2014

ISSN : 0974 - 7435 Volume 10 Issue 19

BioTechnology

An Indian Journal

FULL PAPER

BTAIJ, 10(19), 2014 [11380-11386]

Fuzzy evaluation method in the application of entrepreneurship training in colleges and universities

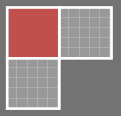
Sufen Huang
Suzhou University, Suzhou, Anhui,234000, (CHINA)

ABSTRACT

The fuzzy evaluation method is suitable for the performance evaluation of the complicated variable relationship and under the non-qualitative factor. The evaluation of Entrepreneurship training in colleges and universities system not only involve the qualitative factors, but also involves the quantitative factor; In addition, the correlation between the variables is not clear, so using fuzzy evaluation method to research about the effectiveness of business system in colleges and universities has the feasibility of the methodology. First of all, this research on the evaluation index system of colleges entrepreneurship training are discussed, has built the index system containing entrepreneurial quality, entrepreneurship, entrepreneurial system and entrepreneurial performance, such as 4 first-level indicators; Each level index also contains a number of secondary index, and each secondary index is subdivided into several three factors. After building the evaluation index system, the evaluation model and method of the Entrepreneurship training in colleges and universities are discussed, which emphatically discusses the fuzzy evaluation method of model building and application steps. Finally, on how to use fuzzy evaluation method to evaluate the Entrepreneurship training in colleges and universities system subject, the empirical research has been done, a university in Wuhan was taken as example, the results proves that the system level of Entrepreneurship training in colleges and universities system is medium. This research has certain reference significance for the related colleges and universities, and other researchers which are interested in this issue.

KEYWORDS

Fuzzy evaluation method; Employment of college graduates; Entrepreneurship training in colleges and universities; Performance evaluation.



INTRODUCTION

The employment problems of college graduates has attracted more attention in recent years, due to the number of employment in the social overall increases, and college education itself is lack of focus, and the college graduates employment situation is not ideal. Therefore, the government from the system level increased the entrepreneurship of college graduates and tax policy support, and many universities also gradually give more and more attention to the aspect of entrepreneurship education. Although many colleges and universities set up special institutions responsible for entrepreneurship training, also opened the relevant professional or on the road, but lack the authority on the effects of entrepreneurship training system and the relative specifications of the evaluation system. Entrepreneurship education, in fact, the original intention and ultimate purpose is in order to be able to make the students after graduation can be more prepared to entrepreneurial activity, so as to improve the probability of successful entrepreneurs. Therefore, this research applies the concept and method of fuzzy evaluation method to the research on the issue of Entrepreneurship training system in colleges and universities. This research on the one hand is able to make the Entrepreneurship training in colleges and universities affect to carry on the quantitative research, on the other hand can also provide the exact evidence for the entrepreneurship courses of the colleges and universities.

THE SELECTION OF EVALUATION INDEX SYSTEM OF ENTREPRENEURSHIP TRAINING IN COLLEGES AND UNIVERSITIES

Entrepreneurship training evaluation index system is be able to more comprehensively reflect the course setting in the colleges and universities, the actual effect of entrepreneurial environment and entrepreneurial performance. Therefore, this research in the process of selecting evaluation index system of entrepreneurship training is following the principle of objective, comprehensive and scientific bidding preliminary collection; In order to further determine the indicators will be according to the principle of maneuverability, relevance and importance of indexes. As shown in TABLE 1, this research is in combination with the actual situation in colleges and universities as well as the characteristics of economy in China, constructs the entrepreneurial quality, entrepreneurship education, entrepreneurial environment and entrepreneurial performance and other four primary index evaluation system; Each level index contains several secondary indexes, and each secondary index is again subdivided into several tertiary indexes. Overall, this evaluation index system includes 47 three-level indexes, the coverage is more comprehensive, and it follows the principle of the operability, correlation and so on, thus the index system can be used to do further research. The venture evaluation index system is shown as TABLE 1.

