

A Study of Factor of Housing Costs and Cost Effectiveness of Real Estate Enterprises in China

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Abstract:

The real estate industry has become the pillar industry of China's national economy, which has a high degree of correlation and a strong driving force for related industries. However, the amount of capital needed by real estate enterprises is huge and the process management is complicated. As the Central government of China continuously increases the regulation and control efforts to regulate the real estate industry, cost control has become the most concerned issue for real estate development enterprises. The purpose of this paper is to identify the key factors affecting the housing cost of real estate enterprises and use structural equation model to conduct an empirical study on the path of housing cost formation. In the real estate business executives group to carry out the questionnaire survey, carried out on the initial inventory item deletion and adjusted, eventually forming a formal China's residential real estate enterprise cost management effectiveness measurement scale, the formal scale environment, decision making, sales, finance, as a potential of the variables in the structural equation model, under the various dimensions of measurement item as observed variables. This paper constructs a theoretical model of residential cost management of Chinese real estate enterprises. Through literature review and cost management theory analysis, the relationship and influence path among environment, decision-making, sales, financial factors and cost management effectiveness are determined by smartPLS3.0.

Keywords: *Real Estate cost management, Housing costs, Cost influencing factors, Cost effectiveness, Partial least squares method.*



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INTRODUCTION

Research background

Since the implementation of the national strategy of reform and opening up in 1978, China's real estate industry has made great achievements in the past 40 years. The development of real estate industry is closely related to the development trend of China's economy. Over the past four decades, housing has transformed from a common consumer product into a valuable financial asset (Blakeley, 2020). Housing and health are two important interrelated indicators to measure a person's quality of life, and good living conditions can improve physical and mental health (Wang et al, 2018). However, the emergence of a large number of vacant houses will have a negative impact on the urban spatial pattern and sustainable development, and may lead to a real estate bubble (Zhang Xin et al., 2021). China's banking and financial system has become more vulnerable, although a booming stock market will help, the real estate market has inflated further again, thus posing additional risks to the economy and the financial system (Liu, 2021). Although real estate professionals can be more sensitive to the bursting of the real estate bubble and the imminent financial crisis (Shen, 2020), there are more and more real estate speculation groups in China, which gradually make real estate prices out of control. The state has implemented a series of regulatory policies to avoid the impact of sharp fluctuations in real estate prices on people's overall lives (Zhang, 2021). With the advancement of major system reforms such as land reform and the steady decline in the cost of real estate enterprises nationwide, there is a certain need for marginal adjustment of housing purchase and price restriction policies in some cities. When real estate enterprises develop at a high speed, the rough operation and product homogenization foreshadow the ending of many real estate enterprises (Chu, 2020). In recent years, the real estate industry has increasingly been expected to adapt its strategy to meet new, more stringent environmental and urban development requirements to adapt to changing demographics and to reduce costs using the latest building techniques and materials (Walker, 2020). Today's era is increasingly full of conflicts and shocks, requiring structural adjustment of the real estate industry, and adjustments of target, renewal of direction and tools become decisive factors for a successful and radical transformation of the real estate sector (Yaskova, 2021). The search library for the current state of foreign research comes from the Web of Science (WOS) database, which belongs to the foreign authority Clarivate Analytics. In this paper, the author used "Real estate cost" OR "Real estate enterprise cost" as the core search terms to filter the subject terms in the WOS database. The content covers all relevant documents from 1945 to 2021, and the following 2352 documents are selected by core keywords, literature categories, and WOS categories (as shown in Table 1). From the perspective of literature field distribution, the literature mainly focuses on Business Economics (1134 articles, 48.21%), Engineering (566 articles, 24.06%), Environmental Sciences Ecology (365 articles, 15.52%) and Computer Science (356 articles, 15.13%), which are focus fields that are relevant to the cost management of real estate companies and occupy the vast majority of them (literature fields are crossed). This feature shows that foreign scholars' research on the cost management of real estate enterprises presents the characteristics of interdisciplinary and multi-perspective research, and the research results are also relatively fruitful. To further understand the relevance and macro trends of engineering management-related studies, this study also conducted a keyword clustering analysis of the 2352 English documents data collected using VOSviewer (V1.6) software. Vosviewer is also a free software based on java language. it is mainly a bibliometric analysis software for drawing scientific knowledge map for literature database and based on the principle of co-citation of documents, it focuses on the

visualization of scientific knowledge and can be used to draw scientific map of various knowledge fields (Orduña, 2021).

