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IMPLEMENTATION AND BENEFITS OF THE 5S METHOD IN IMPROVING WORKPLACE ORGANISATION – A CASE STUDY

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Abstract:
The article deals with the use of the 5S methodology in an organization. It focuses on the implementation of 5S in an organization involved in the production and processing of metal components for the automotive industry. 5S is a Japanese methodology that was first applied in the automotive industry to improve productivity. The article is dedicated to the basic principles of lean manufacturing.The practical part analyses the state of the workplaces before the introduction of 5S and the actual implementation of this methodology. The implementation of 5S brings a number of benefits to the organization, including:
- reducing time wasted searching for tools,
- improving safety,
- boosting employee morale,
- building the culture of the organization.

Keeping the workspace organized with visual aids helps to increase productivity and reduce waste. The ultimate goal of 5S is continuous improvement in the workplace. The final section evaluates the benefits to the organization after the implementation of 5S. By implementing this strategy, the workplace becomes clean and standardized, allowing employees to work as efficiently as possible. The 5S method creates a more efficient work environment by improving the organization and optimizing the system of operation.

Key words: 5S, lean manufacturing, visualization, standardization

INTRODUCTION

The 5S method is part of lean manufacturing, the main goal of which is to eliminate waste. Originally developed by Hiroyuki Hirano in the 1980s as part of the Toyota Production System, the concept is found not only in industrial sectors, but also in medicine, administration and other industries where waste needs to be reduced. The goal of 5S is to eliminate waste and unnecessary items from the work environment. This method includes the steps of sorting, organizing, cleaning, standardizing and maintaining, which contribute to improving productivity and minimizing time spent searching. Implementing the 5S method alone will not guarantee a company's success or profit. Just as important as implementing these steps in the company is the consistent adherence to defined procedures and their continuous development [1, 2, 3, 4].

CURRENT STATUS OF THE ISSUE AT HOME AND ABROAD

5S activities require continuous and long-term effort and therefore „it is necessary that the whole society understands its purpose. Some members of management may think they have nothing to do with Seiri and Seiton etc., considering them to be grassroots workplace issues" [5]. According to the publication 5S FOR THE OFFICE, most companies have figured out that „only about 5 percent of the work is value-added, the rest is non-value-added or useless activity" [6].

As the author of A Guide to Lean Six Sigma Management Skills goes on to write, "Mental discipline is very important to Seiso. An attitude of cleanliness leads to clean and clear thinking, which is reflected in all aspects of work" [7, 8, 9, 10, 11].

„The methods used to implement 5S will vary between companies. Even within a single company, the methods will vary between different divisions (e.g., manufacturing, sales, and management)" [12, 13, 14].

„Is an attitude that finds a dirty and unkempt workplace intolerable. Make a cleaning culture a cornerstone of your organization" Argues Gitlow [7].

Value stream mapping, called VSM, is a widely used tool for optimizing flow through the use of analysis and design. This method finds wide application especially in lean manufacturing companies. The specific feature of this tool is the use of pencil and paper to prepare the physical map so that team members participate together in the process. In the implementation of VSM, it is popular to physically walk the flow in the plant – Gemba Walk, which mainly involves top management members during a joint brainstorming session [15, 16, 17].

The aim of the 5S process is to ensure the cleanliness of the workplace, including tools, machines, work areas and storage areas, including sweeping floors. This major cleaning is carried out once a year and should be visualised so that the condition of the workplace can be compared before and after the cleaning. The use of appropriate cleaning products such as buckets, rags, brooms and grease removers is also an important aspect. Such cleaning can take several hours or even several days in the case of larger enterprises [18, 19].

Implementing a clean and hygienic work environment is important to increase productivity and reduce employee absenteeism. A University of Arizona study showed that employees working in a clean and orderly environment are up to 15% more productive than those working in a messy environment and also have lower absenteeism. Another study found that employees exposed to a clean workplace have 24% fewer sick days than those exposed to a dirty workplace [4, 18, 20, 21]. The implementation of the 5S method has a significant positive impact on workplace economics, namely [22, 23]:

- Reduction of the time required for tool changes,
- increase in product quality,
- decrease in the number of errors, resulting savings,
- increased employee satisfaction and morale,
- increase in employee productivity,
- Ensuring a stable supply to the final customer,
- stable employee safety,
- Sustained customer trust towards the company.