THE EVALUATION MODEL AND METHOD OF THE ENTREPRENEURSHIP TRAINING IN COLLEGES AND UNIVERSITIES

Description of the fuzzy comprehensive evaluation method

The core idea Fuzzy comprehensive evaluation method is for some undefined subordinate relations or subordinate relations present multi-elements characteristic variables, which can make the comprehensive evaluation according to the principle of fuzzy synthetic evaluation object. As mathematical knowledge is more and more wide range of applications in the field of sociology of knowledge, people can first take the way of fuzzy evaluation to the evaluation object to make the quantitative evaluation, which provide more convincing basis for qualitative evaluation. The application of fuzzy evaluation method in the field of sociology has two advantages: firstly it can reduce the absolute requirements for evaluation index, thus reducing evaluation conclusion error due to the unreasonable indicators of risk; Secondly, the fuzzy evaluation method in the determination of index weight has a certain elasticity, and it also can more truly reflects the relation between the relative importance of each index, so as to make the conclusion to be more easy to accept. Therefore, this research decides to choose the fuzzy comprehensive evaluation method to research the entrepreneurship training evaluation in colleges and universities. All the data of this research comes from the province college graduates entrepreneurial community.

The collection of evaluation indexes and their properties

As shown in table 1, this research divide the nature of three levels into four levels of excellent, good, average poor and evaluation collection of each level uses V to indicate. The provisions of this research: V = {V1, V2, V3 and V4}. This evaluation index system used in this research includes quantitative index and qualitative index. Among them, the quantitative index is got by the author through statistical income, while the qualitative indicator is got by interviews and expert scoring method. The weight of each index in rule is by using expert scoring method, and each experts makes the order to relative importance of the index, ultimately through comprehensive, it is concluded the relative importance of the final index, and further to determine the index weight.

The use step of the evaluation model

This research follows the steps as shown below to use evaluation model to make the entrepreneurship training effect evaluation in colleges and universities:

TABLE 1: Venture evaluation index system

First level index	Weight	Second level index	Weigh	Third levelindex	Weight	The proportion of each evaluation level			
						Excellent	Goof	Average	Poor
Entrepreneurial performance	0.20	Non-financial level	0.35	Self-life improvement	0.12	0.09	0.15	0.58	0.18
				Enterprise internal development	0.22	0.04	0.09	0.47	0.40
				Employee level	0.26	0.11	0.37	0.50	0.02
				Customer level	0.40	0.23	0.33	0.44	0
		Financial level	0.65	Relative market share	0.40	0.04	0.13	0.43	0.40
				Profit	0.60	0.10	0.22	0.47	0.21
Entrepreneurial environment	0.20	Natural environment	0.25	Living conditions	0.26	0.12	0.21	0.48	0.19
				Social environment	0.32	0.08	0.26	0.41	0.25
				Natural resources and environment	0.42	0.39	0.31	0.26	0.04
		Marketing environment	0.42	competitor	0.16	0.18	0.34	0.36	0.12
				Substitute good	0.17	0.15	0.37	0.42	0.06
				Customer	0.21	0.09	0.39	0.32	0.20
				Supplier	0.15	0.25	0.30	0.28	0.17
				Public service platforms	0.12	0.31	0.29	0.36	0.04
				Public infrastructure	0.19	0.41	0.38	0.14	0.07
				sociocultural environment	0.20	0.59	0.27	0.11	0.03
		Institutional environment	0.33	Science and technology environment	0.23	0.07	0.13	0.62	0.18
				Financial environment	0.28	0.19	0.25	0.45	0.11
				Policies and regulations on environment	0.29	0.42	0.31	0.27	0
Entrepreneurship education	0.30	Teaching system	0.44	Teaching practice	0.20	0.10	0.15	0.52	0.23
				Relations between students and teachers	0.22	0.12	0.17	0.42	0.29
				Instructional mode	0.17	0.04	0.10	0.47	0.39
				Textbook content	0.25	0.03	0.12	0.37	0.48
		0perating mechanism	0.38	Curriculum system	0.16	0.02	0.07	0.13	0.78
				Elevation andmonitoringmechanism	0.27	0.00	0.00	0.10	0.90
				Teachers team establishment	0.50	0.01	0.03	0.11	0.85
				Bring into the talent training system	0.23	0.02	0.04	0.10	0.84
		Institutional framework	0.18	Base establishment	0.44	0.04	0.10	0.16	0.70
				System establishment	0.30	0.04	0.08	0.12	0.76
				entrepreneurship venture investment leading group	0.26	0.05	0.12	0.15	0.68
entrepreneurial quality	0.30	Capability and quality	0.40	Communication and interpersonal skills	0.24	0.42	0.45	0.13	0
				Integration of resources	0.14	0.1	0.40	0.29	0
				Forecast and decision-making ability	0.26	0.17	0.58	0.25	0
				Marketing Ability	0.16	0.26	0.29	0.45	0
		Knowledge quality	0126	Management and organization skills	0.20	0.25	0.45	0.30	0
				Legal knowledge	0.25	0.20	0.44	0.36	0
				Managerial knowledge	0140	01 34	0146	0120	0
				Professional knowledge	0.35	0.32	0.40	0.28	0
		Psychological quality	0.34	Self-control	0.10	0.35	0.48	0.17	0
				Will power	0.10	0.46	0.45	0.09	0
				Sense of competition	0.09	0.53	0.41	0.06	0
				Professional ethics	0.15	0.41	0.56	0.03	0
				Consciousness of innovation	0.18	0.32	0.47	0.21	0
				Spirit of adventure	0.18	0.38	0.47	0.15	0
				Career Consciousness	0.20	0.40	0.53	0.07	0

