Evaluation of the Level of Real Estate Enterprise Informatization

Yong Wu  Qiangguo Pu, Nikos E. Mastorakis*
Computer Center, University of Science and Technology of Suzhou, Jiangsu 215011, CHINA
*Hellenic Naval Academy and WSEAS, 18539, Piraeus, GREECE
Yaowu Wang
School of Management, Harbin Institute of Technology, Harbin 150001, China

Abstract: - In this paper, the meaning of real estate enterprises informatization is discussed according to the current situation of evaluating real estate enterprise informatization in China. It puts forward the index system of real estate enterprise informatization and presents a method to evaluate the level of real estate enterprises.

Key-words: - Real estate enterprise, informatization, index system, evaluation

1 Introduction
Enterprise informatization has become the basis of national economy informatization. The real estate industry, as one of the pillar industries of the national economy, after over twenty years of development and expansion, has also become the key point of national economic development. The real estate enterprise informatization is the inevitable trend of its development. The informatization degree of an enterprise will exert extremely profound influence on aspects of the enterprise’s production, operation and management, etc. However, how to measure an enterprise’s informatization degree cannot solely rely on subjective inference. It is necessary to have corresponding quantitative measurement and calculation, analysis and estimation. On the basis of these quantitative results, judge and determine this enterprise’s informatization development degree, and establish the modes suitable for this enterprise’s informatization development.

2 Constitution of the Real Estate Enterprise Informatization Index System
Accurately and objectively evaluating the real estate informatization is one of the important tasks of informatization construction. Therefore, this must rely on the quantitative evaluation index system. As the informatization process involves many aspects, so it is necessary to establish a set of index system according to the enterprise’s characteristics, and from different planes and levels, to conduct objective and quantitative evaluation of informatization development and timely discover problems and adopt corresponding approaches, so as to ensure the realization of informatization goal.

The key to making the results obtained from the real estate enterprise informatization level evaluation close to the actual situation as much as possible lies in establishing a set of scientific, comprehensive and practical evaluation index system. On the premise of guaranteeing the realization of the purpose and requirement of the combined evaluation, it is necessary to consider the following few aspects. First, the evaluation index system must be the aggregation able to reflect the evaluation subject’s characteristic factors, the implication of each index should be clear, and no repetition between the indexes is allowed. Secondly, the index system should be able to comprehensively reflect the characteristics of the real estate enterprise, and no omission is allowed. Thirdly, the evaluation index system should, on the scientific and reasonable premise, select suitable levels and index quantity, and the more complex the better is not the case. Figure 1 shows an evaluation index system for the level of real estate enterprise informatization.
Figure 1 an evaluation index system for the level of real estate enterprise informatization

The following is the detailed description of the indexes.

Index C₁ Computer Hardware Level: refers to the proportion of the number of computers of all types the enterprise possesses to the total number of its people and the quality situation of these equipment, the utility situation embodying the enterprise’s informatization equipment. This index may be divided into three grades: 3 points for grade 1; 2 points for grade 2; 0 point for grade 3.

Index C₂ Computer Software Level: The quantity and utility situation of softwares of all kinds used for real estate development, management and marketing aspects the enterprise purchases or develops on its own. This index can be divided into three grades: 3 points for grade 1; 2 points for grade 2; 0 point for grade 3.

Index C₃ Enterprise Network Scale: The proportion of the total number of computers on the intranet established by the enterprise to its total number of computers. This index may be divided into three grades: 2 points for grade 1; 1 point for grade 2; 0 point for grade 3.

Index C₄ Enterprise Network Performance: Combined evaluation of this index should be conducted based on indexes of the intranet’s bandwidth, server capacity, speed and safety, etc. This index can be divided into three grades: 2 points for grade 1; 1 point for grade 2; 0 point for grade 3.

Index C₅ Enterprise Website Construction Level: Evaluation of this index should be conducted based on the browse quantity and content of the websites established by the real estate enterprise on its own. Its content should include the real estate enterprise self-image propaganda, the enterprise’s latest developments and news, inquiry of sales, intermediary information and information about real estate management, etc. This index can be divided into three grades: 4 points for grade 1, having plenty of all types of real estate information, strong authority, quick updating speed, and good interface; 2 points for grade 2, having a certain amount of real estate information, ordinary authority, a certain time lag in updating; 0 point for grade 3, at this grade, the information amount is small, the web page making is simple, and websites lack necessary maintenance.

Index C₆ Development Process Utility Level: refers to the utility situation of the automatic equipment in the course of real estate development. This index can be divided into three grades: 3 points for grade 1; 2 points for grade 2; 0 point for grade 3.

