

A Bayesian network-based analysis of the potential impact of emotion management skills on task completion efficiency improvement

Rongyao Li¹, Jinghui Wang², 

¹ Hebei Sport University, Shijiazhuang, Hebei, 050041, China

² Hebei Vocational College of Public Security Police, Shijiazhuang, Hebei, 051433, China

ABSTRACT

For enterprises, development is ultimately reflected in the task completion performance of employees, and in order for employees to create higher task performance, it is necessary to consider not only their education and knowledge level, but also their emotional management ability. This study first collects data related to employees' emotion management ability and task completion efficiency improvement through questionnaires, and then analyzes the statistical data by using the potential impact identification model designed based on Bayesian neural network model to obtain the potential impact probability of each dimension of emotion management ability on task completion efficiency improvement. The analysis of the forward and reverse inference probabilities of the Bayesian network model indicated that the most important potential influence factor leading to the improvement of task completion efficiency was the emotion expression ability, with a forward and reverse inference probability of 36.2% and 59.4%, respectively, followed by the emotion regulation ability and emotion acceptance ability. The results of this study reveal the important potential influence of emotion management ability on task completion efficiency enhancement, and the formulation of task completion efficiency enhancement strategies based on the perspective of emotion management ability can effectively enhance employee task performance, which in turn promotes the overall development and competitive advantage of enterprises.

Keywords: Bayesian neural network, K2 structural algorithm, questionnaire, emotion management, task completion efficiency

 Corresponding author.

E-mail address: wjh19740105@163.com (J. Wang).

Received 05 January 2024; Revised 15 March 2024; Accepted 10 November 2024; Published Online 15 April 2025.

DOI: [10.61091/jcmcc127a-442](https://doi.org/10.61091/jcmcc127a-442)

© 2025 The Author(s). Published by Combinatorial Press. This is an open access article under the CC BY license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Under the pressure of today's work environment, emotion management plays an important role in an individual's work performance. Good emotion management plays a positive role in an individual's mental health, work motivation, and work efficiency [1-3]. Emotion management, as a competency, covers an individual's ability to perceive, understand, regulate, and cope with his or her emotions. Emotion management plays an important role in an individual's performance and achievement at work [4-6].

First of all, emotion management can improve the mental health of individuals. Positive emotion management can help individuals reduce negative emotions such as anxiety and depression, enhance emotional stability, and thus improve their psychological health. A psychologically healthy employee is often more able to maintain a positive work attitude and efficient work performance [7-10]. Secondly, emotion management positively affects the individual's work motivation. Good emotional management can enhance an individual's intrinsic motivation and promote his or her commitment to work [11-13]. If employees can actively manage and regulate their emotions, they can better cope with work pressure and frustration and maintain a positive emotional state, thus improving their work motivation and effectiveness [14-16]. In addition, emotion management has a direct impact on job performance. A positive emotional state helps to improve job performance, while negative emotions may drag down job performance [17-18]. When people face difficulties, frustrations, or urgency, positive emotion management can help them better maintain focus and self-discipline and solve problems more effectively. Whereas, if emotions are not managed properly, it may lead to mood swings, reduce work efficiency, and affect work quality [19-22].

Literature [23] emphasized the importance of college students' emotion management skills, which were significantly and positively correlated with college students' academic engagement, psychological safety, and self-efficacy. This result sheds light on colleges and universities to actively calm students' emotions and promote normal learning. Literature [24] examined the relationship between emotional intelligence, job satisfaction and job performance in the context of higher education. A positive correlation between emotional intelligence, job satisfaction and job performance was noted. The importance of emotional intelligence and its impact on the work environment was revealed. Literature [25] investigated the utility of emotional intelligence in emotion management in predicting individual performance, team performance and conflict resolution styles. It indicated that emotional intelligence was positively related to team performance and differed from conflict resolution approach. Literature [26] examined emotional management competence as a relevant predictor of job performance. It was emphasized that emotional management competence positively affects task performance, individual directed organizational behavior, etc. Literature [27] analyzed the impact of emotion management (EM) on nurse performance (NP) and pointed out that nurses are at risk for burnout, depression, and anxiety, but job performance is not affected by the way they manage their emotions, and recommended the establishment of a regular psycho-educational program for nurses. Literature [28] conducted a questionnaire on the impact of learning emotions on learning outcomes. It was emphasized that learning outcomes are influenced by interest, attitude and motivation in learning. This finding informs the universities to improve the learning experience of students.

