Construction and Application of Budget Performance Evaluation System in Colleges and Universities

Biao Liu

Jiangxi Science and Technology Normal University, Nanchang Jiangxi, China

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Abstract: As colleges and universities belong to non-profit social groups, their input-output performance is not directly expressed in the form of profit, so it is difficult to directly use the performance evaluation model of commercial enterprises. The purpose of the construction of university budget performance evaluation system is to help colleges and universities more comprehensively and objectively grasp the budget implementation and output of various departments of universities, thus helping schools optimize the allocation of resources. The construction of university budget performance evaluation system uses a balanced scorecard system which combines subjective and objective factors. Questionnaires are used to verify the importance, relevance, reliability and validity of the indicators. Through the analysis of the reliability and validity of the university budget performance evaluation system, it is found that the university budget performance evaluation system created in this study basically meets the requirements of the university budget performance evaluation, but there is still room for improvement.

1. Introduction

1.1 Selection of Construction Method

There are two methods to construct the performance evaluation index system: the subjective method based on the purpose and principle of evaluation and the objective method based on actual data. These two methods can be used in the design of performance evaluation system, but with different emphasis. Subjective method more combines the experience of experts themselves in practical work, and the whole process of index system construction and confirmation inclines to experts'subjective opinions. The objective law is to extract representative indicators from the data of colleges and universities over the years or from the data of different schools in the same period by using statistical analysis. Therefore, the combination of these two methods can be more in line with the actual situation of colleges and universities budget performance evaluation index system construction methods. The specific process is as follows: Firstly, according to the existing literature and data combined with relevant theoretical knowledge, the group of intention indicators is preliminarily selected, and then the questionnaire of university budget performance evaluation indicators is designed, and the questionnaire is sent to experts; after the questionnaire is collected, the statistical analysis is carried out, and the degree of dispersion and indicators of expert screening are analyzed. In order to ensure the independence of the indicators and the validity of the questionnaire survey, the evaluation system of university budget performance is finally established.

1.2 Balanced Scorecard System

As colleges and universities belong to non-profit social organizations, the effect of budget expenditure and the conversion of financial efficiency into actual output are not quantifiable and diverse, especially the personnel training and scientific research results are difficult to be quantitatively analyzed in a short time. Therefore, this study uses the balanced scorecard system to construct an efficient budget performance evaluation index system.

Balanced scorecard system is a comprehensive performance management system used to measure the health status and actual value of a business entity. It usually evaluates the rationality and applicability of its operational objectives and evaluation indicators from four aspects: financial

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dimension, customer dimension, learning and growth dimension and internal business process dimension. The balanced scorecard system emphasizes linking the evaluation indicators with the strategic objectives of the business entities, pursuing the balance between financial indicators and non-financial indicators, short-term and long-term objectives, internal and external indicators, driving indicators and outcome indicators. Because of the consideration of non-financial indicators in the Balanced Scorecard system, this method is especially suitable for the performance evaluation of University budgets.

2. Selection of Evaluation Index of Budget Performance in Colleges and Universities

As colleges and universities belong to special non-profit organizations, their operating objectives have nothing to do with the direct economic effects, but are related to the improvement of social human resources reserves and scientific research reserves. This makes it difficult for the budget performance of colleges and universities to draw directly on the budget performance evaluation system of commercial enterprises, which needs to be based on the school's service objectives and service subjects. And the participants and other aspects of re-evaluation. Although the operational objectives of different universities are complex and comprehensive, the main strategic objectives of universities are teaching and scientific research. From this point of view, combined with the characteristics of the Balanced Scorecard evaluation system, the author preliminarily constructs the evaluation framework of the Balanced Scorecard for university budget performance, as shown in Figure 1. Generally, the combination of qualitative analysis and quantitative analysis should be adopted in budget performance evaluation. However, after studying the actual situation of universities and other performance evaluation methods in the implementation effect of universities, it is found that the qualitative index system is difficult to establish and accurately measure the real effect of the indicators in universities. Therefore, this study regards quantitative indicators as the main indicators to construct the budget performance evaluation system of universities.

