Quantitative study of accounting ethics improvement measures and evaluation system standards

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ABSTRACT

This paper based on mathematical level analysis. By reference to the laws and regulations, literature and expert advice to determine the assessment standards of accounting professional ethics, and select the relevant program level, the establishment of measures to improve the professional ethics of accounting AHP. This paper obtained the weight of quantifying the value of the assessment criteria and different programs by Quantitative calculating, Which determine the distribution of scores about assessment criteria, while get the focus of the program receive priority implementation.

KEYWORDS

Accounting; Professional ethics; Evaluation system; Embodiments; AHP.

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INTRODUCTION

In 1873 badminton movement was born in England; after 100 years of vigorous development, badminton has become a very popular sports project in the world; badminton can fully exe[1-3].

In the 21st century, the deepening of China's reform and opening up, the rapid economic development and rising[4-7]. Accounting profession emerged harsh moral failure phenomenon. "Basic Accounting Standards" clearly ethical standards of accounting dedication, honesty, self-discipline, objective and impartial, uphold standards, improve skills, participation in management, and enhance service. Because of accounting ethics may not be implemented, cooking the books, information distortion, decreased quality of work and other issues frequently arise, which cause huge obstacle to national and social development[8-10]. Therefore, to improve the accounting professional ethics, professional skills will be strong accounting quality imperative.

Aiming at this problem use AHP——a mathematical methods to analysis the programs for improving accounting professional ethics. And to determine the program's implementation approach to accelerate the upgrading of accounting and moral qualities.

MORAL STATUSES OF THE ACCOUNTING PROFESSION AND MEASURES

At present the moral status of native accounting profession is not optimistic. Under professional and moral qualities, bad faith, fraud and other phenomena frequently occur. Based studies in accounting education stage on some issues, concluded that native accounting ethics education colleges in poor results, the process of teaching professional ethics teachers emphasize enough, resulting in the formation of the students do not have a firm conviction. In the enterprise, due to the driving of company's interests, coupled with a weak moral values and accounting professionals are often contrary to professional standards[11].

Against the lack of accounting professional ethics, many scholars from different angles give a lot of solutions. this paper based on the basis of previous studies, according to the accounting professional ethics and moral standards proposed five solutions: 1, improve the accounting profession laws and regulations, 2, improve the reward and punishment mechanism and assessment of the accounting profession, 3, strengthen supervision and management accounting profession, 4, strengthen accounting professional business education, 5, strengthen moral education and practice of accounting profession.

AHP

Analytic Hierarchy Process was born in the 1970s, American scholar Saaty proposed mathematical analysis methods for complex systems, namely Analytic Hierarchy Process (AHP). The core of the algorithm is to calculate the weights of each factor. The method is particularly suitable for multi-objective problem, the decision problem of complex systems; the problem can be transformed into a powerful mathematical method of quantitative research. The idea is that the system is hierarchical, complex becomes simplified, establish hierarchies, numerical calculation. AHP process is divided into four processes, follow these steps.

Step-1 : Established hierarchy

In the algorithm to optimize decision of AHP have three mainly layer. 1 target layer (T), system wants the ultimate problem solving that enhance the quality of accounting ethics in this paper. 2, quasi-side layer (C), are to solve system problems restrictions. 3, the program layer (P), to improve the quality of accounting professional ethics program, usually a variety of programs, the need to implement a reasonable solution. And then calculating program weights by the hierarchy that established by quasi-side layer.

Determine the level of accounting professional ethics guidelines, programs layer based on expert opinion and literature.

TABLE 1 : The accounting professional ethics hierarchy

Target layer T	Quasi-side layer C	Program layer P
Enhance the quality of the accounting professional ethics (T)	Honesty and trustworthiness honesty and self-discipline (C_1) Objective and impartial, dedication (C_2) Improve skills, enhance service (C_3) Compliance, participation in management (C_4)	A sound legal system (P_1) Improve the assessment and incentive mechanisms (P_2) Strengthen management and supervision (P_3) Strengthen professional ethics education (P_4) Strengthen business education and training (P_5)

Step-2 : Judgment matrix

In the system hierarchy, guidelines layer with n constraints $C = (C_1, \quad C_2, \quad \cdots \quad C_n)$ affect the target. Compared factors of criteria with each other, the comparison result represented by 1-9. The result of C_i, C_j comparing represented by a_{ij} , all the comparison results constitute the judgment matrix A. It is expressed as follows.

$$A = \begin{pmatrix} a_{11} & a_{12} & \cdots & a_{1j} \\ a_{21} & a_{22} & \cdots & a_{2j} \\ \vdots & \vdots & \ddots & \vdots \\ a_{i1} & a_{i2} & \cdots & a_{ij} \end{pmatrix}$$

Among them, the figures represent the meaning as following table.