Literature [29] investigated the impact of emotional intelligence on teachers' job performance. A significant positive correlation was indicated between emotional intelligence such as emotional self-awareness, self-confidence, achievement, and conflict management and teacher job performance. Literature [30] and Literature [31] revealed the impact of positive emotions on the work produced and elaborated on the variables of positive emotions that are essential for success in the workplace such as positive beliefs, work engagement, positive coping, teamwork and performance. Literature [32] affirmed the importance of emotion management and paradoxical problem solving model and the

topable strategy generation method of topology were applied in emotion management to achieve emotion transformation through paradoxical problem solving to improve emotion management ability. The above studies have described the impact of emotions on learning and work from the aspects of emotion management, emotional intelligence, and positive psychology. However, the topic of “the impact of emotion management ability on task completion efficiency” has not been widely noticed by academics.

In this paper, the Bayesian network structure architecture is designed through the processes of identifying key influencing factors, establishing dependency relationships, obtaining variable factor probability data and inference analysis. The K_2 -structure algorithm is applied to calculate the degree of fit of the network structure to the data set, determine the direction of directed edges and each node of the network structure by greedy search strategy, and evaluate the advantages and disadvantages of the Bayesian network structure according to the core scoring function. Then the potential influence identification model is constructed by combining the Bayesian network model with the DIB model, and the potential influence of the emotion management ability on the improvement of task completion efficiency is determined based on the two-way reasoning results. In this study, JK Company was selected as the case study object, and the related emotion management ability and task completion efficiency questionnaire data of R&D department employees were collected and statistically analyzed using SPSS software. Then use the influence identification model to analyze the potential influence probability of each factor under the emotion management ability, and realize the analysis of the potential influence of the emotion management ability on the improvement of task completion efficiency.

2. Methodology for analyzing the impact of emotion management skills on the efficiency gains of task completion

2.1. Bayesian network modeling

2.1.1. Model modeling process. In the process of Bayesian network modeling, the experience of experts or a large amount of historical data is mainly used as the basis for modeling, and the model needs to be continuously optimized [33]. There are two main categories of common Bayesian model construction methods, one of which is constructed by relevant experts based on their own knowledge and experience, and the experts directly establish the corresponding network structure. The point of this method is that it does not require a large amount of data to analyze, but it is more seriously affected by the subjectivity of the experts, while the knowledge level and ability of the experts will directly affect the final results. The other category is Bayesian network modeling using machine learning, which automatically learns and builds Bayesian network models from a large amount of historical data through machine learning techniques. This method requires a large amount of data as support, and if the amount of data is too small or the data is not accurate enough, it will lead to the model and results obtained are not accurate enough. The method is suitable for the case of abundant data but lack of domain experts, and is valuable for dealing with uncertainty.

The construction of the Bayesian network model is mainly divided into the following five steps.

- 1) Identify key variables. In this paper, the key variable is the emotion management ability that affects the efficiency of task completion. For the research of this paper is to identify the potential factors to improve the efficiency of task completion, and the nodes of the Bayesian network are the potential influencing factors identified by the final screening.
- 2) Establishing dependency relationships. Determining the dependency relationship between the variables is represented using a directed acyclic graph, where the nodes represent the variables and the directed edges represent the dependency relationship between the variables. In this paper, the influence of different emotion management ability factors on task completion efficiency is assessed by

Bayesian network modeling, so the emotion management ability serves as the parent node and the task completion efficiency serves as the child node.

3) Setting the state of variable factors. According to the characteristics of the project and the research objectives, the corresponding states are set for these variables, and they can also be set to other states as needed.

4) Obtaining probability data of variable factors. In this paper, the data about employees' emotion management ability and task completion efficiency are collected through the method of questionnaire survey, and the corresponding a priori probabilities are calculated. It can also be obtained by learning from a large amount of historical data using the method of machine learning.

5) Inference analysis. By inputting the data into the model for analysis, the analysis results are finally obtained, and the corresponding inference methods are selected in combination with the needs of the actual research problem, and the common inference methods include normal inference and reverse inference, as well as sensitivity analysis.

2.1.2. Bayesian network learning structure. Given the structural and data integrity of Bayesian neural networks, the K_2 -structure algorithm is primarily used [34]. The K_2 -algorithm uses a scoring function to evaluate the merit of the network structure. The scoring function calculates a value based on a given dataset and network structure that reflects how well the network structure fits the dataset. A greedy search strategy is used to construct the network structure. It starts with an empty network structure and then gradually adds edges and determines the direction of the edges, i.e., it determines which node is the parent node and which node is the child node. At each step, it chooses the addition that increases the value of the scoring function the most. In the process of constructing the network structure, the K_2 algorithm needs to determine the parent-child order between nodes. Typically, it first selects a node as the root node, and then for each node for which it has not yet determined a parent, it selects the node that adds the most to the value of the scoring function as its parent. This process continues until all nodes have identified a parent. Its core scoring function is based on a posteriori probability, which is calculated as follows:

$$\max_G [P(G, D)] = C \prod_{\Pi_i} \max_{n_i} \left[\prod_{j=1}^{q_j} \frac{(r_j - 1)!}{(N_{ij} + r_j - 1)!} \prod_{k=1}^{r_j} N_{ijk}! \right] \quad (1)$$

where G is a representation of the network structure, D is a dataset, Π_i is the set of parent nodes of the i th child node, and r_i is the r values of the existence of the i th node.

