Knowledge Management in Relationship Among Abusive Management, Self-Efficacy, and Corporate Performance Under Artificial Intelligence

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ABSTRACT

The purpose of this paper is to explore the application potential of HCI (human-computer interaction) technology under AI (artificial intelligence) in enterprise performance evaluation and the influence of abusive management and self-efficacy on enterprise performance. Guided by psychological theory, employees from a listed real estate enterprise are selected, and the research themes of abusive management, self-efficacy, and employee performance are assumed. Afterward, the employee job satisfaction and performance evaluation model and system interface based on deep learning BPNN (back propagation neural network), SVM (support vector machine) regression, and HCI are innovatively proposed. The results show that the HCI interface can be accessed accurately according to the employee’s verbal instructions. BPNN model has reached the best performance at the iteration of 70 times, and all indexes have reached the expected employee satisfaction.

KEYWORDS

Abusive Management, Artificial Intelligence, BP Neural Network, Enterprise Performance, Human-Computer Interaction Technology, Knowledge Management, Self-Efficacy, Support Vector Machine

INTRODUCTION

As the capital market increasingly grows, the comprehensive evaluation of enterprise performance is gradually valued in the industry. The comprehensive evaluation of enterprise performance is studied from different angles. The scientific and effective evaluation system should make employees consciously abide by the company’s discipline (Meng et al., 2021; Zheng et al., 2022). If enterprises only focus on financial objectives and performance, the needs of enterprise development cannot be met, and positive results cannot be produced. Therefore, Hou (2019) and Muhammad et al. (2015) argued that the comprehensive evaluation system should contain three parts: financial objectives, financial results, and enterprise discipline.

When it comes to enterprise discipline, the core task for the employees is to balance their lives and work. Lyons and Bandura (2016) implied that in educational psychology, employees preferred
discovery learning that had more value. Employees usually felt uneasy in declarative learning. The scholars pointed out that the primary task of improving employee performance was to cultivate employees’ professional ability to further develop their minds based on their existing cognition (Lei et al., 2021; Zheng et al., 2021a; Zheng et al., 2021b). The mental state of employees was directly related to the management style of leaders and affected the self-efficacy of employees (Zheng et al., 2021c; Zheng et al., 2021d). The positive management of leaders could improve enterprise performance (Chen et al., 2021; Gian et al., 2019), while negative management, such as abusive management, would hurt employees’ psychology and make them slack in work, which eventually decreased enterprise performance. However, self-efficacy could increase employees’ job satisfaction and trust in the enterprise. Thus, employees would work actively and would not have the idea of leaving.

Recently, Yin and Qiu (2021) pointed out that the research on human–computer interaction (HCI) technology based on artificial intelligence (AI) was very important in the world. HCI technology realized the dialogue between humans and computers through the input and output of the computer. HCI technology was the core of designing a computer user interface. It has been used in many fields, such as electronic products, medical treatment, and multimedia. However, HCI technology was rarely used in enterprise performance evaluation. Hao et al. (2016) suggested that introducing deep learning into machine learning could make machine learning closer to AI. Lemley et al. (2017) and Chen (2020) proposed that the evaluation methods of employee performance information systems included the analytic hierarchy process, fuzzy comprehensive evaluation method, machine learning method, and deep learning artificial neural network method. Since the essence of the neural network was to simulate the operation process of the human brain, which could process incomplete and inaccurate data more efficiently, it was favored by enterprises and used for employee satisfaction evaluations (Liu & Chen, 2021; Yang et al., 2021; Zhuang et al., 2021).

Here, an HCI interface is constructed using the theory of educational psychology and based on the HCI technology under situational perception (Deng et al., 2021; Wu et al., 2017; Wu et al., 2018; Wu et al., 2021). The present work innovatively combines the relevant research of abusive management, self-efficacy, deep learning, Backpropagation Neural Network (BPNN), and Support Vector Machine (SVM) regression modeling to analyze enterprise performance factors. The findings provide a practical basis for applying AI in enterprise performance evaluation. Moreover, the relevant research results and research data obtained can be saved as a reference to guide the follow-up research direction and planning. The established model can also be used again in relevant field research.

LITERATURE REVIEW
Theoretical Basis of Influencing Enterprise Performance

Learning psychology is an important branch of educational psychology and studies the change process of human psychology and behavior under the effect of acquired practice or accumulated experience.

The Relationship Between Learning Style and Employees’ Professional Ability

Zhang et al. (2018) proposed that compared with traditional receptive learning, enterprise employees preferred the more valuable discovery learning. It pointed out that procedural knowledge learning included declarative learning, knowledge editing, and knowledge generalization, the first of which Chinese employees felt to be the most difficult to learn.

The Relationship Between Learning Process Theory and Professional Ability of Enterprise Employees

Menon (2016) argued that the first thing to improve the performance of enterprise employees was to cultivate their professional ability. Based on their existing knowledge, employees should be encouraged to fully develop their minds, strong motivation should be provided for them to construct
a positive mind, and they should be promoted to construct their ability schema and effectively adapt to the real task situation.

**Performance and Impact of Abusive Management**

Trigeorgis et al. (2016) revealed that abusive management referred to the specific performance of leadership practices towards their subordinates in work. Amiri (2015) pointed out that abusive management in the working environment included active abuse or deception. Michel et al. (2016) believed that abusive management aimed to control employees through acts of intimidation. Belias et al. (2015) suggested that abusive management behaviors put employees in a negative working state. Jung and Yoon (2016) proposed that abusive management weakened employees’ loyalty and support to the enterprise. Finally, the leadership abuse behavior seriously hurt the employees’ psychology and decreased enterprise return.

**Measurement and Influence Effect of Self-Efficacy**

Park (2015) and Hutting et al. (2017) pointed out that self-efficacy could predict employees’ emotional feedback and job performance, and its measurement factors included environmental factors, personality traits, and leadership characteristics. Lepold et al. (2018) believed that task completion would improve employee self-efficacy. Wang et al. (2016) put forward that inclusive leadership could forgive employees for failure and treat every employee fairly, thus enhancing employees’ self-efficacy. Schouteten et al. (2017) implied that self-efficacy could improve employees’ job satisfaction. Eibl et al. (2020) indicated that self-efficacy could positively predict the proportion of dedication, engagement, and activity in work involvement. Day et al. (2017) argued that self-efficacy had a direct impact on the way employees cope with stress. Ivey et al. (2015) believed that self-efficacy could positively predict employees’ job performance. Li et al. (2017) suggested self-efficacy could predict research and developmental performance of personnel in different dimensions. Based on the above theory, the measurement and influence of self-efficacy on employees’ performance are explored under abusive management behavior.

