Study on risk identification of green building in Chengdu

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Abstract

This paper summarized the uniqueness of the green building risk by comparing the difference between the risk of traditional building and green building, combined with the risk identification process and the Chengdu area of green building development, environment, social and cultural characteristics, from the regional differences of green building. The table of risk factors of decision-making and design phase of the green building were obtained.

Keywords

Risk identification; green building; regional difference.

1. Introduction

With the increasingly serious ecological imbalance, environmental pollution, waste of resources, energy crisis and other problems, scientists had to develop a sustainable development path that can get along with nature harmoniously. The increasing amount of construction led to the increasing proportion of the energy consumed by the building in the whole society. Faced with such a severe crisis, we must take the sustainable development path, thus green building became the darling of the construction industry.

Green building refers to the building in harmony with nature, throughout the life cycle of the building, to maximize the conservation of resources, namely energy, land, water, materials, and protecting the environment, providing people with a healthy use of space. With the continuous rise of green building in our country, many provinces and cities in the development of green building are constantly continued, the development of Chengdu as the western development priorities on green building cannot be underestimated. Nowadays, more and more real estate companies are beginning to invest in green building, in order to improve the competitiveness of the enterprise. Proper risk management of the entire life cycle is the key to the success of green building. Because the "green" in the green building are both universal and different, the design and construction of the green building in different regions are different. So the risk assessment and management of green building should be adapted to local conditions, and it is very necessary to carry out the risk management of the green building in Chengdu area.

2. Overview of green building in Chengdu

Chengdu City Construction Department since 2001, actively promoted the industry standard "hot summer and cold winter region residential building energy-saving design standards". In response to the government's call, the construction industry in Chengdu had taken a series of actions. In early 2002, Jinxi National Park officially declared the second batch of the national Ministry of construction energy-saving demonstration area. In 2005, Jinxi Chengdu people's Park residential district won the national green building innovation award. In 2006, "long Jinhui yuan," according to the energy-saving 65% of the index of high standard construction, became the Chengdu City building energy-saving model residential products. By the end of 2010, Chengdu formally approved as national renewable energy demonstration building city. Chengdu Municipal People's Government in January 2014 proposed the Chengdu City green building action plan "requirements, the city's new security housing,

nursing homes, hospitals, schools and other buildings, government investment in public buildings, infrastructure and large public buildings (monomer construction area of 2 million square meters), since 2014, full implementation of green building standards[1].In 2012, Chengdu Raffles City built and opened smoothly and in 2014 obtained U. S. Green Building Council (USGBC) issued by the green energy and environmental design Pioneer Award (LEED). Nearly three years, the scale of China green building increases into the acceleration phase. As of the end of April 2015, China (excluding Hong Kong, Macao and Taiwan) to obtain LEED certified project construction area of more than 2800 million square meters, has become one of the most important overseas market the American LEED certification. Due to the government's call for and building development trends, investment in green building projects in the real estate business is also increasing.There are many famous green building in Chengdu, which are Vanke five Longshan Park h block a, building 1 - 32, Chengdu Landsea - green blocks 1 - 4, 6 - 8 floor, Chengdu Huarun Donghu commercial projects, Chengdu and Sichuan aviation Plaza and energy-saving - New Times Plaza.

3. Difference between Traditional Architecture and Green Building in Risk

Green building "green" to distinguish it from the traditional architecture, compared with the traditional building green building more emphasis on harmony between human and nature, and the rational allocation of resources. Since green building compared to the general building has its own unique advantages, in the whole life cycle it has its unique risk characteristics too. Firstly, with respect to the cost of building green buildings in general, duration, quality objectives have three more goals extending green building also requires environmental protection, building energy consumption, materials, economy and regional and other targets[2]. Moreover indoor comfort and safety are also the goal of green building. Expansion caused by the scope of the risks involved in the expansion of the risk and increasing the risk of green building construction. Secondly, from the economic attributes, the initial investment is generally higher than general green building construction, open room providers to bear more of the cost of construction. Domestic green building cost increases of 4% to 16%[3], so this is a typical external economic product[4]. That is their long-term goals of indoor comfort and environmental protection cannot be directly reflected the economic benefits, but can be recovered by a number of years. This reduces the construction of green building initiative as well as long-term goals to achieve uncertainty. Finally, green building construction standards may lead to increased project duration, and the project's sales price or rent increase may cause the project's short-term rate of return is low[5]. In all, the research of green building risk has a significant impact on the success of green building.

4. Risk identification of green building in Chengdu

Risk identification is the basic step of risk management, and it is very important to the whole project risk management. Risk identification risk factor table is the direct basis for risk management of project management personnel, so the whole green construction project risk management is highly efficient and most of the risk identification of this step.