The initial state of the K_2 structure algorithm includes only nodes, with no directed edges connecting the nodes. In constructing the Bayesian network structure, K_2 the algorithm selects its parent node for each node by examining the node variables one by one through a greedy search strategy. It first determines the found parent nodes for the node, and if the number of parent nodes does not reach a preset upper bound, the algorithm continues to search for a new parent node. During the search process, K_2 the algorithm considers the variables that precede the node in the network topology but have not yet become its parents, and evaluates the network score after adding them as parents. If the score of a candidate parent node is higher than the currently selected parent node, it is added as a new parent node, otherwise the search stops. This process will continue until all nodes' parents have been identified and the number of parents for each node does not exceed a set upper bound, thus constructing a Bayesian network structure that fits the dataset.

2.2. Potential impact identification modeling

The identification model of potential influence of emotion management ability on task completion efficiency improvement constructed based on Bayesian network analysis is shown in Figure 1. On the basis of using the questionnaire to identify the factors related to emotion management ability that affect the improvement of task completion efficiency, this paper comprehensively adopts the DIB

hybrid model to identify the potential impact factors. The DIB model makes full use of expert knowledge and probability statistical methods, integrates the advantages of qualitative and quantitative, and can not only show the relationship between the impact factors, but also reflect the degree of impact of the factors on the task completion efficiency. The specific steps are as follows.

- 1) Establish the direct influence matrix A . Select the set of influencing factors $X = \{x_1, x_2, \dots, x_n\}$ (n is the number of influencing factors). Determine the interrelationship of influencing factors through the expert's experience knowledge, and obtain the direct influence matrix $A = [a_{ij}]_{n \times n}$, where a_{ij} is the degree of influence of factor i on factor j , and when $i = j$ is assigned the value of 0.
- 2) Establish the normative influence matrix B , and normalize the direct influence matrix A to obtain the normative influence matrix B (element b_{ij}):

$$B = [b_{ij}]_{n \times n} = \frac{A}{\max_{1 \leq i \leq n} \sum_{j=1}^n a_{ij}} \quad (2)$$

- 3) Create a comprehensive impact matrix C (element c_{ij}):

$$C = [c_{ij}]_{n \times n} = (B + B^2 + B^3 \dots + B^n) = B(I - B)^{-1} \quad (3)$$

Where I is the unit matrix, reflecting the effect of the factor on itself.

- 4) Establish the reachability matrix. On the basis of the comprehensive impact matrix C , consider the impact of the factor itself to calculate the overall impact matrix D (element d_{ij}), and introduce a threshold value of λ to remove the weaker influence of the indicators to calculate the reachability matrix F (element f_{ij}):

$$D = [d_{ij}]_{n \times n} = I + C \quad (4)$$

$$F = [f_{ij}]_{n \times n} = \begin{cases} 1 & d_{ij} > \lambda \\ 0 & d_{ij} \leq \lambda \end{cases} \quad (5)$$

where I is the unit matrix, $\lambda \in [0, 1]$, λ the larger the value, the more obvious the structure simplification.

- 5) Hierarchical division. Calculate the reachable set $R(x_i)$, the antecedent set $S(x_i)$ and the common set H . Repeat the calculation of $R(x_i)$ and $S(x_i)$ according to the different values of i and update the set sequentially to construct the multilevel recursive structural model:

$$R(x_i) = \{x_j \mid x_i \in X, f_{ij} = 1\} \quad (6)$$

$$S(x_i) = \{x_j \mid x_i \in X, f_{ji} = 1\} \quad (7)$$

- 6) Construct a Bayesian network model. According to the logical relationship between nodes and the Bayesian formula, the Bayesian network model can realize the uncertainty reasoning between nodes:

$$P(T) = \prod_{i=1}^n P(x_i \mid P_a(x_i)) \quad (8)$$

where $P_a(x_i)$ is the parent (surrogate) node of node x_i , and $P(x_i \mid P_a(x_i))$ denotes the probability of a child node occurring under the condition that the parent node occurs.

The larger the value obtained for the a posteriori probability, the greater the likelihood that the given influencing factor will play a potentially influential role:

$$P(x_i \mid T) = \frac{P(x_i, T)}{P(T)} \quad (9)$$

This step converts a multilevel recursive structural model into a Bayesian network model, realizes forward and backward inference, and extracts the potential influencing factors of task completion efficiency improvement.

