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KAIZEN BOX AS A TOOL FOR CONTINUOUS PROCESS IMPROVEMENT: INSIGHTS FROM EMPLOYEES IN METAL MANUFACTURING

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Abstract: The aim of the article was to examine the effectiveness of the Kaizen Box system as a tool supporting continuous improvement processes in companies in the metalworking sector. A survey was conducted among 50 employees of a manufacturing company, analyzing their opinions on the functioning of Kaizen Box and the possibilities of influencing the improvement of production processes. The collected data were subjected to statistical analysis using the Pearson correlation coefficient, which allowed for the identification of relationships between respondents' answers. The results showed that there were moderately strong links between the elements of the system, such as transparency of procedures, access to feedback and a sense of empowerment among employees. At the same time, barriers limiting the effectiveness of the system were identified – including the lack of standardization and low responsiveness of the management staff. The article proposes specific implementation recommendations aimed at improving the effectiveness of Kaizen Box in the SME environment, such as the introduction of digital versions of the system, employee training and incentive systems. The conclusions confirm that a properly implemented suggestion system can become a key tool for strengthening the culture of innovation and employee engagement.
Keywords: Kaizen Box, Continuous improvement, Employee engagement, Metalworking industry, Bottom-up innovation)

1. INTRODUCTION

The metalworking industry plays an indispensable role in the global economy, being one of the key links in many supply chains (Holappa & Nava, 2024). This sector provides components and semi-finished products used in almost every industry – from automotive manufacturing to construction to advanced medical and aerospace technologies (Yang et al., 2019). In the context of growing international competition and the emphasis on sustainable development, companies operating in this industry must constantly adapt their

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processes to meet the changing needs of customers and at the same time increase production efficiency (Grodecki, et al., 2023).

Small and medium-sized enterprises (SMEs) have a special role to play in this area. While they often have fewer financial and technological resources compared to large corporations, they exhibit greater organizational flexibility, which can be a significant competitive advantage. However, the challenges faced by these entities are significant – the need to respond quickly to market needs, limited human and material resources, and pressure to innovate.

In this context, the concepts of Lean Manufacturing and Industry 4.0 are of particular importance. The first assumes the elimination of waste in all aspects of the company's operations, while the second introduces digitization and automation as the foundations of modern production (Bittencourt et al., 2021). The integration of these approaches allows for the creation of intelligent manufacturing systems that are not only more efficient, but also flexible and resilient to interference (Antony et al., 2023).

Continuous improvement is understood as the foundation of competitive advantage. The philosophy of continuous improvement, more widely known as Kaizen, has its roots in Japanese work culture and has been the foundation of quality management in companies such as Toyota for decades (Iwao, 2022). At its core, Kaizen assumes that every process, regardless of its current effectiveness, can be further streamlined. Importantly, these changes do not have to be revolutionary – small but systematic actions taken every day are enough. Modern organizations that successfully implement Kaizen place great emphasis on the involvement of all employees – from the top level of management to machine operators (Staniszewska et al.,2020). It is the people directly involved in the production process who know its strengths and weaknesses best. Their practical knowledge and experience thus become an invaluable source of information that, if used properly, can lead to significant improvements (Gonzalez et al., 2016).

For SMEs, which often cannot afford expensive innovation systems, bottom-up innovation is not only an alternative, but also an opportunity to build a sustainable competitive advantage. Employees who feel they have a real impact on the functioning of the company are more motivated, engaged and loyal. Their activity in the field of submitting ideas for improving processes therefore becomes an invaluable organizational resource.

Kaizen Box can be used as a tool to support employee activity in improving the production processes of a given company and/or information half-life systems between individual cells (Moradi, 2025). Kaizen Box, or the so-called suggestion box, is a tool known in industrial practice for many years. Although its original form was extremely simple – a physical box placed in the workplace into which employees threw cards with ideas – its importance in organizational culture cannot be overestimated (Greeff & Van Staden, 2023). The Kaizen Box is a practical embodiment of the Kaizen philosophy, encouraging the active participation of the entire crew in the improvement process, regardless of their position. With the development of technology and the increasing digitization of production processes, suggestion systems have also been transformed. Today's Kaizen Boxes can take the form of electronic forms, mobile applications or integrated modules within ERP systems (Klimecka-Tatar, D. 2024). This digital format allows for faster analysis of proposals, easier assignment of them to appropriate departments and monitoring of the status of implementation. What's more, it enables transparency – the employee can track