At home and abroad, there are a lot of researches on the risk of green building, especially in foreign countries, but the study on the risk of green building in Chengdu city is very rare. Because the green building green is the coexistence of globalization and localization, that is to say green building from the macro perspective of the world with its universality, but in different regions due to environment, society, culture is also different with the regional disparities. Many domestic research on green building risk recognition this block are generally talk about, and do not take into account the regional characteristics, therefore in the risk identification stage will consider the characteristics of Chengdu Environmental, social and cultural, many found in the construction of the Chengdu green building project potential risk factors.

Through literature research found that many articles are from the whole life cycle of green building is the decision-making stage, design stage, construction stage, trial operation stage and operation and maintenance stage 5 stages to carry out risk identification. Taking the decision-making and design

stage as an example, this paper analyzes the difference between the risk identification and the general risk identification of the green building in Chengdu. First of all, we first look at the past through the literature research and expert questionnaire out of the risk factors table[7] (as shown in Table 1).

Table 1 risk factors of green building in decision making and design stage

Stage	Code	Risk factor
Decision stage	1	Project's green target location is not accurate
	2	Underestimated the attitude of the financial markets
	3	Green building market demand forecast inaccuracies
	4	The lack of accurate estimates of green building long-term investment returns
	5	Lack of impact of the project consider green goals
	6	Green Building investment inaccurate estimates
	7	Inadequate consideration of the impact of life cycle inflation
	8	Government bureaucracy and complex approval process
	9	changes of policy related green building
	10	Green building related laws and regulations are not perfect
	11	Lack of experienced green building consult
	12	Poor public acceptance of green building
	13	Lack of insurance products related to green building
Design stage	14	Lack of experience in green building design
	15	Lack of on-site investigation and design of local conditions
	16	The risk of green design innovation
	17	Poor constructability of design innovation
	18	The cost of green building is not accurate.
	19	Lack of green building certification experience
	20	Green certification responsibility is not clear
	21	Poor communication skills of design team
	22	Lack of participation of the whole life cycle of green project

From the table 1, it is known that there are 22 risk factors in the decision stage and design stage, but there is no recognition of the characteristics of the area. Although Chengdu cannot keep up with North Canton, Jiangsu and Zhejiang and other areas in the development of green building, up to now Chengdu has 27 LEED projects, green label 16 in the country are also considered on the level. Therefore, Article 11: lack of experienced green building consult can be eliminated. The purpose of this paper is to study the risk of green building in Chengdu area. In the early stage of construction, we will do some research on the environment and climate of Chengdu. Therefore, Article 15: lack of on-site investigation and design of local conditions can be eliminated. At present, Chengdu has 43 green buildings have been built and in line with the green building standards and LEED, in the green building certification also has a lot of experience. Therefore, Article 15: lack of green building certification experience can be eliminated.

In addition to delete some unnecessary risk factor in the original table, to be more specific, intuitive management control risk, we need to refine certain risk factors. For example, the public acceptance of Article 12 of the reasons for the price difference can be divided into technical aspects, so this provision may be risk factors are divided into green buildings overpriced, green building design innovation residents feel less than two risk factors. So Chengdu green building decision design stage risk factor table are shown in Table 2.

Table2 risk factors of green building in decision making and design stage in Chengdu

Stage	Code	Risk factor
Decision stage	1	Project's green target location is not accurate
	2	Underestimated the attitude of the financial markets
	3	Green building market demand forecast inaccuracies
	4	The lack of accurate estimates of green building long-term investment returns
	5	Lack of impact of the project consider green goals
	6	Green Building investment inaccurate estimates
	7	Inadequate consideration of the impact of life cycle inflation
	8	Government bureaucracy and complex approval process
	9	Changes of policy related green building
	10	Green building related laws and regulations are not perfect
	11	Green Building overpriced
	12	Lack of insurance products related to green building
Design stage	13	Lack of experience in green building design
	14	Residents do not feel the green building design innovation.
	15	The risk of green design innovation
	16	Poor constructability of design innovation
	17	The cost of green building is not accurate.
	18	Green certification responsibility is not clear
	19	Poor communication skills of design team
	20	Lack of participation of the whole life cycle of green project

5. Conclusion

There is a lot of study on Green Building risk identification there are many, but the combination of regional differences to risk recognition is not enough. In this paper, the development of green building in Chengdu as well as social, environmental and cultural characteristics of the decision-making green building design stage and to identify potential risk factors, obtained for Chengdu green building developers learn risk factors table.

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