**How to Overcome Artificial Intelligence**

AI technology not only brings new ethical problems but also promotes the change of moral consciousness, moral rules, and even the change of moral subjects. With the enhancement of robot autonomy and the improvement of self-reasoning and self-decision-making ability, once AI has self-awareness and can bear independent responsibility, the subject category of morality will be extended not only to humans but also to machines. Whether it is the change of moral standards brought about by the development of AI technology, or the redefinition and thinking of the moral subject, it is the result of the development of AI. Technology affects people’s understanding of the world and how people interact with the world. Social values are dynamic, and technology often changes the value framework that people use for evaluation. AI design should consider the subject values and social values and clarify the moral and ethical factors. The status of AI in society is a normative problem, not a descriptive ethical problem. From the beginning of AI design, the development of AI technology should be standardized. Shneiderman (2020) believed that it is necessary to understand the situation of complete human control or computer control to avoid the risk of excessive human control or computer control. Achieving these goals will significantly improve human performance while supporting human self-efficacy, mastery, creativity, and responsibility. Muthukrishnan et al. (2020) provided a high-level historical perspective on the development of this field in the past few decades, highlighted the potential of this field to change health care, and set realistic expectations for AI applications to avoid repeating the historical cyclical trend.

AI is epistemology from the dimensions of discipline relevance, object relevance, basic relevance, and ultimate pursuit relevance. Watson (2019) proposed AI had been conceptualized in anthropomorphic terms in history. Some algorithms adopt bionic design and deliberately try to
realize some digital isomorphism of the human brain. Others use more general learning strategies that coincide with the popular theories of cognitive science and social epistemology. But Watson believed that such words were misleading at best and that at worst they were completely dangerous. The impulse to legalize computing is an obstacle to correctly conceptualizing the ethical challenges posed by emerging technologies. Lieto et al. (2018) found that integrated AI could play a cognitive role and believed that integrated AI could help humanize AI, make AI more verifiable, interpretable, responsible, and more ethical, to be closer to general intelligence.

The above studies reveal that a reasonable employee management system significantly impacts enterprise performance, and self-efficacy affects employees' work enthusiasm. Therefore, these studies can be used as a reference to provide certain employee management knowledge for each enterprise, study the management strategies, and establish a knowledge base for reference.

**METHODS**

**Evaluation Model of Employee Satisfaction Based on BPNN**

**Modeling**

- **Step 1:** Input nodes are designed. Six evaluation indexes are used as input nodes: whether the enterprise needs to evaluate the performance, the rationality of the evaluation system dimension, the rationality of the data filling time, whether the input operation is simple and feasible, expected employee satisfaction, and system maintenance investment.
- **Step 2:** Hidden layer nodes are designed. The hidden layer node is designed according to the following equation.

\[
h_i = \sqrt{h + l + a}
\]

\[
h_i = \log_a h
\]

where l represents the output value of the neuron, h represents the input value of the neuron, a is a constant with a value range from 1 to 10.

- **Step 3:** The output node is designed. The expert evaluation scores of the six dimensions of the input layer are set as the expected output, and the output results are compared with the expected output, so the output layer needs a neuron. Therefore, the establishment of the BPNN employee satisfaction evaluation model configuration is 6 input neurons, 3 hidden layer neurons, and 1 output neuron.
- **Step 4:** The neural network function is established. The functions newff(minmax(P),[3,1], { tanisg, purelin }, traind) are used to build neural networks. Input layer training function: tanisg, belongs to the hyperbolic tangent S-type transfer function, output layer training function: purelin, belongs to the linear transfer function.

The iris data set is selected for BPNN, which contains 150 samples. The integrated development environment is PyCharm 2018.3.3 (Community Edition). The parameter settings are as follows.
Evaluation Index System and Sample Selection

In order to accurately measure the balance of enterprises, it is necessary to quantify employee performance and employee satisfaction into a visual index system. This paper sets up a comprehensive evaluation index system (EIS) of enterprise relationship balance as per the relevant materials. Specifically, the employee performance index includes skill, effort, intelligence, experience, positive attitude, cooperative spirit, and flexibility; the employee satisfaction index involves salary, allowance, working environment, job safety, status, promotion, and job diversity. The above indexes constitute an integral EIS and can fully reflect the actual situation of enterprise relationship balance.

The data are divided into learning and testing samples, including enterprises with balanced and unbalanced enterprise relations. Learning samples are used to establish the fitting function, and testing samples are used to test and trim the function.

Then, reasonable indexes can be chosen to determine the sample enterprises category, for example, application success rate (ASR) and job-hopping rate (JHR). The present work defines enterprises with low ASR and low JHR as balanced and others as unbalanced.

The low ASR indicates that the enterprise has high aspirations for future employees. Only employees with high enterprise satisfaction are selected for employment. The low JHR indicates that the existing employees’ satisfaction is high with their enterprise. The low ASR and JHR make the enterprise in a state of dynamic balance. During the specific operation, opinions from experts can be collected to determine the level of each ratio. Of course, there is still a lot of research space in practical application on whether other indexes can be used to classify sample enterprises.

Model Analysis

The questionnaire survey (QS) is designed based on the indexes. Employees fill in one scale to obtain their employee satisfaction. The other scale is for managers to fill in to evaluate employee performance. Then, the results of the two scales are averaged as the final index values.

Afterward, the BPNN theory is used for modeling:

A three-layer single-hidden layer BPNN is used because it can complete the mapping of any dimension. The number of input layer nodes should correspond to the number of evaluation indexes, so the experiment sets the number of network input layer nodes as 14. Given the weak nonlinear mapping ability of the single-hidden layer network, there are more hidden layer nodes to adjust network parameters flexibly. Then, the evaluation results of enterprise balance relations are outputted: the balanced enterprise is 0, and the unbalanced enterprise is 1.