TABLE 2 : 1~9 meaning

Digital	Meaning
1	Two factors are equally important
3	The factor is slightly more important than the other factor
5	The factor more important than the other factor
7	The factor more important vary than the other factor
9	The factor more important badly than the other factor
Even	Indicates the importance between the two odd
Reciprocal	Comparing said sequence of importance factors.

Step-3 : Calculate the weight vector and the largest Eigen values

Calculate the weight vector. Assuming a layer of judgment matrix A has n factors, and n are all factors. So using the right of the layer is represented as a vector

$$W = (w_1, w_2, w_3 \cdots w_n)$$

Weights satisfy:

$$w_1 + w_2 + w_3 \cdots + w_n = 1$$

$$A = \begin{pmatrix} w_1/w_1 & w_1/w_2 & \cdots & w_1/w_n \\ w_2/w_1 & w_2/w_2 & \cdots & w_2/w_n \\ \vdots & \vdots & \ddots & \vdots \\ w_n/w_1 & w_n/w_2 & \cdots & w_n/w_n \end{pmatrix}$$

Compare the results of n factors constitute consistency matrix :

1, First, the column vector of A matrix, and get matrix D

$$D = \begin{pmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{pmatrix} \bullet \begin{pmatrix} 1/\sum_{i=1}^{n} a_{i1} & 0 & \cdots & 0 \\ 0 & 1/\sum_{i=1}^{n} a_{i2} & \cdots & 0 \\ 0 & \vdots & \ddots & \vdots \\ 0 & 0 & \cdots & 1/\sum_{i=1}^{n} a_{in} \end{pmatrix}$$

2, The resulting matrix by row summation

$$E = D \bullet \begin{pmatrix} 1 & 1 & \cdots & 1 \end{pmatrix}_{1 \times n}^{T}$$

$$E = \begin{pmatrix} e_{11} & e_{12} & \cdots & e_{1n} \end{pmatrix}^{T}$$

3, Matrix E is normalized, that is, the weight vector

$$W = \begin{pmatrix} w_1 & w_2 & \cdots & w_n \end{pmatrix}^{T} = \begin{pmatrix} e_{11}/\sum_{i=1}^{n} e_{i1} & e_{12}/\sum_{i=1}^{n} e_{i1} & \cdots & e_{1n}/\sum_{i=1}^{n} e_{i1} \end{pmatrix}^{T}$$

4, Calculate the maximum Eigen value

Weight vector corresponding to the maximum Eigen value, it certainly has :

$$AW = \lambda_{\max} W$$

$$\lambda_{\max} = \frac{1}{n} \sum_{i=1}^{n} \frac{(AW)_i}{w_i}$$

Step-4 : Consistency test

       Conformance testing is a very important step in the AHP, Only through consistency test matrix, the results obtained before AHP are reasonable. CI represents consistency index matrix, CR represents matrix consistency ratio, by calculating the results of these two indicators to determine the consistency of the matrix.

$$CI = \frac{\lambda_{\max} - n}{n - 1}$$

n represents the number of factors and order of the matrix.

$$CR = \frac{CI}{RI}$$

RI represents Random Consistency Index.

TABLE 3 : The value of RI

n	1	2	3	4	5	6	7	8	9	10	11
RI	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49	1.51

A factor of Standards layer is α_m, a program of program layers in the corresponding program factors of the weight is β_{nm}, then the weight of the program is:

$$w_i = \sum_{j=1}^{m} \alpha_i \beta_{ij}$$

Consistency ratio is:

$$CR = \frac{\sum_{j=1}^{m} \alpha_j CI_j}{\sum_{j=1}^{m} \alpha_j RI_j}$$

If $CR \geq 0.1$ the matrix is unacceptable, or the matrix is acceptable.

THE APPLICATION OF AHP IN IMPROVING ACCOUNTING ETHICS

Standards and assessment Standards layer weights calculated to quantify

Judgment matrix components based on the TABLE 1 and calculation criteria weights and matrix consistency test indicator. The results were as follows:

TABLE 4 : Criterion level calculations

T	C_1	C_2	C_3	C_4	W	CR
C_1	1	3	1	4	0.384	
C_2	1/3	1	1/3	2	0.143	0.008
C_3	1	3	1	4	0.384	
C_4	1/4	1/2	1/4	1	0.088	

The $CR < 0.1$ matrix is acceptable. The calculated results show that the weight of C_1 is 0.38, C_2 is 0.14, C_3 is 0.38 and C_4 is 0.10.