what is happening with their idea, which increases their engagement and sense of influence on the company's activities. It is also a great tool for analytics – it allows you to measure the number of requests, their quality and the effectiveness of implementations, which in turn can become the basis for further strategic activities (Barraza et al., 2011).
The greatest value of the Kaizen Box system, however, is strengthening the sense of influence and agency in employees. The opportunity to submit ideas that are actually analyzed and implemented builds a culture of involvement, responsibility and co-responsibility for the processes taking place in the organization. It is also a way to identify hidden problems that cannot be seen from the management or middle managers level (Ostrowski & Jagodziński, 2021). Line workers are often the first to notice potential inefficiencies, inaccuracies, or unused resources, and Kaizen Box gives them the chance to turn these observations into concrete actions.
Despite the potential benefits, implementing and maintaining an effective Kaizen Box system is not an easy task. One of the main barriers is organizational culture – if the company does not promote openness, sharing ideas and active participation in improvement, employees will not be willing to engage in the system. Many of them may fear that their suggestions will be ignored, misreceived, or even used against them (Ghaleb, B., 2025).
Another problem is the lack of proper response to reports. If an employee does not see the effects of their activity – the submitted idea has not been considered, there is no feedback, and its implementation is delayed – they quickly lose motivation to continue participating in the system. In many cases, this results in indifference to Kaizen Box and treating it as an ineffective tool.
The system of rewarding and recognizing the contribution of employees is also important. Although the Kaizen philosophy assumes actions out of the need for improvement, in reality, incentive systems – financial or symbolic – significantly increase the number of applications. The lack of such elements can limit engagement to a narrow group of enthusiasts.
The companies that achieve the best results from the implementation of Kaizen Box are those that have developed transparent procedures for evaluating ideas, ensure regular communication and appreciate the initiative of employees. Therefore, it is crucial not only to launch the suggestion box, but also to manage it properly, analyze the requests and implement them quickly and transparently (Lis & Bryke, 2024).

2. METHODOLOGY AND RESULTS

The aim of this study is to understand how workers in the metalworking sector – in particular those employed in SMEs – perceive the Kaizen Box system as a tool for real impact on the improvement of production processes (Klimecka-Tatar & Obrecht, 2024). An interesting aspect here is not only the number of ideas submitted, but above all the motivations, barriers and the level of trust in the management team's actions in terms of their implementation (Bortolotti et al., 2014).
The scope of the study includes an analysis of the functioning of the Kaizen Box system in selected companies in the metal industry, taking into account such elements as: the degree of knowledge of the tool by employees, the frequency of its use, the quality and type of ideas submitted, as well as the procedures for their evaluation and implementation.

Of particular importance is the identification of factors conducive to activity and barriers limiting the effectiveness of the entire system. This pilot study was conducted in one SME operating in the metalworking sector. The study included 50 employees of this single company; therefore, the findings refer only to this organization and should not be generalized to the entire metalworking sector. The full-scale research is planned to include selected companies from the metalworking industry.

In the context of SMEs, the study has an additional dimension – it allows to assess to what extent the limited resources of these companies are an obstacle and to what extent an impulse to greater openness to bottom-up innovation. The final goal is to develop recommendations for improving the functioning of Kaizen Box as an element of continuous improvement strategies in small and medium-sized manufacturing companies operating in the metalworking sector.

The research was carried out at XYZ, a company that operates in the metalworking sector. To collect the data, a paper questionnaire form was used, which was distributed among the company's employees. The total number of respondents was 50 people. The research process took place on May 10, 2025. The enterprise analyzed is a medium-sized manufacturing company operating in the metalworking sector. Its production is focused on metal processing operations, and it is organized into production, maintenance, quality, logistics and administrative areas.

The research group included 11 women and 39 men, which corresponds to the gender proportions typical for the industrial sector. The diversity of respondents in terms of age, length of service and position held allowed to obtain a cross-sectional picture of the perception of the Kaizen Box system by the company's employees.

The research sheet consisted of two parts. The first included 5 metric questions concerning the demographic and professional data of the participants, such as: gender, age, length of service, level of education and the department in which they are employed. The second part of the survey contained 10 questions directly related to the knowledge, application and evaluation of the effectiveness of the Kaizen Box tool as an element of the continuous process improvement strategy. In addition to the ten substantive questionnaire items, two demographic-derived analytical variables were included in the statistical analysis, therefore the correlation matrix uses variables P1–P12.

In order to develop the results of the study, the author's employee questionnaire entitled: "Improving Kaizen processes and practices in the metalworking industry" was used. Its main goal was to obtain the opinions of employees on the effectiveness of the Kaizen Box tool and their ability to influence changes and improvements in production processes (Gigliotti et al., 2019).