Subsequently, the enterprise balance relation index is taken as the input vector X of the network, and the comprehensive evaluation result is taken as the output Y of the network. The function programming in the neural network toolbox is used to solve the output. The network is trained with learning samples to get different input vector outputs. As such, the set of weight coefficients and thresholds are determined as the correct internal representation of the network obtained through adaptive learning. After repeated learning and training, the network parameters (weight and threshold)

| Key parameter                  | Value  |
|-------------------------------|--------|
| Learning rate                 | 0.0075 |
| Number of hidden layer nodes  | 6      |
| Number of input layer nodes   | 12     |
| Number of output layer nodes  | 3      |
| Iterations                    | 10,000 |
corresponding to the minimum error are determined, and the training stops. Finally, the well-trained neural network can be used as an effective tool to evaluate the balance of enterprise relations and make corresponding comprehensive judgments for different evaluation objects. After the model training by the learning sample, the test samples are inputted to test the model, and then the model is trained and modified.

A complete training and testing method of the BPNN regression model comprises the following steps:

1) Data acquisition: Obtain the calibrated data set R of N experimental samples, including M groups of experimental data and their corresponding experimental results.
2) Data preprocessing: The dimensionality of the calibrated data set R is reduced and normalized to obtain the calibrated four-dimensional data set S.
3) Data grouping: Divide the calibrated four-dimensional data set S into training set D and testing set T.
4) BPNN hyperparameter optimization and initialization: Create a three-layer BPNN, find the best number of neurons in the hidden layer, and set the learning rate, neuron activation function, training minimum mean square, minimum performance gradient, and maximum training times according to the actual needs.
5) The first training of BPNN: The BPNN is trained to obtain the weights and thresholds with generalization ability for the actual user needs. Suppose the generalization ability of BPNN meets the actual user needs after the first training. In that case, the training of BPNN is completed and directly used to predict the interface width under different system parameters. Otherwise, the BPNN is trained for the second time.
6) Second training of BPNN: Through fine-tuning, the generalization ability of BPNN is enhanced after the first training so that the generalization ability of BPNN can meet the actual user needs. Suppose the generalization ability of BPNN still does not meet the actual user needs. In that case, step A is re-executed, and the number of samples is increased to expand the training set D. Then, it continues to perform steps B to F until the generalization ability of BPNN after the second training meets the actual user needs. At this time, BPNN training is completed.
7) The training of BPNN is completed, and the interface width under different system parameters is predicted. The data preprocessing in step B includes defining the first-dimensional energy in the calibrated data set R, which is recorded as X. The second dimension is the response speed, which is recorded as y. The third dimension is the data volume, recorded as z. Meanwhile, the mean of the corresponding dimension is subtracted from the experimental data of each group in the calibrated data set R to form a sample matrix Q by M rows and five columns.

The testing environment of BPNN needs to meet the following conditions. Firstly, it must predict the junction temperature of semiconductor devices simply, efficiently, quickly, and accurately, including the ambient temperature and power consumption. In order to do so, the determined ambient temperature and power consumption are inputted into the pre-trained BPNN model to output the junction temperature of the semiconductor device. The BPNN model is trained based on the pre-constructed data set. The data set includes the device model’s junction temperature under various simulation conditions obtained by the Finite Element Analysis method. The device model is a simulation model of the semiconductor device, and each simulation condition corresponds to a preset ambient temperature and preset power consumption. Alternatively, the construction method of the data set includes acquiring the process library file of the semiconductor device. Based on the structural dimension parameters and material attribute parameters in the process library file, various simulation conditions are loaded for the physical model according to the semiconductor device’s power consumption range and ambient temperature range. As such, it obtains the device model under various simulation conditions and the junction temperature of the device model under each simulation
condition through Steady-State Thermal Analysis. The ambient temperature and power consumption corresponding to each stimulation condition are taken as a data sample, and the junction temperature obtained under the simulation condition is taken as the real junction temperature of the data sample to obtain the constructed data set.

**INTERFACE OF EMPLOYEE PERFORMANCE EVALUATION SYSTEM BASED ON HCI TECHNOLOGY UNDER THE SITUATIONAL PERCEPTION**

The HCI technology and data repository are applied to the employee performance evaluation system. HCI technology provides innovative consulting methods through AI and makes information resources mastered and used efficiently. It is at the high level of current distributed information processing technology and solves the thorny problems of the traditional decision-supporting system. The system structure is shown in Figure 1.

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**Data evaluation** is the method and process of evaluating data quality. The commonly used evaluation methods include deductive calculation, internal verification, independent sampling inspection, polygon superposition inspection, and effective value inspection. Each quality element shall be described, and the data quality evaluation report shall be given.

A model base is an important part of a decision support system, which consists of a model base, a model base management system, and a model dictionary. Through man–machine dialogue, decision makers can easily use various models in the model base, and can also apply modeling language or their familiar professional language to establish, modify, and run models. Knowledge base is a structured, comprehensive, and organized knowledge cluster in knowledge engineering, which is easy to operate and use. It is a collection of interrelated knowledge chips stored, organized, managed, and...
used in computer memory by using some (or several) knowledge representations to meet the needs of problem solving in a certain (or some) field.

HCI interface refers to the communication media or means between human and computer system. It is a two-way information exchange platform for various symbols and actions between human and computer.

A model base management system is an abstract and simulation system of objective laws summarized on the basis of many professional studies on the described objects and processes. Knowledge base management system, also known as digital asset management system, is mainly used to manage some commonly used knowledge documents, drawings, video, audio, and other information content. HCI basic management system generally refers to interactive measures such as computer system and automobile control system to command and issue instructions to the system. The network assessor is the person responsible for managing the network system and ensuring the normal operation of all functions of the network system.

