

ANALYZING THE IMPLEMENTATION PROCESS FOR THE KAIZEN METHOD BASED ON THE EXAMPLE OF ZSP „LUBIANA” S.A.

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Abstract: This covers a complex analysis of implementing the Kaizen method at ZPS „LUBIANA” S.A., a Polish company, in the years 2018-2022. This includes a brief assessment of the actions taken as an aftermath of wider practices aimed at perfecting the production process in the company through implementing organizational tools and practices related to the Lean Management concept.

The Kaizen method is related to the constant improvement of actions taken in a company, implemented as part of the Lean Manufacturing method, and used to improve production, minimize waste, maximize profit, increase employee engagement and product quality. The process of implementing the Kaizen method includes three stages: Identifying the issue, finding the solution and using a countermeasure, with an emphasis on small changes implemented by groups or quality circles.

Keywords: Lean Manufacturing, Kaizen, improvement.

1. INTRODUCTION

Kaizen is a concept related to continuous process improvement and the enhancement of productivity in an organization through incremental refinements and the elimination of possible issues. The methodology is based on continuous process analysis and active employee involvement. It is one of the methods of Lean

Manufacturing, a philosophy (or concept) that aims to minimize waste and maximize customer value.

ZPS „LUBIANA” S.A. is a tableware factory, the largest porcelain producer in Europe, and has adopted Kaizen to assist in boosting the production quality.

The "Vase of Ideas" program, derived from the Kaizen method, is a structured system for submitting idea from employees to improve efficiency, quality and organizational structure. Data from 2018–2022 shows increasing employee participation in the program, although the number of accepted proposals may require additional analysis.

The introduction of the Kaizen program has brought tangible benefits, including improving the company's efficiency and employee engagement, both of which are key in market competitiveness.

2. WHAT IS KAIZEN?

"Kaizen" is a combination of two Japanese words: "kai" meaning change or improvement, and "zen" meaning harmony or tranquility [Hamrol 2018; 2022]. In a business context, the concept of Kaizen refers to the continuous improvement of production and increased efficiency, through incremental improvements and eliminating issues [Liker 2011; Hamrol 2018; 2022]. Kaizen is one of the methodologies used as part of Lean Manufacturing, a manufacturing philosophy that aims to minimize waste and maximize customer profit [Moden 2011; Werpachowski 2012; Szelerski 2023]. The methodology involves continuous analysis of the manufacturing processes, using tools such as value flow diagrams, process analysis, value stream map, Pareto-Lorenz analysis, etc. Under Kaizen, employees are encouraged to take initiatives and submit ideas for process improvements [Mann 2014; Hamrol 2018; 2022]. The implementation of changes is gradual, continuous and systematic, avoiding abrupt changes that could disrupt production [Werpachowski 2012; Szelerski 2023]. The Kaizen concept aims not only to improve production, but also to increase employee involvement and improve the quality of the products and services [Rother 2010; Werpachowski 2012; 2018]. By continuously improving the processes, companies can achieve higher productivity, reduce costs and increase competitiveness in the market [Hamrol 2018; 2022]. It is worth noting that the Kaizen concept can be applied not only in manufacturing, but also in other fields, such as services or administration [Werpachowski 2012; 2018; Bicheno 2016]. In each case, the idea is to continuously improve the processes and to strive for the best possible results [Werpachowski 2012; 2018].

The implementation of each improvement associated with the Kaizen methodology follows a three-step plan, see Figure 1.

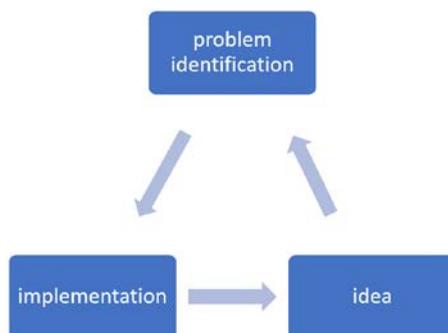


Fig. 1. The 3 steps used in the Kaizen process

Source: own data.