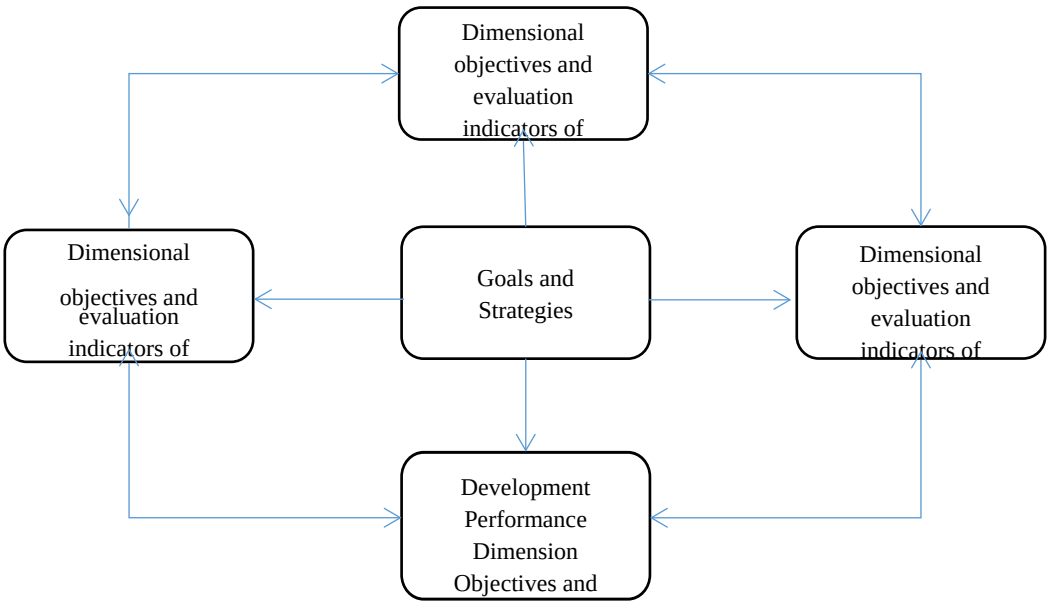

Fig.1 Evaluation Framework of Balanced Scorecard for Budget Performance in Colleges and Universities

2.1 Dimension of Teaching Performance

The main business objective of universities is to train all kinds of talents for the society. Therefore, the teaching level of universities is one of the most important scoring indicators. In order to measure the matching of the input of hardware and software facilities with the students and the results of running a school, based on the construction framework of the Balanced Scorecard, the author selected six indicators from the perspective of input and output: (1) the input scoring angle:

the proportion of students'per capita expenditure on education, the ratio of students to teachers, and personnel expenditure in the total expenditure; (2) the proportion of students' per capita expenditure on education;) From the point of view of scoring and output: the passing rate of graduates, CET4 and CET6, and the annual growth rate of teaching income.

2.2 Research Performance Dimension

With the transformation and upgrading of the country to an innovative country, the scientific research performance of universities has been paid more and more attention. Scientific research performance measures the academic level and accumulation of University teachers. Generally, universities with high scientific research performance are more likely to attract social investment. Because the scoring of scientific research has not been included in the Department budget, and the scientific research achievements of colleges and universities directly reflect the scientific research level of colleges and universities, the evaluation index of scientific research achievements will be used as a measurement index in the dimension of scientific research performance. The main indicators are: per capita number of academic papers published by teachers, per capita scientific research funds, per capita number of patents and income of scientific research activities. The annual growth rate, the number of excellent disciplines (specialties) above the provincial level, and the conversion rate of scientific research achievements.

2.3 Financial Performance Dimension

Although some colleges and universities come from subsidies and investment from the government and society, maintaining the “sustainable development” of school finance is still an important goal of the normal development of high school. Colleges and universities must use limited funds to achieve a proper balance of income and expenditure under the condition of maintaining the development of teaching and scientific research, and even allow colleges and universities to make profits on the basis of not greatly increasing the cost of learning and living of students. As the financial management mode of “budget management” is widely adopted in Chinese universities, the completion of financial budget, financial robustness and efficiency are the two most important aspects in financial performance evaluation of Financial Colleges and universities. Budget completion can be measured by four indicators: budget balance to budget income ratio, budget income ratio, revenue budget completion rate and expenditure budget completion rate. Financial conservatism and efficiency of fund use are mainly evaluated from two aspects: self-financing ratio, annual growth rate of self-financing, self-sufficiency ratio and asset-liability ratio.

