Research on Performance Evaluation Index System of New Generation Information Technology Enterprises

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ABSTRACT

Based on the analysis of new generation of information technology enterprises and add relevant indexes of enterprise technological innovation, this paper puts forward thinking’s of the performance evaluation index system of new ideas generation of information technology enterprises. This paper considers in three ways which are Enterprise operation investment, operation process and operation output. In addition, this paper uses the method of analysis from the perspective of principal utility and AHP method to select indicators and determine the weights.

KEYWORDS

New generation information technology enterprise; performance evaluation index; technology innovation; principal utility.

INTRODUCTION

Information technology industry, characterized by big data, social networking, mobile Internet and cloud computing, it focuses on service technologies and horizontal penetration into the financial, manufacturing and other industries. December 19, 2016, the State Council issued the "13th Five-Year" national strategic emerging industry development plan ". It clearly points out that we should further develop and expand the strategic emerging industries, including the new generation of information technology. The plan also says we will strive to achieve a systematic breakthrough in the weak link of the new generation of information technology industry, with a total output value exceeding 12 trillion yuan by 2020.

The enterprises in the new generation of information technology industry have three distinct characteristics. Firstly, they are capital intensive, technology intensive, and have higher demand for technological innovation. Secondly, they need innovative research and development personnel and technical personnel. Thirdly, the outcome of information technology products is closely related to everyone’s life. The new generation of information technology enterprise performance evaluation system which based on these characteristics, can provides certain decision-making basis and reference for the development of the new generation of information technology industry in China.

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In the current study, the efficiency of the enterprise operation process is not considered in the evaluation method and there are some one-sidedness in the evaluation system. So, this paper attempts to put forward some ideas about how to build a new generation of information technology enterprise performance evaluation system from different angles.

**CONSTRUCTION OF PERFORMANCE EVALUATION INDEX SYSTEM FOR NEW GENERATION INFORMATION TECHNOLOGY ENTERPRISES**

**Index selection and construction.**

The selection and construction of indicators are as follows.

The first one is enterprise operation investment. The operation investment of new generation information technology enterprise mainly refers to the investment of enterprise in fund, personnel, technology and so on. The core competitiveness of enterprises is mainly embodied in R & D results and technological innovation. In order to better reflect the impact of enterprise investment on Enterprise Performance, we should give full consideration to technological innovation investment, capital investment and R & D capability as important influencing factors.

| Target layer | A layer | B layer | C layer | Computing method |
|--------------|---------|---------|---------|------------------|
|               | B1      | C1      | C2      | C3               |
| A1            | B2      | C4      | C5      |                  |
| A2            | B3      | C6      | C7      |                  |
|               | B4      | C8      | C9      |                  |
| B4            | C10     | C11     | C12     |                  |
| B5            | C13     | C14     | C15     |                  |
| B6            | C16     | C17     | C18     | C19              |
| B7            | C20     | C21     | C22     |                  |

**TABLE 1. PERFORMANCE EVALUATION INDEX OF NEW GENERATION INFORMATION TECHNOLOGY ENTERPRISES.**

| Target layer | A layer | B layer | C layer | Computing method |
|--------------|---------|---------|---------|------------------|
|               | B1      | C1      | C2      | C3               |
|               | B2      | C4      | C5      |                  |
|               | B3      | C6      | C7      |                  |
|               | B4      | C8      | C9      |                  |
|               | B5      | C10     | C11     |                  |
|               | B6      | C13     | C14     |                  |
|               | B7      | C16     | C17     |                  |
|               | B8      | C18     | C19     |                  |
|               | B9      | C20     | C21     |                  |

| Target layer | A layer | B layer | C layer | Computing method |
|--------------|---------|---------|---------|------------------|
|               | B1      | C1      | C2      | C3               |
|               | B2      | C4      | C5      |                  |
|               | B3      | C6      | C7      |                  |
|               | B4      | C8      | C9      |                  |
|               | B5      | C10     | C11     |                  |
|               | B6      | C13     | C14     |                  |
|               | B7      | C16     | C17     |                  |
|               | B8      | C18     | C19     |                  |
|               | B9      | C20     | C21     |                  |