The first stage involves realizing that a problem exists and the identifying it. One of the simplest and most common ways to identify problems is to detect small errors in the work results. The second stage of Kaizen is seeking potential solutions (ideas) to existing problems [Werpachowski 2012; 2018]. According to the principle of proportionality, the more diverse the suggestions and ideas, the greater the chance of finding the best solution. At this stage, it is not encouraged to limit oneself to the established rules, and to instead view the situation as an opportunity to explore new paths that may go beyond routine solutions [Werpachowski 2012; Nicholas 2018; Szelerski 2023]. The third and final, but most crucial, stage of Kaizen is the implementation of the chosen solution. Small changes that are typical for Kaizen, and come from employee suggestions, are not put to use immediately by upper management, but are instead tested out by small teams or quality circles [Werpachowski 2012; 2018].

3. GENERAL INFORMATION ABOUT THE COMPANY

ZPS „LUBIANA” S.A. is a tableware company, a contemporary manufacturer of table porcelain, and the largest producer of table porcelain in the European market, with an annual production capacity of about 15,000 tons. This means that about 3.5 million pieces of various products having different shapes, decorations and cuts are produced monthly. The company began manufacturing in 1969 and to this day uses exclusively Polish capital. Its headquarters are located in the picturesque Kashubian village of Lubiana [Blicharska and Szmaglik 2023], in the Pomorskie Voivodeship, Kosciierzyna County, in the municipality of Kosciierzyna. The company has focused on the production of high-quality white porcelain with exceptionally high standards of product quality and hardness. To achieve these parameters, the products go through two separate firing phases, with the final firing taking place at a temperature of about 1360°C. The company has gained significant

experience in international markets, which has fostered the expansion of exports of its porcelain products, which are sent to 43 countries around the world [Blicharska and Szmaglik 2023].

The initial history of the company dates back to 1965, when there was a noticeable lack of these types of products in the domestic market, where areas having high levels of unemployment were sought as potential future locations. Thanks to the efforts of the regional authorities and MPs, it was possible to obtain permission to establish the company near Koscierzyna. A decision was made to immediately begin designing and implementing a plan, which began in 1966. The factory construction process itself took about three years, with an initial production capacity of 4,800 tons per year. The company officially began production on September 30, 1969, with the production process being fully introduced over the next nine months. Full production capacity was achieved in 1972, with the factory already employing more than 2,000 workers. The technology and production process were based on the experience of existing Polish factories, with key technologies and equipment for porcelain production being supplied by other companies, such as PIECOBUDOWA_URANOWA, NITROCERAMAS and MAURUM BYDGOSZCZ. In January 1973, ZPS „LUBIANA” S.A. was incorporated into the structures of an industrial combine under the name United Companies of Table Ceramics CERPOL.

The raw materials required for the production process were imported from the Dolny Śląsk area, and employees were obtained from existing factories in Dolny Śląsk that were part of the CERPOL Combine. These employees had a key role in setting up the production process, both in the company itself and in training employees at various organizational and departmental levels. The firing of porcelain and the heating of rooms and production zones was carried out using chadnickel gas, which was produced from imported coal at the site. In order to meet the growing demand for porcelain in the market, modernization of the production process began in 1975 with the purchase of new semi-automatic lines for the production of round plates from a German manufacturer, Netzsch, as well as the acceleration of the existing porcelain firing furnaces. These changes allowed the production potential to increase to 7,200 tons per year. As a result of negotiations with PHZ MINEX, the company began exporting products to the United States in 1975. Another investment, carried out in 1985-1986, was the construction of a gas pipeline collection facility from Russia to Poland. At the same time, a gas pipeline connecting Plock and Gdansk was built. ZPS „LUBIANA” S.A. applied to the then authorities for connection to the gas network, where it received the green light. Together with the authorities of PGNiG and the Provincial Office in Gdansk, they contributed to the construction of a 62-kilometer gas installation with a diameter of about 200 mm, leading to the village of ZPS „LUBIANA” S.A.. The supply of gas to the company made it possible to change the porcelain firing technology, improve the quality of the products and significantly reduce the emissions of toxic compounds into the

