Satisfaction Evaluation of Strategic Cost Management of Real Estate Enterprises Based on Fuzzy Comprehensive Evaluation Method

CHEN Zhijun[a],*

[a] School of Economics and Management, Nanjing University of Science and Technology, Nanjing, China.
*Corresponding author.

Received 20 August 2015; accepted 15 November 2015
Published online 16 December 2015

Abstract
The quality of strategic cost management on real estate development enterprise, related to long-term development of the company, needs to be evaluated properly. The article is based on fuzzy theory, analyzing theoretically and building the satisfaction evaluation index system on strategy cost management on real estate development enterprise based on commercial ecological system, an objective, quantitative evaluation on satisfaction on strategy cost management work on real estate development enterprise by building fuzzy integrated evaluation method model, solved the fuzziness and uncertainty in the past evaluation, researching on satisfaction degrees on strategy cost management work on a real estate development enterprise in the city of YZ by this method empirically, verifying that the method is scientific and practical.

Key words: Fuzzy comprehensive evaluation; Real estate development enterprise; Strategic cost management; Satisfaction evaluation

INTRODUCTION
The strategic cost management on real estate development enterprises is the hot issue in real estate management, the quality of strategic cost management on real estate development enterprise, related to long-term development of the company, needs to be evaluated properly. Therefore, it is necessary to establish a scientific satisfaction index on strategic cost management on real estate enterprise, and evaluating the work by relevant departments or personnel objectively and fair, the evaluation will have a certain value (Zhang, Lu, & Zhao, 2014). To sum up, it is imperative to build a satisfaction degree evaluation system on strategic cost management on real estate development enterprise; in this paper, we analysis theoretically and build the satisfaction evaluation index system on strategy cost management on real estate development enterprise based on commercial ecological system and apply the fuzzy comprehensive evaluation model to the satisfaction evaluation.

1. FUZZY EVALUATION MODEL CONSTRUCTION OF THE SATISFACTION DEGREE ON REAL ESTATE DEVELOPMENT ENTERPRISE STRATEGIC COST MANAGEMENT
Fuzzy integrated evaluation method is based on fuzzy mathematics, applying the principle of fuzzy relationship synthesis, quantizing some unclear, uneasily quantitative factors, to develop an objective, right, actual, critical evaluation method, the method can solve problems on more factors, fuzzy and subjective judge, a better method to evaluating for variety property, and multiple related factors thoughtfully. It is multi-level and uncertain for satisfaction degree on strategy cost management on real estate development enterprise based on commercial ecological system of real estate development enterprise, so it is more appropriate to evaluate satisfaction degrees on strategy cost management on real estate development enterprise by fuzzy integrated evaluation method; so in this paper, it is decided to use II level fuzzy integrated evaluation method to evaluate the factors on strategy cost.
effect associated degrees based on commercial ecological system in real estate development enterprise, main steps following:

1.1 Evaluation Index System

To build a set of evaluation index $U = (U_1, U_2, U_3, \cdots U_n)$ depending on the target; and, each subset $U_i$ can be continued up to its level of evaluation index $U_{ij}$ to evaluate $U_y = (U_{i1}, U_{i2}, U_{i3}, \cdots U_{in})$, index levels may continue to the next as needed (Han, Li, & Chen, 2014).

Through the literature research and interviews with experts, set evaluation indicators by characteristics of the real estate industry business ecosystem, developing the following evaluation index system based on the four components in a system (see Table 1).