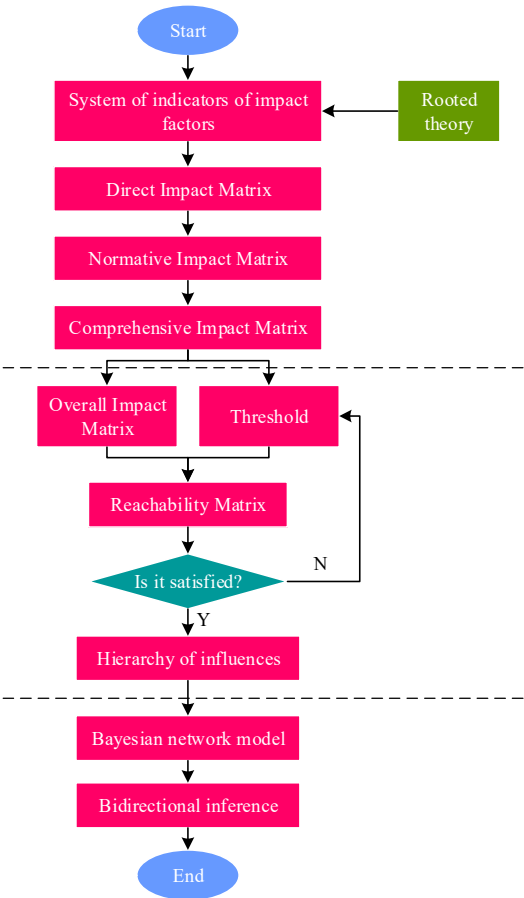


Fig. 1. Potential impact identification model

3. Analysis of research data processing

3.1. Overview of the study population

3.1.1. Basic company profile. The study case chosen for this paper is JK Corporation, which is headquartered in Nanjing and founded in 1996, and is one of the earliest enterprises in China to lay out a cross-border B2B e-commerce platform. According to its 2023 annual report, the company's various main businesses include a comprehensive platform for full-link foreign trade services, cross-border e-commerce business, and insurance agency business that integrates online and offline. With the help of digital technology and intelligent operation means, the company has been deepening and expanding its services to provide small and medium-sized enterprises (SMEs) with full-process services for foreign trade transactions, including cross-border supply chain, transaction payment, warehousing and logistics, and finance and insurance. The company has been deeply engaged in the Internet industry for more than 20 years, and technology research and development and independent innovation are the strong driving force for the company to move forward. The company has accumulated profound precipitation in the field of Internet and e-commerce technology, and has established a perfect technology system, including large-scale data development and application technology system, artificial intelligence development and application technology system, and the basic support technology system to provide global load balancing services, security technology to

ensure system security at all levels, and security technology to ensure system security at all levels. The company has also established a comprehensive technology system, including a large-scale data development and application technology system, an artificial intelligence development and application technology system, a basic support technology system that provides global load balancing services, and a security technology system that guarantees system security at all levels.

3.1.2. Analysis of the human resources situation. The data on the overall personnel structure and the structure of R&D personnel in JK Company are shown in Table 1. By the end of 2023, the company had a total of 2,541 active employees, including production, sales, technology, research and development and other diversified talents, and the company's bachelor's degree and above accounted for more than 70.17% of the employees, and the master's degree and above there are 529 people. Among them, there are 549 R&D personnel, with 369 and 180 with bachelor's and master's degrees respectively. As the company's R&D positions, the task completion efficiency of R&D personnel is closely related to the company's development and performance, etc. Considering that R&D personnel encounter greater difficulties and pressure in their daily work, we take the R&D personnel of JK as a research case to analyze the potential impact of their emotional management ability on the improvement of task completion efficiency.

Table 1. Staff structure and development team member statistics

Company structure			
Educational background		Staff number	Percentage
Junior college		758	29.83%
Undergraduate		1254	49.35%
Master's degree		529	20.82%
Total		2541	100.00%
R&d team member			
Feature	Categories	Number	Percentage
Post	R&d personnel	549	21.61%
Educational background	Undergraduate	369	14.52%
	Master	180	7.08%
age	<30	265	10.43%
	30-40	215	8.46%
	>40	69	2.72%

3.2. Questionnaire design and distribution

In order to be able to clearly understand the current situation of work happiness and work performance of employees in JK Company, this study implemented a questionnaire survey on R&D employees in JK Company. The first part is the basic personal information, including gender, age, education, working years and position level of R&D employees in JK Company. The second part is the Employee Emotional Management Ability and Task Completion Efficiency Scale, which uses the existing Employee Emotional Management Ability Scale developed based on the Chinese context. The scale contains seven core dimensions of emotional awareness, emotional expression, emotional understanding, emotional regulation, emotional cooperation, emotional acceptance, and task completion efficiency, totaling 30 questions. The scale was rated on a five-point Likert scale, in which "1" represents strongly disagree, "2" represents relatively disagree, "3" represents unsure, and "4" represents relatively agree, and "5" represents strongly agree.