Problem Statement

Through the quantitative review and quantitative statistics of the above related literature, this paper systematically sorts out the related researches on real estate cost and cost performance from the perspective of domestic and foreign literature, and forms the following comments:

1.Existing researches on the cost of real estate enterprises mostly simulate the risk of project cost quantitatively with indicators, but there are still some deficiencies in analyzing the occurrence mechanism of the cost of real estate enterprises from the perspective of organizational behavior, corporate governance mechanism and other multidimensional theoretical perspectives. The domestic and foreign related research of real estate enterprises shows that under the new situation of dynamic and complex environment, real estate enterprises are facing more uncertainty, risk and complexity. Foreign research tends to pay more attention to the cost attribute of real estate projects, the application of new technology and analysis methods of project cost. However, domestic research tends to pay more attention to engineering management mode, cost management of small and medium-sized enterprises, cost model and so on. the existing research on the management of real estate enterprises lacks the study on the adverse factors of the cost of real estate enterprises from the perspective of external environment, internal governance mechanism and organizational behavior of the enterprises, which makes the existing research on the cost risk of real estate enterprises limited to the theoretical discussion of a single project management level, lacks the discussion of the systematic management mechanism at the enterprise level, has limited guiding effect on practice, and can not systematically deal with the internal and external adverse factors.. (Hua et al.(2018)

2. Cost effectiveness is a hot topic in the management field, but the mechanism to improve cost effectiveness in the complex context of multiple internal and external factors faced by real estate companies needs to be further explored. The domestic and foreign related studies on cost management of real estate enterprises show that under the constantly turbulent and changing external environment, the cost of enterprises is related to the survival of enterprises, and how to deal with the crisis and the ability to recover from the crisis is an increasing concern of management. Cost effectiveness has been paid more and more attention by foreign scholars, the main research fields include management fields such as project cost performance, enterprise cost performance, financial accounting, etc. The rest mainly focus on cost effectiveness management research in the field of organizational behavior, influencing factors of engineering cost, cost performance and other issues. The domestic research on cost effectiveness is still in the early stage of theoretical research, the relevant literature mainly focuses on the basic concept connotation, concept discrimination and related measurement dimensions of cost performance, the research on the formation mechanism of cost effectiveness from the perspective of management is insufficient, especially the influencing factors of cost effectiveness in the context of multiple influencing factors need further in-depth research. The existing research on enterprise cost effectiveness generally focuses on the internal and external crisis and its influencing factors, most research methods are model prediction and experience sorting, and the discussion on the formation mechanism of enterprise cost management effectiveness lacks empirical test and statistical data support.

Research questions

This study aims to solve the following two key research questions: (1) What are the influencing factors of housing cost management in real estate enterprises? This paper identifies the influencing factors of cost management of real estate enterprises by literature research method, supplements and modifies the influencing factors by Delphi method, and obtains the list of influencing factors. Combined with expert opinions, the influencing factors are classified, and four categories of influencing factors are obtained: environment, decision-making, finance and sales. (2) What is the relationship between the influencing factors of housing cost management in real estate enterprises? The data were collected by questionnaire survey, and the reliability and validity of the data were tested to ensure the reliability of the data research results. SPSS and SmartPLS software were used to verify, analyze and modify the theoretical model, and then the operation results of the modified model were analyzed. To identify which of these influencing factors act directly on cost effectiveness and which act indirectly, and the various path relationships between them.

Theoretical significance

1. It is helpful to understand the value of cost management of real estate enterprises from a systematic perspective. Taking the system perspective as the entry point, to sort out the interaction mechanism of action of each factor and enterprise cost from local to overall. When many factors act together in the cost management behavior of real estate enterprises' residential projects, the force of the interaction will be the integration effect of the overall perspective.
2. It is helpful to expand and deepen the research on the value generation mechanism of cost management of real estate companies. This paper first identifies the factors, from the external macro-environmental factors to internal management decision-making, finance, sales and so on to build a real estate enterprise cost identification framework, and finally constructs a regression model of how the factors affect the real estate enterprise cost and the way of action.

LITERATURE REVIEW

Related research on environmental influencing factors

Environment refers to the living space of human beings and various natural factors that can directly or indirectly affect human life and development (Cao , 2020). Environmental factors include natural environment and social environment, and social environment includes regulatory policies, market laws, economic level and so on (Liu, 2020). The operation of real estate enterprises is a kind of social behavior and economic behavior. From social, economic, political, cultural and geographical environmental factors to internal management, operation and financial status factors of enterprises, every step, procedure and level of real estate projects are affected and controlled by environmental factors (Jia, 2020).

