

Using Fuzzy AI Delphi Method for dispatching ERP executives of banks

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Abstract— Enterprise resource planning is an integrated system of real-time information. With the trend of internationalization, most banks hope to use ERP systems to eliminate the shortcomings of bank operation processes, such as the waste of repeated manpower, duplication of information or delays in transmission, etc., and reduce efficiency. Improve to the highest level and minimize waste. With the openness of Taiwan's government financial policy, the banks here are becoming more liberalized and internationalized. Taiwan is becoming a competitive financial market since more new commercial banks have been set up in Taiwan. So, it is important for a bank to dispatch good executives to overseas branch. In this paper, we analyze what kinds of characteristics and traits a bank's manager in overseas branch should have by using Fuzzy Delphi Method. The purposes of the research are 1) to analyze what kinds of characteristics and traits a bank's manager in overseas branch should have, 2) to compare the difference of manager in overseas branch in Japan and HongKong by using Wilcoxon rank sum test, 3) to set up the dispatch criteria with the AI and fuzzy Delphi method. Through the examination of FDM, a fuzzy referent model framework for the bank's dispatch in overseas branch is built. It is anticipated that the fuzzy framework will provide a more objective means for the dispatch of appropriate personnel for overseas branches.

Keywords— Fuzzy, AI, ERP, Bank

I. INTRODUCTION

Enterprise resource planning is an integrated system of real-time information. With the trend of internationalization, most banks hope to use ERP systems to eliminate the shortcomings of bank operation processes, such as the waste of repeated manpower, duplication of information or delays in transmission, etc., and reduce efficiency. Improve to the highest level and minimize waste.

Bank is a part of service industry that offers their customers financial services. In order to conform to liberalization and internationalization trend of time, banks establish widely their overseas branches. Facing competing environment, bank depends heavily on dispatch of capable staff to overseas branch to keep their

competitiveness in markets. If any organization wants to achieve their targets, "right person" is one of most primary and basic factors. It is certainly safe to say "human resources" is the most important resource in any organization. The success or failure of a business depends largely on whether chief officers know their subordinates well enough to assign them jobs commensurate with their abilities. Therefore, for gain competitive advantages, a bank should strengthen education and training for their staff, and, it is very important for the selection of executive s of overseas branches.

In recent years, Fuzzy Theory has been applied widely to various researches. So has Fuzzy Delphi Method (FDM). Scholars like Ishikawa et al. (1993), Chang et al. (1995), Chang, P.T. et al. (2000) have developed many different

FDMs that have been applied to solve matters which mix with large uncertainties. Therefore, the research adopted FDM to screen indexes of capabilities that executives who are dispatched to branches of Japan and Hongkong should have and conducted empirical research on these dispatch. It is hoped that the results of research could help banks to find out right persons to serve at overseas branches to enhance their competitiveness.

II. LITERATURE REVIEW

Based on an earlier policy-capturing study of the general mental ability and Big Five personality traits, Jane W Moy et al. (2004) explore and analyze the hiring preference of Hong Kong employers across five important personal attributes. They think that among knowledge, abilities skills, and personality, the personality of a candidate has a relatively greater impact on the hiring decision.

Dakin et al.(2004) think that despite widespread evidence of low construct and validity predictive, personality testing is increasingly being used for the selection of managers. Based on available research issue it is argued that personality is likely to play an important role as a determinant of managerial performance.

Chang et al.(2000) developed a new fuzzy Delphi method used in managerial talent assessment for a company located in Taiwan . This new method employs the fuzzy statistics and technique of the conjugate gradient search to fit membership functions. Membership functions may be derived for the fuzzy forecasts.

Ana Isabel Canhoto, Fintan Clear.(2020)Refers to the AI shown by machines made by humans. Generally artificial intelligence refers to technology that presents human intelligence through ordinary computer programs. Viswanathan, Y.S.Beh,J.K.U. Brock, F.von Wangenheim(2020) think that the term also refers to the study of whether and how such intelligent systems can be realized. At the same time, through advances in medicine, neuroscience, robotics, statistics, etc., normal predictions believe that many human occupations will gradually be replaced by them.

Mayeh, M., Ramayah, T., & Mishra, A. (2016) think that the introduction of enterprise resource integration system (ERP) and business process reengineering (BPR) by enterprises can systematize enterprise processes and simultaneously optimize enterprise processes, improving the efficiency of internal operations and organizational learning of enterprises.

III. ANALYSIS

1. The construction and induction of selection factors for banks to dispatch ERP executives of overseas branches.

In order to construct and induct abilities that executives of overseas

bank branches should have, after broad literature study and communicating and discussing with other experts, we inducted and constructed selection factors shown as Table 2. The factors covered include 1) traits of ability; 2) diversified intelligence; 3) academic ability and 4) graduated college.