atmosphere. Thanks to this investment, the production of chadnica gas was completed in December 1996. On March 31, 1992, the enterprise was transformed into a one-person joint stock company of the State Treasury, in accordance with the applicable provisions of the Law of July 13, 1990, and the Notice on Privatization of State Enterprises. This transformation was registered in the Commercial Register under the number RHB-7524 in the District Court in Gdansk. In 1995, the company undertook further investments, including the purchase of an isostatic molding press and German technology tools from Netzsch. In 2002 to 2007, the Management Board, in cooperation with the owners of ZPS „LUBIANA” S.A., decided to implement a new program, which included the replacement of porcelain firing furnaces, a change in technology and the use of kaolin materials. The aim of these measures was to reduce the consumption of natural gas and the emissions of harmful substances, as well as to improve the energy efficiency of the production process. From 2007 to 2015, the company introduced innovative ideas from employees related to the use of recuperators. Thanks to them, it was possible to achieve better results, reduce gas consumption and more efficiently heat the premises and the water needed for production. Since 2014, the company has consistently implemented the company's development plan, which includes increasing production capacity, reducing the cost of the production process, introducing new products with different shapes and decorations, promoting the brand, and conducting training for employees and management to meet the diverse needs of the customers. In 2016, a decision was made to introduce management based on Lean Management methodology. In 2022, a new production area was put into operation, implementing the structure of single-panel porcelain and stoneware products using Stone ware granules.

4. USE OF THE KAIZEN EMPLOYEE IDEAS TOOL

In today's dynamic business environment, companies face the challenge of continuously improving in order to remain competitive and respond to changing customer needs. One of the most effective approaches to achieving these goals is the Kaizen system, which places emphasis on the use of ideas and employee involvement at every level of the company. This paper explores the essence and importance of employee ideas in the context of Kaizen, and it analyzes what benefits the company has achieved by actively involving its employees in the improvement process. In the structure, Kaizen has adopted the name Vase of Ideas. The program is an organized system for the submission and implementation of ideas by the employees in order to improve efficiency, quality, work environment, health and safety, organizational culture and image.

The key principles of the program include:

- actively involving the employee/supervisor in the improvement process;

- strengthening the employee's responsibility for the implementation and execution of the proposal;
- sensitization to losses.

The program is implemented under the Incentive Fund on a special purpose incentive bonus basis. For the purpose of implementation of this program, a Decision Team has been established, consisting of Directors, Operations Manager, Health and Safety Manager, and Human Resources Manager.

The program involves:

- the person submitting an idea;
- the team implementing an idea approved by the Decision Team.

The program ideas are then assigned to the appropriate category, where we distinguish:

- work safety regulations;
- quality;
- savings / costs;
- environmental protection;
- innovation;
- workplace organization.