2.4 Dimension of Resource Allocation Performance

The performance dimension of resource allocation mainly reflects the “resource utilization efficiency” of universities. According to factor endowment theory, the development of colleges and universities is restricted by limited resources. In the absence of adequate social resources, colleges and universities must attach importance to the allocation of educational resources and improve the utilization efficiency of resources in order to ensure the sustainable development of efficient resources. Resource allocation is usually divided into intangible resource allocation and tangible resource allocation. Because intangible resources are difficult to quantify accurately, they are not considered in the evaluation. The performance evaluation index of tangible resource allocation can be divided into financial resource allocation performance and material resource allocation performance. The performance of financial resource allocation can be measured by the total assets per student, the purchase cost of special equipment per student and the fixed assets per student. The performance of material resources allocation can be measured by the efficiency of housing use.

2.5 Development Performance Dimension

Only with the development and growth of universities themselves can they provide better service for local personnel training and scientific research reserve, and meet the needs of enterprises and countries on the basis of ensuring their academic level. The development of colleges and

universities needs both financial support and human resources support. Therefore, we can construct development performance evaluation indicators from the perspective of capital development potential and human resources development potential. Specifically, the growth rate of fixed assets, the growth rate of total assets and the proportion of total expenditure to total income can be used as the evaluation indicators of the potential of capital development, while the proportion of full-time teachers with high educational background and the proportion of professors and associate professors among full-time teachers can be used as the evaluation indicators of the potential of human resources development in Colleges and universities. After dividing the secondary indicators of each level, the evaluation index system of university budget performance is summarized as shown in Table 1.

Table 1 Evaluation Index System of Budget Performance in Colleges and Universities

	First-level indicators	Secondary indicators
Evaluation Index System of Budget Performance in Colleges and Universities	Teaching Performance	Per capita expenditure on Education
		Student to Teacher Ratio
		Personnel expenditure as a proportion of total expenditure
	Scientific Research Performance	Per capita number of academic papers published by teachers
		Per capita research expenditure of Teachers
		Number of Patents Per Teacher
		Annual Income Growth Rate of Scientific Research Activities
		Number of Excellent Disciplines (Majors) at or above the Provincial Level
		Conversion Rate of Scientific Research Achievements
	Financial performance	Income budget completion rate
		Expenditure budget completion rate
		Ratio of budget balance to budget income
		Extra-budgetary income ratio
		Self-financing ratio
		Annual growth rate of school self-financing
		Self-sufficiency rate of funds
		Asset-liability ratio
	Resource allocation performance	Purchase fee for special equipment per student
		Average Gross Asset Value
		Per capita fixed asset value
		Housing efficiency
	Development Performance	Ratio of high and middle educational qualifications among teachers
		Ratio of Professors and Associate Professors among Teachers
		Gross Asset Growth Rate
		Growth rate of fixed assets
		The proportion of total expenditure to total income

3. Expert Scoring and Analysis of Evaluation Index of Budget Performance in Colleges and Universities

In order to evaluate the rigor and rationality of the evaluation index system of university budget performance, the author divides the index into (5) important, (4) more important, (3) more important, (2) less important, (1) less important, and designs five grades of evaluation index to make an expert questionnaire, which is higher from Hubei Province. The school invited 60 experts to quantify the importance of the index system. A total of 60 valid questionnaires and 45 valid questionnaires were sent out in this study.

