Research on information system construction of the evaluation System based on DEA model

Jun Liu

School of Business, Anyang Normal University, Henan, China

ABSTRACT

Both at home and abroad, the information system construction of the evaluation system implementation is at a lower level, one reason is the lag of information system evaluation system and the imperfect. The paper improves the traditional DEA model making it to reflect the subjective preference sequence DEA model, proposes a method to solve the dilemma with the average rate of crosscutting comparison with effective unit, and cites a case for demonstration .

Keywords: preference sequence DEA model; Evaluation of the system; Information system;

INTRODUCTION

Looking from the situation of the implementation of the information system in colleges and universities, both at home and abroad, their success rate is at a lower level. The case one of the reasons is the lag of information system evaluation system and imperfect, so strengthen the research in colleges and universities information system evaluation method, to improve the success rate of information system construction, exert its operation and management in colleges and universities and the competition ability of ascension, related research is very important information system evaluation can distinguish from three dimensions: one is the method of evaluation, the second is the evaluation objects, three is the specific content of the evaluation. Evaluation method mainly has two kinds, one is the subjective evaluation method, the typical research achievements have Delone and others established D&M model and evaluation index system of [1], Markus and others put forward from the Angle of technology and function of the evaluation framework of ERP system in stages [2]; IS an objective evaluation method, the typical evaluation method with Kaplan et al. [3] of the balanced scorecard approach, Farbey et al., based on analyzing the factors affecting the category IS project put forward matrix evaluation method [4] [5] that the existing information system such as Zhang Lingling evaluation IS essentially a kind of after evaluation, they put forward should evaluate the whole process of the construction of the information system, namely before the implementation of information system projects, implementation process, implementation, information system construction of the evaluation content IS not consistent.

Such as MinWenJie information system evaluation system and method of research from six aspects has carried on the design of index system, and puts forward the concept of level indicator, relatively complete system from technology, performance, efficiency, investment in science and technology level, the six criteria such as value and operation layer, indicators for the segmentation, including the system of technical level and the performance index to compare the detailed division, has high practicability. University informatizationevaluation solves who evaluates the evaluation? How do you comment? Who evaluates the main body, the evaluation of the person or organization, there can be a college or a third party, etc. Of information system evaluation content mainly can be divided into the following three aspects: one is the economic benefits of information system evaluation and forecast, 2 it is to the

evaluation of the quality of the information system itself, three is to multi-index comprehensive evaluation of information systems. Considering the information system is a complex social system, therefore, in addition to involving cost, economic benefit and financial considerations, this method also involves the system performance evaluation, system construction, system environment and user evaluation. Evaluate what is the object of evaluation, that is what is the content of the evaluation, to which aspects of colleges and universities information system evaluation. How to evaluate the evaluation algorithm, namely, using the algorithm of what steps. Under the guidance of evaluation organization, establish the evaluation goal, evaluation idea formation, again according to the operating system evaluation idea to establish an evaluation, evaluation of the operating system including evaluation purpose, evaluation method, evaluation index evaluation analysis, according to the set of evaluation procedure and evaluation of the operating system is used to evaluate the evaluation content, finally concluded that the formation evaluation report. This paper, based on the preference sequence DEA model for colleges and universities information system evaluation system

E_j is said the first j a decision-making unit's average crosscut efficiency, the same for effective decision making units, the bigger the E_j, shows that whether to choose for themselves or for other decision-making unit weight, efficiency is more close to 1, the decision making unit, of course, its effectiveness is more stable. Therefore, according to the size of E_j for effective decision making units.

Tab.1 Simple decision making unit efficiency and the efficiency of crosscutting

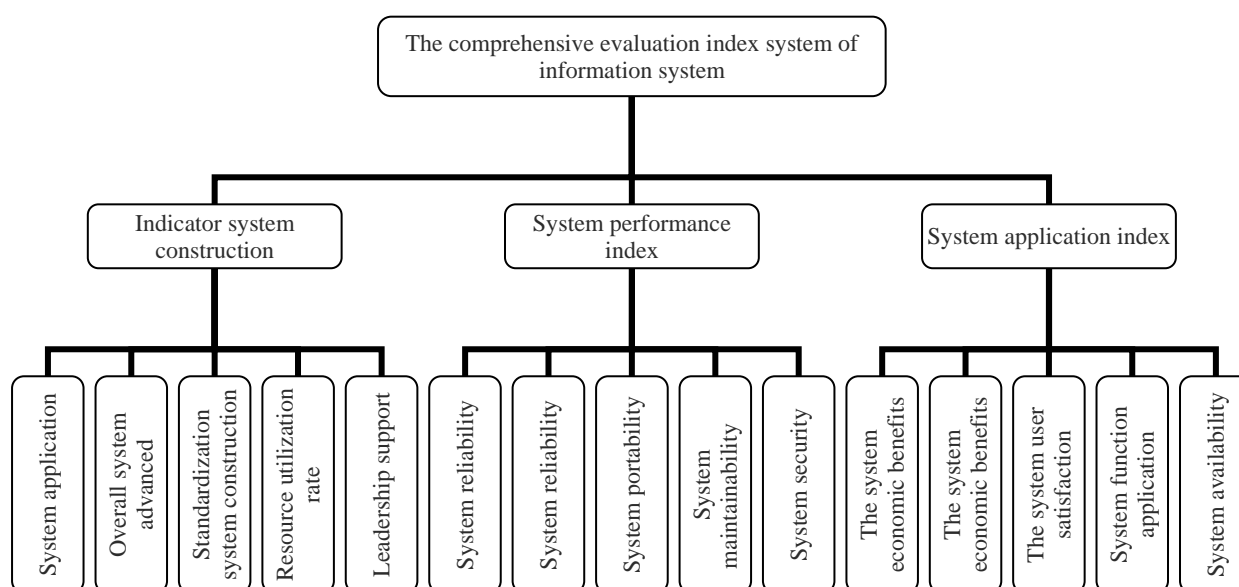| decision-making unit	1	2	…	j	…	n
1	E_{11}	E_{12}	…	E_{1j}	…	E_{1n}
2	E_{21}	E_{22}	…	E_{2j}	…	E_{2n}
…	…	…	…		…	
i	E_{i1}	E_{i2}	…	E_{ij}	…	E_{in}
…	…	…	…	…	…	…
n	E_{n1}	E_{n2}	…	E_{nj}	…	E_{nn}
The average efficiency of crosscutting	E_1	E_2	…	E_j	…	E_n