| DATE | | EMPLOYEE IDEA APPLICATION | | APPLICATION NUMBER | |
|---|------------|---|---|--------------------|----------|
| FILLS OUT BY THE APPLICANT | | | IS FILLED OUT BY THE PROGRAM COORDINATOR | | |
| Details of the applicant | | | WHICH IS NOT AN IDEA: | | |
| Name | Department | | The problem is known and steps have been taken to solve it | | |
| | | | In the application, only an opinion, requirement or complaint was expressed | | |
| | | | The idea relates to an existing standard that is not followed | | |
| | | | The solution is to fix the failure by restoring the original condition | | |
| | | | The solution is the responsibility of the applicant | | |
| | | | The solution is to buy materials | | |
| APPLICATION CATEGORY | | FIELD OF APPLICATION | | | |
| Indicating a problem with a solution | | Work safety regulations | | | |
| Indicating a solution | | Quality | | | |
| | | Savings/Costs | | | |
| IMPROVEMENT GROUPS | | Environmental protection | | | |
| A small idea | | Innovation | | | |
| Improvement | | Workplace organization | | | |
| Project | | Energy efficiency - optimization of media consumption: gas, energy, water, compressed air, reducing CO2 emissions | | | |
| DECISION | | | | | |
| Acceptance | | | | | |
| Rejection | | | | | |
| Suspended | | | | | |
| <p>The administrator of your personal data is the company Zakłady Porcelany Stołowej "LUBIANA" Spółka Akcyjna in Lubiana. The data are collected for the purpose of cooperation. You have the right to access your data and correct them. Providing personal data is voluntary, requires your consent, but is necessary to stay in touch with you in connection with the implementation of cooperation. Detailed information on the processing of personal data can be obtained at the Company's headquarters on the Board's notice board or on the internet website www.lubiana.com.pl on the basis of Article 7 paragraph 1 and 2 of RODO. I declare that I agree to the processing of my personal data by the administrator, which is the company Tableware factory ZPS „LUBIANA” S.A. with its registered office in Lubiana at 1 Zakładowa Street, for the purpose of submitting employee ideas in the "Vase of Ideas" program. I acknowledge that I may revoke my consent at any time, in writing to the address of the Data Controller or by e-mail to ido@lubiana.pl, and that the withdrawal of consent does not affect the legality of the processing performed on the basis of consent before its withdrawal. I am aware that giving this consent is voluntary, however, without giving this consent it is not possible to submit employee ideas in the "Vase of Ideas" program</p> | | | | | |
| Signature: | | | | | Page 1/2 |

Fig. 2. Employee idea proposal sheet – page 1

Source: own data, based on materials from ZPS „Lubiana” S.A.

| EMPLOYEE IDEA APPLICATIONS | |
|---|--|
| DATE | APPLICATION NUMBER |
| <p>TOPIC:</p> <p>Which departments are affected by the problem?</p> | |
| PROBLEM - LOSS | SOLUTION - BENEFITS |
| Describe the problem you noticed that should be solved. Present the losses that said problem brings to you and the company, if possible, sketch or visualize the current state. | Describe how said problem could be solved. List the possible benefits that solving the above-mentioned problem will bring to you and the company, if possible, sketch or visualize the state after implementing your solution. |
| | |
| <p>Signature: _____</p> | |

Fig. 3. Employee idea proposal sheet – page 2

Source: own data, based on materials from ZPS „Lubiana” S.A.

The program's ideas are divided into:

- "small ideas"- minor improvements, duration of up to one week, without the need to involve a large number of people (1 to 3 people);
- "improvements" – ideas with an average implementation time, requiring the involvement of people from larger organizational units (1–4 people, implementation time up to a month);
- "projects" – ideas with a long implementation time, requiring the involvement of people from larger organizational units, mainly concerning changes resulting from significant changes to production and work organization. Minimum average annual profit (savings) from the project – more than 2000 PLN (from 1 to 5 people, implementation time from 1–6 months).

The standardization of the form of submitting ideas led to the creation of an employee idea proposal (Fig. 2–3), which includes the following data:

- name of the employee;
- department in which the employee works;
- details of immediate supervisor.

The employee then describes the problem they have experienced, and which needs to be solved. The damages that the above problem causes to the company is then presented. If possible with sketches or visualizations of the current state. Next, how the described problem can be solved is described, and lists the possible benefits that the company can bring by solving the problem. If possible, sketches or visualizations of the state after the proposed solution is implemented. Within the planned timeframe of no more than 4 weeks, the proposal is reviewed by the Decision Team, which determines the category of the proposal, appoints the implementation team and the Leader. The idea is then registered by the Representative of the Quality and Lean department in the Program Register. The quantitative results of the submitted ideas by department are presented on the Program Information Board, in the Lean showcase. The results are also emailed to all Directors and Managers.

| | | | | | |
|---|-------------------------|---|---|--|--|
| Name and surname (Department - Short): | | Employee's idea completion card (improvement/small idea) | |  | |
| Date: | | | | | |
| Access path: | | | | | |
| Nr WPP. | Project completion date | Topic | | | |
| Applicants (Name, Department - Abbreviation): | | | Implementation team (Name, Department - Abbreviation): | | |
| Applicants: | | | Leader: | | |
| | | | Members: | | |
| | | | | | |
| | | | | | |
| Before photo | | | Photo after | | |
| | | | | | |
| Completion confirmed by the superior | | | Completion confirmed by the superior | | |
| | | | | | |
|  | | |  | | |

Fig. 4. Completion sheet (improvement, small idea) of an employee idea

Source: own data, based on materials from ZPS „Lubiana” S.A.