This research adopts a network questionnaire survey to distribute questionnaires to all personnel in the R&D department of JK Company, a total of 549 questionnaires were distributed, 549 were recovered, 2 invalid questionnaires were screened out, 547 valid questionnaires were recovered, and the questionnaire validity rate was 99.64%. In the following, this study analyzes the 547 valid samples in detail with descriptive statistics, and further conducts reliability and validity tests.

3.3. Results of survey data analysis

3.3.1. Descriptive statistics. This paper uses SPSS data analysis software to analyze the collected data with descriptive statistics, and the descriptive statistical analysis of the results of the survey on emotion management ability and task completion efficiency of the employees in R&D positions in JK Company is shown in Figure 2. In the figure, A1-A6 represents emotion awareness ability, emotion expression ability, emotion understanding ability, emotion regulation ability, emotion cooperation ability, emotion acceptance ability, and B represents task completion efficiency. The mean value of employees in each dimension of emotion management ability is different, between 2.50-3.84 points, which proves that employees' performance on each dimension of emotion management ability is different. And from the table, it can be found that the maximum standard deviation of emotional cooperation ability is 1.67, but it is within the deviation allowed by the data and can be explored in depth. In terms of task completion efficiency, the average survey score of employees is 3.03, which is in the middle level.

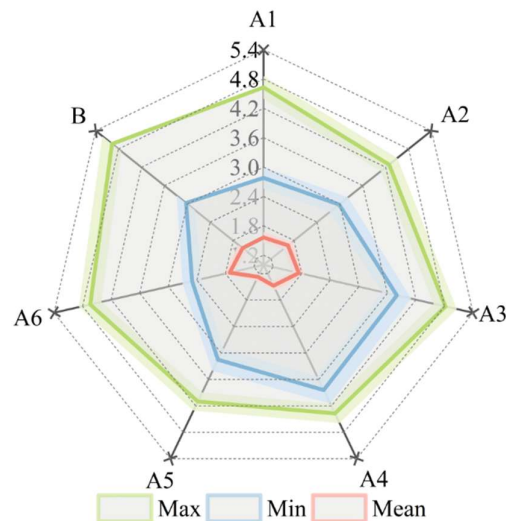


Fig. 2. Descriptive statistics

3.3.2. Data validity analysis. Analysis by SPSS software shows that 547 copies obtained from the questionnaire are valid data and the initial Cronbach Alpha data is 0.997, which is greater than the standard 0.9, which indicates that the data has a high degree of internal consistency with high credibility. Also according to the results of Cronbach Alpha based on standardized terms is also 0.997, which indicates a high level of confidence in the data obtained from the questionnaire. Based on the data collected by analyzing the questionnaire, it can be seen that the overall credibility of the questionnaire is very high, then based on the above conclusions, it can be related to the analysis of the factors of the dimensions of emotional management ability, the statistical results of the credibility analysis are shown in Table 2. The Kronbach Alpha coefficients of the factors affecting the improvement of task completion efficiency collected in this paper are all greater than 0.9, and the CITCs are all greater than 0.5, which indicates that the data of the factors have a high degree of reliability. In addition, the validity analysis found that the value of Kmo is $0.969 > 0.7$, which proves that the stronger the correlation between the variables in the indicated dataset, the better the applicability of the factor analysis, and the significance of 0 is less than 0.6, which proves that the data obtained in this paper belongs to the non-unit matrix, which meets the requirements of the reliability and validity of the questionnaire.

Table 2. Reliability analysis statistics

Dimension	The standard of the scale after deleting	The variance of the scale after deleting the item	The revised terms are associated with the total	Clonbach after deletion
Emotional awareness	100.122	1995.907	0.879	0.994
Emotional expression	100.148	1993.59	0.868	0.996
Emotional understanding	100.258	1996.632	0.897	0.994
Mood control	99.915	1990.181	0.861	0.993
Emotional cooperation	100.104	1992.154	0.893	0.994
Emotional receptivity	100.028	1986.386	0.882	0.996