The research was analyzed using the five-point Likert scale, which allows to assess the degree of agreement of respondents with the statements presented (Joshi et al., 2015). Responses are assigned to the following values:

1 – Strongly disagree
2 – I disagree
3 – I neither agree nor disagree
4 – I agree
5 – Strongly agree

The use of this scale allowed for a quantitative analysis of qualitative employee opinions, which made it possible to draw conclusions about the level of acceptance and effectiveness of the Kaizen Box system in production practice (Doronila, 2024).

The following questions were asked to the surveyed employees:

I. There are many aspects of our production processes that could be improved.
II. I regularly identify areas in my work that could benefit from better organization.
III. I feel encouraged to propose improvements in our processes.
IV. I have the knowledge and experience necessary to propose significant improvements.
V. Our company provides transparent tools or systems (such as Kaizen Box) to support this.
VI. I've made suggestions for improvements through Kaizen Box.
VII. I believe that suggestions through Kaizen Box can lead to real changes.
VIII. I have seen improvements implemented based on ideas submitted by employees.
IX. I believe that my contribution is valued when it comes to improving production.
X. Continuous improvement is part of our company culture.

The results of a statistical analysis carried out on the basis of data collected among the employees of a metalworking company. The aim was to identify the relationship between employees' opinions on the functioning of the Kaizen Box tool and their perception of the possibility of influencing improvement processes. The results are presented in Figure 1



	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Q1	1,00									
Q2	-0,23	1,00								
Q3	-0,10	0,10	1,00							
Q4	-0,26	0,41	-0,10	1,00						
Q5	-0,11	0,07	-0,02	-0,11	1,00					
Q6	-0,14	0,29	0,38	-0,11	-0,01	1,00				
Q7	-0,18	-0,04	0,36	-0,21	0,24	0,09	1,00			
Q8	0,24	0,07	-0,30	-0,06	0,12	-0,09	0,08	1,00		
Q9	-0,21	0,12	0,03	0,11	0,30	0,12	0,17	-0,04	1,00	
Q10	0,04	-0,03	-0,06	-0,04	-0,14	0,17	-0,09	0,04	0,06	1,00

Fig. 1 Correlation coefficient values between the variables analyzed in the accident rate study.

Source: Own development using Micorsoft Exel

The Pearson correlation coefficient was used to determine the strength and direction of the relationship between individual survey variables (denoted as P1–P12). The results were presented in the form of a correlation matrix. The analysis allows us to see the existence of several significant relationships with a value exceeding r = ±0.30, which can be considered moderately strong cognitively significant correlations.

In particular, a positive correlation between P2 and P4 (r = 0.41) was noted, which may suggest that respondents who agree with the statement about the transparency of the idea submission process also express positive opinions about the management response to suggestions. Such a relationship confirms the importance of transparency and communication in increasing the effectiveness of Kaizen Box.

Another example of dependency is the correlation between P3 and P6 (r = 0.38), which may indicate a link between the perceived ease of submitting ideas and the sense of impact on real changes in the company. The simpler and more understandable the reporting process, the higher the subjective belief in the agency's actions.
An interesting phenomenon is also the negative correlation between P3 and P8 (r = -0.30), which suggests that people expressing a positive opinion about one aspect of Kaizen Box (e.g. submitting ideas) may also negatively evaluate another (e.g. availability of feedback or reaction time to an idea). This may indicate a mismatch or deficiencies in the operating logic of the system.
It is also worth noting some weaker but recurring relationships in the P5, P9 and P11 ranges, which indicate mutual relationships in terms of intrinsic motivation and perceived effectiveness of the system. Although correlation values are lower than 0.3, the regularity of their occurrence in different combinations may suggest the existence of a common hidden factor, e.g. overall job satisfaction or level of organizational engagement.
It is worth noting that the lack of strong correlations (r > 0.5) may be caused by the subjective nature of the assessments, the diversity of respondents' experiences and the specificity of the organizational culture of a given company. Nevertheless, the observed dependencies provide valuable premises for formulating practical recommendations for improving the Kaizen Box system.
The correlation analysis showed the existence of several important relationships that can be used by the management as a starting point for further optimization activities. Understanding which elements of the system are interconnected and which function independently allows you to better design interventions to improve communication, respond to suggestions, and motivate employees to actively participate in continuous improvement processes.

3. DISCUSSION

Based on the analysis of a survey conducted among employees of a metalworking company, several key conclusions can be drawn regarding the functioning of the Kaizen Box system and its impact on continuous improvement processes. The survey showed that despite the relatively high level of awareness of the Kaizen philosophy, there are significant discrepancies in assessing the effectiveness of implementing specific solutions, such as the suggestion box. Comparison with previous studies indicates that the observed importance of transparency, feedback and employee involvement is consistent with earlier findings cited in the literature reviewed in this manuscript.

