

# The Construction of Social Services of the Evaluation Index about the Colleges and Universities

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**Abstract.** This article uses the balanced score card (BSC) and various analysis method construct the evaluation index system of social services. Based on the BSC to build model, using factor analysis, descriptive analysis, hierarchical analysis method, it is used in study of higher education school of social service function of performance measurement. This article hopes to find a unified standard in China's colleges and universities social service evaluation index method, to improve and popularize this method.

## 1. Introduction

In the mid nineteenth Century to late nineteenth Century, colleges and universities from the beginning with the society is not only a state of scientific research, and gradually become the state of cooperation between universities and colleges. From 20th century to now, the higher education schools in addition to teach students, two important professional scientific research ability, Higher education for the social service of the college of vocational ability has become the third indispensable professional higher education school ability is accepted by the countries of all classes. It as an integral part of development of higher education schools continue to catalyst<sup>[1]</sup>.

This article uses the balanced score card (BSC) and various analysis method construct the evaluation index system of social services. The balanced scorecard from finance, customer, internal business, learning and growth four Angle, to the organization's strategic implementation for operational metrics and the target of a new performance management system. Based on the BSC to build model, using factor analysis, descriptive analysis, hierarchical analysis method, it is used in study of higher education school of social service function of performance measurement. This article hopes to find a unified standard in China's colleges and universities social service evaluation index method, to improve and popularize this method.

## 2. Research method

### 2.1 the questionnaire design and data collection

Questionnaire survey method is used for the survey data, to select the R and T two schools questionnaires on network platform to carry out the investigation and research. In order to ensure the reliability of the results and objectivity, the research objects to choose teachers for the teaching and administrative staff, degree in bachelor or above.

The questionnaire content is divided into four parts. Questionnaire using five scales to carry on the design, lists the BSC method respectively the four angles of evaluation index, followed by the customer dimension six indicators, internal operational dimension 8 indexes, learning and growth dimension seven indicators, the financial dimension four indicators. All the indicators of this study is to use positive score, the importance of indicators gradually increased from 1 to 5 points. In R and T two school network questionnaire, each school network questionnaire 110, recycling network questionnaire 209, remove unqualified network questionnaire 4, finally have actual effect of network questionnaire 205, including 104 R school, 101 T school, network questionnaire actual recovery was 93.18%.

## 2.2 data analysis method

Descriptive analysis was conducted on data summarized, and its characteristic analysis. This method is mainly related to the concentration of data trend analysis, discrete degree analysis, etc<sup>[2]</sup>.

Reliability refers to the reliability of measurement data, and general use Crch's Alpa coefficient as a measure of the reliability of evaluation index. Cronbach's Alpha coefficient values within the zero and one, the closer the said was the higher the reliability of the test data. As long as it is generally believed that Crch value of zero point seven zero is generally reliable, belong to high reliability interval between zero point seven zero and zero point three five, while less than zero point three five for the low reliability, it is not reliable[错误!未定义书签。].

Factor analysis is also called the validity analysis, factor analysis is to study how to use the least amount of information loss will many of the original variables are condensed into a few factors, and makes the factor has certain named explanatory method of multivariate statistical analysis[错误!未定义书签。].

Hierarchical analysis method is used to more standard, the multi-objective decision of a systematic method<sup>[3]</sup>.

Independent sample T test two samples were randomly selected from a certain number of observation object, the measuring index of a comparison, concluded that two independent sample population mean whether there is obvious difference[错误!未定义书签。].

## 3. Based on the BSC model in constructing evaluation index system of social service in colleges and universities

### 3.1 the questionnaire descriptive analysis

#### 3.1.1 basic information analysis

Descriptive analysis of the basic information of the people surveyed, measured the crowd to see the actual distribution.