(1) Subdividing the index factor X at all levels to gain factor subset, namely $X=\{X_1, X_2, ..., X_k\}$. Factor set must meet the following formula: $B_i=\{b_{i1}, b_{i2}, \cdots, b_{in}\}=A_i \ o \ R_i$. In this formula, o indicates the fuzzy operator; $A_i=\{a_{i1}, a_{i2}, ..., a_{in}\}$, among it, $i\in[1,k]$; R indicates the evaluation matrix formed by the comments proportion.

(2) It needs to evaluate the factor X_i in (1) respectively. In the process, B_i as evaluation of single factor will be through the following fuzzy operations: $B=\{b_1, b_2, ..., b_n\}=A \ o \ R$ (in this relation formula, o indicates fuzzy operation symbol). And set A indicates the judgment matrix, and $A=\{a_1, a_2, ..., a_k\}$; Set R indicates the fuzzy relationship matrix, and $R=(B_1, B_2, M, B_K)^T=(b_{ij})_{kxn}$. And so, in this step, the secondary index comprehensive evaluation result can be obtained, the result set is represented with B. Similarly, in this way, make further subdivided to xi, three-level index comprehensive evaluation results can be obtained.

(3) In this step, it needs according to the results of the first two steps of operation under the "maximum membership principle" to make an evaluation level to the evaluation object. The so-called maximum membership "refers to the level description of the subordinate level of the maximum value in the b_n will be as the final level of the evaluation object.

According to the above steps, combined with the index system of TABLE 1 is to work out this three levels of index weight vector of this research (A is used in this research to express), and evaluation matrix of these indexes(R is used in this research to express)

EMPIRICAL RESEARCH

Based on the discussion of section 2 and section 3, this section will take the date research object of a university in Wuhan to make the empirical research. Specifically, the empirical research part is developed according to the following steps:

(1) Calculate the evaluation matrix. Make the single factor research to the "entrepreneurial quality" in TABLE 1 for. According to the data in TABLE 1,it can calculate the primary index of the weight vector and A secondary indexes weight vectorA1, A2 and A3. Through calculation, A=(0.34,0.26,0.40), A1= (0.20, 0.18,0.18, 0.15, 0.09, 0.10, 0.10), A3=(0.20, 0.16,0.26, 0.14, 0.24). On the basis of the weight vector, it can be further calculating secondary indexes evaluation matrix, through calculation, the secondary index evaluation matrix of R1, R2 and R3 of the "entrepreneurial quality" respectively is:

$$R_1=\begin{pmatrix} 0.40 & 0.53 & 0.07 & 0 \\ 0.38 & 0.47 & 0.15 & 0 \\ 0.32 & 0.47 & 0.21 & 0 \\ 0.41 & 0.56 & 0.03 & 0 \\ 0.53 & 0.41 & 0.06 & 0 \\ 0.46 & 0.45 & 0.09 & 0 \\ 0.35 & 0.48 & 0.47 & 0 \end{pmatrix}$$

$$R_2=\begin{pmatrix} 0.31 & 0.41 & 0.28 & 0 \\ 0.35 & 0.46 & 0.19 & 0 \\ 0.30 & 0.48 & 0.22 & 0 \end{pmatrix}$$

$$R_3=\begin{pmatrix} 0.25 & 0.45 & 0.30 & 0 \\ 0.26 & 0.29 & 0.45 & 0 \\ 0.17 & 0.58 & 0.25 & 0 \\ 0.31 & 0.40 & 0.29 & 0 \\ 0.42 & 0.45 & 0.13 & 0 \end{pmatrix}$$

(2) Leveling evaluation: In this research, it need to evaluate the first level and second level firstly, and then comprehensive evaluation in the third level.