Firstly, respondents appreciate the opportunity to submit ideas and believe that the Kaizen Box tool can play an important role in identifying and eliminating inefficiencies in production processes. However, many responses indicate a lack of sufficient feedback after making a suggestion, which translates into a decrease in engagement and perceived effectiveness of the system. This is one of the key challenges that needs to be addressed in order for this tool to work in accordance with the Kaizen philosophy.

Second, the analysis showed significant correlations between different aspects of the system – such as transparency of the reporting process, ease of use and management responses – suggesting that improving one element can have a positive impact on others.

For example, improving the mechanism for responding to reports may increase trust in the system and, consequently, increase the number of initiatives submitted.

Thirdly, there were also contradictory attitudes among respondents – some correlations were negative, which may indicate ambiguous experiences with the system. This may be due to a lack of standardization in terms of ticket handling, differences between departments, and even different management styles. This shows that the success of the Kaizen Box system largely depends on consistency within the organization and clearly defined procedures.

Based on the results of the study, practical recommendations were also formulated that can contribute to increasing the effectiveness of Kaizen Box in small and medium-sized enterprises in the metal industry:

1. Introduction of a regular feedback system – each submitted idea should receive a response within a certain time, regardless of the decision to implement it.
2. Standardization of the process of handling suggestions – development of uniform procedures for evaluation, implementation and communication of results for all departments.
3. Training and educational activities – employees should be regularly informed about the goals and principles of the system in order to build understanding and commitment.
4. Incentives for activity – introduction of simple reward mechanisms, e.g. symbolic rewards, distinctions or bonuses for the most valuable ideas.
5. Use of technology – transition to digital versions of Kaizen Box, enabling better tracking and analysis of data, which facilitates strategic decision-making.

4. CONCLUSION

To sum up, Kaizen Box is a valuable tool that supports continuous improvement, but its effectiveness depends on many factors – including, above all, organizational culture, management commitment and transparent operating rules. The results of the survey indicate that proper implementation and development of the system can have a real impact on improving the efficiency of processes and increasing employee satisfaction and engagement. For SMEs, this is an opportunity to implement innovative solutions without the need to incur significant investment costs.

The article emphasizes the role of the Kaizen philosophy, i.e. an approach based on continuous, minor improvement of processes. It was pointed out that Kaizen works best when it involves all employees, not just executives. It is people employed in production positions who often notice shortcomings that managers are not able to notice. That is why systems such as Kaizen Box, based on submitting suggestions, can become the foundation of bottom-up innovation and a tool to increase employee motivation.

Research shows that the success of Kaizen Box depends on the transparency of procedures and whether employees feel that their ideas are taken seriously. The authors point out that the lack of standardization in the handling of requests leads to divergent experiences and frustrations of employees. The low responsiveness of the management team further weakens the potential of the tool. Despite these difficulties, the system is positively assessed as a way to engage employees and develop a culture of innovation.

Based on the results, several recommendations were formulated for companies from the small and medium-sized enterprise sector. The first is to introduce mandatory

feedback for each report. The second is to standardize the procedures for handling suggestions in all departments. The third area is training and educational activities to increase employee awareness. It is also recommended to introduce a system of rewards, even symbolic ones, which will strengthen the motivation to submit ideas. Finally, an important direction is the digitization of Kaizen Box, which will allow you to better track and analyze data.

In conclusion, the article indicates that the Kaizen Box is a valuable tool supporting the philosophy of continuous improvement. However, its real effectiveness depends on proper implementation, management activity and transparent operating rules. The implementation of modern technological solutions, combined with building a culture of openness, can make the system not only a way to submit ideas, but also the foundation of a long-term competitive advantage. For small and medium-sized companies in the metal industry, this is an opportunity to develop innovations without having to incur large financial outlays.This study was conducted in a single metalworking company and included 50 respondents. Consequently, the external validity of the findings is limited and the results should be interpreted as a pilot study. The recommendations should therefore be treated as preliminary and applicable primarily to organizations with similar characteristics; broader generalizations to the SME sector require multi-company studies.

REFERENCES

Antony, J., Swarnakar, V., Gupta, N., Kaur, J., Jayaraman, R., Tortorella, G. L., & Cudney, E. (2023). *Critical success factors for operational excellence initiatives in manufacturing: a meta-analysis.* Total Quality Management & Business Excellence, 34(9-10), 1152-1172. Doi: 10.1080/14783363.2022.2157714

Barraza M. F. S., Pujol, J. R., & Kerbache, L. (2011). *Thoughts on kaizen and its evolution.* Lean Six Sigma J, 2(4), 288-308. DOI: 10.1108/20401461111189407

Bittencourt V. L., Alves A. C. & Leão C. P. (2021). Industry 4.0 triggered by Lean Thinking: Insights from a systematic literature review. International Journal of Production Research. 59(5). 1496–1510. DOI: 10.1080/00207543.2020.1832274.

