Effectiveness of AI Education from Vitality- An Example of Banking Management in Taiwan

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Abstract— This study analyzes the dimensions of the vitality of development for banking systems. Fuzzy synthetic decisions are used to construct and evaluate a vitality of training, assigning, and development index to offer banks new perspectives and methods of assessment. In this study, we analyze the vitality index for the human resources development of the banking system. Xie et al. (2021) think that with the rapid development and significant successfulness of various deep learning techniques in artificial intelligence (AI), AI has led to a significant evolution in both academic and industrial fields. For the uncertainty, the factor weight for the vitality index will be determined by using the fuzzy Delphi method (FDM). Through the process of fuzzy synthetic decision (FSD), the model calculated the relative importance for each dimension of the mean factor. In this empirical study of commercial banks, the priority ranks for the five dimensions are as follows: Efficiency, Leadership, Business Culture, Talents and Strategy.

Keywords— Banking, AI, Vitality index, Fuzzy synthetic decision (FSD), Fuzzy Delphi method (FDM)

I. INTRODUCTION

Traditional performance evaluation models for management focus on productivity and competitiveness. Most of them are financial indexes. But the financial index cannot fully express the sustainable development of an enterprise. A lot of physical examination forms for the human body, which are used to measure the function of every system and thus evaluate human health. Similarly, enterprises use indices to manage the performance of productivity and competitiveness. These explain the specification of enterprises to some extent, but not the complete source of an enterprise's sustainable development.

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This study aims to achieve the following objectives: 1. Establish the "vitality index" as measuring indexes of performance of the Taiwanese financial industry. 2. Find a method of operation for the survival of business.

II. THE STUDY OF LITERATURE

2.1 Living System Theory

Living System Theory (LST) was introduced by

Miller (1978), in which he integrated social, biographical, and scientific domains. From the "structure" and "process" of input, output, flow, stability, and feedback, it will help us to understand the characteristics of a living system and further to construct a general conception system that will correspond to the important variables of a concrete living system. Miller divided all living systems into seven levels, and each level was represented by 19 sub-systems.

The development of the vitality index is based on the LST (Tan, 1994), which is of extensive use in structural study, organization management, operating efficiency analysis, accounting, and information systems. In concept, managers can conceptualize the affairs that occurred in management and then provide a conceptual outline applicable to the organization.

In approach, LST supplies a model construction ability, the application of which extends to fields such as accounting, manufacturing, resource management, human resources, TQM, software design, etc. Therefore, LST can be used to describe a management system and framework.

2.2 The Performance of Management in AI

Szentes (2005) proposed a method for measuring competitiveness, including products and services. An asset life cycle management (ALCM) model is subsequently presented for assets in the process industry, integrating the concepts of generic project management frameworks and systems engineering and operational reliability to deal with these inefficiencies (Schuman et al. 2005). José Eugenio (2020) presented in detail a simplified method for the application of the analytic hierarchy method (AHP) that aims to calculate the priorities of a set of criteria. This increases the attractiveness of the AHP method for business applications.

Liang et al. (2003) adopt the efficiency concept to assess and analyze the business performance of organizations, for example, integration evaluation of banks or financial holding companies and performance evaluation of research and development programs.

Overall, business performance is the effectiveness and effect of different kinds of business operations. In profit orientation, it includes quantitative financial indexes and the business strategies and activities of earning at least reasonable profit. In competitive advantage, it includes two dimensions, including business strategies and activities that aim to achieve goals and shape leading advantage in horizontal competition and further develop hypotheses. Business efficiency has a significant impact on business performance, while business performance has a significant impact on the sustainable operation of businesses. The precondition of the sustainable operation hypothesis of an enterprise is to regard it as a living system and to enable it to survive in sustainability.

2.3 Fuzzy Delphi Method

Liang et al. (2003) proposed a process capability index for measuring the operation performance of banks' industries. There is a new insight for the service quality of banks' operations. Chang et al. (2000) developed a new fuzzy Delphi method (FDM) to be used in managerial talent assessment for a company located in Taiwan. This new method employed the fuzzy statistics and technique of a conjugate gradient search to fit membership functions, which may be derived for fuzzy forecasts. Liang and Hsieh (2005) also developed an ability index by using FDM for training in banks' industry.

Xie et al. (2021) think that with the rapid development and significant successfulness of various deep learning techniques in artificial intelligence (AI), AI has led to a significant evolution in both academic and industrial fields.

III. METHODOLOGY

3.1 Structure of Sustainable Vitality

This study determined 'the vitality of the sustainable development index' used by banks' training, assigning, and development departments using the FDM and Analytic Hierarchy Process (AHP) method. Chang and Lee (1995) adopted the original defuzzification method (OM) to determine the weight distribution of these factors, establishing a fuzzy decision system to choose the best candidates.

3.2 Fuzzy Synthetic Decision Process

The fuzzy theory uses the membership function to solve the problem of the general difficulty of determining. The fuzzy synthetic decision (FSD) method is used to compare the relative importance of each dimension of the mean factor.

IV.   RESEARCH RESULTS

After a fairly comprehensive survey and discussions with experts, the vitality of the sustainable development index for banks was established by factor analysis. A total of 899 experts, professionals from banking industries and universities, were invited to answer the factor analysis questionnaire, which was sent through the mail. The weights of various factors in each dimension, given by the weight set W used in the fuzzy synthetic decision, can be determined by the OM method of calculation

In order to test the vitality indexes of the financial industry established in the research, we will conduct in-depth interviews with each manager of department with an aim to understand the importance of leadership, management strategy, management efficiency, assigning managers to foreign branches, responsiveness, and business culture on the vitality index and the weight of vitality of W_1, W_2, W_3, W_4, and W_5. The final vitality index, that is, shown as table 1.

Table 1 The Statistics of Vitality Indexes of Case Company

Contents of Sub-Systems / Scores	Weight of Vitality (OM value)	weights percentage %	Vitality Index
Leadership	34.5730	0.225	2
Management Strategy	22.3235	0.137	5
Management Efficiency	49.6635	0.306	1
Assigning Managers to Foreign Branches	25.5595	0.151	4
Business Culture	29.6203	0.182	3
total	162.8398	100%	

Defuzzification provides a single score for each appraisal grade. Then, the membership degree of each appraisal grade is multiplied by its score, and the fuzzy decision-making set is defuzzified to yield a certain score. Excellent, good, normal, bad, and very bad scores are assigned values of 10, 7.5, 5, 2.5, and 0, respectively. The vitality of sustainable development index score is 9.2.

V.   CONCLUSION

In this study, a fuzzy Delphi method and the fuzzy synthetic method were applied to an empirical study. The following conclusions are drawn.

The empirical vitality of sustainable development index has five dimensions: 1) leadership; 2) management strategy; 3) management efficiency; 4) managers assigned to foreign branches and development of talented personnel; and 5) business culture. This study used the fuzzy Delphi method to determine the weights of factors. A higher OM value indicates that more attention is paid to that factor.

Fuzzy synthetic decisions are used to evaluate a set of vitality of sustainable development indices, offering banks new perspectives and methods of assessing their performance. The index can be used to help solve problems that arise in relation to a bank's development, and especially training and assigning performance.

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