Siyka Demirova*
Technical University - Varna,
Varna, Bulgaria
ORCID: 0000-0001-6557-7407

Juliana Yorgova
Technical University - Varna,
Varna, Bulgaria
ORCID: 0009-0007-9384-1923

*Corresponding author:
E-mail: s_demirova@tu-varna.bg

ASSESSING EMOTIONAL INTELLIGENCE IN ENGINEERING MANAGERS IN BULGARIA AND ITS IMPACT ON TEAM EFFECTIVENESS

Introduction. Under the dynamic conditions of globalisation and increasing competition, modern organisations constantly seek to update their approaches to achieve efficiency and productivity in all activities. One of these approaches would be to build the emotional intelligence of the manager, which has an undeniable role in the work of a working team that achieves the set goals. Since the management of modern organisations aims to achieve efficiency in all aspects of their activities, the manager's emotional intelligence would directly affect the team's effectiveness in the organisation. It leads to a team construct, professional development of team members, and team leadership.

Aim and tasks. The study aims to assess the emotional intelligence of managers from the engineering industry in Bulgaria and prove its correlation with team effectiveness. The criteria and methods of team management and the evaluation of their effectiveness in industrial enterprises were studied. The tasks were to clarify the theoretical issues of the considered problem, to examine the emotional intelligence of managers practically, and to draw conclusions about the relationship between the emotional intelligence of managers and team effectiveness in the organisation.

Results. An overview analysis of the existing literature was conducted, and on this basis, the key criteria supporting the effective work of the team were derived. The emotional intelligence of middle-level management was investigated, and on this basis, the direct relationship between it and team effectiveness in the organisation was proven. The need for intervention in individual indicators to improve the team functioning of the organisation was determined based on a study of the emotional intelligence of managers. The development examined the criteria of Self-awareness, Self-management, Social awareness, and management of relationships in the team, relating to measuring the emotional intelligence of managers. The conclusions drawn are that in the surveyed enterprises, the main attention should be paid to the Social awareness criterion since the final results need to meet the modern requirements for businesses to address human resources from a social perspective.

Conclusions. Evaluating the team's performance helps eliminate weaknesses and strengthen its strengths. The team is motivated and committed to achieving the set goals when this assessment is adequate and timely. The identification of criteria, factors, methods, and team performance evaluation plays a key role in managerial decision-making, providing the key to the success of team functioning in the organisation.

Keywords: emotional intelligence, team effectiveness, leadership, engineering industry.

1. Introduction

The importance of emotional intelligence is recognising emotions and using the information gained to manage organisational behaviour (Salovey & Mayer, 1990; Liu et al., 2024). Emotional intelligence has a key role in building teams and measuring team effectiveness. Emotionally intelligent managers are not impulsive, aware of their emotions, and can regulate themselves (Bannikov et al., 2024, Drigas et al., 2023). The quality of emotional intelligence enables managers to build high-performance teams (Katzenbach & Smith, 2015).

Team effectiveness is important for achieving the set goals based on team unity, expressed in absolute interaction between members (Wageman & Hackman, 2010). This inevitably leads to high productivity and achievement of the quantitative and qualitative indicators set in the assignment to fulfil a certain goal.

Finally, an effective team tends to be different and innovative regarding the work and demands of the organisation (Belbin, 2010). Emotional intelligence can be identified with a low level of conflict in the organisation, good communication between team members, the correct distribution of roles, responsibilities, and duties during the execution of a given task, and the level of effective and efficient achievement of the set goals (Chalermsuk, 2023).

Since the effectiveness of the team cannot be characterised as a static quantity but rather a dynamically moving variable, several factors that influence it should be noted, namely: the composition of the team, the manner and approach of the manager, leadership, etc. (Chalermsook & Anutariya, 2023; Feng et al., 2024; Shah et al., 2023). The emotional intelligence of managers is a key element in achieving success and innovation in organisations organisations, contributing to greater employee satisfaction and higher levels of productivity and competitiveness. It results from harmonious cooperation, high professionalism, and the commitment of all team members (Caruso & Salovey, 2004).

2. Literature review

In the last decade, there has been an increasing focus on emotional intelligence. This is because it is not only the ability of managers to manage employees in the organisation but also how they can manage their own emotions impartially and fairly, which is increasingly being put at the forefront. A high level of emotional intelligence is an exceptional assistance when managing relationships with others. There are theories on which emotional intelligence is innate in a person's character (Chen et al., 2024; Stanley, 2019). However, other theories prove that emotional intelligence is learned and improved in the work process (Viezzer, 2024).