THE AIM OF THE WORK

The aim of the research was is to apply the main principles of the 5S system – sorting (seiri), arranging (seiton), cleaning (seiso), standardizing (seiketsu) and maintaining (shitsuke) – to the company's production areas and processes. The implementation itself was carried out in the production facilities of the company, which is active in the supply and installation of complete structural units and technology for the automotive industry. It deals with specific solutions and benefits in the layout of the production and storage area [25]. In order to meet the requirements of the production department in terms of reserving a sufficiently large space, we had to propose solutions such as the design and creation of a new storage area, the reorganization of the workshop, the disposal of materials and tools, etc. These steps were supported by a long analysis of production processes and space studies. The design was also based on measurements of the severity of waste and the feelings of individual employees. Based on the implemented steps, we arrived at remarkable time differences in work processes, whether in picking and other material handling or in the production processes themselves [26, 27].

At the end of the practical part, a financial evaluation of the project is presented, based on which we determined the payback time of the total investment. Based on the feedback obtained, we can conclude that the steps presented in this article allowed us to create a clean, orderly, systematized, ergonomically stable, and safe workplace for the company's employees [28, 29, 30]. In addition, the article aims to introduce the concept of lean manufacturing, its tools, and methods of implementation.

METHODOLOGY OF WORK

The literature recommends to perform analysis and measurement before and after the implementation of the 5S method. The implementation team were all the staff who expressed their opinion regarding the changes, in our case the implementation of the 5S method.

In this step, we took 3 measurements, one of the measurements focused on the warehouse and material removal, the second measurement focused on moving materials from indoors to outdoors and vice versa, and the 3rd measurement or set of measurements was worked on the individual small tasks that the warehouse manager and workers perform during a normal day. These measurements tell us exactly how much time the workers spend moving and relocating materials within the facility in a completely unnecessary and inefficient manner. The introduction of the 5S method in a production workshop is a structured process that involves several steps. The 5S method, which originated in Japan and is the basis for many lean manufacturing techniques, includes the following steps: Seiri (Sort), Seiton (Set in Order), Seiso (Shine), Seiketsu (Standardize), and Shitsuke (Sustain) [31, 32, 33, 34 35, 36, 37]. The methodology for implementing 5S in the workplace is described below:

1. Seiri (Sort) – Sorting
   - Goal: Remove all unnecessary items from the workspace.
   - Procedure:
     - Go through all tools, equipment and materials in the workshop.
     - Divide the items into those that are necessary and those that are not necessary for the current operations.
     - Either discard unneeded items, move them to storage, or recycle them.
2. Seiton (Set in Order) – Arrangement
   - Goal: Organize the workspace so that all necessary items are easily accessible.
   - Procedure:
     - Determine the best place for each item.
     - Mark locations for tools and materials so it is easy to know where what belongs.
     - Create visual aids (labels, markers on the floor, bulletin boards) for quick reference.
3. Seiso (Shine) – Cleaning
   - Goal: Keep the work area clean and tidy.
   - Procedure**:**
     - Regularly clean work areas, tools and equipment.
     - Ensure that everyone is responsible for keeping their area clean.
     - Establish a regular cleaning and maintenance schedule.
4. Seiketsu (Standardize) – Standardization
   - Goal: Establish standards for organization and cleaning.
   - Procedure:
     - Develop procedures and standards for sorting, organizing, and cleaning.
     - Create checklists and manuals to facilitate compliance with established standards.
     - Regularly train staff on the importance and procedures of 5S.
5. Shitsuke (Sustain) – Sustain
   - Goal: Maintain and improve established 5S practices.
   - Procedure:
     - Conduct periodic 5S audits to determine how well the standards are being followed.
     - Promote a culture of continuous improvement (kaizen) and employee engagement.
     - Recognize and reward employees for adhering to and improving 5S methodologies.