Fig.1 comprehensive evaluation index system of information system

A NUMERICAL EXAMPLE OF PREFERENCE SEQUENCE DEA MODEL

In this paper, the application of the above preference sequence DEA model to study the comprehensive evaluation of information systems. At this point, this article is based on the model 2010 a university in nanjing, horse of the material in succession system to evaluate information system. The model selected indicators are set for the expert evaluation index, which is divided into three categories, respectively is the system construction, system performance

_____

and system application, as shown in figure 1.

Indicators of the evaluation system is mostly qualitative indicators, this article deal with qualitative index of the method is to use like scale to quantify the qualitative index of the corresponding subjective evaluation. Corresponding relation between the subjective evaluation and the quantitative value are as shown in table 2.

Tab.2 The corresponding relationship between subjective evaluation and the quantitative value

subjective assessment	very good	preferably	common	Poor	Very Poor
Quantitative score	0.9	0.7	0.5	0.3	0.1

System maintainability, scalability, portability with maintenance, expansion and transplantation of the ratio of the total cost and system cost, according to its value as small as possible, is the input index of the system. The system reliability generally expressed in mean time between failures, this paper for the study of convenient, processing as a qualitative indicators, and other indicators, the larger the value, the better, is the output index system. this paper proposes the five information system for comprehensive evaluation. Assume that the input index of the preference order is: the system maintainability, scalability, portability. The output index order of preference is: system goal realization degree, economic benefits, system safety, system reliability, system construction standardization, the system as a whole, advanced application, system function, system user satisfaction degree, degree of resource utilization, system utilization, leading support, system and social benefits. The original value of the input index and output index are as shown in table 3 and table 4.

Tab.3 The original value of the input index

Input indicators	Index 1	Index 2	Index 3
Information system 1	0.6	0.4	0.3
Information system 2	0.7	0.9	0.8
Information system 3	0.9	0.2	0.3
Information system 4	0.4	0.8	0.6
Information system 5	0.6	0.5	0.8

Tab.4 The original value of the output indexes

output specification	information systems				
	1	2	3	4	5
Index 1	0.3	0.5	0.7	0.3	0.5
Index 2	0.7	0.9	0.5	0.7	0.3
Index 3	0.5	0.3	0.7	0.9	0.3
Index 4	0.9	0.5	0.3	0.3	0.5
Index 5	0.1	0.3	0.9	0.5	0.7
Index 6	0.5	0.9	0.7	0.3	0.9
Index 7	0.7	0.5	0.5	0.7	0.3
Index 8	0.3	0.7	0.9	0.3	0.5
Index 9	0.7	0.3	1	0.5	0.3
Index 10	0.9	0.7	0.9	0.9	0.7
Index 11	0.3	0.3	0.6	0.5	0.9
Index 12	0.5	0.5	0.1	0.3	0.5

Due to various indicators have different unit of measurement, thus the original data of dimension differences, often

to the original data dimensionless processing. This article USES the average method, to calculate each average value, and then with each actual value divided by the average, the index value. The specific process and the corresponding results in the omitted. The data generation into the traditional DEA model respectively and preference sequence DEA model, the calculation results as shown in table 5.

Tab.5 Traditional DEA and preference sequence DEA evaluation value

information systems	information systems				
	1	2	3	4	5
Tradition DEA	1	0.8340	0.9585	0.9474	0.8836
The preference order DEA	0.9632	0.8495	0.9592	1	0.7881

It can be seen from the results of table 5, the subjective preference for information system of comprehensive evaluation has a great influence. Due to the preference sequence with the preference DEA model, for example for output indicators, planning goal realization degree of index is much more important relative to other output indicators, and information system 1 indicators on this poor performance. The greater the value of information system means that the restrictions in certain weight and decision-makers preference under the constraint condition of the higher value. In the process of practical application, the decision makers can according to their preferences choose a different sequence of comprehensive evaluation of information systems with different characteristics analysis. Based on the traditional DEA model was improved, making it can reflect the subjective preference sequence DEA model, and put forward to solve with the average rate of crosscutting comparison with effective unit. Due to the policy makers can clear of information system evaluation index, and the weight of each index for sorting, therefore the DEA model based on preference order is better than traditional DEA model on the evaluation can reflect the will of policy makers, and the application case also shows that the model is feasible in the method.

REFERENCES

[1] Kaplan R,NortonD. *Harvard Business Review,* **1992**(January-February):71-79.

[2] FarberyB,LandF. *Journal of Infornation Technology* **1994**(9):181-193

[3] Lingling Zhang, Rencheng Tong. *Journal of management science in China*, **2004**, 2:95-100

[4]Quanling Wei. Evaluate the relative effectiveness of DEA model [M], Beijing: China renmin university press, **1998**