Upon completion of the project work, the project team leader delivers the completed project completion card (improvement, minor idea, Fig. 4) to the manager, manager or director of the first level management division in whose area the project is being implemented, in order to verify the reasonableness of the savings/profit. Then the verifier passes the project completion card (project, Fig. 5–6) to the Director of Finance or Controlling Specialist to verify the savings/profit. The card must go to the Quality and Lean department to settle the project bonus.

| Nr. WPP: | | Date of submission WPP | Project start date | Project implementation date | Project completion date |
|--|--|------------------------|--|-----------------------------|-------------------------|
| Topic | | | | | |
| Area of improvement | | | Permission group | | |
| Applicants (Name, Surname, Department – Abbreviation): | | | Implementation team (Name, Surname, Department – Abbreviation): | | |
| Applicants: | | | Leader: | | |
| | | | Members: | | |
| | | | | | |
| Description of the problem - before (photos, problem): | | | Description of the solution – after state (photos, results, benefits): | | |
| | | | | | |





Fig. 5. Completion sheet (project) of the employee idea – page 1

Source: own data, based on materials from ZPS „Lubiana” S.A.

Bonus rules for approved or implemented ideas received:

- initiator;
- implementation team (applies to Projects).

The amount of the reward for accepted and/or implemented ideas is illustrated in Table 1.

| | | | | | | |
|--|------------------------|--|---|-------------------------|--|--|
| Name and surname (Department – Short): | | Employee’s idea completion card (project) | | |  | |
| Date: | | | | | | |
| Access path: | | | | | | |
| Nr. WPP: | Date of submission WPP | Project start date | Project implementation date | Project completion date | | |
| Costs/profits | | The project has been approved | | | | |
| | | Checked for profits | | | | |
| | | Advance amount | Verification period | | | |
| | | Project status after verification | | | | |
| | | Additional remarks | | | | |
| | | | | | | |
| The project was successfully implemented Project suspended The project was implemented but did not bring the desired results | | | | | | |
|  | | |  | | | |

Fig. 6. Completion sheet (project) of the employee idea – page 2

Source: own data, based on materials from ZPS „Lubiana” S.A.

Granted bonuses are paid by the end of the calendar month in which the bonus was awarded. The rule has been adopted that a bonus is awarded only once for the same idea.

All Ideas, which have been implemented by ZPS "LUBIANA" SA in accordance with the provisions of the Employee Ideas within the Vase of Ideas program, are the sole property of ZPS "LUBIANA" SA, and upon implementation the copyrights to such an Idea are transferred from the Employee to ZPS "LUBIANA" SA.

A summary of employee ideas in the Vase of Ideas program is illustrated in Figure 1.

An analysis of the data from the 2018–2022 period of the Vase of Ideas program sheds light on the effectiveness of the initiative of engaging employees in the process of creating and implementing innovative solutions. First of all, the overall number of submitted ideas shows an increasing trend, suggesting active participation of employees in the program and growing interest in the initiative.

Table 1. Bonus system for the Vase of Ideas program of the ZPS „LUBIANA” S.A. tableware company