Table 1 Satisfaction Evaluation Index System on Strategic Cost Management on Real Estate Development Enterprise

<table>
<thead>
<tr>
<th>Evaluation objectives</th>
<th>Level evaluation</th>
<th>Secondary index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic strategy cost management of real estate development enterprises satisfaction</td>
<td>Government $U_{i1}$</td>
<td></td>
</tr>
<tr>
<td>System environment $U_1$</td>
<td>Industry association $U_{i2}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Financial institutions $U_{i3}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Upstream suppliers $U_{i4}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Direct customers $U_{i5}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Customer $U_{i6}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Product supplement $U_{i7}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Land $U_{i8}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Engineering development $U_{i9}$</td>
<td></td>
</tr>
<tr>
<td>System core $U_1$</td>
<td>Financial situation $U_{i10}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Management $U_{i11}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marketing $U_{i12}$</td>
<td></td>
</tr>
</tbody>
</table>

1.2 Determine the Weight of Each Indicator

Adjacent indicators compare the method to determine the weight, select 12 experts he listens to on the basis of evaluation of importance, then adjacent important indicator ratios by simple weighted average calculated importance level evaluation $U_i > U_i > U_i$, weighting the results in Table 2.

Table 2 level target weight can be recorded as: $W = (0.17, 0.33, 0.50)$.

Similarly, by 10 experts he listens to determine secondary index weights separately for: $W_1 = (0.45, 0.20, 0.35)$, $W_2 = (0.30, 0.35, 0.15, 0.20)$, $W_3 = (0.25, 0.18, 0.22, 0.17)$.

1.3 Establish a Set of Ratings

According to the actual situation of strategic cost management, combined with expert advice, the evaluation at all levels was identified as 5 ratings Establish Reviews (Liu, Dong, & Li, 2013).

$$V = \{V_i\} = \{\text{Very Satisfied, Satisfactory, Satisfactory, in General, Dissatisfied} \}$$

Evaluation experts from industry-related parties (Governments, banks, partners, owners, etc), the top decision-making levels (President, General Manager and Deputy General Manager, Chief Engineer, Chief Accountant), middle-level leadership (Finance Manager, project manager, Marketing Manager, General Manager, etc.).

1.4 Established Reporting Lines and Fuzzy Matrix $B_i (i = 1, 2, 3)$

According to strategic cost management of real estate development enterprise’s actual, General $U_i (i = 1, 2, 3)$ index $U_y$ under evaluation the extent it belongs to the $k$-th reviews rank $r_{ik}$, available $U_i$ of fuzzy judgement matrix $R_i$ as follows (Li, 2011):

$$R_i = \begin{bmatrix} r_{i11} & r_{i12} & \cdots & r_{i1m} \\ r_{i21} & r_{i22} & \cdots & r_{i2m} \\ \vdots & \vdots & \ddots & \vdots \\ r_{in1} & r_{in2} & \cdots & r_{inm} \end{bmatrix}$$

This paper presents the following algorithm:

$$B_i = W_i \ast R_i$$

The fuzzy appraisal matrix

$$B_i = (b_{i1}, b_{i2}, \cdots, b_{im})$$

Which

$$b_{il_k} = \sum_{j=1}^{l} W_j r_{jk}$$

known in the $B$ layer fuzzy evaluation of matrix $R = (B_1, B_2, B_3)^T$.

1.5 Fuzzy Comprehensive Evaluation

On strategic cost management of real estate development enterprise satisfaction $U$ evaluate $U$ evaluation of results obtained from:
According to the maximum subordination principle, maximum $B_i$ corresponding comment $V_i$ is the best evaluation results (Li, 2011).

### 2. MODELAPPLICATION

This research to YZ city a real estate development enterprise strategy cost management work satisfaction degrees, for cases, it used has experts scoring of way on effect satisfaction degrees of index for actual survey, this times research respectively organization has company senior management who and the sector head, and invited system in the cooperation partners, and competent sector, engaged in strategy cost management of experts total 12 people composition experts group (see Table 3) for has evaluation. Experts found 12 expert marks after scoring and finishing results are valid. Earlier in this article to build model of fuzzy comprehensive evaluation method of indicator and data based on actual statistics, main steps and results of the evaluation are as follows (Wang, Ou, & Zheng, 2011).

#### 2.1 The Composition of the Evaluation Expert

12 evaluation experts, as shown in Table 3.