When the concept of emotional intelligence is mentioned, it cannot be associated with team effectiveness. This effectiveness can be generally linked to the team's productivity, absence of conflicts, and achievement of the set goal (Bao et al., 2024). When a decision has to be made to change the team, it is crucial for the manager to be emotionally intelligent to identify the problems accurately, outline the action plan, and proceed with implementation so that this type of action does not interfere with the work environment (Cherni & Godat, 2023; Shah & Kiran, 2024).

In-depth research on the team and the manager's emotional intelligence can analyse the root cause of the team's ineffectiveness and then propose specific strategies and tools for its improvement (Bar-On, 2006).

In this way, team research and effectiveness complementteam management, such as providing important tools and information to achieve better results and improve teamwork. Their relationship helps organisations adapt to changing market conditions, and they achieve competitive advantage by effectively using their resources and potential (Wang, Zheng, Cai, 2016).

According to Belbin (2010), teamwork is based on the presence of different types of personalities in teams with different team roles. Belbin's (2010) instruments rate people on how strongly they express behavioural traits from nine different team roles.

Lencioni (2002) focused on identifying several main dysfunctions in the team. Hackman (2011) deals with factors affecting team productivity and how they affect team performance. Brannick et al. (1995) created a methodology for evaluating leadership, communication, situational awareness, and adaptability.

Wageman and Hackman (2010) examined organisational culture, which affects team dynamics in part, and identified the factors that bring the success of top teams to achieve the ultimate strategic goal. Edmondson and Harvey (2018) examined team effectiveness through the lens of innovation in an organisational context.

Leblanc (2024) provides theoretical basics and practical guidelines for creating and managing effective work teams that can adapt and innovate according to the environment and requirements of modern business.

3. Methodology.

3.1. Criteria for Evaluating Team Effectiveness.

In order to maintain the team's competitiveness, it is necessary to develop the proper criteria for evaluating its effectiveness. These criteria must be measured, tracked, and analyzed in different aspects of the team's work (Fig.1).
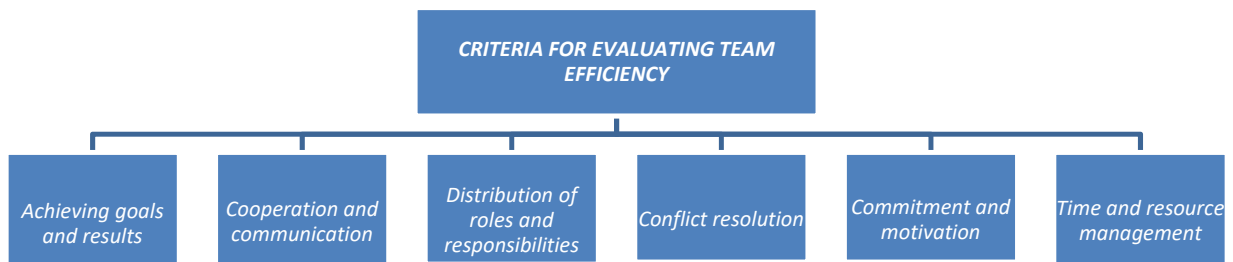

Fig. 1. Criteria for evaluation of the team efficiency.
Source: based on author's research.

This is one of the main criteria for evaluating the effectiveness of a team, as it is related to the deadlines for completing tasks and their effective implementation (Pavez et al., 2022). Based on this criterion, the degree of successful functioning of an organisation can be determined (Lv et al., 2024).

Undoubtedly, good communication and cooperation play important roles in improving the team. It is necessary to apply rules for fair treatment of all team members, to have transparency in relations between managers and employees, for everyone to be able to express their opinions without fear, and last but not least, to create conditions for transparency of communication (Abdullah & Gull, 2024). Promoting transparency ensures that every team member can freely express their opinion, especially on important issues. The rating of this criterion included an analysis of several aspects.

First, it is important to analyse whether all team members clearly define and understand the division of roles.

It evaluated the effectiveness of distributing roles and responsibilities in practice, such as analysing whether team members perform their roles and responsibilities according to expectations and deadlines. Global competitiveness requires the ability of organisations to develop group decision-making through consensus and cooperation (Sah, 2021). This requires the teams to be reliable and accountable. Strong individualists often create conflict, and it is the role of the management and the team to deal with it (Davaei et al., 2022; Ahsan, 2023). For this purpose, tracking how a team reacts to a given conflict is necessary. Team members' abilities to deal with differences in viewpoints and find constructive solutions to the problem were evaluated.