4. Analysis of the impact of emotional management skills on mission effectiveness

4.1. Bayesian network structure modeling

A total of 7 nodes are included in the Bayesian network probability model for the analysis of employee emotion management ability and task completion efficiency, and the Bayesian network structure is shown in Figure 3. The seven nodes in the Bayesian network structure diagram are emotion awareness, emotion expression, emotion comprehension, emotion regulation, emotion cooperation, emotion acceptance, and task completion efficiency. The directed edges in the Bayesian network structure model point from the "emotion awareness" node to the "emotion expression ability" and "emotion acceptance ability" nodes, which indicates that the "emotion awareness" node in the emotion management ability has a direct impact on the pointed node. The nodes of "Emotional Expression Ability", "Emotional Regulation Ability" and "Emotional Acceptance Ability" point to the "Emotional Cooperation Ability" node, and the "Emotional Expression Ability" node also points to the "Emotional Understanding Ability" node, which means that the "Emotional Expression Ability" node, the "Emotional Regulation Ability" node and the "Emotional Acceptance Ability" node have a direct impact on the "Emotional Cooperation Ability" node, and the "Emotional Expression Ability" node has a direct impact on the "Emotional Understanding Ability". The nodes of "Emotion Regulation" and "Emotional Cooperation" both directly point to the "Task Completion Efficiency Improvement" node, which indicates that these two emotion management ability nodes will have a direct impact on the improvement of task completion efficiency.

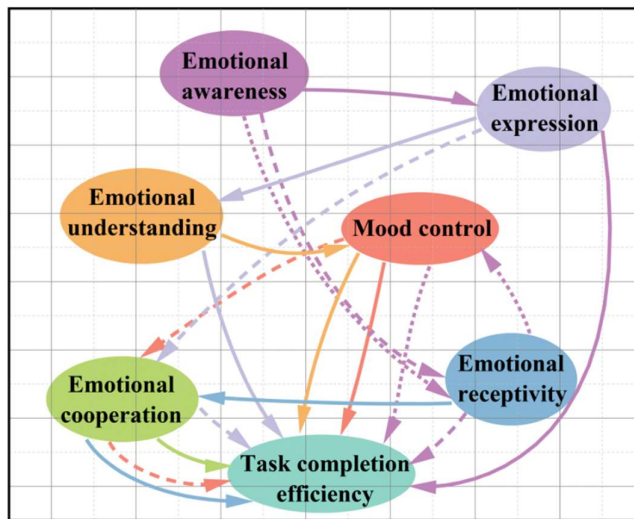


Fig. 3. Beeses network probability structure

4.2. Bayesian network probabilistic model predictive inference results

4.2.1. Probability analysis based on forward reasoning. Combined with the Bayesian network structure model constructed in the previous section, the potential impact probability of the six sub-influential factors under the emotional management ability that affects the improvement of the efficiency of employees' task completion and the posterior probability of the sub-nodes can be obtained through the Bayesian network inference. The potential impact probability of each influencing factor in the employee's emotion management ability is obtained through the operation of the potential impact identification model as shown in Table 3. Among the six sub-dimensions of employees' emotion management ability, the potential impact probability of emotion regulation ability is the highest, accounting for 52.9%, and the underlying reason is that employees who can enhance

positive emotions and attenuate negative emotions in a timely manner during the work process will help to better control and manage their own emotions, and positive emotions are conducive to good thinking and work, thus generating results such as increased efficiency in task completion. At the same time, in the survey analysis and Bayesian network analysis, the employee's ability to regulate emotions also affects the ability to cooperate emotionally, thus increasing the probability of the occurrence of task completion efficiency improvement. Among the six sub-influences of emotional management ability, emotional expression ability and emotional understanding ability are also potentially important influences on the improvement of task completion efficiency, accounting for 36.2% and 44.8% respectively, which is mainly due to the fact that a higher level of emotional expression ability can help employees improve their verbal and non-verbal communication skills as well as the moderateness and appropriateness of their emotional expression, so that they can effectively express their emotions to their partners during the task completion process. Effectively express emotions to cooperators or superiors, and thus improve the efficiency of work task completion. Emotional comprehension helps to better understand the feelings and needs of colleagues or superiors, which helps to improve the efficiency of task completion.

Table 3. Inference results of each node

Influencing factor		Probability
A1	Emotional awareness	Yes=0.248
A2	Emotional expression	Yes=0.362
A3	Emotional understanding	Yes=0.448
A4	Mood control	Yes=0.529
A5	Emotional cooperation	Yes=0.298
A6	Emotional receptivity	Yes=0.352
B	Task completion efficiency	Yes=0.512

4.2.2. Impact probability analysis based on backward reasoning. Reverse inference is the process of analyzing the possible causes of a known result and inferring the factors that led to that result. In this case, setting the status of the "Task Completion Efficiency Improvement" node to "Yes" = 100% indicates that the task completion efficiency has been improved. According to the reverse inference, thus analyzing the important influencing factors leading to the improvement of task completion efficiency. The analysis results of the Bayesian neural network backward reasoning are shown in Table 4, and it is obvious from the results of the backward reasoning that under the assumption that the efficiency of task completion has been improved, the probability of the potential influence of the four factors of emotional expression (59.4%), emotional comprehension (55.7%), emotional regulation (75.8%), and emotional acceptance (51.4%) is very high, which are all more than 50%. In addition, the probability of potential influence of emotional expression ability increased by 23.2%, which is the largest increase of all potential influence factors, indicating that the most important potential influence factor leading to increased efficiency in task completion is emotional expression ability. This was followed by emotion regulation ability and emotion acceptance ability, which increased by 22.9% and 16.2%, respectively, which means that these subfactors in emotion management ability have a greater potential impact on task completion efficiency improvement. When these emotion management abilities increase simultaneously, the probability of task completion efficiency improvement is very high. Therefore, in the future work process, the primary task is to ensure that employees have good emotion regulation ability and emotion acceptance ability in order to enhance the task completion efficiency.