Table 1 Respondents basic information descriptive statistics

Basic	information	classification	frequency
Male	male	103	50.2
	female	102	49.8
Education background	Undergraduate course	53	25.9
	Master's degree	98	47.8
	Doctor's degree	54	26.3
	Teacher	70	34.1
professional	Administrative personnel in colleges and universities	135	65.9
	The following 1 year	63	30.7
Average education years	1-5 years	55	26.8
	5-10 years	41	20.0
	More than ten years	46	22.4

#### 3.1.2 all indicators of descriptive analysis

The study samples from four angles for respondents index descriptive qualitative analyses, we from the point of the research results, the four angles of all survey index average than the big three, the conclusion shows that all survey data index has its important place.

Table 2 The four dimensions of each index of descriptive statistics

Number	index	minimum	maximum	average	standard deviation	skewness	kurtosis
a1	Customer	2	5	3.09	0.68	0.17	-0.13
a2	Customer	2	5	3.26	0.73	0.11	-0.26
a3	Customer	2	5	3.33	0.75	0.22	-0.19
a4	Awareness	1	5	3.38	0.84	0.08	-0.33
a5	Activity propaganda	1	5	3.27	0.76	0.03	-0.11
a6	Respected degree of service activities	2	5	3.57	0.81	0.05	-0.51
b1	Students graduate	2	5	3.55	0.81	-0.29	-0.40
b2	Course quality	2	5	3.50	0.81	-0.26	-0.46
b3	Teaching faculty	2	5	3.51	0.83	-0.20	-0.51
b4	Scientific research and social returns	3	5	3.82	0.64	0.18	-0.64
b5	Scientific research achievements conversion rate	2	5	3.53	0.81	0.04	-0.47
b6	Between research center	2	5	3.58	0.85	0.01	-0.63
b7	Infrastructure utilization	3	5	3.78	0.62	0.20	-0.58
b8	To participate in social service rate	3	5	3.86	0.61	0.09	-0.41
c1	Teachers and students staff satisfaction	2	5	3.50	0.80	-0.24	-0.45
c2	The construction of campus culture	2	5	3.51	0.83	-0.13	-0.52
c3	Incentive mechanism	2	5	3.52	0.83	-0.23	-0.50
c4	Information openness	1	5	3.49	0.91	0.00	-0.59
c5	Campus information management system	1	5	3.54	0.97	-0.22	-0.37
c6	Communication efficiency	1	5	3.52	0.96	-0.20	-0.48
c7	Administrative efficiency	1	5	3.32	0.91	-0.17	-0.19
d1	Social services budget	3	5	3.92	0.64	0.07	-0.53

	year growth rate						
d2	Training cost per head	3	5	3.90	0.61	0.05	-0.30
d3	Social services use fund	3	5	3.92	0.59	0.02	-0.16
	annual growth rate						
d4	Social services budget and	2	5	3.87	0.61	-0.06	-0.03
	the annual budget						

### 3.1.3 scale reliability analysis

Table 3 Reliability analysis

The dimension		Cronbach's Alpha	N of Items
The customer dimension	The audience's satisfaction	0.810	3
	External effect	0.800	3
	Total	0.762	6
	Knowledge service	0.905	3
Internal operational dimension	Scientific research and service	0.753	2
	Direct social services	0.821	3
	Total	0.791	8
	The organization construction	0.903	3
Learning and growth dimension	Information capital	0.821	4
	Total	0.773	7
	Total	0.917	4
The financial dimension			

The table 3 shows that the four dimensions of Cronbach's Alpha coefficient value is greater than 0.7, indicating the dimensions meet the requirement of reliability test, and high credibility.

### 3.1.4 scale validity analysis

#### 3.1.4.1 KMO (Kaiser - Meyer - Olkin) test

KMO value between zero and one, the closer it gets to the one, which means that the simple correlation coefficient between the variables have square sum of squares, far more than partial correlation coefficient can do factor analysis. It is generally believed  $KMO > 0.9$ , very suitable for;  $0.8 < KMO < 0.9$ , suitable for;  $0.7 < KMO < 0.8$ , general;  $0.6 < KMO < 0.7$ , is not suitable for;  $KMO < 0.5$ , is not suitable for.

