Evaluation Method of Post Competency Based on Fuzzy Analytic Hierarchy Process

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Abstract: In the recruitment process, enterprises will focus on the adaptability of candidates and assign posts to them according to their characteristics. However, at present, enterprises still face the problem of difficult talent team construction. Based on this point, this paper puts forward the research on talent team construction of post competency management based on fuzzy analytic hierarchy process. Firstly, competency assessment indicators are established according to different post properties. The index weight analysis based on fuzzy analytic hierarchy process is realized, and the evaluation index is assigned by the relevant units of the enterprise, and 5 employees are selected as the evaluation objects, so as to verify the evaluation method in this paper. The experimental results show that the traditional evaluation method based only on experience has obvious shortcomings and cannot effectively reflect the post competency of employees. It also puts forward some improvement strategies, such as introducing high-tech talents and providing special talent management services for enterprises, in order to provide references for the construction of enterprise talent team.

Keywords: Post competency management, Fuzzy Analytic Hierarchy Process, Talent team construction, Ability training

1 INTRODUCTION

Since Taylor, the father of management science, put forward the management competency movement, the research on human resources competency has been gradually put on the agenda and widely used in the field of management. The concept of competency was first proposed by McClelland. He clearly points out that the difference between excellent completers and average completers in a certain job reflects the difference in competency, which can be divided into different factors and can be effectively measured, counted and clearly distinguished by the individual characteristics of excellent and average performance. The concept of competency is proposed and constantly developed in management practice, and its main contents include personality, traits, motivation, values, knowledge, skills and abilities [4].

Boyatzi proposed the Onion model of competency, including two parts and three levels: difficult to cultivate and evaluate and easy to cultivate and evaluate. The core level is personality and motivation. The outer layer is attitude and values, social role and self-image. The outermost layer is easy to cultivate and evaluate the knowledge and skills. Spencer proposed the competency iceberg model, which includes the knowledge and skills above the iceberg and the role positioning and values, self-perception, qualities, and motivation below

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the iceberg. TimHall (2013) proposed meta-competency. He believed that meta-competency is a skill that enables individuals to acquire abilities they do not possess. Based on competency, individuals can know their own strengths and weaknesses, so that they can give full play to their abilities in specific tasks. Mount (2016) measured more than 200 enterprise managers and, after analysis, believed that the competency model of managers should include three dimensions, namely, the interpersonal relationship dimension, management ability dimension and technology dimension. Han Yang (2016) emphasized the importance and necessity of selection and training based on competency for government organization work, constructed a competency model specifically for organizational cadres, and then analyzed the content direction and focus of selection and training of organizational cadres based on this model [1].

Traditional human resource management is a kind of human resource management based on position. Competency-based human resource management, the criteria for selecting employees not only focus on explicit characteristics such as knowledge and skills, but also pay more attention to implicit characteristics such as personality and motivation, to help employees make up for their "short board" deficiencies, so that employees can highlight stronger adaptability and competitiveness in the process of business model transformation and business diversification.

At present, micro-enterprises in cities have become a core force to drive the development of urban economy and science and technology, and such enterprises mainly rely on the ability of the talent teams in the development process, so it is very important to establish a stable and good talent team. However, when such enterprises set up talent teams, they often have problems such as shortage of talent supply and instability of talent team due to imperfect talent training mechanisms and insufficient investment in human capital, which limits the development of enterprises to a certain extent and seriously leads to the failure of enterprise management [8]. Unlike large enterprises, small enterprises only introduce market mechanism when facing such problems, and it is difficult to solve these problems by simply regulating the internal human resources management mechanism.

Based on this, this paper adopts a questionnaire survey to understand the current situation of talent team construction of small and medium-sized enterprises in this city, analyzes its existing problems, and proposes solutions according to the problems. The method of network survey is adopted to investigate the staff of certified small and medium-sized science and technology enterprises in a city. According to the hierarchical structure of personnel participating in the questionnaire, the data are sorted out, and the main problems and reasons in the talent construction of small and medium-sized science and technology enterprises are analyzed. The improvement strategies are put forward from the perspective of enterprises.