3.1 Analysis of the Importance of Expert Scoring and Evaluation Index

Through statistical analysis of the results of experts'scoring, we mainly analyze the mean, standard deviation and coefficient of variation of each index after scoring. Mean value can indicate the concentration trend of each index score, and the larger the mean value in this study, the more important it is; standard deviation can indicate the degree of dispersion of each index, the smaller

the standard deviation, the more consistent the experts'opinions; coefficient of variation can indicate the degree of coordination of indicators, and the more obvious the degree of coordination is, the worse the coefficient of variation is. Statistical analysis shows that most of the indicators in the evaluation index system mean more than 3, indicating that most of the indicators are important in the index system. The indicators with average less than 3 are only “the qualified rate of graduates”, “the passing rate of CET-4 and CET-6” and “the ratio of teachers'senior to senior education”. Looking at the discrete degree of each index, it is found that the discrete degree of all indicators is less than 1, which indicates that the experts'judgment on the important degree of indicators is more consistent. Finally, looking at the statistical coefficient of variation, it is found that the coefficient of variation of most indicators is less than 0.25, while the coefficient of variation of these indicators is more than 0.25, such as “the qualified rate of graduates”, “the passing rate of CET-4 and CET-6”, “the number of excellent disciplines or majors at or above the provincial level”, “the ratio of teachers'intermediate and advanced education”, which shows their coordination process. Not good enough. In summary, four indicators, namely, the qualified rate of graduates, the passing rate of CET-4 and CET-6, the number of excellent disciplines or specialties at or above the provincial level, and the ratio of teachers'intermediate to advanced academic qualifications, were excluded on the basis of the screening criteria with the mean value greater than 3 and the coefficient of variation less than 0.25, as shown in Table 2.

Table 2 Excluded Indicators By Statistical Analysis

Eliminated indicators	mean value	standard deviation	Coefficient of variation
Qualification rate of graduates	2.48	0.727	0.292
Pass rates of CET-4 and CET-6	1.85	0.795	0.431
Number of Excellent Disciplines or Majors at or above the Provincial Level	3.02	0.762	0.251
Ratio of Teachers'Intermediate to Advanced Education	2.88	0.737	0.255

3.2 Relevant Analysis of Evaluation Indicators

There is a greater possibility of correlation among the indicators selected by experts, which will lead to the reuse of some evaluation information and ultimately reduce the rigor and rationality of the evaluation results. Therefore, it is necessary to delete some of the indicators that are highly relevant to ensure the independence of the indicators to the greatest extent. Through consulting the budget and final accounts data of 30 colleges and universities in Hubei Province in 2018, and collecting the data of 24 evaluation indicators screened by experts in that year, the correlation analysis is carried out, and finally the correlation coefficient matrix tables of each evaluation index are obtained (omitted). In the data in the table, only the ratio of internal and external budgetary revenue is highly correlated with other indicators. The correlation between the ratio of internal and external budgetary revenue and expenditure budget completion rate is 1.00, the ratio of budgetary balance to budgetary revenue is 0.97, the correlation between income budget completion rate and self-financing rate is 1.00, and the correlation between the index and self-financing rate is 0.95. Therefore, the index is independent. Not strong should be excluded, while the other 24 indicators are retained.

4. The Application and Reliability and Validity Test of Budget Performance Evaluation System in Colleges and Universities

4.1 Reliability Analysis

By consulting the budget and final accounts data of 30 colleges and universities in Hubei Province in 2018, and using SPSS 13.0 statistical software, the reliability analysis Alpha coefficient table of university budget performance evaluation index system is obtained. As shown in Table 3. From the table, we can see that the overall Alpha coefficient of the performance evaluation system is 0.68, which basically meets the requirements of surveying, but there is room for improvement.

The Alpha coefficient of other performance indicators also exceeds 0.6, which is in a reasonable range.

Table 3 Alpha Coefficient Table of Evaluation Index System for Budget Performance of Universities

	population	Teaching Performance	Scientific Research Performance	Financial performance	Resource allocation performance	Development Performance
Alpha	0.68	0.64	0.65	0.72	0.66	0.63

4.2 Validity Test

The indicators of this study are selected by experts'scoring, backward statistics and analysis, which can basically ensure the practicability and integrity of the selected indicators. The author invited 60 universities in Hubei Province as experts to evaluate these indicators, of which 45 experts have substantive responses. Among the 45 experts, 39 think that the 24 indicators can effectively cover the content of university budget evaluation. Combining with expert feedback, the content validity ratio of the index system is calculated, and it is found that the content validity ratio of each index is between 0.4 and 0.7, which shows that the index system can effectively reflect the content needed by the university budget performance evaluation.

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