| Target layer | A layer | B layer | C layer | Computing method |
|--------------|---------|---------|---------|------------------|
|               | B1      | C1      | C2      | C3               |
|               | B2      | C4      | C5      |                  |
|               | B3      | C6      | C7      |                  |
|               | B4      | C8      | C9      |                  |
|               | B5      | C10     | C11     |                  |
|               | B6      | C13     | C14     |                  |
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|--------------|---------|---------|---------|------------------|
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|               | B2      | C4      | C5      |                  |
|               | B3      | C6      | C7      |                  |
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|               | B5      | C10     | C11     |                  |
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|               | B2      | C4      | C5      |                  |
|               | B3      | C6      | C7      |                  |
|               | B4      | C8      | C9      |                  |
|               | B5      | C10     | C11     |                  |
|               | B6      | C13     | C14     |                  |
|               | B7      | C16     | C17     |                  |
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|               | B2      | C4      | C5      |                  |
|               | B3      | C6      | C7      |                  |
|               | B4      | C8      | C9      |                  |
|               | B5      | C10     | C11     |                  |
|               | B6      | C13     | C14     |                  |
|               | B7      | C16     | C17     |                  |
|               | B8      | C18     | C19     |                  |
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|               | B3      | C6      | C7      |                  |
|               | B4      | C8      | C9      |                  |
|               | B5      | C10     | C11     |                  |
|               | B6      | C13     | C14     |                  |
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|               | B8      | C18     | C19     |                  |
|               | B9      | C20     | C21     |                  |
The second one is enterprise operation process. The policy and economic factors of the external macro environment will also influence the new generation of information technology industry market, which will have a certain extrapolation effect on the operation process of enterprises. From the analysis of the enterprise itself, the main function of the enterprise in the process of operation is different, and the standard of measuring the performance of enterprises is also different.

The last one is enterprise operation output. The output capability of the new generation of information technology enterprises is mainly embodied in the income of technology innovation products and the promotion of technology. Only by keeping the core competitive power and good profitability can the enterprise attract more investors and customers, and ensure the rapid development of the enterprise.

Based on the above analysis, this paper establishes a new generation of information technology enterprise performance evaluation index system based on principal utility, which is shown below.

### Index weight setting

In this paper, AHP method is used to determine the weight of each index. First of all, questionnaires are given to experts, and experts are invited to compare the A indexes with 22. Experts used 1~9 scales to score. After scoring, the score of relative importance of A index was obtained. Table 2.

After calculation, the largest characteristic roots of the matrix A, $\lambda_{\text{max}}=3.0012$, $\text{CI}=0.0006$, consistency index $\text{CR}=0.0011<0.1$. The consistency test was adopted. At this time, the weight vector of A is $(0.3697, 0.3447, 0.2856)$. Similarly, the index weights of the B and C layers can be obtained, and the detailed results are shown in table 3.

As can be seen from table 3, the index of enterprise operation input has the biggest impact on enterprise performance, accounting for 36.97%. It shows that the index of enterprise operation investment occupies a leading position in the new generation of information technology enterprises. In the second is the enterprise operating process indicators, accounting for 34.47%, only slightly lower than the previous indicator. It is obvious that the impetus of enterprise operation to enterprise performance is also obvious. Enterprise operation output index proportion is 28.56%. It shows that output plays an important role in enterprise performance evaluation, especially the decision making that will affect the operation investment of the next year.