2 CURRENT SITUATION OF MODERN TALENT TEAM CONSTRUCTION

2.1 Insufficient supply of talents to meet the needs of the posts

In recent years, under the influence of the market economy and employment situation, the number of small and medium-sized enterprises around the country is increasing, and with the continuous development of enterprises, their construction scale is also expanding. Based on

this, the talent gap of such enterprises is very large, that is, the total demand for talents continues to rise. But the number of talents that meet the needs of enterprises has not increased, so there is a contradiction between supply and demand [2]. At present, the problem of "insufficient number of talents and difficult recruitment" is the consensus of the human resources industry in China. According to relevant research, the employment gap of small and medium-sized enterprises in southern coastal provinces and cities is more than 15%, and even if enterprises increase their salaries by more than 20%, it is difficult to recruit suitable talents [10].

This paper, in view of this city enterprise investigation process, from the local enterprise human resources department has also understood that it also has the recruitment difficult problem, but does not exist the labor force serious shortage phenomenon. It still has a big difficult problem, which affects the development of small and medium-sized enterprises because undertaking the personnel recruitment enterprise human resources department work pressure is still big. According to the staff of the human resources department of small and medium-sized enterprises, at present, the most scarce talents in such enterprises are mainly divided into two categories, one is high-tech talents, the other is high-level R & D talents. In terms of the shortage of quantity, the gap of high-tech talents in enterprises is larger, but in terms of the importance of enterprises, the shortage of high-level R & D talents has a greater impact on enterprises.

2.2 The poor stability of talent team construction

At present, most small and medium-sized enterprises generally have the problem of poor stability in the construction of talented team. Frequent job-hopping of employees in micro and small enterprises generally occurs in the early stage and growth stage of enterprise development. When the enterprise enters the growth stage, the human resources of the enterprise will become more stable [11]. Further analysis shows that this is mainly due to the lack of human resources training and the imperfect promotion mechanism in the early stage of development. The weak ability of talent team construction, which leads to the instability of the talent team and the outflow of talents. In the process of development, enterprises also have some concerns about brain drain and are unwilling to invest too much resources in staff training, which further leads to the decline of employee satisfaction with enterprises and further promotes brain drain [7]. In view of this, such enterprises are in sharp contrast to those with scientific promotion mechanisms. The questionnaire designed this time also investigates the reasons why employees choose to change jobs. The results of the questionnaire are shown in Figure 1.

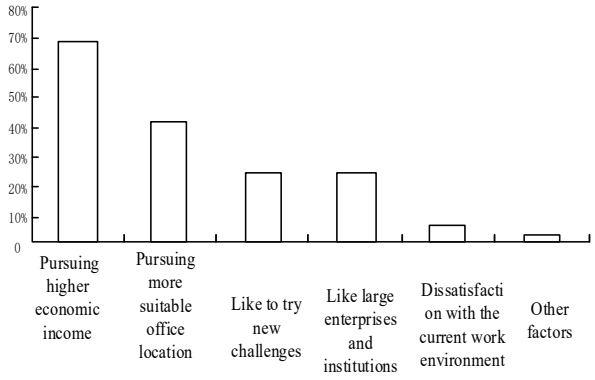

Figure 1 Investigation of reasons for employee job-hopping

As shown in Figure 1, 68.1% of employees choose to change jobs because they want to pursue higher income, followed by about 42.1% of employees who choose to change jobs in order to choose a more suitable place of work, and about 25.1% of employees want to try new job challenges. Some employees were selected because they liked more stable large enterprises and institutions and were not satisfied with the existing corporate culture and interpersonal relationships, with the proportion of 23.8% and 7.7% respectively.

