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E-commerce Education from Vitality- an Example of Banking Management in Taiwan on AI models

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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. 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, Artificial Intelligence (AI), Vitality Index (VI), E-commerce, Fuzzy Delphi Method (FDM), Fuzzy Synthetic Decision (FSD)**

I. INTRODUCTION

Traditional performance evaluation models for management focus on productivity and competitiveness, often quantifying output through metrics such as revenue growth, market share expansion, and operational efficiency. Most of these models rely heavily on financial indexes; including profit margins, return on investment (ROI), and earnings per share (EPS), which serve as tangible markers of a company's immediate financial health. However, the financial index cannot fully express the sustainable development of an enterprise, as it tends to overlook intangible assets and long-term capabilities that underpin enduring success. A lot of physical examination forms for the human body, which are used to measure the function of every system—from cardiovascular health to immune response—and thus evaluate human health holistically, rather than focusing solely on a single vital sign. Similarly, enterprises use indices to manage the performance of productivity and competitiveness, akin to how medical check-ups assess individual bodily systems. These evaluation frameworks explain the specification of enterprises to some extent, highlighting their current operational strengths and weaknesses, but not the complete source of an enterprise's sustainable development, which encompasses factors like employee well-being, innovation capacity, environmental stewardship, brand reputation, and stakeholder relationships that collectively ensure resilience and growth over time.

A lot of physical examination forms for the human body, which are used to measure the function of every system—from the cardiovascular system that pumps life-giving blood through veins and arteries, to the respiratory system that draws in oxygen with each breath, to the nervous system that sends electrical signals across synapses—thus evaluate human health by tracking vital signs like heart rate, blood pressure, lung capacity, and organ function. Similarly, enterprises use indices to manage productivity and competitiveness, such as key performance indicators (KPIs) that measure output per employee, customer satisfaction scores, market share growth, and operational efficiency metrics like production cycle times and cost per unit. These explain the specification of enterprises to some extent, but not the complete source of an enterprise's sustainable development, as they often focus on quantifiable outputs rather than the underlying cultural values, innovative spirit, and adaptive resilience that drive long-term success.

This study aims to achieve the following objectives: First, establish the "vitality index" as measuring indexes of performance of the Taiwanese financial industry, encompassing key indicators such as liquidity ratios, profitability metrics, operational efficiency scores, customer satisfaction ratings, and resilience against market fluctuations, to provide a comprehensive assessment of the sector's dynamic health and sustainability. Second, Find a method of operation for the survival of business, focusing on strategies that enhance adaptability to regulatory changes, optimize risk management frameworks, leverage technological innovations for process streamlining, foster customer-centric service models, and build robust competitive advantages in an increasingly globalized and digitally driven financial landscape.

II. LITERATURE REVIEWS

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. Living System Theory (LST) addresses how humans understand, perceive, and utilize life energy. It emphasizes the importance of emotions, willpower, and the root center in driving personal growth and life choices. Through awareness and self-criticism, individuals can better understand their own driving forces, thereby achieving self-improvement and life enhancement.

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—such as daily operational challenges, team dynamics, resource allocation hurdles, and strategic decision-making processes—and then provide a conceptual outline applicable to the organization, capturing nuanced interactions between internal processes, external market pressures, and human capital engagement to gauge overall organizational health and sustainability.

In approach, LST supplies a model construction ability, the application of which extends to fields such as accounting, where it streamlines financial forecasting and budget allocation by analyzing historical transaction patterns and identifying emerging trends; manufacturing, where it optimizes production schedules, minimizes downtime, and enhances supply chain efficiency by predicting equipment maintenance needs and material demand fluctuations; resource management, where it allocates human, physical, and technological resources dynamically based on real-time project requirements and organizational priorities; human resources, where it aids in talent acquisition, employee performance evaluation, and workforce planning by modeling skill gaps, career progression paths, and team collaboration dynamics; Total Quality Management (TQM), where it integrates quality control processes across departments, monitors key performance indicators (KPIs) for product consistency, and drives continuous improvement initiatives through data-driven insights; and software design, where it assists in system architecture development, code optimization, and user experience enhancement by simulating user interactions and identifying potential bottlenecks. Therefore, LST can be used to describe a management system and framework that not only structures operational workflows but also adapts to evolving business needs, providing a holistic, data-informed approach to decision-making and process optimization across diverse organizational contexts.