We focus on the implementation of the 5S system in the production area of the selected company. This process will involve detailed training and designing future changes. Based on the analyses, designs, and project documentation developed, we plan to implement the 5S system, which consists of five basic points: sorting (seiri), arranging (seiton), cleaning (seiso), standardizing (seiketsu), and maintaining (shitsuke). The process of implementing 5S within a manufacturing organization involves the following steps:

- Designing the solution,
- Analyzing and measuring,
- Creating design and drawing documentation for the solution,
- Implementation of the designed solution,
- Elimination of potential deficiencies,
- Evaluating the success of the project.

The article mainly focuses on waste identification, verification and remediation. It provides an insight into the savings expressed in terms of time but also in financial terms.

RESULTS OF WORK

The main space for the workstation is the first floor, as this is where the workshop and rooms we will be working with in this project are located. The company bases its know-how on a high level of expertise in the company's field of activity. The production itself is focused on the manufacture, supply and installation of support technology for the automotive industry. All these technologies are designed and calculated with the intention of saving as much as possible, not only in terms of costs but also in terms of saving our planet from an environmental point of view. The building, as well as the production organisation, was built and put into use before 2000. This fact confirms that over the years this production organisation has maintained the same 'outdated' methods and principles of operation. At the heart of the entire production organisation is the aforementioned workshop, where most of the work and preparations are carried out. This room is also used for storing various types of material - consumables, metallurgical, insulation or chemical. The material is stored in racks but is not systematically classified.

Fig. 1a shows the current status of the workplace before the application of corrective measures. We can see the storage of assembly material on the shelves, which is removed during order picking before going to the customer. Position b shows the current status with the handling and storage of oils on the job site.

Fig. 1 Baseline state of order and separation on the workshop where: a) stored material on shelves, b) stored oil on the workplace, c) storage of unnecessary packaging, d) storage of material before sorting

This condition is confusing and needs to be changed. Fig. 1d presents the storage of unneeded paper packaging. Fig. 1d gives us a view of the storage of the material before the actual application of 5S on the workplace. Based on the measurements, we have worked out in Fig. 2, a percentage representation of the workplace distribution.
Fig. 2 shows the proportions of manufacturing and non-manufacturing areas in the overall ratio of the organization. The production area is represented in the ratio of 52%, while the temporary dedicated material storage and shelf areas together have a representation of 48%.

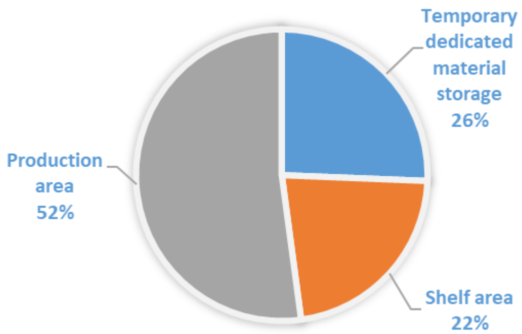

Fig. 2 Layout of the workshop area

Due to the variable nature of the company's production and business activities, which depend on the requirements of end customers and material inputs, it is essential to have sufficient quantities of material available. Despite our efforts to comply with the 5S system standards, we are forced to compromise on the use of the workshop for material storage as well. In order to optimize space and time efficiency, we propose to reorganize and modify the shelving layout in the workshop on the first floor. In this way, the workshop will gain sufficient space for production and the ergonomics of the working environment will be improved.
Another proposed solution is to allocate additional space for the storage of consumables and tools. This space would be located in the storekeeper's office on the first floor, allowing for efficient inventory management and improved access to materials. The current condition of the workshop is limited due to inefficient storage of materials in racking, which leads to wasted space and problems with materials handling.
For these reasons, it is necessary to conduct analysis and measurement before and after the implementation of the 5S method to determine the effectiveness of the proposed changes and their impact on the work environment and the production process.
In this step, we will carry out three measurements, focusing on different aspects of the work activities. The first measurement will deal with the process of storage and retrieval of materials (Table 1), the second measurement will focus on the movement of materials between the interior and exterior of the facility (Table 2), and the third measurement will analyze the small tasks performed by the warehouse and workers during a normal working day (Table 3).