The system framework contains the page library, browser, and server of the HCI interface, replacing the traditional database with the data repository. The auxiliary system of the user interface is composed of a browser and HCI page to form a unified user interface. It has simple operation steps and is convenient to supplement system functions. If a user is added, it gives the corresponding access without installing the software again. Workers can enjoy the human–machine dialogue function in the same browser interface. The design system environment of the HCI interface is Qt environment, and the data set comes from Python data. Firstly, based on the analysis of the characteristics and influencing factors of enterprise employee satisfaction, this paper selects the employee satisfaction factors and divides them into specific indexes. Then, combining the evaluation of employee satisfaction with the BPNN algorithm, a BPNN-based enterprise employee satisfaction EIS is constructed to study enterprise employee satisfaction. This study provides an objective and scientific measurement standard for organization managers to comprehensively and efficiently evaluate employee satisfaction and understand the specific situation of the organization’s employees’ satisfaction among employees in the same industry. Organization managers can implement a differentiated management model to improve employee satisfaction according to the research results and various indicators. At the same time, the research conclusion has essential reference significance for organization managers in improving the selection of specific employee satisfaction indexes. Further, according to the research results and the three dimensions of employee satisfaction, this paper puts forward countermeasures and suggestions to improve the satisfaction of each dimension.

CONSTRUCTION OF COMPREHENSIVE PERFORMANCE EVALUATION MODEL FOR REAL ESTATE ENTERPRISES

Specific Development Environment of HCI Interface

HCI user pages must reflect the user’s needs. Then, to understand user needs, the primary purpose of the design should be clear, namely the content of usability and the comprehensive experience of users. These two factors are different in the implementation process. The content of usability is whether it can meet a specific goal. The comprehensive user experience is a significant improvement in the quality of user experience. Table 1 lists the factors that need to be considered in designing an HCI interface.

Any product has to go through a complex process from preliminary research, overall design, specific design, and implementation. Regardless of the particularity of each product design and development process, the following focuses on the typical process of user-centered HCI design and evaluation.

The strategy and user analysis stage determines the direction and expected goal of product design. The user-centered design idea holds that the success or failure of the product ultimately depends on user satisfaction. To this end, it is necessary to first deeply and clearly understand who is the target
user and care about the specific characteristics of the target user group different from the general population. This process is the user feature description. At the same time, the product designer should also clearly understand target users’ expectations of the designed product, including the user preferred functions or the indexes to achieve specific goals. This process is demand analysis. These two processes are intertwined and mutually beneficial. In the analysis process, the information and data are summarized and organized and then expressed intuitively and clearly in various ways, such as diagrams, lists, and narratives, as a guide for system design.

The Principle of Support Vector Machine Regression

A sample set \((a_1,b_1), (a_2,b_2), \ldots, (a_i,b_i)\) is determined. Where \(a_i \in X^m, m\) represents the dimension vector (independent variable), \(b_i \in X\) is the dependent variable and belongs to the predicted object value. The factor value of the prediction object is set as \(a_{i+1}, a_{i+2}, \ldots, a_{i+m}\). It is necessary to establish a functional relationship to get the value of the prediction object. Therefore, the basis of constructing the SVM regression model is the dependent variable of the known sample data, that is, the output variable of the model, which represents the comprehensive evaluation of each object. The output variables are calculated by technique for order preference by similarity to an ideal solution, known as TOPSIS. If there are \(y\) evaluation indexes, \(K\) evaluation objects, and \(d_{ip}\) represents the \(y\)-th index value of the \(k\)-th evaluation object, the evaluation index matrix \(U\) is expressed as follows.

\[
U = \begin{bmatrix}
U_{11} & U_{12} & \cdots & U_{1y} \\
U_{21} & U_{22} & \cdots & U_{2y} \\
\vdots & \vdots & \ddots & \vdots \\
U_{k1} & U_{k2} & \cdots & U_{k3}
\end{bmatrix}
\]  

(2)

Data Processing

The selected indexes are positive indexes, negative indexes, and moderate indexes, so the dimension will have an impact on them. Thus, it is necessary to model these data after assimilation. \(d_{ip}\) is the original data, and the processed data is \(c_{ip}\). If \(d_{ip}\) is a positive index, the calculation method of \(c_{ip}\) is as follows:

\[
c_{ip} = \frac{d_{ip} - d_{p}^{\min}}{d_{p}^{\max} - d_{p}^{\min}}
\]  

(3)

If \(d_{ip}\) is a negative index, the calculation method of \(c_{ip}\) is as follows:

\[
c_{ip} = \frac{d_{p}^{\max} - d_{ip}}{d_{p}^{\max} - d_{p}^{\min}}
\]  

(4)

If \(d_{ip}\) is a moderate index, the calculation method of \(c_{ip}\) is as follows:
After data assimilation, a positive index matrix can be formed, and the value range of \( c_{ip} \) is 0 to 1. The financial data of real estate enterprises are assimilated. The factors of the object to be tested are: \( a_1 \) (earnings per share), \( a_2 \) (net asset value per share), \( a_3 \) (return on equity), \( a_4 \) (net profit margin), \( a_5 \) (current ratio), \( a_6 \) (quick ratio), \( a_7 \) (days in inventory), \( a_8 \) (days sales outstanding), \( a_9 \) (equity to asset ratio) and \( a_{10} \) (equity ratio). Among them, \( a_1 - a_4 \) are positive indexes, \( a_7 \) and \( a_8 \) are negative indexes. \( a_5, a_6, a_9, \) and \( a_{10} \) are moderate indexes and the moderate values are set as 2, 1, 0.6 and 1.2, respectively.

**Weight Value of Each Index**

The entropy weight method is used to calculate the index weight. The algorithm can use different values of each attribute weight to select each attribute, so there is no need to reduce the dimension. The calculation steps are as follows:

In the first step, the output entropy of the i-th index is calculated.

\[
T_p = -\left( \ln x \right)^{-1} \sum_{i=1}^{x} d_{ip} \ln d_{ip} \tag{6}
\]

Where \( d_{ip} = d_{ip} / \sum_{i=1}^{x} d_{ip} \); \( p = 1, 2, \ldots, m \).

The second step is to calculate the variation degree of index \( p \).

\[
E_p = 1 - T_p; \quad p = 1, 2, \ldots, m \tag{7}
\]

The third step is to calculate the weight value of index \( p \).

\[
w_p = E_p / \sum_{p=1}^{m} E_p; \quad p = 1, 2, \ldots, m \tag{8}
\]

**Establishment of Support Vector Machine Regression Model**

The comprehensive evaluation value calculated by the TOPSIS method is used as the output variable of the SVM regression model, and the attribute value of assimilation is used as the input variable (independent variable) of the model. Then the radial basis function is selected as the kernel function of the research model. The cross-validation and grid search of 82 training samples are carried out. Finally, the optimal parameter of the model is determined as \( (c, g) = (0.18925, 1.1469) \). Therefore, the SVM regression model for the comprehensive performance evaluation of real estate enterprises is obtained as follows.
\[ f(x) = \sum_{p=1}^{m} (\lambda_p - \lambda_p') \exp\left(-g|x - x_p|^2\right) + s \]  \hspace{1cm} (9)

Where \( \lambda_p - \lambda_p' \) represents the model.sv_coef (matrix of 8*1 in decision function), \( s \) stands for model. \( \lambda \) is a constant (-0.3052).