2.2 The Performance of Management in AI

Szentes (2005) proposed a method for measuring competitiveness, including products and services, which involves a multi-dimensional framework that evaluates key performance indicators such as market share, customer satisfaction, innovation rate, and cost efficiency, providing a holistic view of an organization's competitive standing in the marketplace. 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). This ALCM model encompasses phases from asset conception and design, through acquisition, operation, maintenance, and eventual decommissioning, ensuring optimal utilization, minimizing downtime, and maximizing return on investment by leveraging data-driven decision-making and predictive analytics. 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, streamlining the traditional AHP process by reducing complexity in pairwise comparison matrices and introducing user-friendly tools for data input and analysis. This increases the attractiveness of the AHP method for business applications by making it more accessible to non-expert users, enabling faster decision-making in areas such as resource allocation, supplier selection, and strategic planning, while maintaining the method's robustness in handling both qualitative and quantitative factors.

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. Their framework delves into how efficiently resources are allocated and utilized within these entities, examining metrics such as input-output ratios, operational productivity, and strategic alignment to gauge overall effectiveness. Big data refers to massive, complex, and variable datasets that are difficult for traditional data processing software to handle effectively. This data typically originates from diverse sources, such as social media platforms teeming with user-generated content, detailed transaction records from e-commerce and banking systems, mobile devices capturing location and usage patterns, and sensors embedded in smart devices and industrial machinery, all generating data at high speeds that can reach terabytes or even petabytes per day. Artificial intelligence (AI), on the other hand, refers to the ability of computers or machines to simulate human intelligence and behavioral patterns, enabling them to reason, learn from experience, adapt to new inputs, and perform tasks that typically require human cognition (Kaban, 2023). This encompasses subfields like machine learning, natural language processing, computer vision, and robotics, where algorithms are designed to process information, recognize patterns, make decisions, and even interact with humans in increasingly sophisticated ways.

Deep learning is a sophisticated subset of machine learning, distinguished by its ability to process and interpret unstructured data—such as images, text, audio, and video—with remarkable precision, all without the need for manual feature extraction. Unlike traditional machine learning models that rely on predefined features engineered by humans, deep learning algorithms autonomously learn hierarchical representations of data, enabling them to make general observations and draw conclusions from complex patterns inherent in the input. These algorithms excel at analyzing vast datasets with depth, uncovering hidden correlations, trends, and insights that might remain invisible to conventional analytical methods or even to the original training data itself. Moreover, deep learning systems possess the capacity for continuous learning and adaptation; they can refine their performance over time by incorporating new user interactions, feedback, and behavioral patterns, thereby enhancing accuracy and relevance in dynamic environments. Artificial Neural Network: An artificial neural network (ANN) is a computational system designed to mimic the structure and function of the human brain, utilizing interconnected layers of mathematical processing units known as neurons. Each neuron within the network applies mathematical functions to simulate the behavior of biological neurons, transmitting signals through weighted connections that model the synaptic transmission and response mechanisms observed in organic neural networks. When external information or input stimuli are fed into the network, these signals propagate through the layers, with each neuron adjusting its output based on the strength (weights) assigned to incoming connections. Through iterative training processes, the network dynamically modifies these weights, allowing it to learn from experience, optimize its responses, and ultimately produce accurate outputs that reflect the underlying patterns in the input data.

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. The Fuzzy Delphi Method is a semi-structured expert interview method. It begins by searching for relevant literature on a specific topic to initially summarize the questions. Then, based on the knowledge and experience of experts in the relevant field, opinions are offered on the questions, and the degree of consensus among the expert group is analyzed. To formally implement the Fuzzy Delphi Method, a suitable expert group of 10-15 scholars needs to be selected. Each expert independently provides feedback on specific topics. After collection and analysis, the consistency or differences in the expert group's responses to each question are confirmed. The implementation process may involve multiple rounds as needed to gradually reach a consensus among the experts. 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. This evolution is marked by groundbreaking advancements such as the proliferation of convolutional neural networks (CNNs) revolutionizing image recognition, enabling machines to identify objects with near-human accuracy; recurrent neural networks (RNNs) and their variants like LSTMs and GRUs transforming natural language processing, allowing for sophisticated text analysis, machine translation, and sentiment detection; and transformer models, which have become the backbone of state-of-the-art systems in tasks ranging from language modeling to computer vision, powering applications like real-time language translation services and advanced chatbots. In academia, this has spurred a surge in interdisciplinary research, with scholars from computer science, neuroscience, mathematics, and engineering collaborating to unravel the mysteries of neural network architectures, optimize training algorithms, and explore ethical implications of AI deployment. Industrial fields have witnessed a paradigm shift as well, with tech giants and startups alike integrating AI-driven solutions into everyday products and services—think of personalized recommendation systems on e-commerce platforms that analyze user behavior patterns to suggest tailored items, autonomous vehicles leveraging deep learning for real-time object detection and decision-making to navigate complex road environments, and healthcare diagnostics tools utilizing AI to analyze medical images such as X-rays and MRIs with high precision, aiding clinicians in early disease detection. The success of these techniques has not only accelerated innovation but also created new job roles, reshaped business models, and fostered a culture of continuous learning and adaptation, as industries strive to keep pace with the ever-evolving landscape of AI technology.