Table 1
Measurement of material removal time

MEASUREMENT OF MATERIAL REMOVAL TIME			
Item	Staff 1	Staff 2	Staff 3
	(s)	(s)	(s)
Anchor HILTI MQK 21 = 5ks	0:01:33	0:02:05	0:01:58
Screw M16-110 mm = 5ks	0:01:19	0:01:59	0:01:23
Mother M16 = 5 ks	0:01:05	0:01:39	0:01:07
TOTAL REMOVAL TIME	0:03:57	0:05:43	0:04:28

Table 2
Measurement of handling time before and after the work has been carried out

MEASUREMENT OF MATERIAL HANDLING TIME BEFORE AND AFTER THE WORK HAS BEEN CARRIED OUT			
Item	Before starting work	After completion of the work	Total time spent with handling
Moving and handling the material	0:43:21	0:50:07	1:33:28

These measurements will give us an accurate indication of how much time workers spend unnecessarily and inefficiently moving materials around inside the facility.
To evaluate the measurement, we had to time the various activities performed by the warehouse worker and the workers during a normal working day. This type of measurement is particularly challenging because it is not possible to predict every step employees take. After interviewing the workers, we identified the five most frequent activities or job actions, which we then simulated and timestamped (Table 3).

Table 3
Measurement of handling time before and after the work has been carried out

Item number	Mark	Duration before the introduction of the 5S
1	Receiving and storage of oversized material	0:28:09
2	Receipt and storage of current consumables	0:06:33
3	Preparation of material for production	0:10:21
4	Preparation of material for assembly	1:14:28
5	Oil filling	0:15:00

Creating or reorganizing any space usually requires considerable effort. In order to obtain funding from the economic department, an analysis of projected costs is required in accordance with the company's internal regulations. To prepare a report on the preliminary costs of creating a new warehouse space, we have summarized the estimated costs shown in Figure 2 in Table 4.
Similarly, we analyzed and recorded the costs of reorganizing the manufacturing space shown in Figure 2 in Table 5.

Table 4
Estimated cost of allocating new storage space

Item name	Quantity	Unit of measurement	Unit price	Total price
Storage system	1	whole	1,500.00 €	1,500.00 €
Construction work	16	h	53.00 €	848.00 €
Assembly work	16	h	53.00 €	848.00 €
Project and coordination work	5	h	63.00 €	315.00 €
TOTAL PRE-DEPOSITED COSTS				3,511.00 €

Table 5
Estimated costs for the reorganisation of the workshop

Item name	Quantity	Unit of measurement	Unit price	Total price
Assembly work	40	h	53.00 €	2,120.00 €
Project and coordination work	8	h	63.00 €	504.00 €
TOTAL PRE-DEPOSITED COSTS				2,624.00 €

Once measured, we had a clear picture of the space into which we could draw the layout of a suitable selected storage system. From the point of view of space and its most efficient use, we decided to buy a shelving system (Fig. 3).

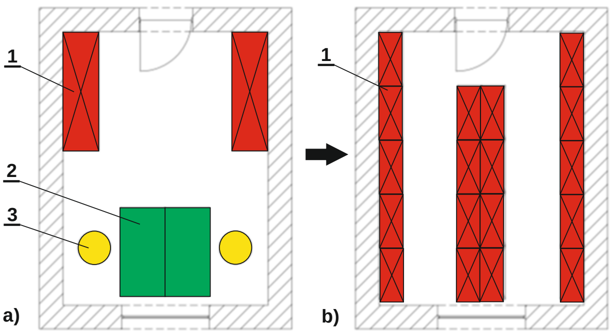

Fig. 3 Proposed layout change of office space to warehouse a) state before the change, b) state after the change, 1 – shelf, 2 – table, 3 – chair

After receiving specific data regarding the dimensions of the shelving, the space and the storage material, we were able to process the final drawings. We based the drawings on the general STN and EN standards in force.
The design and drawing documentation for the workshop consisted of the same procedures. The priority was to focus and identify the existing condition. Once this condition was documented, we were able to design appropriate measures to improve efficiency and cleanliness in the workplace (Fig. 4).