Team members' openness and honesty with other members and their freedom to express themselves according to the situation are also valued. The effectiveness of the decisions made regarding the conflict was also evaluated, concluding whether these decisions improved the working climate and supported the team's work and achieving its goals. Successful teams are built by motivated members who meet the criteria of McGregor's (1960) theory.

Such teams are ready to take responsibility and work hard to achieve the ultimate goal, and external incentives are not important for such teams; on the contrary, internal incentives for the development of the individual and the team take precedence. These teams report high levels of productivity.

First, an analysis was made of the team's level of motivation, as mentioned earlier. Based on the level of motivation, a direct link can be made between motivation and team members' commitment. Evaluation according to this criterion allows management to take measures to stimulate and maintain the high motivation and commitment of the team.

When considering this criterion, the management functions of planning, organising, motivating, coordinating, and motivating and their relationship with time should be mentioned.

Time is one of the most valuable resources available to any organisation. If it is not handled correctly, neither production plans nor plans for the future development of the organisation can be made.

3.2. Criteria for Assessing Emotional Intelligence.

Salovey & Mayer (1990) coined the term emotional intelligence, which they divided into four "branches":

1. Self-awareness;
2. Self-management;
3. Social awareness;
4. Relationship management.

Goleman and Boyatzis (2017) further elaborate on this model, including five main elements in the "emotional intelligence" concept (Fig. 2): Self-awareness; Self-regulation; Motivation; Empathy; Social skills.
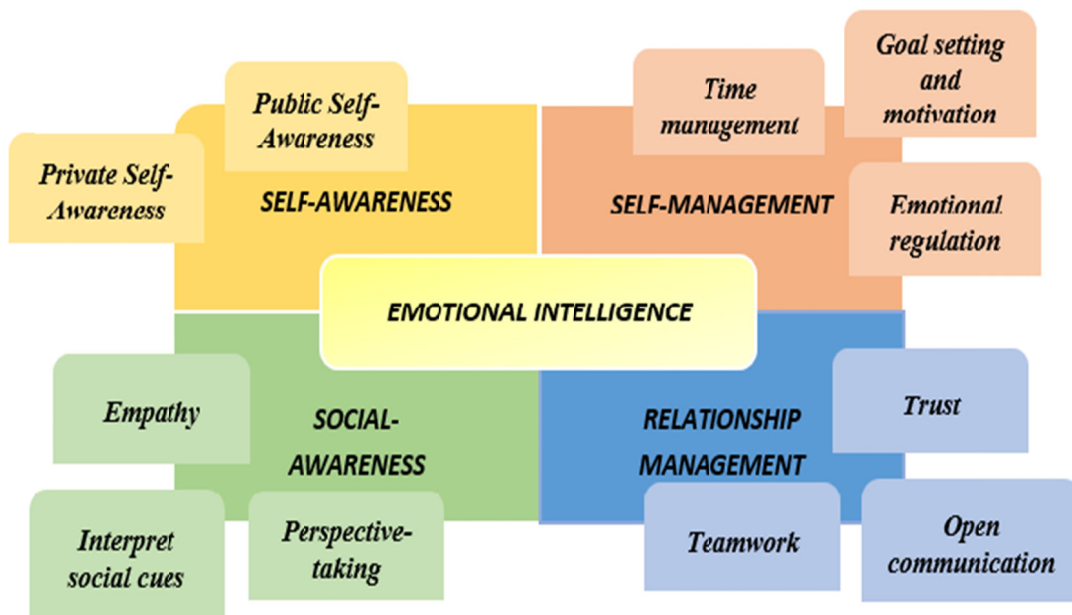

Fig. 2. Criteria for evaluating emotional intelligence
Source: based on Goleman and Boyatzis (2017).

For the research, several key competencies managers should have were selected to assess them and the organisation's team's functioning:

- Self-awareness – under this competence, managers must answer questions such as whether they understand the non-verbal messages of colleagues and employees, whether they are motivated when good results are reported, whether they think they are not good at what they do and whether they can say "no".

- Self-management – under this competence, managers answer questions such as whether they are nervous about a future project, look for activities that make them happy, or handle conflict situations and manage to make timely decisions.