The environment for establishing the SVM regression model is Python—scikit-learn. The data set is the Iris data set, and the parameter settings are shown in Table 2.

**Table 2. SVM regression model parameters**

| Key parameter                                      | Value |
|---------------------------------------------------|-------|
| Penalty coefficient (c)                           | 1     |
| Dimension of polynomial poly functions (degree)   | 3     |
| Kernel function parameter gamma                   | 0.0   |
| The constant term of kernel function (coef0)      | 0.0   |
| The error of stopping training (tol)              | 0.001 |
| Kernel function cache size (cache_size)           | 200   |
| Maximum number of iterations (max_iter)           | 1     |

Figure 2 shows the parameters of the SVM regression model made into graphics with a clearer format.

Employee information management is necessary for enterprises to investigate employees in an all-around way. It is an essential tool in human resource management (HRM) activities. In the vast and complex HRM system, ensuring the accuracy, timeliness, integrity, and security of employee information and appropriate human resource development strategy according to the enterprise development is a difficulty that awaits immediate attention.

The employee information management module covers the functions of a comprehensive enterprise HRM system, including employee personnel information, entry and resignation, employee salary system, attendance system, and employee salary calculation and submission. It can dynamically and intuitively reflect the enterprise’s human resources situation to provide a basis and vouchers against employee-related problems. As a result, it provides efficient decision support for HRM. Meanwhile, development loans and mortgage loans will continue to pick up, the completion end will maintain a high growth rate, and the pessimistic expectations of the capital market will be further repaired. The recent performance and sustainability of the real estate sector can be trusted and further prospected. In particular, the selected leading real estate enterprises are expected to have strong strengths, such as business ability, a brand advantage, credit advantage, and product reputation.
The proposed real estate enterprise-oriented comprehensive performance evaluation system includes a safety lamp system, safety lamp voice broadcast, team management, quality management, maintenance management, workshop management report, system setting, data acquisition module, and other functional modules. It realizes the automatic statistical analysis of key indexes, such as workshop output, production achievement rate, labor efficiency, equipment efficiency, rework, and scrap rate. After system implementation, the original on-site paper statistical reports are canceled to reduce workshop employees’ labor load and improve the data accuracy. At the same time, the performance appraisal of workshop employees and teams and the regular management meeting at the factory level all use the system data. Thus, it improves the objectivity and efficiency of management. The appraisal-setting module sets the appraisal standards of each employee according to their needs. The performance calculation module calculates employee performance according to different evaluation standards. According to employee performance, the bonus calculation module calculates the bonus payable at the individual-employee level. The report generation module is connected with the performance calculation module and the bonus calculation module to automatically generate an employee performance evaluation report according to the employee performance and the bonus payable. The proposed comprehensive performance evaluation system only needs to set the evaluation standard according to the demand to generate the corresponding method. Moreover, the system will quickly and automatically generate the performance report without manual data entry, saving time, energy, and labor costs. Simultaneously, it improves work efficiency and accuracy and ensures the objectivity and fairness of the performance evaluation.
RESEARCH HYPOTHESIS

Hypothesis Test of Abusive Management and Employee Performance

In the enterprise structure, if employees receive abusive behavior from leaders, it will have a negative impact. Alessandri et al. (2015) pointed out that a high-quality relationship between leaders and employees was formed according to the principle of reciprocity theory. Graham et al. (2017) put forward that it depended more on whether the leaders gave positive and beneficial help to the subordinates. Xu et al. (2015) and Huang et al. (2019) proposed that if the subordinates felt the abusive behavior of the leader, they would reduce the work effort and finally reduce the work performance. This negative behavior had no benefit to the enterprise. The final result was that both task performance and relationship performance would be harmed. Based on the above research topics, the following hypotheses are proposed, as shown in Table 3.

Table 3. Hypotheses of abusive management and employee performance

| Number | Hypothesis                                           |
|--------|------------------------------------------------------|
| 1      | Abusive management is negatively correlated with targeted performance |
| 2      | Abusive management is negatively correlated with employee relationship |
| 3      | Abusive management is negatively correlated with job performance |

HYPOTHESIS TEST OF SELF-EFFICACY AND JOB PERFORMANCE

From the analysis of the relationship between self-efficacy and job performance, self-efficacy can directly predict employees’ job performance. Jung and Yoon (2016) suggested that there was a positive correlation between employee self-efficacy and job performance. People with high self-efficacy could not only effectively complete their work, but also complete the more difficult tasks assigned by the leaders. Moreover, they had strong professional ability and finally showed excellent personal performance. It revealed that employees’ self-efficacy could directly and positively affect their work performance. Therefore, the following assumptions are proposed, as shown in Table 4.

Table 4. Hypothesis of self-efficacy and employee performance

| Number | Hypothesis                                           |
|--------|------------------------------------------------------|
| 1      | Self-efficacy is positively correlated with targeted performance |
| 2      | Self-efficacy is positively correlated with employee relationship |
| 3      | Self-efficacy is positively correlated with job performance |
| 4      | Self-efficacy is positively correlated with the company’s working environment |
| 5      | Self-efficacy is positively correlated with enterprise salary |