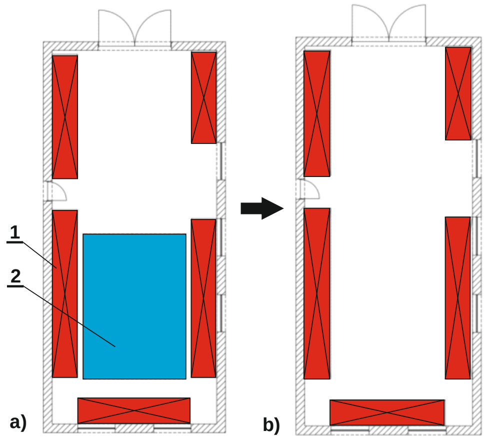

Fig. 4 Proposed layout change of the workshop area: a) state before the change, b) state after the change, 1 – shelf, 2 – storage space

The first step in implementing a 5S system is to sort through unnecessary, unneeded and unused items. The 5S system, a lean manufacturing tool, shows us that machines and equipment that are closely related to the work activity can be present in the workplace. We carried out the sorting in collaboration with the warehouse manager and the project manager, following the prescribed standards and marking unnecessary items with red cards, as shown in Figure 5.

Fig. 5 Equipment marked for scrapping

Arranging the sorted components is one of the most challenging steps of the 5S method from a financial and time perspective. Time, ergonomics, applicable legislation, safety and the environment must all be taken into account in this step. The problem we encountered was the oversized material that we had to store on the production area of the workshop due to the lack of space in the racks. After sorting, we gained almost 35 m^2 of space in the workshop. The proposed solution to further free up space was to create a new warehouse for small components such as consumables, small hand tools and other small tools. We labelled all these components and moved them to the new warehouse, saving approximately 28 m^2 of space in the workshop.

The third step in implementing the 5S system is cleaning and housekeeping, as shown in Fig. 6 and 7.

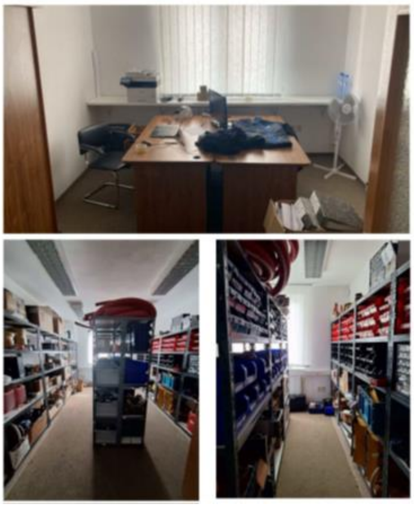

Fig. 6 Office before and after 5S warehouse implementation

Fig. 7 Workbench before and after implementation

Although this activity may not seem to have much impact on efficiency, the opposite is true. Scientific studies confirm that workers are happier in a clean and tidy workplace, which in our case leads to increased efficiency during production. During implementation, we cleaned and tidied every single component and area.

No.	What needs to be cleaned	Aids for cleaning	How often?	Who?	Dedicated time
1	Workshop vise surface - cleaning	Cloth, degreasing spray	Last working day of the week	Technician	20 min
2	Workbench surface - sweep and clean	Broom, trowel			
3	Floor - in front of and under the desk - sweep	Broom, trowel			
4	Rubbish bin - empty	-			

Fig. 8 Standard of cleaning

After sorting, organizing and cleaning the workplace, we proceeded to standardization. In this step, it is important that the standards created are valid for the entire workplace or its individual sections. These standards (Figure 8) define what is allowed and what is not allowed in the workplace. The main steps of standardisation are the creation of detailed procedures for carrying out different activities. These standards are of great value to employees because they serve as a manual for their particular workplace.

Discipline is the last but key pillar of the 5S system. Maintaining and adhering to the points described above is the basic essence of the whole system. If standards, controls, cleanliness and other steps of the 5S method are repeatedly ignored, the entire implementation process can become meaningless. For this reason, we have put in place an internal guideline that includes, among other things, regular internal audits, specifically on the first Friday of every month.