| No. | Bonus system for the „Vase of ideas” program of Tableware factory ZPS „LUBIANA” S.A | | | | | |
|-----|---|--------------------------------------|---|-----------------------------|---------------------------------------|-----------|
| I | The amount of bonus for applications accepted under the „Vase of ideas” program depending on: | | | | | |
| 1 | Idea category – small ideas | PLN 50 for the originator(s) | | | | |
| 2 | Idea category – improvements | PLN 70 for the originator(s) | | | | |
| II | The amount of bonus for applications under the „Vase of ideas” program depends on: | | | | | |
| | The expected amount of company profit after implementing the project: | For authors of accepted applications | For the design team after submitting the project card to the DJL department | For the project team leader | For other members of the project team | Together |
| 1 | between PLN 2000 and PLN 10000 | PLN 150 | PLN 550 | PLN 210 | PLN 490 | PLN 700 |
| 2 | between PLN 10000 and PLN 50000 | PLN 150 | PLN 1350 | PLN 450 | PLN 1050 | PLN 1500 |
| 3 | between PLN 50000 and PLN 100000 | PLN 150 | PLN 3750 | PLN 1170 | PLN 2730 | PLN 3900 |
| 4 | between PLN 100000 and PLN 200000 | PLN 150 | PLN 8950 | PLN 2730 | PLN 6370 | PLN 9100 |
| 5 | over PLN 200,000 | PLN 150 | PLN 12850 | PLN 3900 | PLN 9100 | PLN 13000 |

Source: own data, based on materials from ZPS „Lubiana” S.A.

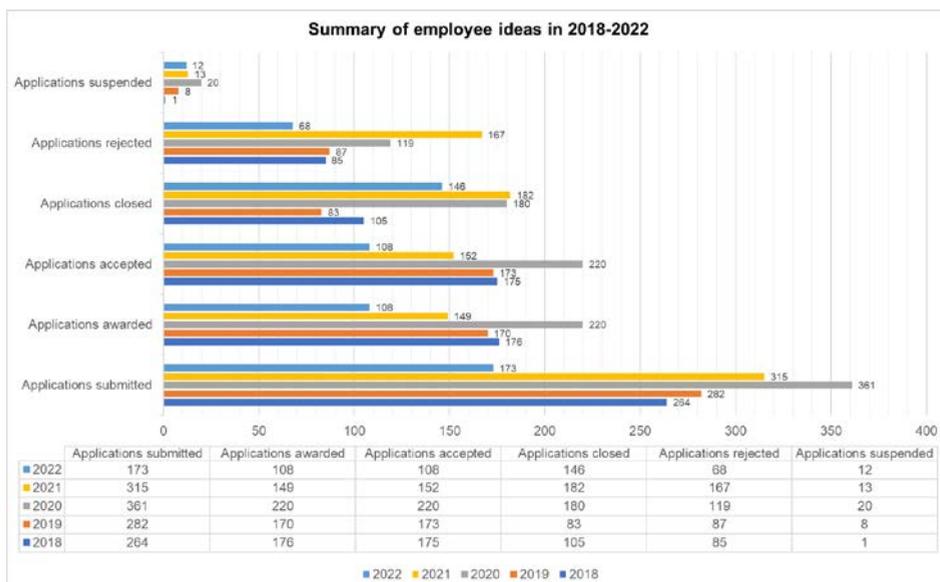


Fig. 7. Summary of employee ideas in 2018–2022

Source: own data, based on materials from ZPS „Lubiana” S.A.

It is noteworthy that despite the increase in the overall number of submissions, the number of awarded proposals remains relatively stable, and in some years decreases. The number of accepted applications presents the overall level of acceptance within the program. In 2018–2020, there was an increase in this category, which shows the efficiency of the process of reviewing and implementing ideas. However, in subsequent years, especially in 2021 and 2022, the number of accepted applications decreased, which requires additional analysis to determine the reasons and possible corrective actions. Closed applications represent a group of completed projects or ideas that did not proceed to implementation. It is worth noting that the number of closed applications is relatively high in all years, which is due to various factors, such as changing organizational priorities or resource constraints. Rejected and suspended proposals are categories that require special attention. The number of rejected applications suggests the need for clearer communication of the program's criteria and an improved process for submitting ideas. The number of suspended applications, on the other hand, indicates that there are barriers to project implementation that require additional understanding and corrective action. In conclusion, the Vase of Ideas program brings together the activity and creativity of employees, and there is potential for further improvement in the evaluation, implementation and communication processes, which should contribute to even greater effectiveness of the initiative.

A summary of the employee ideas from the production and support departments is illustrated in Figures 8–9.