Index C₇ Transaction Process Utility Level: refers to the utility situation of computers in the course of transaction. For instance, conduct combined evaluation of the enterprise’s on-line transaction, on-line intermediary service, transfer and the enterprise’s electronic business development. This index can be divided into three grades: 3 points for grade 1; 2 points for grade 2; 0 point for grade 3.
Index C8 Information Technology Economic Results Contribution Level: This index indicates the proportion of the economic results increment the enterprise is able to bring to it by making use of information technology in the enterprise’s overall profit. The economic results increment can be obtained by adopting Formula (1) for computation[1]:

$$E_y = [(I_e - I_o) + (C_o - C_e)]S - KR$$  \hspace{1cm} (1)

where: $E_y$ is the economic results after adopting information technology;
$I_e$ is the income after adopting unit information technology;
$I_o$ is the income before adopting unit information technology;
$C_o$ is the cost of the original technical mode;
$C_e$ is the cost of unit information technical mode;
$S$ is the information technology cumulative popularization amount;
$R$ is the research and development expense;
$K$ is the standard scientific and technological results coefficient (Take 0.15).

For example: A certain real estate company develops the smart housing. Its price of each m² is 200 yuan higher than the selling price of ordinary housings, its corresponding combined cost also increases by 50 yuan. If 10,000 m² of this smart housing is sold out, the research and development fund is 1,000,000 yuan, then there will be:

$$(200-50) \times 10000-0.15 \times 1000000=1350000 \text{ yuan}$$

This index can be divided into five grades: 5 points for grade 1, accounting for over 40% of the overall profit; 3 points for grade 2, accounting for over 25% of the overall profit; 2 points for grade 3, accounting for over 10% of the overall profit; 1 point for grade 4, accounting for less than 10% of the overall profit; 0 point for grade 5, having no contribution.

Index C9 Management Informatization Level: To be divided into four grades based on the actual situation. 7 points for grade 1, on the basis of realizing ERP, comprehensively realizing the enterprise supply chain management, client relationship management, completely realizing the smart management; 5 points for grade 2, realizing the enterprise network-based comprehensive management; 3 points for grade 3, initially realizing the enterprise office work automation system and financial affairs management system; 0 point for grade 4, not adopting information technology.

Index C10 Management Control Level: This index mainly reflects the degrees of network and integration in the enterprise’s operation process. It can be divided into four grades: 5 points for grade 1, the management control is highly integrated, the enterprise is internally integrated and the enterprise internal groups are integrated with external enterprises. 3 points for grade 2, the management and control information realize the process integration, data integration and network integration; 2 points for grade 3, the management and control information realize the information integration; 0 point for grade 4, the enterprise management information and control information do not have any integration.[2]

Index C11 Enterprise Leadership and Information Persons in Charge (CIO) Level: refers to the degree to which the enterprise leadership attaches importance to informatization. This index can be divided into four grades: 3 points for grade 1, attaching the greatest importance to informatization, staffing the full-time information department and persons in charge; 2 points for grade 2, attaching fairly great importance to informatization, having the information department and concurrent person in charge; 1 point for grade 3, the degree of attaching importance to informatization is not enough, but having the department concurrently in charge of the functions of the information department; 0 point for grade 4, not attaching importance, not having the information department.

Index C12 Professional Computer Personnel Proportion: refers to the proportion of the college graduates, post graduates of information technology specialty and the engineering and technical personnel engaged in computer design, development to the total
number of the people in the enterprise. This index can be divided into four grades: 3 points for grade 1, 2 points for grade 2, 1 point for grade 3, 0 point for grade 4.

Index C13 Employees Receiving Information Technology Training Level: The proportion of the employees having undergone information technology training to the total number of employees. This index can be divided into four grades: 3 points for grade 1, over 50%; 2 points for grade 2, over 30%; 1 point for grade 3, over 10%; 0 point for grade 4, below 10%.

3 Evaluation Method of Real Estate Enterprise Information

3.1 Determination of the weights

The index weight refers to the numerical indication of the relative importance of each index in the whole system. Whether the weight determination is reasonable or not will exert a decisive influence on the combined evaluation results and evaluation quality. Since the real estate enterprise information evaluation index system is comparatively large, so the level analysis method (AHP) is often adopted to determine the weight of each index[3].

(1) Determination of the guideline level

The weight of the sub-target level is determined by adopting the expert opinion method, i.e. inviting a few experts, under the situation of separation from each other, to fill out the weight survey form respectively, after the forms are collected, overall sorting out is made, and the statistical results are returned to the individual experts, asking them to state reasons and give out corresponding weights. After three rounds of investigations are made of the fifteen experts, the weights obtained are 0.2, 0.3, 0.3, and 0.2.