If the assessment of out of 100 points, the scores were four Standards, 38 points, 14 points, 38 points, 10 points. Established the evaluation system based on the weight of the, then the assessment is calculated as follows.

$$Y = 0.38C_1 + 0.14C_2 + 0.38C_3 + 0.1C_4$$

Y represents the final accounting professional ethics examination results, $C_i (i = 1,2,3,4)$ means that the resulting assessment standards individual achievement.

The determine of the program layer weights and implementation of programs

Established judgment matrix based on TABLE 1, and conformance testing. Calculation the weight of programs, establish a reasonable solution implementation.

TABLE 5 : The result of program one

C_1	P_1	P_2	P_3	P_4	P_5	W	CR
P_1	1	3	1/2	5	2	0.253	
P_2	1/3	1	1/6	2	1/2	0.083	
P_3	2	6	1	9	3	0.468	0.004
P_4	1/5	1/2	1/9	1	1/3	0.048	
P_5	1/2	2	1/3	3	1	0.148	

TABLE 6 : The result of program two

C_2	P_1	P_2	P_3	P_4	P_5	W	CR
P_1	1	2	1/3	3	1/2	0.146	
P_2	1/2	1	1/7	2	1/3	0.080	
P_3	3	7	1	9	2	0.476	0.005
P_4	1/3	1/2	1/9	1	1/5	0.048	
P_5	2	3	1/2	5	1	0.250	

TABLE 7 : The result of program three

C_3	P_1	P_2	P_3	P_4	P_5	W	CR
P_1	1	1/2	3	1/3	2	0.148	
P_2	2	1	7	1/2	3	0.271	
P_3	1/3	1/7	1	1/9	1/2	0.045	0.005
P_4	3	2	9	1	5	0.450	
P_5	1/2	1/3	2	1/5	1	0.086	

TABLE 8 : The result of program four

C_4	P_1	P_2	P_3	P_4	P_5	W	CR
P_1	1	3	1/2	5	2	0.248	
P_2	1/3	1	1/6	2	1/2	0.082	
P_3	2	6	1	8	4	0.476	0.010
P_4	1/5	1/2	1/8	1	1/4	0.047	
P_5	1/2	2	1/4	4	1	0.147	

Consistency test $CR < 0.1$, and the combination of consistency test values $CR < 0.1$. Therefore, AHP judgment matrix can be accepted.

TABLE 9 : Program weight calculation results summary

C W P	C_1	C_2	C_3	C_4
	0.384	**0.143**	**0.384**	**0.088**
P_1	0.253	0.146	0.148	0.248
P_2	0.083	0.080	0.271	0.082
P_3	0.468	0.476	0.045	0.476
P_4	0.048	0.048	0.450	0.047
P_5	0.148	0.250	0.086	0.147

TABLE 10 : The weights of program layer

Target layer T	Program layer P	Weight	Rank
	A sound legal system (P_1)	0.197	3
	Improve the assessment and incentive mechanisms (P_2)	0.155	4
Enhance the quality of the accounting professional ethics (T)	Strengthen management and supervision (P_3)	0.307	1
	Strengthen professional ethics education (P_4)	0.202	2
	Strengthen business education and training (P_5)	0.139	5

CONCLUSIONS

The best solution to enhance accounting professional ethics is to strengthen the management and supervision, this conclusion from table ten based on four standards using for accounting. The Strengthen accounting ethics education rank second, Improve laws and regulations of the accounting profession rank third, Reward and punishment mechanism to improve the assessment of accounting rank fourth, Strengthen business education and training is the last, and whose function of improving accounting professional ethics is the smallest.

Improve the accounting profession ethics can not just rely on strengthening the management and supervision of the program, Only multiple programs at the same time and cooperate can improve the current accounting ethics missing phenomenon quickly. In this paper, based on the conclusions that five options have their role, they should be reasonable to develop implementation plans. This article recommends five programs were put in efforts to 19.7%, 15.5%, 30.7%, 20.2%, and 13.9%.

In this paper, quantify calculate of accounting ethics by mathematics AHP evaluation system obtained a mathematical expression evaluation. To analysis the weight of programs enhancing the professional ethics of the accounting, we got a reasonable solution implementation.

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