

Research on Performance Evaluation of China Universities' Financial Expenditure

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Abstract

Nowadays, with the government's increasing investment in China higher education, it is very necessary to evaluate the effectiveness of financial funds. The article reviews the related literature of higher education performance appraisal firstly, then constructs a performance appraisal index system of high efficiency financial expenditure by Delphi method and the analytic hierarchy process (AHP), which including 3 first-level indexes and 17 second-level indexes. Finally, using a case study to verify that index system, and getting a better understanding by data analysis and the results.

Keywords

Performance appraisal, financial expenditure, AHP, index system, case study.

1. Introduction

The concept of performance based on organizational behavior, it applies to many disciplines widely, such as management, economics and pedagogy. Performance is generally a measure of the organization or individual's behavior and results, and a comprehensive evaluation is conducted to test the realization of the expected goals. In the middle of the twentieth Century, with the large-scale expansion of government functions, the scale of the government has expanded sharply. The proportion of government expenditure, especially the social welfare expenditure, has risen sharply, the financial burden of the government is becoming heavier, and a serious financial crisis has been formed in the 70s of the recession. In order to get rid of the financial difficulties and improve the efficiency of the government, the western governments have set off a reform movement called "New Public Management"[1], they take a series of measures to create a government with less money and more affairs, and the performance evaluation of government expenditure is as an important part of the government's internal management reform. With the rapid development of public expenditure performance evaluation in western countries and the increasing investment in higher education, the performance evaluation of financial expenditure has developed more and more mature and perfect.

The "Performance Indicators in Higher Education of British" by Cave et al (1992) and "Education Criteria for Performance Excellence" from Malcolm Baldrige National Quality Award of United States (1999) have provided reference for the follow-up study. In China, since the beginning of this century, the Ministry of finance has issued a series of guiding methods, which has effectively promoted the comprehensive development of fiscal expenditure performance evaluation. In 2010, the "National Long-Term Education Reform and Development Plan (2010-2020)" proposed that universities should strengthen financial management and establish performance appraisal system to improve the quality and efficiency of high-education.

Base on the five design principle of evaluation index system(relevance principle, importance principle, comparability principle, systematic principle and economic principle), this paper constructs a system of performance evaluation of financial expenditure in Chinese universities, and uses Delphi method and Analytic Hierarchy Process to determine each performance evaluation index weight. Finally, by taking a case study of X University in 2014-2016, this paper points out the shortcomings of X University' financial expenditure by analyzing the results according to the performance evaluation,

and gives the corresponding suggestions. It is verified that the performance evaluation system is reasonable and practical.

2. Performance Evaluation Measures

2.1 The Delphi Method

The Delphi method is a structured communication technique or method, originally developed as a systematic, interactive forecasting method which relies on a panel of experts. The experts answer questionnaires in two or more rounds. After each round, a facilitator or change agent provides an anonymized summary of the experts' forecasts from the previous round as well as the reasons they provided for their judgments. Thus, experts are encouraged to revise their earlier answers in light of the replies of other members of their panel. It is believed that during this process the range of the answers will decrease and the group will converge towards the "correct" answer. Finally, the process is stopped after a predefined stop criterion (e.g. number of rounds, achievement of consensus, and stability of results) and the mean or median scores of the final rounds determine the results.

Delphi is based on the principle that forecasts (or decisions) from a structured group of individuals are more accurate than those from unstructured groups. The technique can also be adapted for use in face-to-face meetings, and is then called mini-Delphi or Estimate-Talk-Estimate (ETE). Delphi has been widely used for business forecasting and has certain advantages over another structured forecasting approach, prediction markets.

2.2 The Analytic Hierarchy Process(AHP)

The analytic hierarchy process (AHP) is a structured technique for organizing and analyzing complex decisions, based on mathematics and psychology. It was developed by Thomas L. Saaty in the 1970s and has been extensively studied and refined since then. It has particular application in group decision making, and is used around the world in a wide variety of decision situations, in fields such as government, business, industry, healthcare, shipbuilding and education.