Preliminary study

Otieno (2019) pointed out that the macro environment is composed of political, economic, social and technical forces, which enterprises can not control, and enterprises can not ignore the established effects of the macro environment. Safaei (2020) studies the impact of environmental uncertainty on the cost, time, quality and risk of engineering projects, and found that optimizing the construction period can reduce the project cost. Gong's study (2021) showed that environmental uncertainty positively regulates the relationship between inclusive leadership and resource development innovation, and managers should

pay attention to the risks brought by environmental uncertainty. Hua et al. (2018) pointed out that environmental uncertainty leads to the increase of cash flow fluctuation and the decline of accounting information quality of real estate enterprises, which has adverse consequences on enterprise costs. Wang et al. (2021) show that environmental uncertainty will intensify the financialization of enterprises, and will further intensify the financialization of enterprises by increasing their risk taking, financing constraints and agency costs. Wang et al. (2021) believe that the business environment of an enterprise is a prerequisite for the strategic choice of an enterprise. Therefore, an enterprise should first conduct environmental analysis, judge the dynamic intensity of the environment, strengthen the collection and judgment of external environmental information, and formulate a matching innovation strategy. Tao (2017) believes that the cost core competitiveness of real estate enterprises is affected by resource factors, capacity factors and environmental factors. Environmental factor has the greatest influence, resource factors take second place, and ability factors are the weakest. Yang (2017) found that the period with the greatest impact on the real estate development cost is the residential bidding period and the construction period, and summarized the influencing factors in each period. Liu (2019) analyzed that full-decoration housing has gradually become the development direction of China's housing field due to the characteristics of material saving and environmental protection. However, due to the influence of factors such as high development cost and imperfect policies, real estate enterprises still focus on the development of roughcast house. Zhao (2019) studied the relationship between the project cost and influencing factors of residential projects. The results showed that market and industry conditions have the most significant impact on the project cost, followed by regulatory system, and finally key stakeholders. The Chinese government's real estate purchase restriction policy can not only play a role in the short term, but also have long-term effectiveness (Shao, 2021). Mo et al. (2018) believe that the government's regulation and control of land acquisition and its compensation expenses has the greatest impact on the overall real estate residential project. Jiang et al. (2018) found that the cost of real estate enterprises in the eastern region has a "threshold" effect, with low-skilled labor and high-skilled talents gathering, and the quality of labor shifts to both ends. Affected by the exogenous impact of the loan restriction policy, real estate enterprises have reduced the scale of their bank loans, and at the same time, real estate enterprises have been prompted to use the shadow banking system for financing, significantly increasing the financing cost (Li, 2019; Liang, 2020). Wenjing (2020) believes that the increase of deed tax rate has a negative impact on the residential construction cost and the pre-tax price of land use right of real estate enterprises. Xi (2018) believes that under the current economic situation, real estate companies are facing a long financial management cycle and high development difficulty, so corresponding countermeasures should be taken to improve the financial management level of real estate companies. Tax planning can effectively reduce the land value-added tax burden and increase the project profit (Liao, 2019). Denicol (2020) suggests considering large engineering projects as large-scale inter-organizational production systems to close the cost gap with manufacturing. Residential construction projects usually operate in a complex dynamic environment, and the accumulation of construction project system, economic market environment and external environment causes high uncertainty, and construction project system and economic market environment have a significant impact on construction project cost (Zhao, 2019). Environmental uncertainty includes the uncertainty of policies and the uncertainty of managers' perception of the internal environment of enterprises (Zhu, 2019). Enterprises are not passive recipients of the environment, but actively adjust their investment decisions to cope with environmental changes (Jian et al., 2021).