- Social awareness – under this competence, managers answer questions such as: Do they reward employees for completing a task on time, do they stimulate personal responsibility in employees, do they support informal groups, and do they organise events liked by employees?

- Management of relationships in the team – under this competence, managers answer questions such as whether they support transparent relationships and communication in the team, whether they value the honesty of team members, whether each team member can express his opinion without fear, whether they support the career development of employees.

4. Results

Bulgaria's industrial sector is mainly concentrated in the large cities, which contributes to the development of the country's economy to the main ones. Bulgarian enterprises are engaged in construction, and over the past years, the cities have experienced a construction boom caused by the active expansion of urban infrastructure. In addition, the largest chemical plants in the country are located in large cities, which make it an important hub for the chemical industry.

The enterprises participating in the study fall into the category of large enterprises. Three of them produce chemical products, two are machine-building, and one is a shipbuilding enterprise. The questions were answered by 38 middle and senior managers in positions such as Production Manager, Project Manager, Human Resources Manager, Logistics Manager and Customer Relationship Manager.

The research was conducted during the period from 01.06.2024 to 30.06.2024. The online survey was not anonymous. It contained the following sections: Introductory-constructive section and Questionnaire. The questions were direct, indirect, dichotomous (yes or no), scale, and open-ended.

As shown in Fig.3, the average highest positive scores (86.25%) were in the question section: Do you get motivated when you see good results?
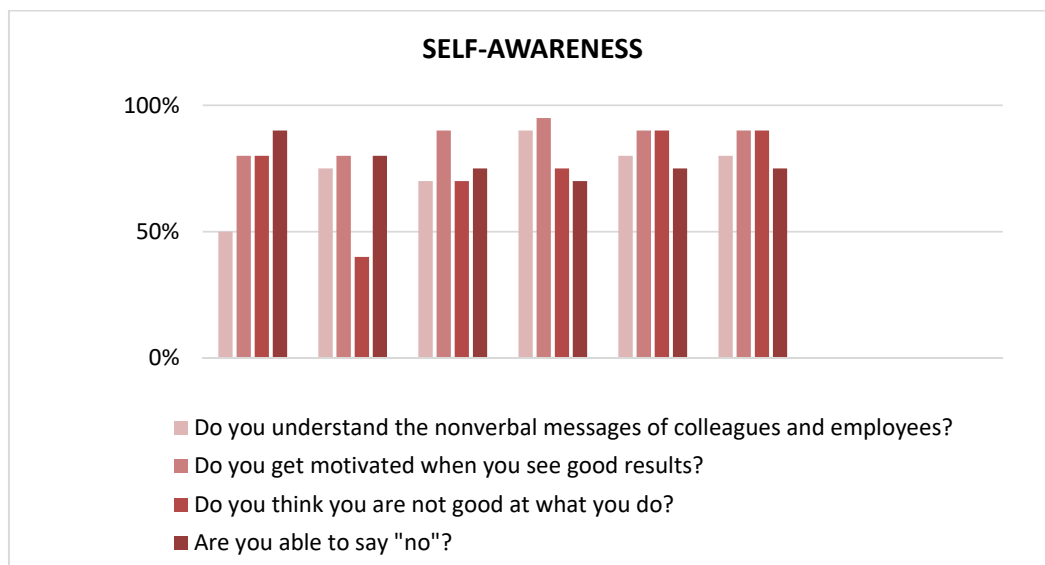

Fig. 3. Results by criterion "Self-awareness".

The lowest (62.5%) were given to the question: Are you able to say it right? In general, the score on the self-awareness indicator is approximately 75% positive, which outlines the framework that managers' self-awareness is at a statistically high level to look for a correlation between managers' emotional intelligence and team effectiveness.

Fig.4 shows the opinion of the managers regarding their self-management.

The average highest scores were given to the question (85%): Do you look for activities that make you happy? Moreover, the lowest (72.5%) – on the question: Do you manage to make timely decisions? The average overall score for the indicator is 78.75%.

As can be seen, the reported result is well above average, proving the strong connection between managers' emotional intelligence and team effectiveness.

SELF-MANAGEMENT

- Are you nervous about a future project?
- Do you look for activities that make you happy?
- Do you control yourself in conflict situations?
- Do you manage to make timely decisions?

Fig. 4. Results by criterion "Self-management".

Fig.5 shows the opinion of the managers regarding their Sosial-awareness.