#### 3.1.4.2 bartlett ball test

Bartlett spherical test statistics are based on correlation coefficient matrix determinant. If the value is bigger, and the corresponding correlation probability value less than the significance level of the user to specify, then it should be rejected the null hypothesis  $H_0$ , thought correlation coefficients could not be unit matrix, the correlation between the original variables.

### 3.1.4.3 validity analysis of the customer dimension

#### (1) KMO and Bartlett's test

Table 4 KMO and Bartlett's test

Sampling enough degrees of Kaiser - Meyer - Olkin measurements.		0.714
The approximate chi-square		448.754
Bartlett sphericity test	df	15
	Sig.	0.000

This table shows that the value attribute scale  $KMO = 0.714$ , greater than 0.7, Bartlett statistic was 448.754,  $P = 0.000$ ,  $P$  value is less than 0.01, shows that customer dimension of selected indicators for exploratory factor analysis.

#### (2) structural common factor

Table5 the explain total variance

element s	The initial eigenvalue			Extraction of sum of squares loaded			Rotate the sum of squares loaded			
	total	Variance %	cumulative %	total	Variance%	cumulative %	total	Variance %	cumulative %	
1	2.753	45.889	45.889	2.753	45.889	45.889	2.191	36.514	36.514	1
2	1.617	26.953	72.841	1.617	26.953	72.841	2.180	36.328	72.841	2
3	0.550	9.173	82.014							3
4	0.454	7.567	89.581							4
5	0.346	5.768	95.349							5
6	0.279	4.651	100.000							6

Table shows that there are two common factor characteristic root values were greater than 1, and 2 common factor of the cumulative contribution rate reached 72.841%, shows two common factor can be extracted to response the customer dimension.

#### (3) factor rotation

After using the principal component method to extract the common factor, also must be conducted for each practical significance of the common factor reasonable explanation. Rotate the common factor is analyzed by applying the method of maximum variance below.

Table 6 Rotating factor loading

	element	
	1	2
a1	<b>0.846</b>	0.016
a2	<b>0.803</b>	0.232
a3	<b>0.877</b>	0.103
a4	0.066	<b>0.823</b>
a5	0.046	<b>0.909</b>
a6	0.233	<b>0.782</b>

Table shows that common factor 1 (there is major factor loading on a1 - a3, were greater than 0.6, the reaction is a customer dimension of audience satisfaction attribute; On the common factor in a4-2 a6 has bigger factor loading, were greater than 0.6, the reaction on the audience dimension of foreign influence attributes.

#### 3.1.4.4 validity analysis of the internal process dimension

##### (1) KMO and Bartlett's test

Table 7 KMO and Bartlett's test

Sampling enough degrees of Kaiser - Meyer - Olkin measurements.		0.725
The approximate chi-square		808.102
Bartlett sphericity test	df	28
	Sig.	0.000

Table shows that value attribute scale KMO = 0.725, greater than 0.7, Bartlett statistic was 808.102, P = 0.000, P value is less than 0.01, shows that the internal process dimension of the selected indicators for exploratory factor analysis.

##### (2) structural common factor

Table 8 Explain the total variance

elem ent s	The initial eigenvalue			Extraction of sum of squares loaded			Rotate the sum of squares loaded			
	total	Variance %	cumulative %	total	Variance%	cumulative %	total	Variance %	cumulative %	
1	3.308	41.352	41.352	3.308	41.352	41.352	2.535	31.694	31.694	1
2	1.727	21.590	62.942	1.727	21.590	62.942	2.275	28.440	60.133	2
3	1.431	17.889	80.831	1.431	17.889	80.831	1.656	20.698	80.831	3
4	0.413	5.164	85.995							4
5	0.381	4.758	90.753							5
6	0.326	4.078	94.831							6
7	0.227	2.834	97.665							
8	0.187	2.335	100.000							

Table shows that there are three common factor characteristic root value were greater than 1, and 3 common factor of the cumulative contribution rate reached 80.831%, that can be extracted three common factor to reflect the internal process dimension.

