Research on Competency Model of Top Management of Coal Enterprises

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Abstract. Coal is China's main disposable energy, in the next few decades coal is the main disposable energy pattern will not change. Therefore, the development of coal enterprises has a very important impact on the development of China's national economy, and the development prospect of enterprises is inseparable from the management of enterprises, that is, the ability of managers determines the development direction of enterprises, and then has an impact on China's economic structure. It is in this paper, we study the intent of the coal enterprise top managers competency model, and to top managers of coal enterprises as the research object, through the literature research method to determine the research item, in turn, implementation of questionnaire survey, the reliability and validity of the sample is analyzed, and using the factor analysis method from 28 competency characteristics, extract the key factors in building up coal enterprise top managers competency model.

1. Introduction

As early as the Neolithic Age six or seven thousand years ago, China discovered the existence of coal and discovered its flammability. Since the Han Dynasty, coal has been used for ironmaking, and Western Han began to mine iron. Until today, coal has become the basic guarantee for the rapid and sustainable development of China's economy.

However, due to the serious exploitation of coal, many problems have appeared in the ecological environment, national resources and society, which has led to a downward trend in coal production. Faced with such fluctuating situations, the profitability of enterprises and the economic development of the country have been hit to a certain extent. The top management of coal enterprises, as the core strength of the whole enterprise, has an unshirkable direction for the development direction and profitability of enterprises.

There are already many researchers in the country who have proposed a competency model. Shi Kan conducted a competency study on the senior management of China's communication industry through interviews with behavioral events [3]. Through research on the competency model construction of a large private joint-stock enterprise executive, Yang Fan found that in the modeling process [4]. Liao Yuan built a competency model for tourism managers, and his model research yielded six competencies for managers in the tourism industry. [5]. The exploration and practice of competency features originated in the United States and is represented by McBer. Aldrege and Nilan built 3M's global competency model [6]. Olesen et al. established a Microsoft leadership model that
includes benchmarking capabilities, future-oriented capabilities, and identifying three different dimensions of competitors [7].

Although domestic and foreign research on competency models has made great progress and has been applied in many fields, there are few studies on the coal industry. In the coal industry, “safety first” is the primary policy to be implemented. Based on this point, this paper needs to give more consideration when constructing the top-level features of senior management.

2. Theoretical review
Senior management not only has the role of guiding the development of the enterprise, but the development of a company is inseparable from whether it has a path suitable for the development of the enterprise. In short, it is the role of the leader. Moreover, it is necessary to develop a development plan for the enterprise to achieve certain goals and achievements within a certain period of time, so as to achieve the purpose of corporate profitability. At the same time, the decision-making of the enterprise is also decided by the top management. The correctness of the decision-making will directly affect the height that the enterprise can achieve. Therefore, senior managers have a pivotal position in the entire enterprise, so they are researched. This paper studies the top management, referring to the senior managers of the company's chairman, CEO, deputy general manager, director, etc. in the corporate organization.

3. Research process
The questionnaire was distributed to the senior managers of the coal enterprises who are employed and graduated from the EMBA. Questionnaire type uses the Likert five-level scale assignment method, and these grades are divided into five grades according to the most "very consistent, consistent, general, rarely meet, non-conformity", respectively assigned 5, 4, 3, 2 and 1 point.

3.1. Overview of questionnaire design and research.
Through the study of human resources theory, organizational behavior theory, organization of leadership theory and other literature, 28 characteristics of this survey item are obtained. a1 Organizational management capabilities, a2 Mining risk prediction and conflict resolution skills, a3 Self-learning ability, a4 Coal expertise and skills, a5 Fit with superior manager, a6 Affinity, a7 Collaborative operation, a8 Personality charm, a9 Social Responsibility of Coal Enterprises, a10 Long-term vision, a11 Team building ability, a12 Grasp the overall awareness, a13 Loyalty, a14 Change and innovation, a15 Interpersonal relationship construction and maintenance, a16 Cultivation or assisted subordinates, a17 Comprehension, a18 Leadership, a19 Supervision, a20 Personal willingness to cooperate, a21 Work experience, a22 Effective negotiation skills, a23 Coordination between different functional areas Ability, a24 High sense of responsibility, a25 Quickly change roles, a26 Trade-off ability, a27 Respect the same level, a28 Security crisis management.

The survey object of this survey is the senior management of W coal enterprises. The survey worker distributed 140 questionnaires and collected 132 questionnaires, compared with 126 actual questionnaires. The recovery rate of the final questionnaire was 94.3%, and the effective rate of the questionnaire was 95.45%.