Table 4. Regression inference probability analysis results

Influencing factor		Probability
A1	Emotional awareness	Yes=0.365
A2	Emotional expression	Yes=0.594
A3	Emotional understanding	Yes=0.557
A4	Mood control	Yes=0.758
A5	Emotional cooperation	Yes=0.326
A6	Emotional receptivity	Yes=0.514
B	Task completion efficiency	Yes=1.000

5. Conclusion

This paper constructs a Bayesian neural network model based on the modeling process and the learning structure method, calculates and analyzes the potential impact probability of each sub-dimension of emotion management ability on the improvement of employees' task completion efficiency. The survey and analysis of R&D employees in the case object JK Company found that the average survey score of employees in task completion efficiency is 3.03, which is in the middle level. And the average level of each dimension of emotion management ability is below 4.0 points. The probability analysis of forward reasoning in the Bayesian network model shows that the node of "emotion management ability" has the highest probability of potential influence on the node of "task completion efficiency improvement", accounting for 52.9%. In addition, the probability of the potential influence of "emotional expression ability" in reverse reasoning increased the most compared with that of forward reasoning, which is 23.2%, indicating that the most important potential influence factor leading to the improvement of task completion efficiency is emotional expression ability.

To sum up, emotion management ability is an important part of the process of improving task completion efficiency, enterprises should actively do a good job in improving employees' emotion management ability, reduce the negative impact of negative emotions on the completion of work tasks, and realize the purpose of improving task completion efficiency.

References

- [1] Lee, M., Pekrun, R., Taxer, J. L., Schutz, P. A., Vogl, E., & Xie, X. (2016). Teachers' emotions and emotion management: Integrating emotion regulation theory with emotional labor research. *Social psychology of education*, 19, 843-863.
- [2] Jeung, D. Y., Kim, C., & Chang, S. J. (2018). Emotional labor and burnout: A review of the literature. *Yonsei medical journal*, 59(2), 187-193.
- [3] Lee, Y. H., & Chelladurai, P. (2018). Emotional intelligence, emotional labor, coach burnout, job satisfaction, and turnover intention in sport leadership. *European Sport Management Quarterly*, 18(4), 393-412.
- [4] Garwood, J. D., Vernon-Feagans, L., & Family Life Project Key Investigators. (2017). Classroom management affects literacy development of students with emotional and behavioral disorders. *Exceptional Children*, 83(2), 123-142.
- [5] Al-Qeed, M. A., Khaddam, A. A. H., Al-Azzam, Z. F., & Atieh, K. A. E. F. (2018). The effect of talent management and emotional intelligence on organizational performance: Applied study on pharmaceutical industry in Jordan. *Journal of Business and Retail Management Research (JBRMR)*, 13(1).
- [6] Yang, H., Lin, Z., Chen, X., & Peng, J. (2023). Workplace loneliness, ego depletion and cyberloafing: can leader problem-focused interpersonal emotion management help?. *Internet Research*, 33(4), 1473-1494.