##### (3) factor rotation

Table 9 Rotating factor loading

	elements		
	1	2	3
b1	<b>0.890</b>	0.210	0.030
b2	<b>0.922</b>	0.094	0.083
b3	<b>0.895</b>	0.082	0.165
b4	0.015	0.154	<b>0.890</b>
b5	0.196	0.013	<b>0.885</b>
b6	0.184	<b>0.811</b>	0.212
b7	0.112	<b>0.888</b>	0.011
b8	0.076	<b>0.863</b>	0.020

For rotating shaft of the factor loading matrix read after analysis, it can be seen: common factor 1 has bigger factor loading on b1-b3, were greater than 0.6, the reaction is the knowledge of the internal

process dimension of service attributes; Common factor 2 in b6 - b8 larger factor loading, were greater than 0.6, the reaction is the internal process dimension of direct social service properties; On common factor 3 b4-b5 have bigger factor loading, were greater than 0.6, the reaction is the internal process dimension of scientific research and service properties.

### 3.1.4.5 Validity analysis of learning and growth dimension

#### (1) KMO and Bartlett's test

Table 10 KMO and Bartlett's test

Sampling enough degrees of Kaiser - Meyer - Olkin measurements.		0.733
The approximate chi-square		768.231
Bartlett sphericity test	df	21
	Sig.	0.000

Table shows that the value of property scale KMO = 0.733, greater than 0.7, Bartlett statistic was 768.231, P = 0.000, P value is less than 0.01, shows that learning and growth dimension of selected indicators for exploratory factor analysis.

#### (2) structural common factor

Table 11 Explain the total variance

elem ent s	The initial eigenvalue			Extraction of sum of squares loaded			Rotate the sum of squares loaded			
	total	Variance %	cumulative %	total	Variance%	cumulative %	total	Variance %	cumulative %	
1	2.977	42.536	42.536	2.977	42.536	42.536	2.611	37.296	37.296	1
2	2.166	30.943	73.478	2.166	30.943	73.478	2.533	36.182	73.478	2
3	0.576	8.227	81.705							3
4	0.458	6.547	88.252							4
5	0.380	5.422	93.674							5
6	0.345	4.928	98.601							6
7	0.098	1.399	100.000							

Table shows that there are two common factor characteristic root values were greater than 1, and 2 common factor of the cumulative contribution rate reached 73.478%, two common factor that can be extracted to reflect the dimension to learn and grow.

#### (3) Factor loading

Table 13 Factor loading

	elements	
	1	2
c1	0.029	<b>0.858</b>
c2	0.063	<b>0.956</b>
c3	0.126	<b>0.919</b>
c4	<b>0.803</b>	0.030
c5	<b>0.862</b>	0.060
c6	<b>0.821</b>	-0.012
c7	<b>0.726</b>	0.188

For rotating shaft of the factor loading matrix read after analysis, it can be seen: common factor 1 have bigger factor loading on c4 to c7, were greater than 0.6, the reaction is dimension information capital attributes to learn and grow; Common factor 2 larger factor loading on c1, c3, were greater than 0.6, the reaction is dimension attributes of the organization construction to learn and grow.

### 3.1.4.6 validity analysis of the financial dimension

#### (1) KMO and Bartlett's test

Table 13 KMO and Bartlett's test

Sampling enough degrees of Kaiser - Meyer - Olkin measurements.		0.840
The approximate chi-square		613.284
Bartlett sphericity test	df	6
	Sig.	0.000

The table shows that the financial dimension of KMO = 0.840, greater than 0.7, Bartlett statistic was 613.284, P = 0.000, P value is less than 0.01, shows that the financial dimension of selected indicators for exploratory factor analysis.