The average highest scores were given to the question (79.1%): Do you reward employees for completing a task on time?

And the lowest scores (45.5%) on the question: Do you organise events that employees like? The average overall score for the indicator is 67.4%.

Since the score is close to the mean, it can be concluded that may correlate with between the emotional intelligence and team effectiveness, but only when changing the thinking of managers affects their social awareness. The low average percentage of this indicator shows that managers should pay attention to corporate social responsibility as human resources are the most important for the organisation.

SOCIAL-AWARENESS

■ Do you reward employees for completing a task on time?

■ Do you encourage personal responsibility in employees?

■ Do you support informal groups?

■ Do you organize events that employees like?

Fig. 5. Results by criterion "Social awareness".

Fig. 6 shows the opinion of the managers regarding their *Managing Team Relationships.* The average highest scores (96.7%) were given to the question: Can each team member express their opinion without afraid? Furthermore, the lowest (81.7%) – on the question: Do you support career employee development? The average overall score for the indicator is 89.2%.

MANAGING TEAM RELATIONSHIPS

■ Do you support transparent relationships and communication in the team?

■ Do you value the honesty of team members?

■ Can each team member express their opinion without fear?

■ Do you support the career development of employees?

Fig. 6. Results by criterion "Management of relationships in the team".

It can be concluded that the criterion has the most significant weight *Managing Team Relationships,* which summarises the overall management of the organisation, and the lowest – *Social-Awareness,* which shows that in their efforts to achieve the set goals and objectives, managers in the studied enterprises are not strongly socially oriented. Fig. 7 shows the weight of the criteria for managers' emotional intelligence.
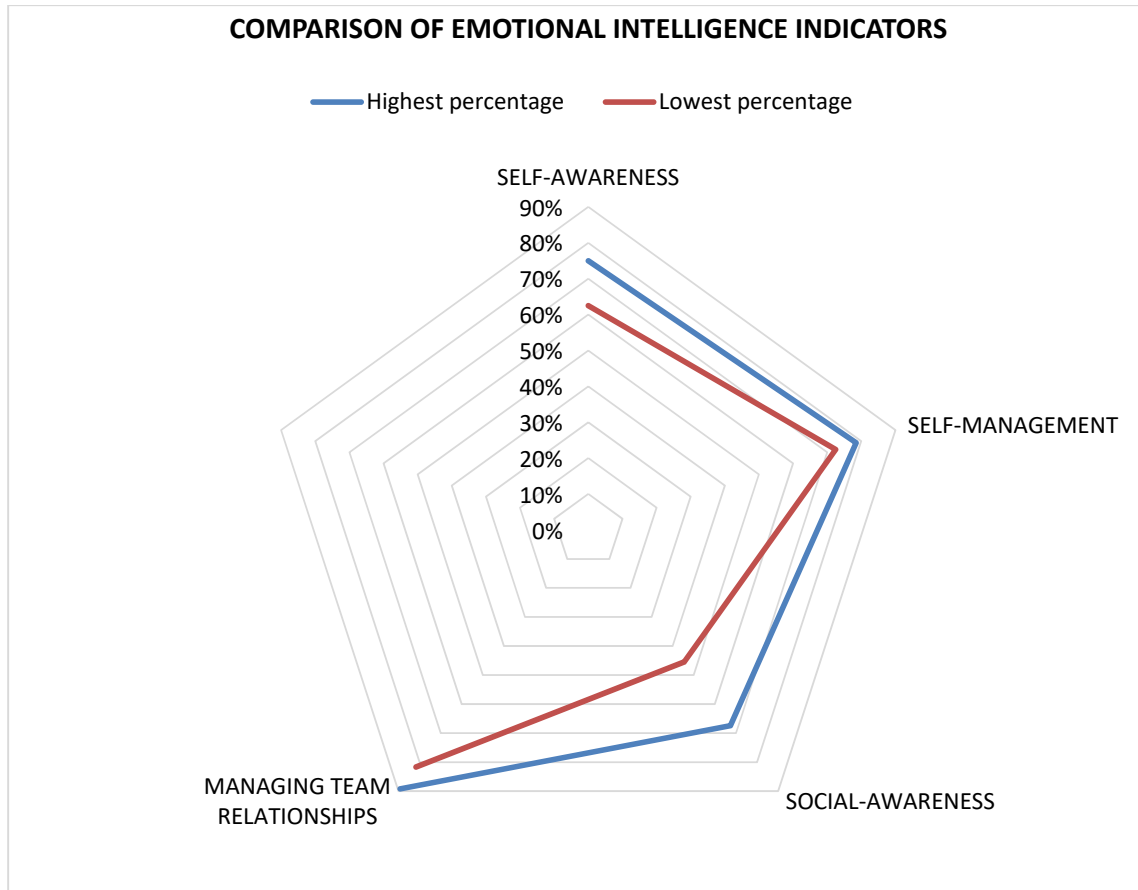

Fig.7. Weight of the studied criteria, regarding the emotional intelligence of managers.