<table>
<thead>
<tr>
<th>Serial number</th>
<th>Expert sources</th>
<th>Expert professional</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Government authorities</td>
<td>Real estate</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Industry association</td>
<td>Real estate</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Company executives</td>
<td>General manager</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Company executives</td>
<td>The chief engineer</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Company executives</td>
<td>Chief economist</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Company executives</td>
<td>The chief accountant</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Company executives</td>
<td>Financial department manager</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Company executives</td>
<td>Marketing manager</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Cooperative construction enterprises</td>
<td>Construction</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Cooperative financial institutions</td>
<td>Financial</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>Owner</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

#### 2.2 Data Statistics

Effective evaluation tables of statistical data, as shown in Table 4.

<table>
<thead>
<tr>
<th>Level evaluation</th>
<th>Two-level evaluation index</th>
<th>Evaluation grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Very-satisfied</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Satisfaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>More-satisfactory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General-satisfaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dis-satisfaction</td>
</tr>
<tr>
<td>System environment U1</td>
<td>Government U11</td>
<td>4</td>
</tr>
<tr>
<td>Industry association U12</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Financial institutions U13</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Upstream suppliers U21</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>System extension U2</td>
<td>Direct customers U22</td>
<td>0</td>
</tr>
<tr>
<td>Customer of customer U23</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Product supplement U24</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Land U31</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Engineering development U32</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Financial situation U33</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Management U34</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Marketing U35</td>
<td>0</td>
<td>8</td>
</tr>
</tbody>
</table>

#### 2.3 According to the Formula $B_i = W_i \cdot R$, to Calculate Much $B_i$ ($i = 1, 2, 3$)

The results appear as shown below:

\[
B_1 = W_1 \cdot R_1 = \begin{pmatrix}
0.2000 & 0.4667 & 0.2291 & 0.1042 & 0 \\
0.0667 & 0.5333 & 0.2333 & 0.1667 & 0 \\
0.1291 & 0.6125 & 0.1917 & 0.0667 & 0
\end{pmatrix}.
\]

#### 2.4 Put $B_i$ Together Constitute a Hierarchy Fuzzy Evaluation Matrix $R$

\[
R = (B_1, B_2, B_3)^T, \text{ That is}
\]

2.5 Fuzzy Comprehensive Evaluation

On strategic cost management work satisfaction $U$ to make comprehensive evaluation, the comprehensive evaluation results of $U$ is $B = W \cdot R$. That is:
According to the maximum membership degree principle, and learned from the calculation results can be fuzzy comprehensive evaluation of the second indexes set 0.5616 is the largest, and the corresponding evaluation level is satisfaction; so, in YZ city some real estate development enterprise strategic cost management satisfaction results belong to the second level, that is satisfaction.

\[
B = \begin{bmatrix}
0.2000 & 0.4667 & 0.2291 & 0.1042 & 0 \\
0.0667 & 0.5333 & 0.2333 & 0.1667 & 0 \\
0.1291 & 0.6125 & 0.1917 & 0.0667 & 0
\end{bmatrix}
\]

CONCLUSION

Real estate development enterprise strategic cost management satisfaction evaluation from the subjective analysis of real estate development enterprise strategic cost management level, in order to avoid the influence of vulnerability to subjective problem in the analysis, this article mainly from the theoretical analysis and build the real estate development enterprises based on business ecosystem evaluation index system of strategic cost management satisfaction, at the same time, the fuzzy comprehensive evaluation model applied to the evaluation of the degree of satisfaction (Zhang, 2014) the fuzzy comprehensive evaluation method to evaluate real estate development enterprise strategic cost management satisfaction, the method is simple, convenient calculation, Avoided in evaluation in the past a lot of people and uncertainty, for real estate development enterprises and the relevant administrative departments provides a good method and train of thought about real estate strategic cost management job satisfaction assessment.

REFERENCES