2. The design of Fuzzy Delphi Method

In order to compare factors for selecting dispatched executives of branches in Japan with that of branches, the research uses design of questionnaire.

3. Data collection

Data were collected in a survey of the professors and professional members in Taiwan's Banks. The total of 61 first questionnaires were distributed and 57 usable questionnaires were used in the decision analysis, representing a valid response rate is 61.46%.

4. The Steps of Fuzzy Delphi Method

Fuzzy Delphi Method of Kaufmann and Gupta(1988) is on the basis of triangular fuzzy number

$$u_A(x) = \begin{cases} 0 & , x < a \\ \frac{x-a}{b-a} & , a \leq x \leq b \\ \frac{c-x}{c-b} & , b \leq x \leq c \\ 0 & , x > c \end{cases} \quad (1)$$

β_1 及 β_2 are offered as any two convenience value to conduct prediction of Fuzzy. The steps are as follows:

step 1: Ask experts for their prediction (a,b,c). a represents the most pessimistic value, c represents the most optimistic value, b represents the most suitable value in the interval between a and c.

step 2: Average opinions of all experts (a,b,c) · obtain (am, bm, cm) average, minus opinions of individual experts (a,b,c) from the average separately and obtain (am -a, bm -b, cm -c) . Distribute those opinions to experts for reference when they are given questionnaires to fill.

step 3: According to the average opinions in Step 2, (am, bm, cm) , calculate with Formula (2) the degree of differentiation of triangular fuzzy numbers between fuzzy opinions and average opinions for every expert in the cycle. If all differentiations are falling within a certain

tolerable scope, then we could consider that they have reached convergence. The average opinions in the cycle is the final prediction and go ahead to implement Step 4. If not, return to Step 1.

step 4: Defuzzication

Defuzzication is to transform fuzzy number into a definite value that acts as tool used in the process of fuzzy making. The research adopted OM method introduced by Chang & Lee (1995). The higher OM value is , the more important the factor will be.

$$OM(A_i) = \int_0^1 \{ \frac{1}{2} w [a_m + w (b_m - a_m)] + (1 - \frac{1}{2} w) [c_m + w (b_m - c_m)] \} dw \quad (2).$$

IV. DISCUSSION

Fuzzy Delphi Method, provided by Kaufmann and Gupta, is a repeated procedure, its results of the first and second questionnaires are shown as Table 1. Besides, Based on these OM values, calculate the degree of stability of fuzzy opinions between two questionnaires. The calculating method of degree of stability is that 2nd OM minus 1st OM, then pick absolute values.

Table 1. The OM Value and Stability Value of ERP Executives in Japan

Factor		Japan (OM Value)		
		A. 1st	B. 2nd	B-A
Traits of Ability	Intelligence Quotient	7.38	7.38	0.00
	PR and Social Ability	7.67	7.73	0.07
	Management Ability	8.37	8.34	0.03
Diversified Intelligence	Decisiveness	7.17	7.09	0.08
	Expression	6.51	6.58	0.07
	Moral Character	7.10	7.01	0.08
Academic Ability	Accounting	7.16	7.16	0.01
	Investment	7.54	7.59	0.05
	Bank Operation and Management	7.06	7.15	0.09

Table 2. The OM Value and Stability Value of ERP Executives in Hongkong

Factor		Hongkong (OM Value)		
		C. 1st	D. 2nd	C-D
Traits of Ability	Intelligence Quotient	7.15	7.08	0.07
	PR and Social Ability	7.13	7.07	0.07
	Management Ability	7.01	7.10	0.09
Diversified Intelligence	Decisiveness	7.36	7.31	0.05
	Expression	7.54	7.45	0.09
	Moral Character	8.00	8.02	0.02
Academic Ability	Accounting	7.02	6.96	0.06
	Investment	6.76	6.66	0.10
	Bank Operation and Management	6.88	6.91	0.04

V. CONCLUSION

1. The research adopted Fuzzy Delphi Method to find the weight of evaluation factors for overseas branch manager dispatch. The value of 2nd OM is shown as Table 4. The higher value of OM is, the more attention is paid to the factor during their process of selecting overseas branch executives.

2. The research took advantage of Wilcoxon Rank Sum Test to compare the weighted value of 2nd OM of evaluation factors for dispatching executives to branches in Japan and Hongkong. The results were: there was no significant differentiation on colleges the candidates graduated from. That means that the banks in Taiwan hardly consider which college or departments the candidates graduated from when they selecting executives for their branches.

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APPENDIX

Viswanathan, Y.S. Beh, J.K.U. Brock, F.von Wangenheim (2020). *Artificial intelligence and marketing: Pitfalls and*