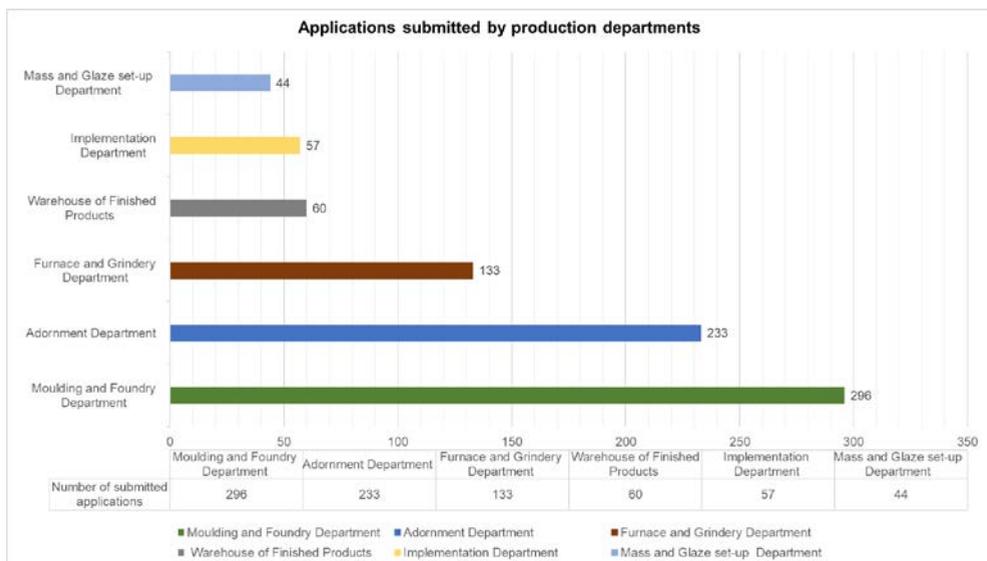


Fig. 8. Applications submitted by production departments

Source: own data, based on materials from ZPS „Lubiana” S.A.

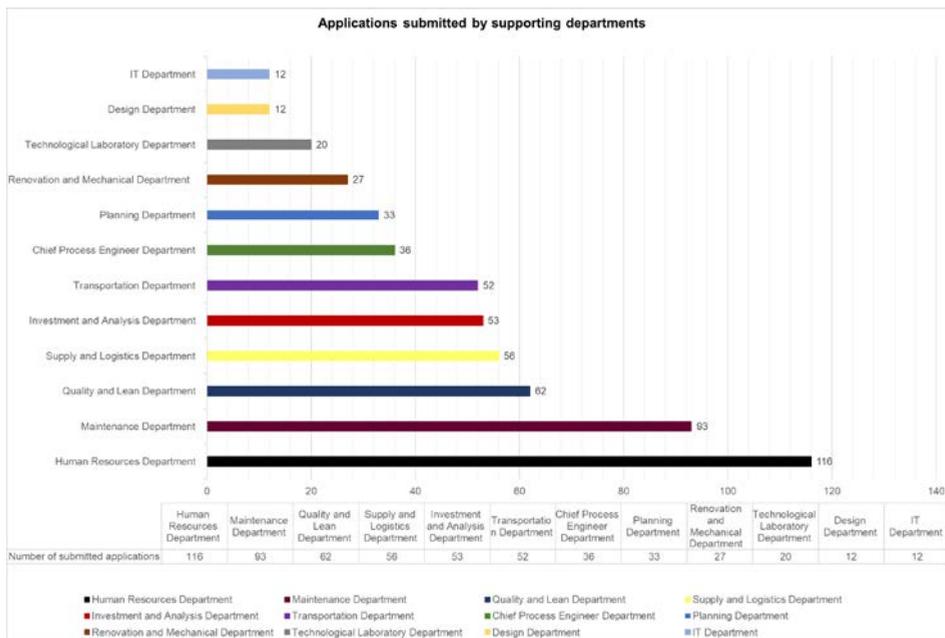


Fig. 9. Applications submitted by supporting departments

Source: own data, based on materials from ZPS „Lubiana” S.A.