Related research on influencing factors of decision

The influencing factors of strategy and decision-making refer to some important programmatic decisions made by enterprises considering the overall situation, long-term, competitiveness and strategy. They are the key to the success or failure of enterprises' operation. Good strategies and decisions enable enterprises to move forward in the right direction, while wrong strategies and decisions will bring huge losses to enterprises (Zhang, 2020; Luo, 2017, Du, 2018). The investment decision-making of real estate enterprises is the key to determine the height of their operation and development. The ways to improve the decision-making level include strengthening expansion management, reasonable planning and layout, optimizing evaluation methods and improving the quality of decision-makers (Qi, 2020). Small and medium-sized real estate enterprises should use the operation mode of asset-light, attach importance to brand construction and realize strategic transformation (He, 2018). Project complexity leads to cost and time overruns, and decision makers need to identify key risks and decide on the best risk mitigation strategy (Qazi, 2016). The investment decision of real estate enterprises to invest in real estate is related to the probability of expected house price bubble bursting and the strength of government supervision. When the expected risk is low, they will continue to increase their real estate assets, otherwise, they will be more inclined to sell in time to stop losses (Liao, 2020). Blind land development decisions of the enterprise decision-making will lead to waste of land resources, and at the same time will have a negative impact on the real estate and residential environment, increasing the planning difficulty of the residential environment (Chiang, 2019). Real estate enterprises should pay attention to the government's macro-control of land supply, establish the concept of overall cost control internally, strictly control the construction cost, financial cost, and speed up the return rate after sales, thus effectively reducing the cost of real estate and residential projects (Zhang, 2021). In the development and operation of real estate enterprises, it is necessary to improve the cost control system, effectively control the financial cost, rely on information technology, accurately bid land, and pay attention to dynamic construction cost, thus improving the economic benefits of enterprises (Zheng, 2021).

METHODOLOGY

Research design

After defining the variable scale of key concepts, this study respectively analyzed and studied the selection, expression, arrangement and display of the items of the scale, which related to the details of the questionnaire design, in order to improve the acceptance and measurement validity of the questionnaire. In this study, the following four steps are carried out for the questionnaire of temporary organizational toughness of engineering projects. In this study, the actual situation of housing project cost management in China's real estate enterprises was considered, and in order to ensure the reliability and validity of the scale, the scale was mainly referred to the mature scale in the past research abroad, and the Likert 7-point scoring method was used to measure the scale. This study mainly focuses on economic orientation and legal orientation. Economic orientation represents the priority of managers for short-term economic benefits, and legal orientation represents the priority of managers for enterprises to abide by legal obligations. Environmental factors are classified as competitive environment in the same industry, macroeconomic policies, real estate regulation, and environmental policies. Decision-making factors draw lessons from variables set by Quinn & Cameron's OCAI scale (Lou, 2018), and divide decision-making factors into enterprise strategic planning, management experience and quality, decision-making level's risk awareness, and enterprise innovation ability. Referring to the research results of Wright & Snell (1998) and Martins (2003), the financial

factors are divided into financing ability, capital structure, tax planning ability, capital operation ability and so on. Referring to Samiee (1992), Wu et al. (2009), Hu (2011) and Luo (2016), the sales factors are divided into four dimensions: sales promotion, sales plan, sales cycle and customer demand change to measure the effectiveness of cost management.

1.1.1 Variable measurement

Table 7: Definition table of research variables

Variable Name	Variable Definition	References
Environmental Factors	Environment refers to the living space of human beings and various natural factors that can directly or indirectly affect human life and development. Environmental factors include natural environment and social environment, and social environment includes regulatory policies, market laws, economic level and so on. The operation of real estate enterprises is a kind of social behavior and economic behavior. From social, economic, political, cultural and geographical environmental factors to internal management, operation and financial status factors of enterprises, every step, procedure and level of real estate projects are affected and controlled by environmental factors.	Cao, (2020), Liu, (2020), Jia, (2020)
Decision-making factors	The influencing factors of strategy and decision-making refer to some important programmatic decisions made by enterprises considering the overall situation, long-term, competitiveness and strategy. They are the key to the success or failure of enterprises' operation. Good strategies and decisions enable enterprises to move forward in the right direction, while wrong strategies and decisions will bring huge losses to enterprises.	Xu, (2021), Cheng, (2021), Chen, (2020), Cui, (2020), Xie, (2021)
Sales Factors	The sales phase is the capital withdrawal stage, and its main cost lies in the marketing activities for the promotion of real estate. Compared with other stages, this stage has less cost input. Its cost is mainly affected by internal factors, which mainly come from advertising operation, media relations, sales team construction and overall construction progress	Debruine (2011), Chen, (2017), Qiu, (2018), Su, (2017)
Financial Factors	The efficiency of financial cost management directly affects the fund security and stability of enterprise development. Therefore, based on their own competition and development position in the real estate market, real estate enterprises choose the best financial cost management mode, improve their own management system, improve the awareness and ability of internal financial cost management, and create good internal conditions for the innovation and development of enterprises to the greatest extent.	Yu, (2019), He, (2020), Long, (2021), Ye, (2021), Liu, (2021)
Cost Management Effectiveness	The effectiveness of real estate companies in managing the construction technology of residential projects can be seen as an integral and important element of the entire project. Real estate enterprises should strive to integrate more resources allocation to achieve the best possible overall cost saving level on the basis of urging the project to be completed on time.	Du, (2020), Chen, (2019), Zhu, (2018), Cui, (2015), Du, (2015)