The surveyed employees are from a listed real estate company in Shaanxi Province: Tian Di Yuan Co., Ltd. Thirty employees are randomly selected to conduct a questionnaire survey (QS), and 30 abusive management scales and 30 self-efficacy scales are distributed. Tian Di Yuan Co., Ltd. is a joint-stock limited company (Stock Code: 600665) under Xi’an High Tech (Group) Company and listed on the Shanghai Stock Exchange. It has a registered capital of 720 million RMB, with the first-
class qualification for real estate development issued by the Ministry of Construction of the People’s Republic of China. Meanwhile, it is the largest listed company focusing on real estate development in Northwest China. In response to the development strategy of “based on Xi’an, consolidating Shanghai, expanding Shenzhen and developing Tianjin,” the company has continuously consolidated and expanded the layout of four regions. It has made every effort to promote the intensive and regional development of its main business and accelerated the improvement of profitability and profit margin by highlighting professional advantages. Thereby, it strengthens management efficiency, broadens financing channels, consolidates brand influence, and integrates resources of all parties. Ultimately, the company aims to realize the steady growth of overall performance and the continuous improvement of competitiveness and move forward to the development goal of national real estate development companies. With a supplementary filling, the recovery rate of the QS is 100%. Among the surveyed employees, 5 are senior managers, 9 are supervisors, and the other 16 are ordinary employees. Self-efficacy is positively correlated with targeted performance. Targeted performance determines not only the individual investment degree of employees but also the actual achievement of their activities. In the attribution process, individuals with high self-efficacy are more likely to attribute success to skills or efforts rather than objective factors, thus encouraging individuals to improve their focus, and the higher their goal level, the higher the performance. Hence, it can be said that self-efficacy is positively correlated with targeted performance.

**CONTENT OF QUESTIONNAIRE SURVEY**

Specifically, the measured value of Cronbach’s alpha coefficient of the scale is 0.905, which indicates that the scale has good reliability. The KMO (Kaiser-Meyer-Olkin) statistic is 0.697, indicating that the scale is valid. According to Tepper’s maturity scale, 15 aspects are included. Employees should take self-evaluation according to the real situation of the enterprise. The contents of the scale are shown in Table 5.

**Table 5. Abusive management scale**

| Number | Abusive Management |
|--------|--------------------|
| 1      | The superior ridicules the subordinate in the company. |
| 2      | The superior despises the subordinate in the company. |
| 3      | The superior ignores the subordinate in the company. |
| 4      | The superior belittles the subordinate in the company. |
| 5      | The superior offends the privacy of the subordinate in the company. |
| 6      | The superior finds fault with the work of the subordinate in the company. |
| 7      | The superior hinders the subordinate in the company. |
| 8      | The superior abuses the subordinate in the company. |
| 9      | The superior does not keep the premises in the company. |
| 10     | The superior gets angry inexplicably in the company. |
| 11     | The superior denigrates the subordinate in the company. |
| 12     | The superior misbehaves in the company. |
| 13     | The superior hinders the contacts between the subordinate in the company. |
| 14     | The superior scorns the ability of the subordinate in the company. |
| 15     | The superior cheats the subordinate in the company. |
Evaluating employees’ performance is usually a very subjective process. Each company manager has its own standards and ways to evaluate and rank performance. However, since performance evaluation data are widely used in companies’ business operations and HRM, employee performance ratings must be consistent and fair. Social exchange theory has always played an important role in the research of corporate social responsibility and employee performance. According to the social exchange theory, everyone will exchange material and non-material resources with others. People will keep a relatively balanced state between the reward they get and the cost they pay in a certain relationship based on the reciprocity principle. Obviously, the responsibility of enterprises to employees, customers, the government, and the public is beneficial to these groups. According to the reciprocity principle, employees, as one of the beneficiary groups, will improve work efficiency and contribute more to the enterprise development to repay the enterprise support.

According to the social exchange theory, corporate social responsibility impacts employees mainly through two channels. The first is the responsibility of enterprises to employees. When the enterprise directly provides employees with work and life support, such as training and welfare, employees will return to the enterprise with a higher work level. The second channel comprises the responsibilities of enterprises to customers, the government, and the public. Enterprises provide customers with high-quality products and after-sales services, make efforts in ecological protection, and pay taxes on time. An impressive brand image created by such behaviors will make employees gain emotional values, including pride and respect. These emotions can infect employees and actively engage them in their work.

RESULTS

Evaluation Results of Employee Satisfaction

Before the BPNN model is used to evaluate employee satisfaction, the simulation training and test are conducted to obtain the final employee satisfaction evaluation results, as shown in Figures 3a, 3b, and 3c below.
In business terms, a Key Performance Index (KPI) is a metric used to measure business performance, often evaluated over a period of time. For example, the sales department of a company can use the monthly gross profit (GP) as the KPI. However, the human resources department of the same company can use the quarterly employee turnover rate (ETR) as the KPI. Both are examples of performance indexes. Business executives often use grouped performance indexes in the form of a business scorecard to obtain a rapid and accurate summary of business performance history. Figure 3a shows that when the neural network model is iterated 70 times, the whole network reaches the best. Figure 3b shows that the solid line almost coincides with the dotted line, indicating that the performance of the established BPNN is in the best state. Figure 3c shows the output results of six-dimensional variables of the BPNN model reaching the optimal level as compared to the target output value given by experts, and the actual output value and target output value is very close. This shows that all the indexes of the model achieve the expected goal, which is to achieve the expected employee satisfaction. From the perspective of enterprises, the employee satisfaction QS can understand the specific problems of employees in their daily work, as well as the work progress of their own enterprises and the disadvantages in their work that otherwise cannot be found. The employee satisfaction QS can also reflect genuine opinions about the enterprise that employees seldom express. Because the QS is generally anonymous, employees can also fill in with complete confidence and express their reasonable suggestions.

**EMPIRICAL ANALYSIS OF ABUSIVE MANAGEMENT**

In this study, abusive management is studied, and the measurement scale of multiple dimensions and fields is developed. In the analysis of abusive management of employees, its reliability and validity are very high. Generally, the alpha coefficient is used for the validity test of the QS. This index is actually a test of the internal consistency of the topics used in QS; the higher the correlation is, the better the reliability is. The internal reliability refers to whether a group of questions in the QS measures the same concept, the internal consistency between these questions. The most commonly used internal reliability indexes are Cronbach coefficient and half reliability. The most commonly used external reliability index is test-retest reliability. In simpler terms, repeat the measurement of the same object with the same QS at different times, and then calculate the degree of consistency. In the present experiment, the Statistical Package for the Social Science, known as SPSS, is used to calculate the alpha coefficient of the QS as 0.8, indicating that the reliability is good and can be used. The experimental result data are analyzed and discussed through the factor test in Table 5.