3 RESEARCH ON THE CONSTRUCTION OF TALENT TEAM BASED ON POST-COMPETENCY MANAGEMENT

3.1 Introduce new and high-tech talents in many aspects

In view of the problems existing in the process of talent construction in enterprises at present, considering the post- competence of enterprises, we can introduce high-tech research talents and high-level R & D talents from various aspects. The main way is through school-enterprise cooperation. In order to find talents who can adapt to the development of enterprises more quickly, enterprises should actively implement the school-enterprise cooperation policy with institutions of higher learning [9]. As the ultimate destination of talents, enterprises should actively participate in the process of personnel training, guide the training of talents in Colleges and universities, enhance their practical ability, and make the talents they train closer to the market demand. In school-enterprise cooperation, enterprises need to find schools that meet the job requirements. They accept some students for internship when they are about to graduate, give students enough time to adapt, strengthen their practical ability, so that they can gradually adapt to the work rhythm of enterprises, and then provide convenience for the construction of enterprise talent team [6]. In school-enterprise cooperation, enterprises select students who meet their needs to train, that is, to formulate the outline of students' practice, send special teachers to deal with all kinds of problems in the process of students' practice in enterprises, and evaluate their practical ability to determine whether they meet the standards of enterprise recruitment. Through school-enterprise cooperation, the employability of students can be improved. Talents that meet the needs of their jobs can be provided for enterprises, and market competitiveness can be provided for the development of enterprises [3].

3.2 Provide special talent management services

To solve the problem of brain drain caused by poor human resource management levels in small and medium-sized enterprises, it can be carried out from the perspective of strengthening special talent management services, that is, providing active services for talents in key areas such as labor disputes when necessary [12]. In view of this, it can be improved in three aspects. The first is to strengthen the information service of talent policy, that is, enterprises should establish a platform for talent policy exchange, problem consultation and feedback with other enterprises through the Internet, analyze the commonality of the problem of talent drain in enterprises, and discuss corresponding solutions [5]. Secondly, enterprises should do a good job in the management of professional title declaration of talents, give full play to the guiding and motivating role of professional title, and thoroughly implement that the declaration of the professional title of talents is not restricted by region, identity, working years and other restrictions, increase the publicity and business guidance of professional title declaration, and promote the comprehensive development of related work. Finally, technology-based small and medium-sized enterprises should take the initiative to establish standardized a labor security system and welfare treatment systems. If they have disputes with employees, they should solve labor disputes on the premise of legality, fairness, and justice.

4 POST COMPETENCY EVALUATION SYSTEM BASED ON FUZZY ANALYTIC HIERARCHY PROCESS

4.1 Establishment of post competency evaluation index system

To realize the accurate assessment and evaluation of workers in different positions, an assessment index system for the work content of workers is constructed. According to Spence and his wife's point of view, we roughly divide the competency into benchmark success and discrimination competency. Then, we establish a three-level index system based on the fuzzy analytic hierarchy process to analyze the ability needs of applied logistics talents, which are the general index layer, sub-index layer and sub-index layer. The system structure is as follows: the total index level is applied logistics talent ability demand factor A; the sub-index layer is divided into three parts: benchmark competency B1, discrimination competency B2 and service competency B3.

The index system adopts a hierarchical way to divide the index level, that is, to refine the content of the assessment index, which is to improve the assessment and evaluation index system. According to this method, a hierarchical index system is established, which is displayed in Table 1.

Table 1 Job competency evaluation system

Sub-indicators	Sub-indexes
Benchmark competence B_1	Ability to master basic knowledge of the industry C_{11}
	Ability to master professional knowledge of the post C_{12}
	Facility and equipment operational capability C_{13}

	Information technology application ability C_{14}
	Basic skills of enterprise operation C_{15}
	Cost awareness and data analysis capabilities C_{16}
Discriminative competence B_2	Sense of service C_{21}
	Responsibility C_{22}
	Interpersonal communication skills C_{23}
	Self-confidence and self-awareness C_{24}
	Team spirit C_{25}
	Personal morality and professional ethics C_{26}
Service competence B_3	Work service C_{31}
	External work C_{32}
	Social services C_{33}

In this paper, the benchmark competency is divided into six parts: industry basic knowledge C_{11}, post professional knowledge C_{12}, facilities and equipment operation C_{13}, information technology application C_{14}, enterprise basic operation skills C_{15}, cost awareness and data analysis C_{16}.

The discriminating competence is divided into six aspects: service consciousness C_{21}, responsibility C_{22}, interpersonal communication ability C_{23}, self-confidence and self-awareness C_{24}, team spirit C_{25}, personal morality and professional ethics C_{26}.

The service competency is divided into three aspects: work service C_{31}, external work C_{32} and social service C_{33}.

According to the evaluation index system of post competency assessment, in order to ensure that the index system meets the evaluation needs in the actual work, after the completion of the design, the index system is filled according to the actual work content of the post. It intends to realize the comprehensive optimization and real-time update of the construction index system.