Based on the research problems and theoretical basis of this study, the variables in the structural model are obtained from the literature. The four variables in the structural model and their definitions are listed in Table 7.

2. Latent variable and observed variable

Because this study focuses on the factors affecting the housing cost of real estate enterprises in China, the research object should be the senior managers who participate in the cost management and decision-making management of enterprises and have certain working experience. For this kind of specific social population, in order to meet the special requirement that the sample has cost management experience, this study has special requirements from the preliminary selection of research objects to the screening of research objects, and then to the distribution of questionnaires. In the second chapter, the connotation, dimension and measurement of the key variables are reviewed in detail, which lays a solid theoretical foundation for the research content of this chapter. Therefore, according to the logical relationship between the variables, the variables are divided into independent variables (environment, decision), mediating variables (sales, finance), dependent variables (cost effectiveness). In order to ensure the measurement validity of the scale, the scale was selected from the existing literature, and some English literature was translated, compared and discussed to ensure the accuracy of the item description. All the adjustments of items are based on literature and pre-tested. The item measurement method is a 7-point Likert scale (e.g., 1 is Strongly disagree, 7 is Strongly agree). Before the scale was released, the researchers formed an expert group to discuss the questionnaire, and invited cost management personnel, engineering management personnel and senior management personnel with more than 10 years of work experience in real estate enterprises and engineering industries to test the content of the scale, to ensure that the measurement content of the scale is consistent with the practice situation.

Population / Sampling / Unit of Analysis

Sampling Method

The positivism research paradigm allows researchers to select a part of the samples that can be grasped to represent the group of samples after defining the objects of interest. Therefore, in order to carry out the survey smoothly, the convenience sampling method was adopted for the subjects of the questionnaire survey, starting from the interpersonal network familiar to the researchers, to find samples that meet the research conditions. Convenience sampling is used based on the following considerations: (a) The research cost is reduced, the investigation efficiency is improved, and the manpower and time are saved. When distributing questionnaires, researchers can hand questionnaires or links directly to familiar friends and then send it to other primary samples through their social networks. (b) Reduce the difficulty of obtaining suitable samples. Friends in the social network have an executive background and are familiar with who is involved in senior management of the enterprise, so it is easier to initially determine the appropriate sample. The researcher himself is a member of the top management of a real estate company, and members of his interpersonal network, such as colleagues, peers in his WeChat moment, classmates, and members of the same subject group, most of whom are also corporate executives or mid-level managers, which provides the conditions for finding the sample needed for this study.

Reliability and validity test

Reliability test

The reliability of the questionnaire was tested by calculating Cronbach's alpha coefficient. This paper defines that when $\alpha > 0.6$, the questionnaire reliability is considered acceptable. A Cronbach's Alpha value between 0.70 and 0.80 is considered acceptable, and a value greater than

0.80 is good. In social sciences, according to empirical judgment, the correlation coefficient of items retained in variable measurement items to all items (item-total) should be greater than 0.35 and the alpha value of the measurement variable should be greater than 0.70. This paper uses SPSS 26.0 to analyze the reliability of the scale in the questionnaire. The analysis results of alpha value of each variable are shown in Table 15. From Table 15, it can be seen that the alpha value of each variable meets the requirement of greater than or equal to 0.70, and the reliability of the sample passes the internal consistency test. The correlation coefficients of the items included in each variable to all items (Item-total) are greater than 0.35, which makes it suitable for multiple linear regression from the perspective of reliability test. The reliability test of the scale is shown in Table 15 below.