A summary of the accepted applications by category of employee idea applications for the 2018–2022 period is shown in Figure 10.

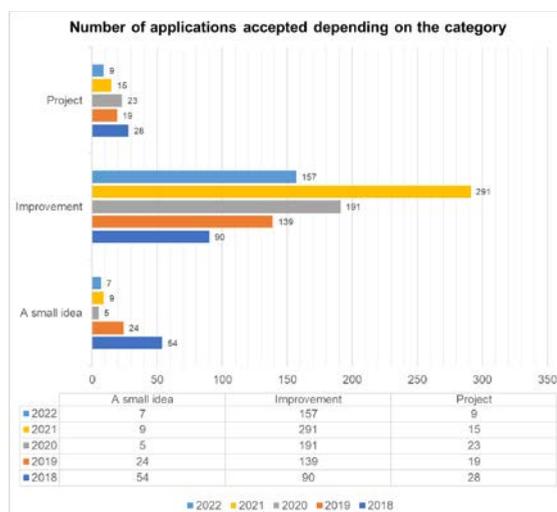


Fig. 10. Number of applications accepted depending on the category

Source: own data, based on materials from ZPS „Lubiana” S.A.

The following is a financial analysis to evaluate the effectiveness of employee ideas in terms of economic and business aspects. Given the importance of effective resource management and increasing competitiveness in the market, financial analysis of the employee idea proposals is becoming an indispensable tool to support enterprise development strategies.

A summary of the financial savings achieved is illustrated in Figure 11.

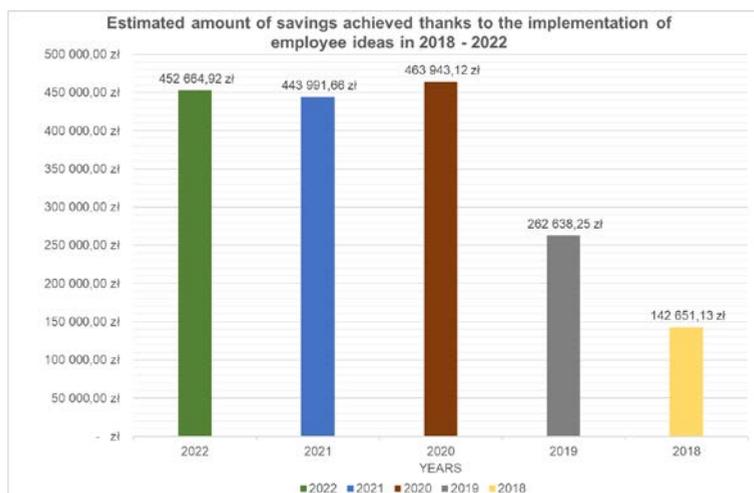


Fig. 11. Estimated amount of savings achieved thanks to the implementation of employee ideas in 2018–2022

Source: own data, based on materials from ZPS „Lubiana” S.A.

The implementation of the Kaizen employee ideas program was a key step in improving the company. The program was implemented in response to the growing need to effectively manage employee ideas, improve our operational processes, and increase employee engagement and positively impact company performance.

5. CONCLUSIONS

The paper describes the proceedings related to implementing the Kaizen method in years 2018–2022 at ZSP „LUBIANA” S.A., as one of the crucial tools in implementing Lean Management, which has led to improvements in the organization and production processes. It began with an analysis of the state of affairs and identifying areas for potential improvement. The main goal of the project, as described here, was adjusting the concept of Lean Management to the specifics of the company and pre-editing a plan leading to the successful implementation of the Lean Management tools. In addition to the Kaizen method, other tools have been

used, such as: 5S, Root Cause Analysis, standardization, Value Stream Mapping and OEE index based on manual labour.

The effects of efforts taken at ZSP „LUBIANA” were the achieving of substantial benefits related to eliminating waste, improving the effectiveness of the production process and increasing the employee engagement. The proceedings also included aspects related to monitoring and evaluating the effectiveness of the applied solutions, a crucial element in the maintenance and further improvement of the Lean Management system.

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