① Use the following formula for the first level evaluation:

$$B_i=\{b_{i1}, b_{i2}, ..., b_{in}\}=A_i \circ R_i$$

According to the above formula, it can get each secondary index fuzzy operation result as follows:

The first secondary index:

$$A_1 \circ R_1 = (0.20\ 0.18\ 0.18\ 0.15\ 0.09\ 0.10\ 0.10) \circ \begin{pmatrix} 0.40 & 0.53 & 0.07 & 0 \\ 0.38 & 0.47 & 0.15 & 0 \\ 0.32 & 0.47 & 0.21 & 0 \\ 0.41 & 0.56 & 0.03 & 0 \\ 0.53 & 0.41 & 0.06 & 0 \\ 0.46 & 0.45 & 0.09 & 0 \\ 0.35 & 0.48 & 0.17 & 0 \end{pmatrix} = (0.396\ 0.489\ 0.115\ 0) = B_1$$

The second secondary index:

$$A_2 \circ R_2 = (0.35\ 0.40\ 0.25) \circ \begin{pmatrix} 0.32 & 0.40 & 0.28 & 0 \\ 0.34 & 0.46 & 0.20 & 0 \\ 0.20 & 0.44 & 0.36 & 0 \end{pmatrix} = (0.298\ 0.434\ 0.268\ 0) = B_2$$

The fuzzy operation of the third secondary index:

$$A_3 \circ R_3 = (0.20\ 0.16\ 0.26\ 0.14\ 0.24) \circ \begin{pmatrix} 0.25 & 0.45 & 0.30 & 0 \\ 0.26 & 0.29 & 0.45 & 0 \\ 0.17 & 0.58 & 0.25 & 0 \\ 0.31 & 0.40 & 0.29 & 0 \\ 0.42 & 0.45 & 0.13 & 0 \end{pmatrix} = (0.280\ 0.451\ 0.269\ 0) = B_3$$

Then, the first factor fuzzy relationship matrix RA of the first level is as follows:

$$R_A = \begin{pmatrix} B_1 \\ B_2 \\ B_3 \end{pmatrix} = \begin{pmatrix} 0.396 & 0.489 & 0.115 & 0 \\ 0.298 & 0.434 & 0.268 & 0 \\ 0.280 & 0.451 & 0.269 & 0 \end{pmatrix}$$

According to the above way, it also can get the other factors in the first level of fuzzy relationship matrix RB, RC and RD, which respectively is:

$$R_B = \begin{pmatrix} 0.043 & 0.099 & 0.145 & 0.713 \\ 0.010 & 0.024 & 0.105 & 0.861 \\ 0.064 & 0.125 & 0.391 & 0.420 \end{pmatrix}$$

$$R_C = \begin{pmatrix} 0.309 & 0.244 & 0.369 & 0.078 \\ 0.226 & 0.351 & 0.308 & 0.115 \\ 0.221 & 0.268 & 0.365 & 0.146 \end{pmatrix}$$

$$R_D = \begin{pmatrix} 0.076 & 0.184 & 0.454 & 0.286 \\ 0.140 & 0.266 & 0.479 & 0.115 \end{pmatrix}$$

② The second level comprehensive evaluation. Refer to the first□ part, in a similar way, it can according to the following formula to get the fuzzy relations of the second level, and to, and calculate N1, N2 and N3 and N4, which respectively is :

$A \circ R_A = N_1 = (0.324, 0.460, 0.216, 0)$

$B \circ R_B = (0.040, 0.082, 0.238, 0.640) = N_2$

$C \circ R_C = (0.252, 0.295, 0.342, 0.111) = N_3$

$D \circ R_D = (0.098, 0.213, 0.463, 0.226) = N_4$

③ The third level comprehensive evaluation. The TABLE 1 shows that the weight vector of the 4 first-level index of the evaluation object is:

$L = (0.30, 0.30, 0.20, 0.20)$

By the operation result of the last step, it shows that the evaluation matrix RL of three level of evaluation object is:

$$R_L = \begin{pmatrix} N_1 \\ N_2 \\ N_3 \\ N_4 \end{pmatrix} = \begin{pmatrix} 0.324 & 0.460 & 0.216 & 0 \\ 0.040 & 0.082 & 0.238 & 0.640 \\ 0.252 & 0.295 & 0.342 & 0.111 \\ 0.098 & 0.213 & 0.463 & 0.226 \end{pmatrix}$$