Table 15: Reliability test of the scale of influencing factors of cost management

	Measurement questions	Cronbach's <i>a</i>	Cronbach's Alpha if Item Deleted	Item-Total correlation coefficient
Environmental Factors	Competition in the same industry	0.724		0.572
	Macroeconomic Policy	0.693		0.636
	Real estate industry regulation policy	0.777	0.712	0.595
	Current laws and regulations		0.755	0.515
Decision- making factors	Corporate Strategic Planning	0.769		0.638
	Management experience and quality	0.751		0.679
	Risk awareness at the decision-making level	0.818	0.747	0.685
	Corporate Innovation Capability		0.808	0.553
Financial Factors	Financing Capacity	0.791		0.708
	Capital Structure	0.802		0.684
	Tax planning capabilities	0.845	0.812	0.661
	Capital Operation Capability		0.808	0.672
Sales Factors	Sales Promotion Method	0.748		0.602
	Sales Solutions	0.736		0.625
	Sales Cycle	0.797	0.741	0.616
	Customer Needs		0.756	0.587
Cost- effectiveness	Lower cost management capability than competitors	0.829	0.800	0.618
	Business costs are higher than competitors		0.786	0.647
	Cost competitiveness inferior to competitors	0.829	0.761	0.703
	Corporate profits are lower than those of competitors		0.784	0.651

Validity test

The test parameters of the measurement model are shown in Table 16.

Table 16: Test parameters of reflective measurement model

Validity test indicators	Measurement method
Internal consistency	Cronbach's alpha Composite reliability (CR)
Convergent validity	Indicator reliability Average variance extracted
Discriminant validity	(AVE) Fornell-Larcker criterion

Convergence validity test.

Validity is used to reveal the relationship between structural variables and measurement indicators. The validity test mainly includes convergence validity and discriminant validity. In this study, SmartPLS3 structural equation model was used to estimate the validity of the variables, and the results showed that the measurement indicators had good convergence validity. As for the content validity, this study is based on the relevant literature research results, and has discussed with real estate enterprises and real estate research experts for many times, so it can ensure a good content validity. As for construct validity, the average of variance extracted (AVE) is often used to measure it. The higher the AVE is, the more the measurement index can reflect the factor to be measured. When the AVE value is greater than 0.5, the convergence validity is ideal, and the AVE value between 0.36-0.5 indicates acceptable (Zhang, 2021). The test results showed that the AVE values of all factors in this study are greater than 0.5, indicating that the convergence validity of the measurement indicators is satisfactory. The specific results are shown in Table 17. In this study, the data collected from the questionnaire are used to describe each indicator variable, which is the basis of the subsequent model estimation and evaluation, so the collected data need to be checked first. A descriptive statistical analysis is shown in Table 31 below.

FINDINGS AND DISCUSSION

In this study, the data collected from the questionnaire are used to describe each indicator variable, which is the basis of the subsequent model estimation and evaluation, so the collected data need to be checked first. A descriptive statistical analysis is shown in Table 31 below.

Table 31: Descriptive statistics of survey samples

Statistical quantities	Specific description	Sample size	Percentage (%)	Cumulative share (%)
Nature of business	State-owned enterprises	141	26.65%	26.65%
	Private enterprises	214	40.45%	67.11%
	Joint Stock Company	78	14.74%	81.85%
	Sino-foreign joint venture / wholly foreign-owned enterprise	40	7.56%	89.41%
	Other	56	10.59%	100.00%
Years of work	7-10 years	315	59.55%	59.55%
	10-15 years	113	21.36%	80.91%
	16-20 years	58	10.96%	91.87%
	More than 21 years	43	8.13%	100.00%
Education background	High School and below	18	3.40%	3.40%
	College	49	9.26%	12.67%
	Undergraduate	332	62.76%	75.43%
	Graduate	112	21.17%	96.60%
	PhD	18	3.40%	100.00%

The survey results show that the object of this questionnaire survey is mainly private enterprises, accounting for 40.45%, which is also consistent with the time point of China's housing system reform. Most of China's real estate enterprises are mainly private enterprises, with a short establishment time and uneven development scale. The respondents all come from the high-level and middle-level employees of the enterprise, of which the proportion of high-level managers reaches 8.13%, the proportion of middle-level managers reaches 32.33%, and the proportion of bachelor's degree or above reaches 87.33%. These employees are rich in experience, and most of them are the core decision-making and executive levels of the enterprise.