The Goodness of Fit Index (GFI), including other indexes, represents the overall fitness evaluation of the Structural Equation Model (SEM). Each index of the SEM meets the standard, indicating the data and the model fits perfectly; that is, the data verify the first proposed model well. The Adjusted Goodness of Fit Index (AFGI) is the chi-square divided by the degree of freedom (DOF). The chi-square is easily affected by the sample size. The larger the sample is, the smaller chi-square is, so the AFGI easily gets larger when the sample is small. These statistics are the indexes in the SEM used to test the fitting degree between the model and the data. They are collectively called GFI, sometimes fitting index for short. Different scholars have proposed many different fitting indexes. Commonly used indexes are chi-square, DOF, Root Mean Square Error of Approximation (RMSEA), and Comparative Fit Index (CFI). Generally, in an optimal condition, RMSEA is below 0.08 (the smaller, the better), GFI and CFI are above 0.9 (the larger, the better), and the model fits well. Meanwhile, for AGFI and Incremental Fit Index (IFI), the larger their values are, the better, and the model fits well, but they are not commonly used now. Chi-square and DOF are mainly used to compare multiple models. The smaller the chi-square is, the better. The DOF reflects the complexity of the model. The simpler the model is, the more DOFs are. On the contrary, the more complex the model is, the fewer DOFs are. Generally, model designs aim for a simple and well-fitted model.
Musavimoghadam et al. (2016) proposed the CFA model, and an empirical analysis of the abusive management scale was carried out. The results are shown in Figure 4.

Figure 4. Results of abusive management scale (CR=0.969; AVE=0.679)

It shows $n=493$, ratio of chi-square value to the degree of freedom ($\chi^2/df=2.269$), goodness of fit index (GFI)=0.928, adjusted goodness-of-fit index (AGFI)=0.899, comparative fit index (CFI)=0.976, root mean square error of approximation (RMSEA)=0.061, and non-normed fitting index (NNFI)=0.971. The fitness of each calculation is appropriate, and each is within the range of standard index values. Due to $\text{AVE}>0.5$, the goodness-of-fit and convergent validity of the model are both excellent. Some enterprise organs and organizations that manage public affairs abuse administrative power authorized by laws and regulations to eliminate and restrict competition, which still exists in economic life. These behaviors hinder the free circulation of goods throughout the country; are not conducive to forming a unified and orderly market, the optimal allocation of resources, and the healthy development of the economy; and harm the interests of the majority of employees.

EMPIRICAL ANALYSIS OF SELF-EFFICACY

The General Self-efficacy Scale is used for revising, including ten aspects. Employees should make self-evaluations according to the actual situation of the enterprise. The measured value of the Cronbach alpha coefficient of the scale is 0.889, indicating that the scale has good reliability. The KMO is 0.695, indicating that the scale is effective. The scale contents are shown in Table 6.
According to the CFA model, the empirical analysis of the self-efficacy scale is carried out. The results are shown in Figure 5. Where C.R. refers to the critical ratio, $n=493$, $\chi^2/df=2.399$, $GFI=0.945$, $AGFI=0.912$, $CFI=0.966$, $RMSEA=0.061$, and $NNFI=0.972$. The fitness of each calculation is appropriate, and each is within the range of standard index values. Due to $AVE>0.5$, the goodness-of-fit and convergent validity of the model are both excellent. In this theory, people’s self-efficacy is particularly emphasized; people are the motivation of action. People can actively choose behavior according to their own will to adapt

### Table 6. Self-efficacy scale

| Number | Abusive Management                                                                 |
|--------|------------------------------------------------------------------------------------|
| 1      | I can do my best to solve the problem.                                             |
| 2      | I will achieve my goal without the support of others.                              |
| 3      | I think I can realize my goals.                                                    |
| 4      | I think I can deal with emergencies.                                               |
| 5      | My IQ can help me to deal with accidents.                                          |
| 6      | If I work hard, I can handle a difficult task.                                     |
| 7      | I can keep calm faced with any difficulty.                                         |
| 8      | I can think of many ways to solve the problem.                                     |
| 9      | I can deal with the trouble in different ways.                                     |
| 10     | I can handle everything confidently.                                               |

**Figure 5. Self-efficacy management scales**

Where C.R. refers to the critical ratio, $n=493$, $\chi^2/df=2.399$, $GFI=0.945$, $AGFI=0.912$, $CFI=0.966$, $RMSEA=0.061$, and $NNFI=0.972$. The fitness of each calculation is appropriate, and each is within the range of standard index values. Due to $AVE>0.5$, the goodness-of-fit and convergent validity of the model are both excellent. In this theory, people’s self-efficacy is particularly emphasized; people are the motivation of action. People can actively choose behavior according to their own will to adapt
to the environment. The individual’s self-belief in their behavior ability, namely, self-efficacy, can also determine the performance of individual behavior. The transformation of any activity requires efficiency expectation, and the confidence of this ability will play an important regulatory role. Sense of efficacy is regarded as the central mechanism of human motivation. It is an important basis of human activities. Self-efficacy can determine the individual’s choices and persistence, affect people’s attitude towards difficulties, and affect attitude and emotion during activities. As such, it further affects the final result of things. After the self-efficacy concept was put forward, follow-up researchers conducted in-depth research and content expansion in this field. They extended the concept of self-efficacy to other behavioral fields, such as interpersonal efficacy and group efficacy. However, self-efficacy is a kind of subjective perception of an individual’s own ability, which is only the ability of this subjective perception in a specific field.

**IMPACT OF ABUSIVE MANAGEMENT AND SELF-EFFICACY ON CORPORATE PERFORMANCE**

The t-test is used to analyze the differences in the employees’ age and education level. The results are shown in Figures 6a and 6b below.

Figure 6. The impact of abusive management and self-efficacy on corporate performance (a: age as a variable; b: education as a variable)

Figure 6a shows that in terms of age, employees’ perception of the leader’s abusive management and job performance have extremely significant differences (P<0.01). Figure 6b shows that in
terms of education level, there is a dramatically significant difference between self-efficacy and job performance (P<0.01).