After processing the results and identifying the highest and lowest percentage values for various indicators, an intervention should be undertaken to improve the effectiveness of the team in the organisation based on the various characteristics of the manager's emotional intelligence (Table 1).

Such an intervention should be perceived, realised and diligently applied to the actual situation to find an environment that will accept it in an understanding and friendly manner. In this situation, it is not only about the manager's approach to making changes but also about the feedback and the team's readiness to accept them. Here again, the correlation between the manager's emotional intelligence and the team's effectiveness is proven, because change requires skills to overcome resistance, improve commitment and maintain productivity.

An intelligent manager is an excellent master of strategies for effective change management, with the most important place being given to communication with employees, their training and retraining, the commitment of leaders, etc.

Table 1. Indicators for intervention to enhance team functioning based on managers' emotional intelligence assessment.

Indicator	Evaluation indicators	Final average score (%)	Necessity from intervention
Self-awareness	Understanding the non-verbal messages of colleagues	74.25	Moderately imperative
	Motivating employees with reported good results		
	Managers are not good at what they do		
	Are they able to say no		
Self-management	Are managers nervous about an upcoming project?	78.75	Moderately imperative
	Are they looking for activities that make them happy		
	Do they manage themselves in conflict situations?		
	Are they able to make timely decisions		
Social awareness	Do managers reward employees for completing a task on time	67.4	Very imperative
	Is employee personal responsibility encouraged		
	Are informal groups supported?		
	Are events organised that the employees like		
Managing team relationships	Are transparent relationships and communication within the team supported	88.54	Weakly imperative
	Can every member of the team speak their mind without fear		
	Is the career development of employees supported		
	Is the honesty of team members valued?		

For the successful application of emotional intelligence by managers in achieving the goals of the organisation, it is necessary to assess leadership (the ability of the manager to inspire his employees) (Coronado-Maldonado & Benítez-Márquez, 2023; Aristana et al., 2024). It is of utmost importance for the effectiveness of the team and can be measured using various approaches and indicators (Fig. 8). This approach assesses the degree to which a leader demonstrates different aspects of leadership, such as autocratic, democratic, or transformational styles.

This may include assessing the leader's ability to motivate, and encourage team:
- Management results. The team's results under a specific leader's leadership were then evaluated. It may include an analysis of key success indicators such as team productivity, achievement of goals and objectives, and customer satisfaction.
- Feedback from team members. The goal is to obtain feedback from team members about leaders' leadership. It can include anonymous surveys or interviews in which employees evaluate the leadership quality and effectiveness of their superiors.

- Employee Development. The influence of leadership on the development and growth of team members is also assessed. This includes opportunities for training and development, career advancement, and management support.

- Trust and Respect. It measures the level of trust and respect that team members have for their immediate supervisors. Analyse the level of peer respect, frequency of team conflict, and emotional work atmosphere.
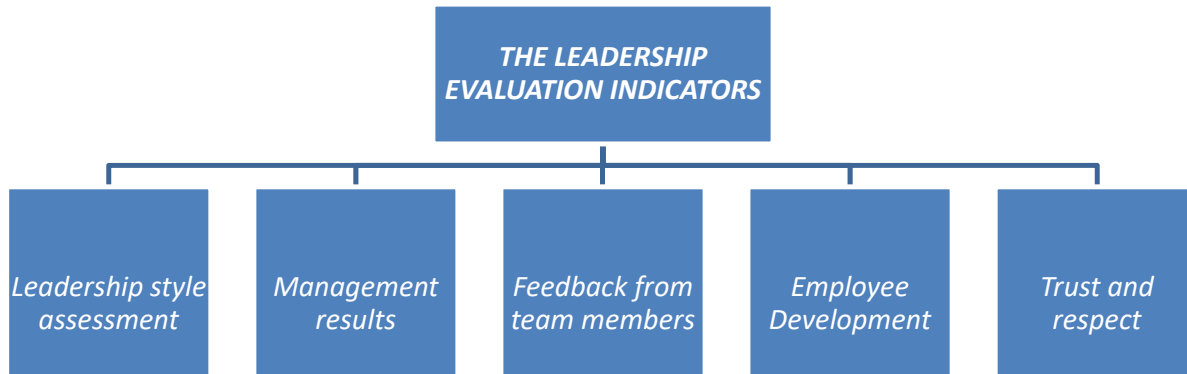
```
                    ┌─────────────────────┐
                    │   THE LEADERSHIP    │
                    │ EVALUATION INDICATORS│
                    └─────────────────────┘
```