Bortolotti T., Boscari S., & Danese P. (2014). *Successful lean implementation: Organizational culture and soft lean practices.* International Journal of Production Economics. 160. DOI: 10.1016/j.ijpe.2014.10.013.

Doronila, R., & Cariaga, R. (2025). Is the Likert Scale Still IN in 2025? Revisiting Usage, Interpretation, and the Rounding Paradigm. *International Journal of Interdisciplinary Viewpoints* , *1*(5), 587–594. https://doi.org/10.64612/ijiv.v1i5.36

Ghaleb B., (2025). *Importance of Kaizen Principles for Business Success.* Jurnal Riset Multidiplin dan Inovasi Teknologi. 3. 371-385. DOI: 10.59653/jimat.v3i03.1906.

Gigliotti R., Vardaman J., Marshall D. R. & Gonzalez, K. (2019). *The role of perceived organizational support in individual change readiness.* Journal of Change Management, 19(2), 86-100. DOI: 10.1080/14697017.2018.1459784

Gonzalez A. F. & Van Aken E. M. (2016). *Systematic literature review of critical success factors for continuous improvement projects.* International Journal of Lean Six Sigma, 7(3), 214-232. 10.1108/IJLSS-06-2015-0025

Greeff A. S. & Van Staden L. J., (2023). *The relationship between participatory management and safety culture: a case of the South African forestry industry.* Polish Journal of Management Studies, 28(1), 123-138. DOI:10.17512/pjms.2023.28.1.07

Grodecki A. & Wołowczyk J. & Klimecka-Tatar D. (2023). *The hazards occurring during the construction and reconstruction of metal structures. System Safety: Human - Technical Facility - Environment.* 5. 151-159. DOI: 10.2478/czoto-2023-0017.

Holappa L., & Nava A. C., (2024). Secondary steelmaking. Treatise on Process Metallurgy (Second Edition), 2024, 3: Industrial Processes, 267-301, DOI: 10.1016/B978-0-323-85373-6.00033-8

Iwao S. (2022). Continuous Improvement Revisited: Organization Design as the Last Step in Gaining the Full Competitive Advantage of Kaizen. Management and Business Review. 2(1). 47–52. DOI: 10.1177/2694105820220201002.

Joshi A., Kale, S., Chandel, S., & Pal, D. K. (2015). Likert scale: Explored and explained. British journal of applied science & technology, 7(4), 396-403. DOI: 10.9734/BJAST/2015/14975

Klimecka-Tatar D. & Obrecht M.,2024. *Development and Improvement of a Production Company (and their Product) Based on the Value Stream Mapping of Business Processes.* Management Systems and Production Engineering. 32(2). 185-191. DOI: 10.2478/mspe-2024-0018.

Klimecka-Tatar, D. (2024). Lean Management, Kaizen, and TIM WOODS Reduction in Logistics. W: P. Bhambri, P. Bajdor (red.), *Handbook of Technological Sustainability: Innovation and Environmental Awareness*. CRC Press. https://doi.org/10.1201/9781003475989-29

Lis, M., & Bryke, M. (2024). *Transformacja KAIZEN w perspektywie przemiany kulturowej organizacji*. Akademia WSB. ISBN 978-83-67673-48-8.

Moradi B., (2025). *Kaizen: The Philosophy of Continuous Improvement in the Global Business Landscape "MasteringSmall Changes for Lasting Success" Kaizen: The Philosophy of Continuous Improvement in the Global Business Landscape. 1-33.* DOI: 10.13140/RG.2.2.32703.37281.

Ostrowski D. & Jagodziński J. (2021). Operation of an employee suggestion system in administration and production departments of a remanufacturing company. Journal of Remanufacturing. 11, 107–120. DOI: 10.1007/s13243-020-00095-7.

Staniszewska E. & Klimecka-Tatar D. & Obrecht M. (2020). *Eco-design processes in the automotive industry.* Production Engineering Archives. 26(4), 131-137. DOI: 10.30657/pea.2020.26.25.

Yang K., Ahn C. R., & Kim H., (2019). *Validating ambulatory gait assessment technique for hazard sensing in construction environments.* Automation in Construction, 98, 302-309. DOI: 10.1016/j.autcon.2018.09.017