2.4 E-commerce

Boer, et al. (2022) categorized online commerce into two types based on the perspectives of sellers and buyers: e-commerce favored by manufacturers and e-commerce favored by customers. The first type implies that manufacturers want to retain customers, and e-commerce facilitates business transactions between manufacturers and customers. The second type involves customers using website information to discover product prices, compare prices, and negotiate offers. Further classifications include:

1. Business-to-business transactions: the buying and selling of goods or services between businesses; business-to-business transactions constitute the main volume of e-commerce transactions.
2. Business-to-consumer transactions: businesses sell goods to consumers.
3. Consumer-to-consumer transactions: consumers buy and sell between themselves.
4. Consumer-to-business transactions: companies decide whether to purchase goods based on the prices listed by consumers.

Deise et al. (2010) argue that the B2B world emphasizes distribution channels, meaning that using internet technology can add an extra electronic sales channel and enhance the purchasing power of business buyers by streamlining processes and reducing barriers to access. B2B e-commerce includes electronic purchasing systems and an electronic channel that more closely connects distributor networks, fostering seamless collaboration and real-time information sharing between manufacturers, wholesalers, and retailers. Businesses use electronic interaction to conduct commercial activities, including providing detailed product names, specifications, high-resolution images, and technical datasheets to customers online, allowing for informed decision-making at any time and from any location. Conducting buying and selling transactions online encompasses a range of activities such as submitting inquiries with specific requirements, receiving instant quotations tailored to volume and terms, placing orders with automated confirmation, making secure payments through integrated financial gateways, and accessing after-sales service support via ticketing systems or live chat. This should also encompass comprehensive customer service support, where businesses can address queries about product performance, troubleshooting, and warranty claims; manufacturing updates, including production schedules and quality control reports; problem inquiries resolved through dedicated support portals; electronic catalogs featuring interactive filters for easy product discovery; inventory inquiries that provide real-time stock levels and lead times; online negotiation platforms facilitating price discussions and contract terms; efficient distribution management, tracking shipments and optimizing logistics; and robust inventory management tools that help businesses monitor stock levels, automate reordering, and reduce holding costs.

E-commerce refers to marketing activities conducted via computer networks, encompassing a broad spectrum of digital interactions that facilitate the exchange of goods, services, and information across the globe. In a narrower sense, it refers to using computer networks for activities such as product negotiation, where buyers and sellers engage in real-time or asynchronous discussions to determine terms, pricing, and specifications; promotion, which involves leveraging digital channels like social media platforms, search engines, email campaigns, and online advertisements to showcase products and reach target audiences with tailored messaging; distribution, which streamlines the process of delivering goods through digital marketplaces, direct-to-consumer websites, and integrated logistics systems that track shipments and ensure timely delivery; and service, which includes post-purchase support such as customer inquiries, returns processing, technical assistance, and personalized recommendations delivered via chatbots, help centers, or dedicated customer service teams. These activities collectively aim to better understand and meet customer needs than competitors by analyzing consumer behavior data, adapting to market trends, and offering unique value propositions, while also achieving organizational goals such as increasing sales revenue, expanding market reach, reducing operational costs through automation, and enhancing brand loyalty in an increasingly competitive digital landscape.