Rather than prescribing a "correct" decision, the AHP helps decision makers find one that best suits their goal and their understanding of the problem. It provides a comprehensive and rational framework for structuring a decision problem, for representing and quantifying its elements, for relating those elements to overall goals, and for evaluating alternative solutions.

Users of the AHP first decompose their decision problem into a hierarchy of more easily comprehended sub-problems, each of which can be analyzed independently. The elements of the hierarchy can relate to any aspect of the decision problem—tangible or intangible, carefully measured or roughly estimated, well or poorly understood—anything at all that applies to the decision at hand.

3. Performance Evaluation Index System

3.1 Design Principle of Evaluation Index System

Relevance principle. It should be directly related to performance goals and reflect the degree of realization of goals properly.

Importance principle. Priority should be given to the core indicators that represent the most appraise objects and best reflect the requirements of evaluation.

Comparability principle. It should set common performance evaluation indicators for similar evaluation objects, so that the evaluation results can be compared with each other.

Systematic principle. Quantitative indicators and qualitative indicators should be combined to reflect the social benefits, economic benefits, environmental benefits and sustainable effects of fiscal expenditure.

Economic principle. It should be easy to understand, simple and convenient. Data acquisition should consider realistic conditions and maneuverability, and conforms to the principle of cost-effectiveness.

3.2 Evaluation Index

Based on the above principles, combined with the points of universities' financial expenditure, this paper designs 3 first level indexes and 14 second level indexes, as shown in Table 3.1.

Table 3.1 Performance Evaluation Index of Universities' Financial Expenditure

| First level | Second level |
|-------------------------|---|
| A1 personnel training | B1 Awards For Teaching Results |
| | B2 Number of Innovation Projects For Students |
| | B3 Development Of Subjects |
| | B4 Employment Rate |
| | B5 Employer Satisfaction Rate |
| A2 scientific research | B6 Authorized Patent Average Income |
| | B7 Scientific And Technological Achievements |
| | B8 Average Citation Frequency of SCI Paper |
| | B9 Number of Scientific Research Projects |
| | B10 Awards For Scientific Research |
| A3 Development capacity | B11 Teacher Education Structure (Doctors Ratio) |
| | B12 Teacher Title Structure (Professors Ratio) |
| | B13 Student Teacher Ratio |
| | B14 Talent Introduction Funds Ratio |
| | B15 Budget Allocation Efficiency |
| | B16 Implementation Rate Of Financial Funds |
| | B17 Procurement Cost Savings Rate |

3.3 Determination of Index Weight

In this paper, the evaluation method of Delphi Method and analytic hierarchy process (AHP) is used to determine the performance evaluation index weight. It is more suitable for the cases with fewer samples and more variables. In order to avoid the deviation caused by subjective methods, In order to avoid the deviation caused by the subjective method, we can use the experienced workers as experts and expand the scale of the experts, which will effectively reduce the effect of negative factors on the results. After calculation, the weight of each index is shown as shown in table 3.2.

Table 3.2 Performance Evaluation Index Weight

| First level | Second level | Weight |
|-------------------------------|---|--------|
| A1 personnel training 0.4 | B1 Awards For Teaching Results | 0.0423 |
| | B2 Number of Innovation Projects For Students | 0.0228 |
| | B3 Development Of Subjects | 0.0755 |
| | B4 Employment Rate | 0.1297 |
| | B5 Employer Satisfaction Rate | 0.1297 |
| A2 scientific research 0.4 | B6 Authorized Patent Average Income | 0.0738 |
| | B7 Scientific And Technological Achievements | 0.0391 |
| | B8 Average Citation Frequency of SCI Paper | 0.0738 |

Table 3.2 Performance Evaluation Index Weight (continued)

| First level | Second level | Weight |
|-------------------------|---|--------|
| | B9 Number of Scientific Research Projects | 0.0738 |
| | B10 Awards For Scientific Research | 0.1394 |
| A3 Development capacity | B11 Teacher Education Structure (Doctors Ratio) | 0.0114 |
| 0.2 | B12 Teacher Title Structure (Professors Ratio) | 0.0114 |
| | B13 Student Teacher Ratio | 0.0190 |
| | B14 Talent Introduction Funds Ratio | 0.0336 |
| | B15 Budget Allocation Efficiency | 0.0574 |
| | B16 Implementation Rate Of Financial Funds | 0.0336 |
| | B17 Procurement Cost Savings Rate | 0.0336 |