| Leadership style assessment | Management results | Feedback from team members | Employee Development | Trust and respect |

Fig. 8. The leadership evaluation indicators.
Source: based on author's research.

5. Conclusions.

Emotional intelligence and the successful functioning of teams in industrial enterprises are accompanied by several tasks, solutions, and challenges to their effectiveness. Criteria for assessing emotional intelligence play a crucial role in enterprise competitiveness. This leads to a connection with the factors of team effectiveness, such as communication, conflict management, and the degree of goal achievement, which are key to positioning the company as a leader. Assessing the emotional intelligence of specialities helps eliminate weaknesses and strengthen their strengths. When this assessment is adequate and timely, the team is motivated and committed to achieving the set ultimate goals.

This study reviewed the existing literature and derived key criteria to support the effective work of the team. Emotional intelligence at the middle management level was studied, and on this basis, the direct relationship between it and team effectiveness in the organisation was proven. The study examined the criteria of Self-awareness, Self-management, Social awareness, and Team relationship management related to the measurement of managers' emotional intelligence. The conclusions drawn are that in the surveyed enterprises, the main attention should be paid to the criterion of Social awareness since the final results need to meet the modern requirements for business regarding the attitude towards human resources from a social aspect.

REFERENCES

Abdullah, I., & Gull, M. (2024). Interplay of personality traits, emotional intelligence and innovative behaviour among the leaders. Middle East Journal of Management, 11(3), 233–259. https://doi.org/10.1504/MEJM.2023.10053230

Ahsan, M. (2023). The Role of Emotional Intelligence in Effective Corporate Social Responsibility Leadership. International Journal of Organisational Analysis, 31(8), 75–91. https://doi.org/10.1108/IJOA-02-2023-3615

Aristana, I. N., Puspitawati, N. M. D., Salain, P. P. P., Koval, V., Konarivska, O., & Paniuk, T. (2024). Improving innovative work behavior in small and medium enterprises: Integrating transformational leadership, knowledge sharing, and psychological empowerment. Societies, 14(11), 228. https://doi.org/10.3390/soc14110228

Bannikov, V., Horchakov, K., & Baidyk, V. (2024). The role of emotional intelligence in the formation of team efficiency. Economics Finances Law, 10(2024), 11-15. https://doi.org/10.37634/efp.2024.10.2

Bao, P., Liao, Z., & Li, C. (2024). Does inclusive leadership influence employee innovation? A multilevel investigation. Cross Cultural & Strategic Management, ahead-of-print(ahead-of-print). https://doi.org/10.1108/CCSM-09-2023-0187

Bar-On, R. (2006). The Bar-On model for emotional-social intelligence (ESI). Psicothema, 18(Suppl.), 13–25.

Belbin, R. M. (2010). Management teams: Why they succeed or fail (3rd ed.). Butterworth-Heinemann. https://doi.org/10.1016/C2009-0-26603-4

Caruso, D. R., & Salovey, P. (2004). The emotionally intelligent manager: How to develop and use the four key emotional leadership skills. Jossey-Bass.

Chalermsook, K., & Anutariya, C. (2023). Team composition, recomposition, and selection of roles in long-term educational programs: A theoretical framework using multiple criteria. Advances in Transdisciplinary Engineering, 41, 212–221. https://doi.org/10.3233/ATDE230614

Chen, C., Chiang, C., & Chu, C. (2024). Comprehensive meta-analysis of emotional intelligence. Work. https://doi.org/10.3233/WOR-230553

Cherni, E., & Godat, D. (2023). Transforming innovation teams with a best decision-focused approach to achieve preferred futures. In Innovation Leadership in Action: How Leaders Convert Ideas into Value in a Changing World (pp. 161–181).