TEST OPERATION

The test run is a critical step that allows us to get a realistic and practical view of the changes implemented in a particular facility. During the trial run, we carry out control measurements and analyses to assess the status achieved. In order to obtain relevant data, we repeat the removal process with the same materials and in the same quantities as in the original measurement (Table 6).

Table 6
Measurement of material removal

MEASUREMENT OF MATERIAL REMOVAL			
Item	Staff 1	Staff 2	Staff 3
	(s)	(s)	(s)
Anchor HILTI MQK 21 = 5ks	0:00:46	0:00:50	0:00:52
Screw M16-110mm = 5ks	0:00:15	0:00:13	0:00:18
Mother M16 = 5ks	0:00:14	0:00:16	0:00:20
TOTAL REMOVAL TIME	0:01:15	0:01:19	0:01:30

Table 7
Measuring the time of the most frequently performed work activities

TIME MEASUREMENT OF THE MOST FREQUENT WORK ACTIVITIES PERFORMED			
Item number	Mark	duration before the introduction of 5S	duration after the introduction of 5S
1	Receiving and storage of oversized material	0:28:09	0:20:00
2	Receipt and storage of current consumables	0:06:33	0:05:52
3	Preparation of material for production	0:10:21	0:08:12
4	Preparation of material for assembly	1:14:28	0:59:16
5	Oil filling	0:15:00	0:10:00
Time difference before and after the introduction of the 5S system		**0:31:11**	

The biggest saving in wastage was achieved by moving oversized materials, freeing up space for actual production. By placing these items in existing racking, we were able to allocate work area for production. This measure not only solved the space shortage problem, but also eliminated the time workers spent handling. We conducted a third control measure to determine whether the implementation of the 5S system also affected processes or work tasks that we had not previously prioritized (Table 7).

EVALUATION OF PROJECT COSTS

After evaluating all the income and expenses associated with the implementation of the 5S system in our manufacturing organization, we concluded that the total cost of the implementation amounted to 4,599 euros excluding VAT (Table 8), which is less than we originally expected (Tables 4, 5).

Table 8
Total costs associated with implementing a 5S system in an organisation

Item name	Quantity	Unit of measurement	Unit price	Total price
Total actual costs associated with the creation of the new warehouse space	1	whole	2,964.00 €	2,964.00 €
Total real costs associated with the reorganisation of the workshop	1	whole	1,650.00 €	1,650.00 €
Unexpected expenses	1	whole	495.00 €	495.00 €
Total costs associated with implementing a 5S system in an organization				4,599.00 €

The largest item at € 2,964.00 was the total actual cost of creating the new warehouse space. This includes the storage system, construction and installation work. Design and coordination work was also required. When selecting the components and materials used, we were looking for a „balance" between quality and price, and therefore we bought a substantial part of the materials from regular brick-and-mortar stores and handled the work in-house by our own staff. Another item in the amount of € 1,650.00 was the total actual costs associated with the reorganization of the workshop, which included installation, design and coordination work. The penultimate item in the amount of € 495.00 included holders and containers for the storage of small materials. After sorting out the workplace, we generated almost 600 kilograms of mixed waste, which brought us approximately € 480 when handed over. The added value of this is that in addition to sorting and getting rid of unnecessary elements from the production area, or workshop, we also received funding that we could use to purchase a shelving system.

After evaluating the values obtained during the initial measurements before implementation and the test measurements after implementation, we concluded that each worker will save two hours and eight minutes per day after the implementation of the 5S system. At the company's hourly rate of € 53/hour, that's over € 100 a day. If we count a normal working month, the expected savings should amount to more than EUR 1200. Based on this simple calculation, we can assume that the investment should be recovered within two quarters. If the above calculations are confirmed, we will immediately start preparations to extend the building to provide additional storage space outside the production area.