4. Case Study

This paper selects the data of X University for three years in 2014-2016 years, and conducts performance evaluation through comparative method. As the evaluation index units are not unified, in order to realize the weighted calculation of the comprehensive evaluation score, The data will be dimensionless. After investigation and collection, the index non-dimensional values of three years are shown in table 4.1:

Table 4.1 Performance Evaluation Index Non-Dimensional Values of X University in 2014-2016

| First level | Second level | 2014 | 2015 | 2016 |
|-------------------------|---|--------|--------|--------|
| A1 personnel training | B1 Awards For Teaching Results | 0.6792 | 0.4618 | 0.5705 |
| | B2 Number of Innovation Projects For Students | 0.5848 | 0.5655 | 0.5816 |
| | B3 Development Of Subjects | 0.5564 | 0.6028 | 0.5719 |
| | B4 Employment Rate | 0.5814 | 0.5762 | 0.5744 |
| | B5 Employer Satisfaction Rate | 0.5802 | 0.5722 | 0.5796 |
| A2 scientific research | B6 Authorized Patent Average Income | 0.5786 | 0.5818 | 0.5717 |
| | B7 Scientific And Technological Achievements | 0.4650 | 0.5736 | 0.6743 |
| | B8 Average Citation Frequency of SCI Paper | 0.5159 | 0.5624 | 0.6462 |
| | B9 Number of Scientific Research Projects | 0.4083 | 0.5035 | 0.7614 |
| | B10 Awards For Scientific Research | 0.6186 | 0.4396 | 0.6512 |
| A3 Development capacity | B11 Teacher Education Structure (Doctors Ratio) | 0.5281 | 0.5583 | 0.6399 |
| | B12 Teacher Title Structure (Professors Ratio) | 0.5631 | 0.5838 | 0.5849 |
| | B13 Student Teacher Ratio | 0.5874 | 0.5598 | 0.5845 |
| | B14 Talent Introduction Funds Ratio | 0.4087 | 0.6291 | 0.6612 |
| | B15 Budget Allocation Efficiency | 0.5552 | 0.6503 | 0.5185 |
| | B16 Implementation Rate Of Financial Funds | 0.5913 | 0.5479 | 0.5918 |
| | B17 Procurement Cost Savings Rate | 0.4201 | 0.5761 | 0.7012 |

According to the weight value of table 3.2, calculate the score of all levels of indicators, as shown in table 4.2.

Table 4.2 Performance Evaluation Score of X University in 2014-2016

| First level | 2014 | 2015 | 2016 |
|-------------------------|--------|--------|--------|
| A1 personnel training | 0.2347 | 0.2269 | 0.2302 |
| A2 scientific research | 0.2153 | 0.2053 | 0.2632 |
| A3 Development capacity | 0.1032 | 0.1199 | 0.1205 |
| total | 0.5532 | 0.5521 | 0.6140 |

5. Conclusion

Through the case study of the performance evaluation index of universities' financial expenditure above, the results show that the overall use efficiency is increasing from 2014 to 2016. In the first level indexes of personnel training, scientific research and development capacity, the highest performance score of personnel training performance is in 2014, the scientific research improved greatly in 2016, and the development ability is the best in 2015. Through the analysis of the second level indexes, it is concluded that X university: (1) has maintained a high level of output and quality in the personnel training; (2) has the ability to undertake more scientific research projects, and has improved the recognition degree of its scientific research output in the international academic field; (3) the level of teachers' level has been improved significantly in the capacity of development, but the ratio of students to teachers is not good enough, which is lower than standard; (4) based on the index of budget allocation efficiency, it found that a teaching project had a lower performance from 2014 to 2016, but the appropriation was still maintained, it is clear that the decision is incorrect. Through the analysis of the above results, it is verified that the performance evaluation system constructed in this paper is reasonable and practical.

References

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