III. METHODOLOGY

1.1 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. The sustainable development index, a composite metric integrating environmental stewardship, social responsibility, and economic viability, was rigorously evaluated for its vitality—its capacity to drive meaningful, long-term growth within banking human resource frameworks. By employing FDM (Fuzzy Decision Making), the research navigated the inherent uncertainties and ambiguities in assessing intangible aspects of candidate potential, such as adaptability to green banking initiatives or commitment to ethical lending practices. Complementing FDM, the Analytic Hierarchy Process (AHP) provided a structured approach to decompose complex decision-making into hierarchical levels, allowing for pairwise comparisons of criteria like technical expertise, sustainability awareness, and leadership potential, thereby quantifying their relative importance. Chang and Lee (1995) refined this process by applying the Original Defuzzification Method (OM), a technique that converts fuzzy sets—representing vague or imprecise data—into crisp numerical values, ensuring that the weight distribution of each factor in the sustainable development index was both precise and reflective of expert judgment. This fuzzy decision system not only streamlined the candidate selection process but also ensured that the chosen individuals aligned with the bank's strategic goals of fostering a workforce capable of driving sustainable development, thus enhancing organizational resilience and competitive advantage in an increasingly eco-conscious financial landscape.

3.2 Fuzzy Delphi Method 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. This study applies fuzzy theory to describe general uncertainty problems. The research methods consist of two main parts: literature review and the Fuzzy Delphi Method. The Fuzzy Delphi Method is described below: Fuzzy theory uses the value of the membership function to describe general uncertainty problems. Hierarchical analysis, proposed by Satty, is a decision-making method that uses pairwise comparisons to identify the relative importance of elements at each level and selects the solution with the highest relative weight as the optimal solution. Kaufmann and Gupta's (1988) fuzzy deffey method is based on the triangular fuzzy number.

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

This study uses the Original Method (OM method) proposed by Chang and Lee (1995). The larger the OM value, the higher the importance of the factor. Fuzzy Delphi Method Process shows as Figure 1

$$OM(O_k)=\int_{\rho^*}^{1}\varpi(w)\left[\eta_1(w)\times c_k(w)+\eta_2(w)\times d_k(w)\right]\mathrm{d}w \tag{1}$$

$$OM(Oi)=\int_0^1\{0.5w[a+w(b-a)+(1-0.5w)[c+w(c-b)]\}dw$$
$$=(6b+a+5c)/12 \tag{2}$$

$$OM(O_j)=\int_0^1\{(1-0.5w)[a+w(b-a)]+0.5w[c+w(c-b)]\}dw$$
$$=(6b+5a+c)/12 \tag{3}$$

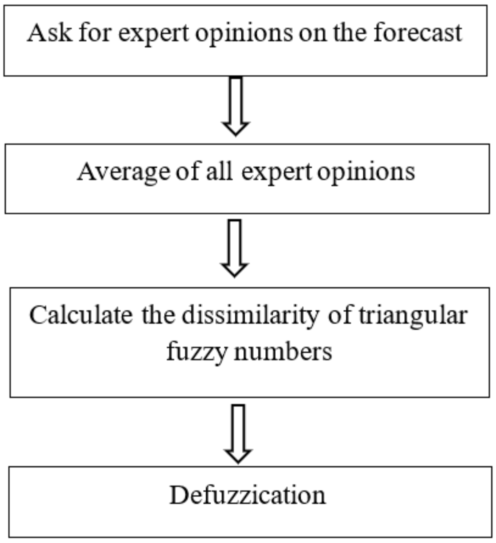

Fig.1 Fuzzy Delphi Method Process

IV. ANALYSIS AND RESULTS

After a fairly comprehensive survey and in-depth discussions with a diverse group of experts, the vitality of the sustainable development index for banks was meticulously established through factor analysis, a statistical method that identifies underlying variables or factors influencing observed data. A total of 899 experts and professionals, drawn from various sectors including banking industries, academic institutions, and related fields, were carefully invited to participate in the study by answering a detailed factor analysis questionnaire. These questionnaires were systematically distributed through postal mail, ensuring a broad and representative reach across different geographical and professional backgrounds. The weights assigned to various factors within each dimension of the sustainable development index, as determined by the weight set W employed in the fuzzy synthetic decision-making process—a method that integrates multiple criteria with varying degrees of membership—were calculated using the OM (Optimal Method) approach. This method involves rigorous mathematical computations to derive precise and reliable weight values, reflecting the relative importance of each factor in contributing to the overall vitality of the sustainable development index for banks.