Therefore, primary index fuzzy arithmetic result is as follows:

$L \circ RL = (0.1792, 0.2642, 0.2972, 0.2594)$

(3) Final evaluation. According to maximum membership principle, primary index in the fuzzy operation results, the maximum value is 0.2972, which corresponding nature language is described as "in". It can be seen that the entrepreneurship training in colleges and universities effect is medium level. From the point of the evaluation result, this entrepreneurship training in colleges and universities courses for the training score of “entrepreneurial quality" of the training object is lowest. It can be seen that entrepreneurial quality is one of the determinants of entrepreneurial success of the college graduates, and this factor in entrepreneurial practice tends to become the short slab of the entrepreneurs. And in the "entrepreneurial education" indicator, the "organizational framework " and "operating system" also has a lot of problems, and the "organizational framework " exists serious bureaucracy and "decoration", but the running system performs the same, too rigid, they often can not very effectively reflect the university students' entrepreneurship appeal, also can't very well help training object better understanding the self weakness, also will not be able to help them effectively targeting the promotion. "entrepreneurial environment" indicator in the institutional environment is not perfect, especially these two aspects of the imperfect laws and policies; In addition, the fierce market competition environment, and the widespread of monopoly and power interference phenomenon, lead to entrepreneurs in the colleges and universities hard to deal witheven after entrepreneurship training. The problems in the "entrepreneurial performance” indicators are mainly manifested in start-up low profit margin, internal management is not mature and low customer recognition. The future entrepreneurship training should focus on the accumulation of management skills, coping skills, and entrepreneurial quality to develop.

CONCLUSION

The role and importance of the entrepreneurship training in university education is more and more getting the recognition of education and social. In this process, as a vital part of the education system in China, the colleges and universities should actively promote entrepreneurship training, so as to make the college graduates to get the knowledge, skills and to have a much broader of and career prospects. Entrepreneurship training is an education curriculum of higher technical contains. In order to accurately assess the effect of Entrepreneurship training, and then according to the evaluation results to make targeted transformation and ascension, it is necessary to research and take accurate effective evaluation methods. In this paper, the application problems of the fuzzy evaluation method in entrepreneurship training system in colleges and universities have been made the corresponding discussion. This discussion has strong theoretical significance and display meaning. However, as the enterprise training evaluation methods are still lack of unified standards and specification, so the discussion this article still has its limitations on the promotion.

ACKNOWLEDGEMENT

Provincial excellent resource sharing course in Suzhou University - "Occupation career development and employment guidance of college students" (Project No. 2013gxk098)

REFERENCES

[1] Zhao Yan, Wang Bo; Coordination of small and medium-sized enterprise salary management and countermeasures of the relationship between college students' employment [A], The collected papers of the 11th annual meeting and Chinese academy of sciences, Shenyang automobile industrial concentration area development and cooperation forum (humanities and social science and pedagogy booklet) [C], **(2014)**.

[2] Wang Xiaodong, Wang gang; The driving and promotion of the University-enterprise cooperation education on college students' employment – taking example on the university-enterprise cooperation of animal husbandry and veterinary medicine of Shenyang agricultural university [A], The collected papers of 11th annual meeting and Chinese academy of sciences, Shenyang automobile industrial concentration area development and cooperation forum (humanities and social science and pedagogy booklet) [C], **(2014)**.

[3] Zao Ming, Zhao Luning; Analyses on college students' practice base functions [A], The collected papers ofthe 11th annual meeting and Chinese academy of sciences Shenyang automobile industrial concentration area development and cooperation forumproceedings (humanities and social science and pedagogy booklet)[C], **(2014)**.

[4] Wang Hui; Test theory on employment and guidance of the difficult groups of college graduates [A], The selected research papers of Chinese education theory and the practice achievements [C], **4**, **(2010)**.

[5] Zheng Tianhua; Theory on innovation entrepreneurship education system in higher vocational colleges[A], 2011 Collected papers of Wuxi vocational education teacher forum [C], **(2012)**.

[6] Cao Bingyuan; Application of fuzzy mathematics and system [M], Beijing: Science Press, **(2011)**.

[7] Zhang Lizhu and others; Regional investment environment evaluation method Based on multilevel fuzzy comprehensive evaluation[J], Shandong Agricultural University: Natural Science Edition, **39(3)**, 444-448 **(2011)**.