- [7] Fusar-Poli, P., de Pablo, G. S., De Micheli, A., Nieman, D. H., Correll, C. U., Kessing, L. V., ... & van Amelsvoort, T. (2020). What is good mental health? A scoping review. *European neuropsychopharmacology*, 31, 33-46.
- [8] Menefee, D. S., Ledoux, T., & Johnston, C. A. (2022). The importance of emotional regulation in mental health. *American journal of lifestyle medicine*, 16(1), 28-31.
- [9] Inwood, E., & Ferrari, M. (2018). Mechanisms of change in the relationship between self-compassion, emotion regulation, and mental health: A systematic review. *Applied Psychology: Health and Well-Being*, 10(2), 215-235.
- [10] Sontag, J. M. (2018). Visual framing effects on emotion and mental health message effectiveness. *Journal of Communication in Healthcare*, 11(1), 30-47.
- [11] Wirtshafter, H. S., & Wilson, M. A. (2021). Lateral septum as a nexus for mood, motivation, and movement. *Neuroscience & biobehavioral reviews*, 126, 544-559.
- [12] Fantiro, F. A., Arifin, B., Muzakki, A., & Setiawan, E. (2022). Blended learning or full online: Increase student mood and motivation during the new normal era. *Jurnal SPORTIF: Jurnal Penelitian Pembelajaran*, 8(1), 13-28.
- [13] De Luca, A., Verschoor, S., & Hommel, B. (2023). No correlation between mood or motivation and the processing of global and local information. *Experimental Psychology*.
- [14] Côté, S., & Moskowitz, D. S. (2016). How are moods instigated at work? The influence of relational status on mood. In *Managing emotions in the workplace* (pp. 111-134). Routledge.
- [15] Zhuang, M., & Gadiraju, U. (2019, June). In what mood are you today? An analysis of crowd workers' mood, performance and engagement. In *Proceedings of the 10th ACM Conference on Web Science* (pp. 373-382).
- [16] Gaucher, R., Burger, M., & Veenhoven, R. (2020). Difference in mood at work and home. An additional indicator of job satisfaction. *Journal of Well-Being Assessment*, 4(3), 347-367.
- [17] Costa, C., Mondello, S., Micali, E., Indelicato, G., Licciardello, A. A., Vitale, E., ... & Fenga, C. (2020). Night shift work in resident physicians: Does it affect mood states and cognitive levels?. *Journal of Affective Disorders*, 272, 289-294.
- [18] Vanderlind, W. M., Millgram, Y., Baskin-Sommers, A. R., Clark, M. S., & Joormann, J. (2020). Understanding positive emotion deficits in depression: From emotion preferences to emotion regulation. *Clinical psychology review*, 76, 101826.
- [19] Carl, J. R., Soskin, D. P., Kerns, C., & Barlow, D. H. (2013). Positive emotion regulation in emotional disorders: A theoretical review. *Clinical psychology review*, 33(3), 343-360.
- [20] Hodgins, M., & Dadich, A. (2017). Positive emotion in knowledge creation. *Journal of Health Organization and Management*, 31(2), 162-174.
- [21] Banisi, P. (2019). The effectiveness of positivism training on subjective well-being, positive meta-emotion and self-management ability in the elderly women. *Aging Psychology*, 5(3), 217-227.
- [22] Lin, Y., Wang, J., Liu, W., & Jia, Y. (2022). More Positive Emotion, Less Stress Perception?. *Psychology Research and Behavior Management*, 3721-3732.
- [23] Lei, X. (2022). The impact of emotion management ability on learning engagement of college students during COVID-19. *Frontiers in Psychology*, 13, 967666.
- [24] Abebe, D. W., & Singh, D. P. (2023). The relationship between emotional intelligence, job satisfaction, and job performance: empirical evidence from public higher education institutions. *European Journal of Business and Management Research*, 8(3), 45-52.

- [25] Jordan, P. J., & Troth, A. C. (2021). Managing emotions during team problem solving: Emotional intelligence and conflict resolution. In *Emotion and performance* (pp. 195-218). CRC Press.
- [26] Kluemper, D. H., DeGroot, T., & Choi, S. (2013). Emotion management ability: Predicting task performance, citizenship, and deviance. *Journal of Management*, 39(4), 878-905.
- [27] Elshahat Hamed, W., & Abd Elsalam Ahmed Eldeeb, G. (2021). Effect of Emotion Management on Nurses Job Performance during Pandemic COVID-19. *Egyptian Journal of Health Care*, 12(2), 998-1018.
- [28] Wang, X. (2022). Influences of learning emotion on learning outcome in online teaching mode. *International Journal of Emerging Technologies in Learning (ijET)*, 17(8), 126-139.
- [29] Asrar-ul-Haq, M., Anwar, S., & Hassan, M. (2017). Impact of emotional intelligence on teacher' s performance in higher education institutions of Pakistan. *Future Business Journal*, 3(2), 87-97.
- [30] Wall, T., Russell, J., & Moore, N. (2017). Positive emotion in workplace impact: the case of a work-based learning project utilising appreciative inquiry. *Journal of Work-Applied Management*, 9(2), 129-146.
- [31] Diener, E., Thapa, S., & Tay, L. (2020). Positive emotions at work. *Annual review of organizational psychology and organizational behavior*, 7(1), 451-477.
- [32] Zhou, Y., Shi, J., & Wu, L. (2017). Application of extension theory in emotion management. *Procedia computer science*, 122, 502-509.
- [33] Iis Dewi Ratih, Ketut Buda Artana, Heri Kuswanto, Emmy Pratiwi & Athaya Raihan Zaki. (2024). Probabilistic Modeling of Ship Collision in The Lombok Strait, Indonesia: A Bayesian Network Approach. *IOP Conference Series: Earth and Environmental Science*(1), 012008-012008.
- [34] Bouazizi Samar, Benmohamed Emna & Ltifi Hela. (2023). PSO-K2PC: Bayesian structure learning using optimized K2 algorithm for parents-children detection. *International Journal of Computers and Applications*(9), 553-563.