#### (2) structural common factor

Table 14 Explain the total variance

element s	The initial eigenvalue			Extraction of sum of squares loaded			
	total	Variance%	cumulative %	total	Variance%	cumulative %	
1	3.210	80.245	80.245	3.210	80.245	80.245	1
2	0.377	9.417	89.662				2
3	0.263	6.567	96.230				3
4	0.151	3.770	100.000				4

Table shows that there are a common factor of characteristic root values were greater than 1, and the common factor of the cumulative contribution rate reached 80.245%, the common factor can response the financial dimension.

#### (3) Factor loading

Table 15 Factor loading

	elements
	1
d1	0.848
d2	0.936
d3	0.878
d4	0.919

Since there is only one common factor, no need to factor rotation steps. The chart shows the factor loading of each target values were greater than 0.6, explain the four indicators can be a good response to the financial dimension.

### 3.2 build evaluation index

#### 3.2.1 evaluation index is determined

First using SPSS analysis software after the descriptive analysis on all indicators, you can see the scores of all the indicators are more than three points, that the institute all indicators are set up with a certain degree of importance and rationality. Second in the above after the exploratory factor analysis, this paper will be the original survey indicators as indicators of level 3, then the original indexes after exploratory factor analysis, a three-tier indicators dimension, respectively to extract the comprehensive index as a secondary indicator. Finally, the four angles of the BSC model as the



primary index, thus established on the basis of the BSC method university social service evaluation index model.

Table 16 University social service evaluation index table

id	Level 1 indicators	id	Level 2 indicators	id	Level 3 indicators	
A1	The customer dimension	B1	The audience's satisfaction	C1	Customer satisfaction	
				C2	Customer loyalty	
				C3	Customer recognition	
		B2	External effect	C4	Awareness of colleges and universities	
				C5	Activity propaganda	
				C6	Respected degree of service activities	
		B3	Knowledge service	C7	Students graduate	
				C8	Course quality	
				C9	Teaching faculty	
A2	Internal operational dimension	B4	Scientific research service	C10	Scientific research and social returns	
				C11	Scientific research achievements conversion rate	
				C12	The number of school and enterprise research center	
		B5	Direct social services	C13	Infrastructure utilization	
				C14	To participate in social service rate	
				C15	Teachers and students staff satisfaction	
		B6	The organization construction	C16	The construction of campus culture	
				C17	Incentive mechanism	
				C18	Information openness	
A3	Learning and growth dimension	B7	Information capital	C19	Campus information management system	
				C20	Communication efficiency	
				C21	Administrative efficiency	
		B8	Sources of finance	C22	Social services budget year growth rate	
				C23	Training cost per head	
				C24	Social services use fund annual growth rate	
					C25	Social services budget and the annual budget

### 3.2.2 Determine the weight of each index

#### 3.2.2.1 Determine the level 1 of index weight

Using analytic hierarchy process (ahp), grade level index criterion layer can be obtained by the expert group A corresponding university social service F judgment matrix F - A target layer in the table 17:

Table 17 Judgment matrix F - A

F	A1	A2	A3	A4
A1	1	2	2	3
A2	1/2	1	2	2
A3	1/2	1/2	1	2
A4	1/3	1/2	1/2	1

$$W_i = \frac{w_i}{\sum_{i=1}^n w_i} (w_i = n \sqrt[n]{\prod_{j=1}^n a_{ij}})$$

According to the formula (i=1, 2, n), n=4, We can learn the rule layer u single order results, W={0.4204、0.2686、0.1899、0.1211}T。At the same time we get: the

largest eigenvalue of judgment matrix  $\lambda_{\max} = \sum_{i=1}^4 \frac{(AW)_i}{4W_i} = \frac{I_{\max} - 4}{4 - 1} = 4.0680$ , CI=0.0227, n=4, RI=0.9, CR=CI/RI=0.0252<0.1, the judgment matrix F-A satisfactory consistency, so the standard layer of A weight vector Was follows:

Table 18 Level 1 indicators weight

id	Level 1 indicators	weight
A1	The customer dimension	0.4204
A2	Internal operational dimension	0.2686
A3	Learning and growth dimension	0.1899
A4	The financial dimension	0.1211

### 3.2.2.2 Secondary index weight is determined

According to the factor contribution can be to determine the weight value of the secondary indexes.