4.2 Index weight analysis based on fuzzy analytic hierarchy process

The fuzzy analytic hierarchy process is introduced to analyze the weight of different indicators to ensure the authenticity and reliability of the evaluation results. In the process of analysis, it is necessary to construct a fuzzy consistent matrix of the same level evaluation index, and grasp the importance of the index in the evaluation by comparing the same level index in pairs. In this study, the commonly used scale method is applied to compare the index weights. The scale value is between 0.1 and 0.9. The description of the fuzzy scale method is displayed in Table 2.

Table 2 Index fuzzy scale

Scale value	Instructions	Scale definition
0.4;0.3; 0.2:0.1	Assuming that the two elements to be compared are expressed as I and j, and the judgment result obtained is expressed as r_{ij}, the relative comparison result obtained for j can be expressed as $r_{ij} = 1_{-rji}$	Relative comparison method
0.5	After comparing the two indicators, the importance level of the two indicators is the same.	Same importance level
0.6	After comparison, one of the indicators is slightly more important than the other.	Slightly important
0.7	After comparison, one of the indicators is more important than the other	Important
0.8	After comparison, one of the indicators is significantly more important than the other	Significantly important
0.9	After comparison, one of the indicators is much more important than the other	Extremely important

Assuming that in this process, the two evaluation indexes are respectively represented as I and j. The relationship between the two must satisfy the equation relationship rij = 1-rji during fuzzy evaluation and comparison. Therefore, R is represented as a consistency matrix, and the weight values of the assessment index elements in different index layers are calculated according to the fuzzy characteristics of the matrix. The calculation equation is expressed by equation (1):

$$W_{i=}\frac{1}{n}-\frac{1}{2\alpha}+\frac{1}{n\alpha}\times\sum_{k>1}^{n}r_k \tag{1}$$

Where, Wi refers to the weight value of the corresponding index I in the evaluation; n is the index layer; α refers to the importance level (scale value); k refers to the number of indexes; and r represents the fuzzy property. Where, the value of I satisfies i∈Ω. The value of Ω is between 1 and n. The value of α in the equation is represented by (n-1)/2. According to the method, the analysis of the index weight based on the fuzzy analytic hierarchy process is completed.

4.3 Evaluation of examination results based on fuzzy evaluation matrix

After the completion of the above research, through the construction of fuzzy evaluation matrix, the results of job competency assessment are evaluated. In this process, it should be clear that the fuzzy comprehensive evaluation of employees is a comprehensive evaluation of individual behavior considering the influence of various external factors and combining with the fuzzy calculation equation. Assuming that U represents the multiple factors of the job object, U can be expressed as { U1; U 2; U3; ⋯ ; Um }. Each evaluation index represents V in n decision forms of the object to be evaluated in its state, and V is represented as { V1; V2; V3;.. ； Vn}. It is known that the performance evaluation results of job competence are determined by n indicators, and the corresponding weight values of each indicator are different. In this case, the assignment of weights can be regarded as the previous fuzzy subset. The corresponding subset is denoted as A, then A is denoted as {α1;α2;α3;…;αm}, where the value

of αi must be a value greater than 0. Through the fuzzy evaluation analysis of each factor in the evaluation index system, a complete judgment matrix can be obtained. The judgment matrix is expressed as R, and the corresponding expression of R is as follows formula (2):

$$R = \begin{bmatrix} R_1 \\ R_2 \\ \cdots \\ \cdots \\ R_n \end{bmatrix} = \begin{bmatrix} r_{11} r_{12} \cdots r_{1n} \\ r_{21} r_{22} \cdots r_{2n} \\ \cdots \\ r_{m1} r_{m2} \cdots r_{mn} \\ \end{bmatrix} \tag{2}$$

Where, Ri refers to the single-factor evaluation result of the ith evaluation index, and it can be considered that the calculation factors of Ri and rji maintain a certain consistency in terms of comments. To ensure the consistency of the frequency distribution of different indexes in the evaluation process, the evaluation indexes are normalized, that is, the calculated value of $\sum_{j>1}^{n} r_{ij}$ is equal to 1.0.