DISCUSSION

Kumar et al. [35] in their work highlighted that the 5S system is the foundation of all improvements and is a key component for creating a visual workplace. Their research suggests that the safety of the work environment is significantly higher after the implementation of 5S. A similar view is shared by Kaminska [34], who argues that 5S is one of the lean management methods aimed at continuous development, increasing productivity and quality in the production environment. In our manufacturing organization, 5S has proven to be a successful system, as confirmed by Makhija et al. [13], who points out its universal opportunity in various industries, including office environments.

Our work focused on the implementation of 5S in production and warehouse areas. We followed a five-step process: sort, organize, clean, standardize and maintain. The first step was a detailed analysis of production processes and work tasks, based on which we proposed improvements. We backed up these suggestions with project documentation and then implemented them according to the 5S strategy. Singh and Ahuja [38] emphasize that 5S is an integral part of lean manufacturing and enables the delivery of the right product at the right time and in the right quantity. Based on our experience, we have successfully created an ergonomic, safe and well-organized workplace where workers perform their tasks efficiently. We focused on employee engagement. We made sure all staff are engaged in the process and understand the benefits of 5S. We used visual methods. We used visual management to promote 5S (e.g., bulletin boards with "before and after" photos, policy boards). Implementation of staff training and education. The organization decided to provide regular training and education programs focused on 5S methodology. Implementing the 5S method can lead to significant improvements in efficiency, reduced waste and increased safety in the workplace [39, 40, 41] .

CONCLUSION

The cost of implementing the newly created warehouse space included items such as: Storage system, Construction work, Assembly work, Design and coordination work in the total amount of 2,964 €. When selecting the components and materials used, we looked for a "balance" between quality and price. In addition to the expenses for the newly created warehouse, we also incurred expenses related to the reorganization of the workshop. These costs consisted of assembly work and project and coordination work totalling 1,650 €.

After adding up all the income and expenses that were associated with the implementation of the 5S system in our company, we can evaluate that the actual costs spent on the implementation amounted to 4,599 €. With the arrival of foreign companies in Slovakia, new working norms and cultures are being introduced into the work environment to increase competitiveness in the market. In the current environment where prices are rising rapidly, increasing productivity is the only way to remain competitive. Every small change can bring profit, so companies are trying to adapt to new trends.

Our first contact with the management of the company where we planned to implement the 5S system was rather negative. The company was founded in 1991 and since then its sales and profits had grown steadily, but it had shown no effort to minimize waste. The company's business still has great potential in the Slovak market, but it is important to adapt to new requirements and trends due to increasing competitive pressures. Every project in such a company brings changes, problems and costs which are necessary for the implementation of any changes.

After several meetings and initial analyses, we agreed with the company's management to prepare an analysis and design and drawing documentation, on the basis of which further steps will be decided. After assessing the processed documents and indicative calculations of the costs associated with the implementation of the 5S system, we received approval for the actual implementation. The professional aspect of the implementation proved to be less demanding than the design phase. Focusing on the spaces, measuring the time of individual movements and processes and creating the drawings was time-consuming and professionally demanding. Compliance with all applicable regulations, ISO standards and internal company guidelines required a lot of time spent on the project. The primary problem that we identified at the beginning of the preparation. It was the lack of space in production. Inefficiently stored material in racks forced workers and company management to create a temporary storage area for oversized material right on the production floor. Moving material from the production area to the outside and back again led to wasted worker time. The proposed solution involved freeing up shelf space, resulting in 58 m^2 of free space for material, including machinery and equipment. We then introduced standards throughout the workplace. According to the available literature, cleanliness and order are not difficult to achieve, but maintaining them is the key to long-term positive outcomes. In this way, we have been able to effectively eliminate waste and increase safety and efficiency in the company.

Although similar methods are common abroad, where they are technologically advanced, they are less well known in Slovakia. It is important to motivate employees and involve them in the whole process of 5S implementation. Based on the savings we have achieved compared to the estimated costs, we have distributed part of the funds among employees as a form of reward, which motivates them to take a responsible approach to the changes [42, 43, 44].

Some companies make the mistake of implementing multiple methods to increase productivity at the same time. Our experience has shown that in the case of 5S implementation, every step had a positive impact on production.

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