(2) Determination of the index level

The index level weight adopts the improved AHP method, i.e. first, establish the judgment matrix, each two of the indexes in the sub-target level compare pairwise, give out the judgment value based on the three scales of 0, 1, 2 according to the relative importance degree, thus obtaining the initial judgment matrix. Calculate the collating index of all the index importance degrees.

Translate the three scales’ initial judgment matrixes into formal judgment matrixes, then use the root method to conduct computation and pass the consistency check, it is possible to obtain the weights of C1-C5: 0.15, 0.16, 0.25, 0.21, 0.23, the weights of the corresponding C6-C8 are: 0.2, 0.4, 0.4, the weights of C9-C10 are 0.5, 0.5, the weights of C11-C13 are: 0.25, 0.35, 0.4.

3.2 Method of the combined evaluation

In the informatization evaluation index system, since each index’s dimension, economic significance, form of expression and its functional trend on the general target are different, they do not have the direct comparability, so it is necessary to conduct the dimensionless treatment and the index value measurement, and then it is possible to calculate the combined evaluation results.

It is possible to use the weighted scoring method to conduct the combined evaluation of the index level, i.e.:

$$S'_i = \sum_{j=1}^{n} W'_j S'_{ij} \quad (i = 1, 2, \ldots, m)$$

in which, $S'_i$ is the enterprise informatization quantitative level, $W'_j$ is the index level weight, $S'_{ij}$ is the unit score value.

Then conduct a weighted scoring once more, it is possible to obtain the overall level of the informatization of the said real estate enterprise, i.e.:

$$S_i = \sum_{j=1}^{n} W_j S_{ij} \quad (i = 1, 2, 3)$$

in which, $S_i$ is the enterprise informatization overall level, $W_j$ is the weight, $S_{ij}$ is the unit score value.

After calculating and obtaining the score value of
the enterprise informatization overall level, it is necessary to conduct the standardized revision of it. Set each of the indexes to be grade 1 informatization overall level at 100 points, each of the indexes is the poorest of 0 point, conduct revision of the informatization overall level. Each of the indexes is grade 1 informatization level of 4.1, from this it is possible to obtain the informatization level standard score value of:

\[ S = \frac{S_i}{4.1} \times 100 \]  \hspace{1cm} (4)

4 Real Example Research

4.1 Evaluation of the informatization level of a certain real estate development enterprise

We now conduct the combined evaluation by taking an example of Suzhou Construction Group Co., Ltd. This company is a state real estate development grade 1 qualification enterprise with 248,500,000 yuan of registered capital, and has passed the ISO 9002 International Quality System Certification. It has been rated as a municipal level and provincial level civilized unit for four consecutive years, has been given the titles of the commodity housing combined quality trustworthy unit and the construction ministry national project construction management advanced unit, meanwhile it has been rated as the enterprise financial standing grade of AAA grade by Jiangsu Province International Counseling and Evaluation Company. By the end of 2001, it has developed and constructed a total of 2,400,000 m² of houses of various types, with the project compliance rate at 100%, the excellence rate at 60%. The real estate area under its management amounts to 2,000,000 m².

In early 2001, an expert team (consisting of 15 persons) was set up to conduct the combined evaluation of this company. The results are gathered, which having undergone statistical sorting out, are as shown in Table 1.

<table>
<thead>
<tr>
<th>Index</th>
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</table>

Based on Formulas (2), (3), it is possible to obtain the informatization level of Suzhou Construction Group Co., Ltd. of 2.71. Based on Formula (4), it is possible to obtain its informatization level standard score of 66 points.

4.2 Supplementary explanation

This real example research only shows one state of this enterprise’s informatization level. If it is intended to show the position the enterprise is in the overall informatization level of the local enterprises, it is necessary to conduct combined testing of the informatization level of all the local enterprises. According to the combined testing of the informatization level of twenty real estate enterprises in Suzhou region conducted by this expert team, the informatization level standard score of Suzhou region real estate enterprises is 52 points on the average. It can be seen that Suzhou Construction Group Co., Ltd. is at fairly high level against the local informatization level.

References:

[1] Qiangguo Pu, Yong Wu, The application of system parameter fusion principle to evaluating the level of real estate enterprise informatization, Proceedings of IC-AI’03 (The 2003 International Conference on Artificial Intelligence), Las Vegas, U.S.A. 2003, pp. 538-543