3.2. Test of reliability and validity of the sample
Reliability analysis is the basis and premise of the statistical work of the questionnaire. It is an important indicator for the investigation and investigation. The lack of reliability investigation is of no value. This paper uses the Cronbach coefficient method, which is a widely used reliability test method. The formula is as follows:
Among them, $s_i^2$ is the internal variance of the $i$ score of the first item; $s_T^2$ is the variance of the total score of all items and $n$ is the number of questions.

The value of the $\alpha$ coefficient is between 0-1. The closer to 1, the higher the reliability of the scale, the higher the internal consistency of the scale. When $\alpha$ is greater than 0.4, it can be trusted. The reliability of the relevant variables was analyzed by the spss19.0 software, as shown in Table 1. It can be seen that the $\alpha$ coefficient of the competency measurement scale of the senior management of coal enterprises is 0.782, and the reliability test of the sample is passed. It can be seen from Table 2 that in the descriptive statistics and common factor variance table, the average value of all items is greater than 3, and the common factor variance is greater than 0.5, so these 28 items can be retained.

Table 1. Measurement indicators of competency characteristics of senior managers of coal enterprises

| Cronbach's $\alpha$ | Number of items |
|---------------------|-----------------|
| 0.782               | 28              |

| Number | Competency Features                                      | Average value | Correlation | Sort |
|--------|----------------------------------------------------------|---------------|-------------|------|
| a1     | Organizational management capabilities                    | 4.45          | 0.603       | 1    |
| a2     | Mining risk prediction and conflict resolution skills    | 4.31          | 0.671       | 5    |
| a3     | Self-learning ability                                    | 4.23          | 0.617       | 7    |
| a4     | Coal expertise and skills                                | 4.35          | 0.709       | 3    |
| a5     | Fit with superior manager                               | 4.07          | 0.778       | 12   |
| a6     | Affinity                                                 | 3.95          | 0.783       | 13   |
| a7     | Collaborative operation                                  | 3.67          | 0.734       | 25   |
| a8     | Personality charm                                        | 4.11          | 0.641       | 10   |
| a9     | Social Responsibility of Coal Enterprises                | 3.75          | 0.703       | 23   |
| a10    | Long-term vision                                         | 4.32          | 0.748       | 4    |
| a11    | Team building ability                                    | 3.74          | 0.777       | 15   |
| a12    | Grasp the overall awareness                              | 3.95          | 0.67        | 14   |
| a13    | Loyalty                                                  | 3.89          | 0.709       | 19   |
| a14    | Change and innovation                                    | 3.91          | 0.807       | 17   |
| a15    | Interpersonal relationship construction and maintenance  | 3.79          | 0.569       | 22   |
| a16    | Cultivation or assisted subordinates                     | 3.74          | 0.811       | 24   |
| a17    | Comprehension                                            | 4.15          | 0.641       | 9    |
| a18    | Leadership                                               | 4.21          | 0.698       | 8    |
| a19    | Supervision                                              | 3.82          | 0.657       | 21   |
| a20    | Personal willingness to cooperate                         | 3.54          | 0.517       | 27   |
| a21    | Work experience                                          | 3.67          | 0.546       | 26   |
| a22    | Effective negotiation skills                              | 3.89          | 0.764       | 18   |
| a23    | Coordination between different functional areas Ability   | 3.92          | 0.711       | 16   |
| a24    | High sense of responsibility                             | 4.24          | 0.714       | 6    |
| a25    | Quickly change roles                                     | 4.09          | 0.76        | 11   |
| a26    | Trade-off ability                                        | 3.85          | 0.719       | 20   |
| a27    | Respect the same level                                   | 3.31          | 0.547       | 28   |
| a28    | Security crisis management                               | 4.39          | 0.647       | 2    |
3.3. Validity analysis of the questionnaire

Before the statistical analysis of the questionnaire, the inspection link of the questionnaire data is indispensable. The correlation between the variables is calculated by Bartley's spherical test and KMO test to determine whether the survey should be factor analysis. The KMO statistic is to judge the correlation between variables by comparing the simple correlation coefficient and the partial correlation coefficient between variables. When the correlation is strong, the KMO value is close to 1. The results of the KMO and Bartlett tests for this questionnaire are shown in Table 3 below.

| Sampling enough KMO metrics | 0.847 |
|-----------------------------|-------|
| Bartlett's sphericity test  |       |
| Approximate chi square      | 1093.519 |
| df                          | 249   |
| Sig.                        | 0.000 |