In order to rigorously test the vitality indexes of the financial industry established in the research, we will conduct in-depth interviews with each department manager, ensuring comprehensive engagement with key decision-makers across all functional units. These interviews will be structured to delve into critical aspects influencing organizational vitality, including the pivotal role of leadership in fostering innovation and employee motivation, the strategic alignment of management strategies with market dynamics and long-term growth objectives, the operational efficiency of day-to-day processes and resource allocation, the challenges and opportunities associated with assigning managers to foreign branches—considering cultural adaptation, cross-border communication, and global market integration—the responsiveness of the organization to external changes, customer feedback, and internal stakeholder needs, and the permeating influence of business culture on employee behavior, collaboration, and overall organizational health. Through these discussions, we aim to not only understand the relative importance of each of these factors on the vitality index but also to determine the precise weight assigned to each component: W1 (leadership), W2 (management strategy), W3 (management efficiency), W4 (assigning managers to foreign branches), and W5 (responsiveness and business culture). The culmination of this analytical process, incorporating insights from the interviews and weighted assessments of each vitality component, will yield the final vitality index, which is presented and detailed in Table 1.

Defuzzification provides a single score for each appraisal grade, transforming the abstract fuzzy membership degrees into concrete numerical values that facilitate clear decision-making. Then, the membership degree of each appraisal grade is multiplied by its corresponding predefined score, with these products summed together to defuzzify the fuzzy decision-making set, ultimately yielding a crisp, actionable score that represents the overall assessment. Excellent, good, normal, bad, and very bad scores are assigned specific numerical values to quantify their respective levels of performance: Excellent is valued at 10, reflecting peak performance and high satisfaction; Good is assigned 7.5, indicating strong performance with minor areas for improvement; Normal stands at 5, representing average or satisfactory performance; Bad is given 2.5, signaling below-average performance with notable issues; and Very Bad is set to 0, denoting poor performance with significant shortcomings. The vitality of sustainable development index score, after undergoing this defuzzification process, is determined to be 9.2, a value that suggests a high level of vitality and robustness in the sustainable development framework being evaluated.

Table 1 The Statistics of Vitality Indexes of Case Company

Scores / Contents of Sub-Systems	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%	

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, encompassing visionary direction, strategic foresight, and commitment to long-term sustainability goals that guide organizational decision-making and align stakeholders toward shared environmental, social, and economic objectives; 2) management strategy, involving the formulation and implementation of comprehensive plans that integrate sustainability principles into core business operations, risk mitigation frameworks, and innovation pathways to drive resilient growth; 3) management efficiency, reflecting the optimization of resource utilization, process streamlining, and operational effectiveness that minimize waste, reduce costs, and enhance productivity while maintaining high standards of quality and ethical practices; 4) managers assigned to foreign branches and development of talented personnel, focusing on the deployment of skilled, culturally competent leaders in international markets to navigate diverse regulatory landscapes and foster local partnerships, alongside systematic talent development programs that cultivate expertise in sustainability, cross-cultural communication, and adaptive leadership; and 5) business culture, embodying the values, norms, and behaviors that permeate the organization, promoting collaboration, accountability, transparency, and a collective mindset prioritizing sustainability as integral to success rather than a peripheral concern. This study used the fuzzy Delphi method to determine the weights of factors, a structured approach that combines expert judgment with fuzzy logic to handle uncertainty and subjectivity, allowing for iterative refinement of criteria through rounds of feedback and consensus-building. A higher OM value indicates that more attention is paid to that factor, signifying its greater perceived importance, influence, and contribution to the overall empirical vitality of the sustainable development index, thereby guiding resource allocation, policy formulation, and performance evaluation efforts within the organization.

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. By integrating fuzzy logic, which accounts for the inherent uncertainty and subjectivity in real-world data, these decisions provide a more nuanced and comprehensive evaluation framework. The vitality of sustainable development indices, when analyzed through fuzzy synthetic decision-making, encompasses a range of factors such as environmental impact, social responsibility, economic resilience, and operational efficiency, each contributing to a holistic view of a bank's sustainability. This approach allows banks to move beyond traditional, often rigid, quantitative metrics by incorporating qualitative aspects and ambiguous information, leading to more informed and adaptive strategies. In practice, this method helps identify critical areas where a bank may be underperforming, such as gaps in employee training programs related to sustainable practices or misalignment in performance metrics that do not fully capture long-term sustainability goals. By leveraging the flexibility of fuzzy synthetic decisions, banks can develop targeted interventions, enhance employee skill sets in sustainability-related domains, and align performance evaluations with broader organizational objectives of responsible growth. The process involves aggregating multiple indices, each weighted according to its importance, and using fuzzy operators to synthesize the data into a single, interpretable score that reflects the overall vitality of sustainable development. This not only aids in problem-solving but also fosters a culture of continuous improvement, ensuring that banks remain agile and responsive to evolving challenges in the financial sector while contributing positively to societal and environmental well-being.

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