to the government excess profits. According to the principle of negligence, the same risk and benefit principle, the urban bidding risk of public infrastructure and real estate project should be borne by the social investors. Because social investors are involved in the long-term goal of project investment which is used to obtain profits, if they cannot achieve their goals or their own interests may be destroyed, they will take measures to avoid risks, so the risk-sharing design can fully reflect the competition between bidders. We must strength strong tender units. Social investors can take risk quotes for bid risk, which is reflected in the bidding phase.

For real estate projects and other construction projects, the tender stage is facing a certain moral hazard, the latter of the project smooth development is extremely unfavorable. For example, social investors lack the experience of contracting contracts in the public sector, the risks facing the contract may be revoked, and illegal bidding often occurs. If the project's public sector gives social investors a commitment, the continuing project may cause the project to be revoked. Thus, participants in the moral risk bidding phase can control themselves. According to the principle of minimum risk cost, the moral hazard of the real estate project bidding stage should be borne by the risk. The public sector should also give social investors a certain profit margins, fundamentally eliminate moral hazard . Social investors in the contract may require the public sector to provide credit guarantees, which can reduce the concerns of social investors. The so-called enterprise alliance refers to the individual and the individual in the strategic objectives of the consideration of allies, independent of the complementary resources exchange, each achieved the target product stage goals, and finally get long-term market competitive advantage. The significance of the alliance is used to share the benefits, reduce the risk of each enterprise, and reduce the cost of investment. The league more and more frequent reason is that companies need more and more money, investment risk is getting higher and higher. Single business strength is limited, if the exploration of a field failed, the loss is relatively large. This is for the real estate business is undoubtedly a win-win situation. Hence, it can be confined to the alliance between real estate companies, such as design companies and real estate companies, construction companies and real estate companies, which cannot only reduce the early capital investment, but also can improve the liquidity and return of funds. The difficulty of corporate finance and its own strength has an absolute link, so real estate companies can improve the size and strength of the team to improve the core competitiveness.

5. CONCLUSION

BIM is an innovation in the history of building Financing. Through the establishment of BIM-based project management information system, so that the computer can express all the information of the project, information-based architectural design can be truly realized. "BIM + big data" is accelerating the pace of revolution in the construction industry, although this trend will face a lot of resistance, but the direction and speed of progress is not accelerated by the human will. For construction enterprises, the change between upstream customers and government industry can promote the financing management, and the pioneer has take-all power. Real estate business financing, according to the needs of the funds, the company's own conditions and the difficulty of financing and cost, and determined to determine the rational financing of enterprises and scale, and financing programs should also be conducive to the optimization of corporate financial structure. The By choosing the right financing method, the real estate enterprises have sufficient financial support to enhance the ability to pay and development potential, expand the scale of enterprises and improve the profitability, so that enterprises can take full advantage of economies scale to improve business competition in the market force to accelerate the development of enterprises. In addition, we should follow the same risk and benefit principles in terms of financing risk. The bid risk of urban public infrastructure real estate projects should be borne by social investors. Through large data technology, network technology and BIM technology, in advance to do a good job
of project financing and risk shared commitment to the industry economies of scale to do. When the real estate industry competition is more rational, the industry average profits will increase exponentially. This revolution is undoubtedly beneficial to the whole society, to win and leave who should be early to embrace the "BIM + big data" business.

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