As can be seen from Table 3 the KMO value of the competency characteristics of the senior managers of coal enterprises is 0.847, and the Bartlett spherical test approximates the chi-square value of 1093.519 (degree of freedom is 249, p<0.001), indicating that the survey data is very suitable for factor analysis. The rotation load matrix analysis of the factors is shown in Table 4:

| Table 3. KMO values and Bartlett spherical test results |
|--------------------------------------------------------|
| factor1 | factor2 | factor3 | factor4 | factor5 | factor6 |
|--------------------------|----------|----------|----------|----------|----------|
| a28 Security crisis management | 0.713 | | | | |
| a17 Comprehension | 0.697 | | | | |
| a10 Long-term vision | 0.585 | | | | |
| a5 Fit with superior manager | 0.547 | | | | |
| a13 Loyalty | 0.540 | | | | |
| a4 Coal expertise and skills | 0.802 | | | | |
| a24 High sense of responsibility | 0.767 | | | | |
| a14 Change and innovation | 0.602 | | | | |
| a11 Team building ability | 0.590 | | | | |
| a18 Leadership | 0.573 | | | | |
| a19 Supervision | 0.558 | | | | |
| a6 Affinity | 0.524 | | | | |
| a16 Cultivation or assisted subordinates | 0.712 | | | | |
| a3 Self-learning ability | 0.652 | | | | |
| a2 Mining risk prediction and conflict resolution skills | 0.611 | | | | |
| a23 Coordination between different functional areas Ability | 0.536 | | | | |
| a9 Social Responsibility of Coal Enterprises | 0.451 | | | | |
| a7 Collaborative operation | 0.449 | | | | |
| a15 Interpersonal relationship construction and maintenance | 0.68 | | | | |
| a8 Personality charm | 0.62 | | | | |
| a22 Effective negotiation skills | 0.59 | | | | |
| a12 Grasp the overall awareness | 0.796 | | | | |
| a25 Quickly change roles | 0.755 | | | | |
| a26 Trade-off ability | 0.527 | | | | |
| Eigenvalues | 3.082 | 4.416 | 1.364 | 2.047 | 1.89 | 2.087 |
| Variance interpretation rate | 35.936 | 9.368 | 6.947 | 6.323 | 5.949 | 5.453 |
| Cumulative variance interpretation rate | 35.936 | 45.304 | 52.251 | 58.574 | 64.523 | 69.976 |

Table 4. Factor Rotational Load Matrix and Variance Contribution Rate
The principal component analysis method was used to analyze the questionnaire factors. After orthogonal rotation and factor screening analysis, a total of 6 factors were obtained, and the cumulative variance was 69.976%, indicating that the questionnaire has good structural validity.

For the result of factor analysis, the retention factor load is greater than 0.4. The six factors are shown in Table 4, which constitutes the competency model of the top management of coal enterprises. Factor1 contains five feature elements: security crisis handling ability, comprehension, long-term vision, fit with superior managers, and loyalty, which can be attributed to executive power.

Factor2 contains seven characteristics that are coal expertise and skills, high sense of responsibility, change or innovation, team building, leadership, supervision, and affinity, which can be attributed to leadership.

Factor3 contains two characteristic elements, namely the ability to develop or cultivate subordinates and self-learning, which can be attributed to the elements of counseling.

Factor4 contains four characteristic elements: skills for predicting and resolving conflicts, coordination between different functional areas, social responsibility of coal enterprises, and coordinated operations, which can be attributed to coordination factors.

Factor5 contains three feature elements: interpersonal relationship construction and maintenance, personality traits, and effective negotiation skills, which can be attributed to contact factors.

Factor6 contains three characteristic elements, namely, grasping the global consciousness, rapidly changing the role, and balancing the ability, which can be attributed to the role conversion ability.

4. Conclusion
According to the characteristics of the coal industry with risk and uncertainty, high technical and professional knowledge, sudden conflicts and literature research, this paper puts forward the elements of the senior management of coal enterprises and builds the competent managers of coal enterprises. The paper summarizes through questionnaires and literature research, and applies reliability verification analysis to extract the six competencies of the senior managers of coal enterprises. The model includes six feature factors: Execution (ES), Leadership (LS), Coaching (CS), Coordination (CC), Liaison (LC), and Role Conversion (RC), from four dimensions. Research on senior managers of coal enterprises. The six factors of this model reflect the characteristics of the senior managers of coal enterprises, and also provide a reference direction for enterprises to select outstanding senior managers, and also provide the basis for other similar enterprises to select senior managers.

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