Table 19 Level 2 indicators weight

id	Level 2 indicators	weight
B1	The audience's satisfaction	0.2020
B2	External effect	0.2009
B3	Knowledge service	0.1120
B4	Scientific research service	0.1005
B5	Direct social services	0.0731
B6	The organization construction	0.0932
B7	Information capital	0.0904
B8	Sources of finance	0.1279

### 3.2.2.3 weights of level 3 indicators

Factor analysis was carried out on the index, we get the component score coefficient matrix. Combining with the level 1 and level 2 of the weight of indicators, we get a three-level index weights.

Table 20 Level 3 indicators weight

id	Level 3 indicators	weight
C1	Customer satisfaction	0.0618
C2	Customer loyalty	0.0743
C3	Customer recognition	0.0702
C4	Awareness of colleges and universities	0.0634
C5	Activity propaganda	0.0681
C6	Respected degree of service activities	0.0726
C7	Students graduate	0.0339
C8	Course quality	0.0329
C9	Teaching faculty	0.0340
C10	Scientific research and social returns	0.0297
C11	Scientific research achievements conversion rate	0.0308
C12	The number of school and enterprise research center	0.0356
C13	Infrastructure utilization	0.0302

C14	To participate in social service rate	0.0286
C15	Teachers and students staff satisfaction	0.0267
C16	The construction of campus culture	0.0307
C17	Incentive mechanism	0.0315
C18	Information openness	0.0253
C19	Campus information management system	0.0279
C20	Communication efficiency	0.0245
C21	Administrative efficiency	0.0276
C22	Social services budget year growth rate	0.0330
C23	Training cost per head	0.0364
C24	Social services use fund annual growth rate	0.0343
C25	Social services budget and the annual budget	0.0358

### 3.2.2.4 The university evaluation index system of social services

Table 21 The university social service evaluation index weight

Level 1 indicators	weight	Level 2 indicators	weight	Level 3 indicators	weight		
The customer dimension	0.4204	The audience's satisfaction	0.2020	Customer satisfaction	0.0618		
				Customer loyalty	0.0743		
				Customer recognition	0.0702		
				Awareness of colleges and universities	0.0634		
		External effect	0.2009	Activity propaganda	0.0681		
				Respected degree of service activities	0.0726		
				Knowledge service	0.1120	Students graduate	0.0339
		Course quality	0.0329				
		Teaching faculty	0.0340				
		Internal operational dimension	0.2686	Scientific research service	0.1005	Scientific research and social returns	0.0297
Scientific research achievements conversion rate	0.0308						
The number of school and enterprise research center	0.0356						
Infrastructure utilization	0.0302						
Direct social services	0.0731			To participate in social service rate	0.0286		
				The organization construction	0.0932	Teachers and students staff satisfaction	0.0267
						The construction of campus culture	0.0307
Incentive mechanism	0.0315						
Information openness	0.0253						
Learning and growth dimension	0.1899			Information capital	0.0904	Campus information management system	0.0279
		Communication efficiency	0.0245				
		Administrative efficiency	0.0276				
		Sources of finance	0.1279	Social services budget year growth rate	0.0330		
				Training cost per head	0.0364		
				Social services use fund annual growth rate	0.0343		
The financial dimension	0.1211			Social services budget and the	0.0358		

#### **4.Conclusions**

Based on the BSC to build model, using factor analysis, descriptive analysis, hierarchical analysis method, it is used in study of higher education school of social service function of performance measurement. This article have found a unified standard in China's colleges and universities social service evaluation index method, to improve and popularize this method.

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