After ensuring that the relevant indicators in the evaluation process meet the requirements, the evaluation results for the work competency assessment are output by means of compound calculation. The calculation equation is as follows formula (3):

$$B = A \cdot B = \left(b_1, b_2, b_3, \cdots, b_n \right) \tag{3}$$

Where, bj is the degree to which the evaluation object of work competency assessment has comments, that is, the membership degree of the fuzzy set. According to this method, the evaluation indexes are extracted from the membership data set. The single value calculation of the indexes is carried out according to the method proposed above. The final calculation results are given weight scores to realize the normalization of the evaluation results of different indexes. To sum up, it realizes the evaluation of assessment results based on the fuzzy evaluation matrix, and completes the research of job competency assessment evaluation system based on the fuzzy AHP.

5 PRACTICAL APPLICATION OF EVALUATION SYSTEM

The evaluation system is connected with a university to prove the effectiveness of the job competency evaluation system designed in this paper. A number of employees are chosen as the object of job competency evaluation. There are 5 employees in total, which are defined as J1 ~ J5. The working experience is 1 year, 2 years, 3 years, 3 years and 4 years respectively. The salary of the employee with the shortest working experience is the lowest, and the salary of the employee with the longest working experience is the highest, which can be seen from the order of salary. The evaluation of post competency in enterprises is mostly based on the

length of service and effective working hours, which has the problem of singleness. Therefore, the system in this paper is adopted to make a comparative analysis.

In this study, a number of relevant enterprises and departments were interviewed through enterprise visits and questionnaires. A total of 12 relevant leaders from the human resources department and the management department were invited to score the importance of the indicators through the pairwise comparison method. The weight table of the evaluation indicators was obtained through calculation (as displayed in Table 3).

Table 3 Job competency evaluation system

Sub-indicators	Weight $\bar{W}$	Sub-indexes	Weight W_i
B_1	0.3218	C_{11}	0.1043
		C_{12}	0.2134
		C_{13}	0.1425
		C_{14}	0.1735
		C_{15}	0.2114
		C_{16}	0.1549
B_2	0.4790	C_{21}	0.1844
		C_{22}	0.2339
		C_{23}	0.1981
		C_{24}	0.1125
		C_{25}	0.1628
		C_{26}	0.1083
B_3	0.1992	C_{31}	0.3324
		C_{32}	0.3011
		C_{33}	0.3665

The performance evaluation results of five employees are calculated through the system in this paper, and the specific values are displayed in Table 4.

Table 4 Post competency evaluation results of assessment objects

Employees		J1	J2	J3	J4	J5
Scores	A	24.8	13.5	13.4	12.2	20.3
	B	6.8	21.3	7.6	2.8	22.9
	C	7.8	3.5	18.1	2.5	19.5
Total scores		39.4	41.3	39.1	17.5	62.7
Result grades evaluation		C	B	D	E	A

In Table 4, among the 5 employees who participated in the post competency evaluation, the total score of J5 was higher than that of J2, J1, J3 and J4. The final results do not match the original performance evaluation results of five personnel based on work experience. It is clear that the early use of the work evaluation system only evaluates the comprehensive ability and work level from a single level, and can not evaluate the different levels of post personnel from multiple perspectives. Therefore, this system realizes the comprehensive evaluation of individual ability from different levels, which is to optimize the salary and treatment of grass-roots posts, and ensure the fairness, impartiality and comprehensiveness of individual evaluation.

6 CONCLUSION

In the process of enterprise investigation, based on the consideration of post competence, there are shortcomings and team building is not stable enough. This paper gives improvement countermeasures from two aspects. First, they should introduce high-tech talents in many ways. Enterprises can strengthen school-enterprise cooperation by participating in the training process of talents, so that they can meet the job requirements and provide convenience for the components of the enterprise talent team; Second, they should take the initiative to provide management services for special talents. Enterprises should keep abreast of the relevant national policies on talent management, and actively communicate with other enterprises.

When evaluating the professional titles of talents, they should strictly follow the relevant policies and personal abilities, so that they will not be affected by the region, age and working years. When there are labor disputes among talents, they should also strictly abide by the relevant systems to safeguard their rights. Through the above two improvement strategies, we can optimize the talent team management of enterprises from two aspects of introducing talents and retaining talents.

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