Coronado-Maldonado, I., & Benítez-Márquez, M.-D. (2023). Emotional intelligence, leadership, and work teams: A hybrid literature review. Heliyon, 9(10), e20356. https://doi.org/10.1016/j.heliyon.2023.e20356

Davaei, M., Gunkel, M., Veglio, V., & Taras, V. (2022). The influence of cultural intelligence and emotional intelligence on conflict occurrence and performance in global virtual teams. Journal of International Management, 28(4), 100969. https://doi.org/10.1016/j.intman.2022.100969

Drigas, A., Ppoutsi, C., & Skianis, C. (2023). Being an emotionally intelligent leader through the nine-layer model of emotional intelligence: The supporting role of new technologies. Sustainability, 15(10), Article 8103. https://doi.org/10.3390/su15108103

Edmondson, A. C., & Harvey, J.-F. (2018). Cross-boundary teaming for innovation: Integrating research on teams and knowledge in organisations. Human Resource Management Review, 28(4), 347–360. https://doi.org/10.1016/j.hrmr.2017.03.002

Feng, X., Han, P., & Long, T. (2024). Journal of Business Research, 183. https://doi.org/10.1016/j.jbusres.2024.114860

Goleman, D., & Boyatzis, R. E. (2017). Emotional intelligence has 12 elements. Which do you need to work on? Harvard Business Review. Retrieved from https://hbr.org

Hackman, J. (2011). Joint intelligence: Using teams to solve difficult problems. In Q: Intro Heads (pp. 1–17). Berrett-Koehler.

Hackman, J. R. (2011). Collaborative intelligence: Using teams to solve hard problems. In Opening chapters (pp. 1–17). San Francisco, CA: Berrett-Koehler.

Katzenbach, J., & Smith, D. (2015). The wisdom of teams: Creating high-performance organisations. Harvard Business Press.

Leblanc, P., Harvey, J., & Rousseau, V. (2024). A meta-analysis of team reflexivity: Antecedents, moments, results, and borderline conditions. Human Resource Management Review, 34(4). https://doi.org/10.1016/j.hrmr.2024.101042

Lencioni, P. (2002). The five dysfunctions of a team. Jossey-Bass.

Liu, S.-C., Luu, T. T., Pham, N. T., & Tang, A. D. (2024). Internal CSR and work-family facilitation: A dual mechanism of organisational citizenship behaviors and moderating role of emotional intelligence. Journal of Hospitality and Tourism Management, 58, 394–408. https://doi.org/10.1016/j.jhtm.2024.02.008

Lv, B., Jiang, J., Wu, L., & Zhao, H. (2024). Team building in large organisations: An approach for deep strengthening learning. Decision Support Systems, 187. https://doi.org/10.1016/j.dss.2024.114343

McGregor, D. (1960). Theory X and Theory Y. Organisation Theory, 358(374), 5.

Pavez, I., Gómez, H., Liu, C., & González, V. (2022). Measuring project team effectiveness: A review and conceptualization. International Journal of Project Management, 40(8), 951–971. https://doi.org/10.1016/j.ijproman.2022.11.001

Sah, V. (2021). Impact of emotional intelligence on job performance and techniques to improve emotional intelligence. Pacific Business Review International, 13(9), 24–29.

Salovey, P., & Mayer, J. (1990). Emotional intelligence. Imagination, Cognition and Personality, 9(3), 185–211. https://doi.org/10.2190/DUGG-P24E-52WK-6CDG

Shah, B., & Kiran, S. (2024). The impact of emotional intelligence in the workplace on productivity. International Journal of Business and Management Invention, 13(10), 69–76. https://doi.org/10.35629/8028-13106976

Shah, H., Jain, S., & Jain, V. (2023). Organisational culture and team effectiveness: Insights and implications for human resources. Benchmarking, 30(3), 766–787. https://doi.org/10.1108/BIJ-11-2020-0581

Stanley, J. (2019). Experts say emotion recognition lacks scientific foundation. ACLU Speech, Privacy, and Technology Project.

Viezzer, S. (2024). How to improve emotional intelligence.

Wageman, R., & Hackman, J. R. (2010). What makes teams of leaders leadable? In N. Nohria & R. Khurana (Eds.), Handbook of leadership theory and practice (pp. 475–506). Harvard Business Press.

Wang, C., Zheng, P., & Cai, X. (2016). Research on influential mechanism of emotional intelligence and career success. Proceedings of the First International Conference on Economic and Business Management, 16, 456–460.