The relationship between environmental factors and cost effectiveness

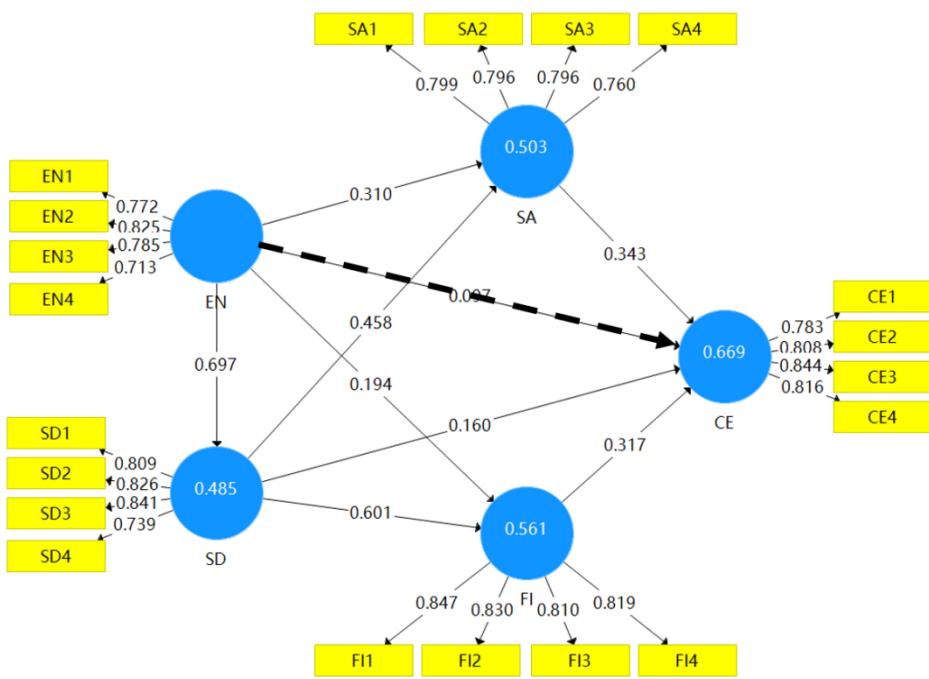
Analysis of the relationship between environmental factors and cost effectiveness

Environmental factors exist outside the enterprise and will not be affected by the enterprise, but will directly or indirectly affect the production and operation activities of the enterprise and various factors of the cost control system. The uncertainty of external environment brings uncertainty to the cost management of real estate development enterprises, which is uncontrollable by enterprises, and this uncertainty will affect the cost of residential projects at any time, prompting the strategy and sales of real estate development companies to adjust with the changes of external environment. At the same time, real estate development enterprises will follow the changes of the external environment and change the controllable factors at the enterprise level. Environmental uncertainty means the unpredictability caused by the variability and complexity of information in the environment (Duncan, 1972). Environmental uncertainty is divided into technical uncertainty and market uncertainty, in which technical uncertainty refers to the difficulty of technology prediction caused by the shortening of product and technology renewal cycle. Market uncertainty refers to the unpredictability of the market caused by rapid changes such as consumption and supplier development (Kohli & Jaworski, 1990). The information asymmetry caused by the highly uncertain environment will increase the operating risk and financing constraints of enterprises, thus increasing the risk of project investment (Wang & Chen, 2016; Yang, 2019). The complex and changeable environment will force enterprises to give full play to competitive advantages through more product and technology investment to cope with the potential cost increase threat brought by environmental change.

Results of analysis of the relationship between environmental factors and cost effectiveness

The analysis of the relationship between environmental factors and cost effectiveness is shown in Figure 9. Figure 9: Analysis of the relationship between environmental factors and cost effectiveness. Environmental uncertainty will aggravate the financialization of enterprises by increasing the risk undertaking, financing constraints and agency costs of enterprises. Environmental factors can directly affect the effectiveness of cost management. For example, the increase of raw materials can directly increase the construction cost of residential projects. At the same time, environmental factors can also affect the decision-making, financial factors and sales factors of enterprises, and then affect the effectiveness of cost management.

Table 32 shows the significance test result of path coefficient of structural model in this study. It can be seen that since the T value is greater than 1.96, there is a significant impact of environmental factors (EN) on cost management effectiveness (CE), with a significant level of 0.05 or more and its estimated value is 0.097; so Hypothesis H1 is valid. The results show that environmental factors has a positive correlation with the cost effectiveness of enterprises, that is, the change of environmental factors can significantly increase the housing cost of real estate.