Education level has the following influences on the performance of the company and employees:

1. Assist the enterprise to stabilize the backbone members, so that the backbone members have a platform for further study. Enable employees to learn after work, make the enterprise a platform for learning and work, and make employees have a sense of belonging.
2. Make enterprise members form the habit of learning, to improve the enterprise culture and enhance the comprehensive quality of enterprise personnel.
3. Make employees' knowledge, skills, working methods, working attitudes, and work values improve, thus exerting the greatest potential to improve the performance of individuals and organizations, promoting the continuous progress of organizations and individuals, and realizing the dual development of organizations and individuals.
4. The promotion of personal education is the source of strength for the sustainable development of enterprises, which can ensure that enterprises will win in the increasingly fierce competition for talents.
5. Strengthen the common values of the enterprise.

Therefore, the impact of education on enterprises should be considered from many aspects. In addition to education, learning ability, work experience, EQ, enthusiasm for the industry, and recognition of corporate culture all have an equally important impact. For human recruitment, candidates should be comprehensively considered, deeply excavated, and matched with enterprises.

Although many studies have shown that abuse of supervision has an adverse impact on subordinates’ work attitudes and results, little is known about how abuse of supervision affects supervisors themselves. With reference to self-perception theory and power dependence theory, this paper adopts a unique actor-centered approach to study how the way and time of abusive supervision benefit the actors (i.e., supervisors). Specifically, it proposes that the abuse of supervision behavior is positively related to the supervisor’s sense of state power, which is related to their sense of management self-efficacy and task-oriented leadership behavior. Besides, the relationship between abusive supervision behavior and state power consciousness and the positive and indirect impact of abusive supervision behavior on management self-efficacy through state power is stronger for supervisors with long-term power.

**ENTERPRISE PERFORMANCE EVALUATION**

The dependent variable data of test samples are input into the model to obtain the output prediction value of real estate enterprise performance evaluation under the SVM regression model. Figure 7 shows the results.
The data in Figure 7 reflect that the actual value is close to the predicted value, and the relative error between the predicted value and the actual value between each group is small, which is stable within 0.1. Especially for the fourth group of samples, the actual value is very close to the predicted value, the relative error between the actual value and the predicted value is 0.06, and there is a small difference in the values. It shows that the SVM regression model can accurately predict the real performance of enterprises. With the development and improvement of high-level echelon theory, the heterogeneity of the senior management team is reflected in different dimensions. It includes the physiological characteristics, such as gender and age, and tenure and education level heterogeneity. The heterogeneity of functional experience and education level leads to team differences and team conflict, which significantly negatively impacts enterprise performance. The experimental finding reveals a significant negative correlation between the executives’ power distribution imbalance and enterprise performance. Age and tenure heterogeneity affect corporate performance, while gender and education have no significant impact on corporate performance.

DISCUSSION

The results show that abusive management has a significantly negative correlation with job performance. This is consistent with the research results of Melián-González (2016). In the enterprise, leaders provide support and resources for employees, and employees actively accept them. At the same time, employees can improve their performance in their work projects. Moreover, they may actively take actions outside their own business to promote the development of the enterprise, as returns to the enterprise. If employees suffer from abusive management of leaders, they will have negative emotions psychologically, have less understanding, and take less action for work. Finally, they will work in an orderly manner and go slow, leading to a decrease in work performance. At the same time, negative emotions can also cause employees’ unwillingness to maintain good relations with colleagues and leaders, which hurts relationship performance.
There is a positive correlation between employees’ self-efficacy and job performance (P<0.01), which is consistent with the research results of Wilson and Narayan (2016). Self-efficacy represents the self-confidence of employees to complete their tasks. When employees have a strong sense of self-efficacy, they will have faith to achieve their goals through their efforts. In the enterprise, employees with a strong sense of self-efficacy know how to overcome difficulties in completing tasks. At the same time, they are full of self-confidence, and their work performance will also be improved accordingly. By achieving the set goals, employees can also be more confident to carry out the work plan further and be able to help their colleagues. In addition, the factors affecting self-efficacy include employees’ interest in work, adaptability to the post, employees’ sense of fairness, and the company’s reward mechanism. To improve employees’ self-efficacy and the company’s performance, enterprises must develop their own corporate culture. This can drive employees to set goals consistent with the organization, keep a consistent pace with the enterprise, and create a positive working atmosphere, shared values, and good management mechanism for employees. In this way, a suitable working environment can be formed to encourage positive creation. Only by improving employees’ enthusiasm can the company’s performance be further improved.

The human–machine dialogue system is designed based on HCI technology under situational perception. The B/S network calculation model is used to integrate the HCI with the data repository. Based on the traditional support system and HCI server, the system can operate the Internet, which is consistent with the research results of Makarov et al. (2020). The BPNN model proposed has the best comprehensive performance, which is in line with the expected value of employee satisfaction, which is consistent with the research results of Escobedo-Trujillo et al. (2016). To analyze the relationship between abusive management, self-efficacy, and enterprise performance, an SVM regression model based on machine learning is proposed. The model with optimized parameters can accurately predict the performance of real estate enterprises, and the error curve is relatively gentle, which is consistent with the research results of Kisi (2015). The HCI technology under artificial intelligence can better realize the efficient coordination and application of heterogeneous databases. At the same time, deep learning technology can also be integrated with employee satisfaction evaluation.

CONCLUSION

Employees can also have more confidence to further implement the work plan and help colleagues by achieving the set goals. The self-efficacy factors involve employees’ work interest, post adaptability, a sense of fairness, and the company’s reward mechanism. To improve employees’ self-efficacy and company performance, enterprises must develop their own corporate culture. This enables employees to set goals that are consistent with the organization. Guided by educational psychology and learning psychology, abusive management is negatively correlated with job performance. Abusive behavior of leadership weakens the trust of employees and their loyalty and responsibility to the enterprise. Self-efficacy reflects the employees’ characteristics and can predict their work engagement. From the perspective of educational psychology, the significance of the proposal is that the performance of BPNN is in the best state, and each index has reached the expected employee satisfaction. An SVM regression model can correctly predict the actual performance of real estate enterprises and provide an effective method for enterprises to evaluate employees’ self-efficacy and job satisfaction. However, the results need to be improved. Due to the diversity of culture, the related content of abusive management is very complex, without one-to-one data support, which is not comparable. Meanwhile, the scientificity of the respondents’ answers is uncertain, which affects the preciseness of the research results. This is also a problem to be solved by further research.

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