Overall, the proportion of technical personnel, R & D expenditure growth rate, the average cycle of new product development, employee satisfaction, the proportion of new products are more important indicators. This requires enterprises to actively carry out technological innovation, shorten the R & D cycle, improve efficiency, train more skilled personnel, and promote further development of enterprises.
TABLE 3. WEIGHT OF PERFORMANCE EVALUATION INDEX.

| A layer | B layer | C layer | Comprehensive weight |
|---------|---------|---------|----------------------|
| index   | weight  | index   | weight   | index   | weight   | weight |
| A1      | 0.3697  | B1      | 0.39     | C1 R & D investment ratio | 0.17 | 0.0245 |
|         |         |         |          | C2 Technical staff ratio | 0.45 | 0.0649 |
|         |         |         |          | C3 Technology innovation patent proportion | 0.38 | 0.0548 |
| A2      | 0.3447  | B2      | 0.20     | C4 Ratio of main business cost | 0.62 | 0.0458 |
|         |         |         |          | C5 Operating cost growth rate | 0.38 | 0.0281 |
|         |         | B3      | 0.41     | C6 R & D expenditure growth rate | 0.45 | 0.0682 |
|         |         |         |          | C7 Average cycle of new product development | 0.55 | 0.0834 |
| A3      | 0.2856  | B4      | 0.32     | C8 Proportion of technical exchange meetings | 0.50 | 0.0552 |
|         |         |         |          | C9 Proportion of technological innovation projects | 0.50 | 0.0552 |
|         |         | B5      | 0.37     | C10 Market share | 0.26 | 0.0332 |
|         |         |         |          | C11 Customer retention rate | 0.37 | 0.0472 |
|         |         |         |          | C12 Customer satisfaction | 0.37 | 0.0472 |
|         |         |         |          | C13 Staff per hour training hours | 0.43 | 0.0459 |
|         |         |         |          | C14 Employee satisfaction | 0.57 | 0.0609 |
|         |         | B6      | 0.31     |         |         |         |
|         |         |         |          |         |         |         |
|         |         | B7      | 0.33     | C15 New product ratio | 0.66 | 0.0622 |
|         |         |         |          | C16 Proportion of self created intangible assets | 0.34 | 0.0320 |
|         |         | B8      | 0.29     | C17 Revenue growth rate | 0.35 | 0.0290 |
|         |         |         |          | C18 Return on equity | 0.36 | 0.0298 |
|         |         |         |          | C19 Total assets yield | 0.29 | 0.0240 |
|         |         | B9      | 0.38     |         |         |         |
|         |         |         |          |         |         |         |
| SUMMAR

Summary

Research conclusion

From the three aspects of enterprise operation input, process and output, this paper constructs a new generation of information technology enterprise performance evaluation index system based on main body utility. Overall, the performance evaluation index system broadens the construction of the new generation of information technology enterprise performance evaluation system, and strengthens the pertinence, effectiveness and guiding role of enterprise performance evaluation. Specifically, enterprise managers can understand the present situation of enterprises, guide the operation of enterprises and improve the core competence of the new generation of information technology companies through the system.

Suggestion

Firstly, strengthen the policy support of technology, funds and talents. The new generation of information technology industry has the characteristics of high investment, great risk and long cycle, so it needs to invest a lot of money in the early
stage of enterprise operation. This requires the government to strengthen policy
support, such as preferential policies in finance and taxation, Establishment of
technology development fund to support technological innovation of enterprises and
Continue to improve policies and measures conducive to convergence of technology,
funding and talent.

Secondly, strengthen the cultivation and encouragement of innovative talents. Top
talent is the core value maker of the new generation of information technology
enterprises, and the cultivation of talents should be paid attention to in order to
promote technological innovation. Enterprises need to make efforts in introducing
talents, innovating skills training, improving the remuneration of labor services and
preventing brain drain. For example, we should focus on training industries with
scarce talent, encouraging the flow of scientific and technological talents to enterprises,
and making full use of global talent, so that high-level talents can truly contribute to
the development of enterprises and the progress of industries.

Thirdly, further improve the index design, strengthen the actual application of
performance evaluation results. With the continuous improvement and perfection of
the research methods of performance evaluation system, the scientific, pertinence and
effectiveness of the index system need to be constantly adjusted and improved. Strive
to achieve more consistent with the characteristics of the enterprise, adapt to the
environment, and provide more effective support for enterprise decision-making.

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