Discussion on the analysis results of the relationship between environmental factors and cost effectiveness

At no time can an enterprise operate in isolation from the social, economic, political and cultural environment in which it resides. At no time can an enterprise operate in isolation from the social, economic, political and cultural environment in which it resides. The factor loading of macroeconomic policy on environmental factors is 0.825, which has the largest influence effect among the four categories of factors; the factor loading of real estate regulation on environmental factors is 0.785; the factor loading of competitive environment in the same industry on environmental factors is 0.772; the factor loading of environmental protection policy on environmental factors is 0.713; the macroeconomic policy has the largest effect among the four categories of influencing factors, which proves that the residential cost of Chinese real estate enterprises is highly dependent on the environment at this stage, and the change of macroeconomic policy leads to the increase of raw material cost and financing cost. Real estate regulation leads to rising land costs, poor sales and increased enterprise costs.

The relationship between decision-making factors and cost effectiveness

Analysis of the relationship between decision-making factors and cost-effectiveness
 Most real estate development enterprises locate in their business ecosystem, and their strategic decisions will be affected by the internal conditions and system environment to a certain extent. Real estate companies should conduct dynamic real-time analysis of the environment in which they operate to enhance their core competitiveness. The traditional cost management decision-making separates the integrity of production and operational activities, which leads to the unsystematic cost management. The value chain of the industry and competitors is not fully considered, and enterprises ignore the information of the cost management department when making strategic decisions. After the real estate enterprise formulates the strategy according to the system environment, it will adjust the organization and system of the enterprise according to the strategy, and different enterprise strategies also mean different methods and technologies at the project implementation level, such as the material standard of residential products, delivery

interface, construction period, financing amount, sales cycle, etc. These decisions have a profound impact on the cost of residential products. From the above analysis, it can be seen that decision-making factors can directly affect the cost management effectiveness of enterprises, and also can affect the cost management effectiveness through finance and sales.

CONCLUSION

Findings of the study on the mechanism of the impact of residential cost influencing factors on cost effectiveness in Chinese real estate enterprises. The first key problem to be solved in this study is the influence mechanism of cost influencing factors on cost effectiveness. With the help of SmartPLS 3.0 software and questionnaire survey, this part explores the influence mechanism of housing cost influencing factors on cost effectiveness from the perspective of environment and decision-making, and identifies the relationship between environment, decision-making, finance, and sales. The results show that there are various mechanisms between environment and decision-making, decision-making and sales, environment and sales, and decision-making and finance, besides environment, decision-making, sales and finance have direct effects on cost effectiveness, there are also three indirect paths of housing cost influencing factors on cost effectiveness (Liu 2021). Specifically, ① environment and decision making, respectively, affect cost effectiveness by constructing two mechanisms of sales system and financial system; ② in the environment perspective, corporate decision making and residential product sales, corporate finance, respectively, affect cost effectiveness by constructing three mechanisms of decision making structure, establishing sales incentives, and setting financial thresholds; ③ in the organization perspective, sales and finance, respectively, affect cost effectiveness by constructing two mechanisms of stable sales team and improving financial risk control (Wang 2021). Findings of a study on the construction of a conceptual model of residential cost influencing factors and cost effectiveness of real estate enterprises in China.

The second problem to be solved in this study is to construct a conceptual model of cost influencing factors and cost effectiveness from the perspective of housing cost management of real estate enterprises. Through the systematic literature review, this study identifies the characteristics of cost effectiveness from the perspective of cost management theory, analyzes the mechanism of action of environmental, decision-making, sales and financial factors on cost effectiveness with the TOE theory, and establishes a conceptual model of cost influencing factors and cost effectiveness. The research conclusions show that there are significant differences between the functions of environment, decision-making, finance, and sales in the path of affecting cost effectiveness. The environment has a passive reactive impact on cost effectiveness, while decision making, finance, and sales have an active adaptive impact on cost effectiveness. Therefore, it is necessary to further improve the cooperation level from decision-making level to cost management teams such as finance and sales functions on the basis of paying attention to the ability of resource reconstruction within real estate enterprises. Through trust relationship and team culture, it is necessary to actively deal with the unfavorable factors of internal and external cost management, actively pay attention to the abnormal contents in business processes and cost optimization tasks, form a risk early warning list for project cost planning, and actively improve the efficiency of project cost management. At the same time, maintain an open learning attitude, maintain the continuous attention of decision makers and functional areas of business to the problem of abnormal costs, and take concerted actions to correct deviations when abnormalities in cost business processes or data are found.

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