

CONTINUOUS IMPROVEMENT THROUGH KAIZEN MANAGEMENT SYSTEM: A CASE STUDY

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ABSTRACT

The study was conducted in a manufacturing company with foreign subscribed capital that faced problems such as high costs, long period of time elapsed between receiving the orders and delivery, delays in deliveries to customers etc. Taking into consideration the problems that have arisen, the top management of the company has decided to focus on improving production processes, identifying wastes and, at the same time, eliminating them, leading to the establishment of the "company vision" and the implementation of Kaizen culture. Our research paper aims to analyze the impact of implementing Kaizen principles on a company's performance. The study presents the results of a two-year (2017 and 2018) implementation of Kaizen system within the core department of the company's production structure. As a consequence of implementation of Kaizen tools, the analysis revealed the positive impact on stock control, with reduced number of stock blackouts. Improvements regarding the accuracy of the stocks were recorded both in the case of leather stock, which is the most valuable, and fabrics stock. At the company level, all these positive effects have been translated into important cost savings. Human resource plays a vital role in the succes of implementing Kaizen system and, within the company subject to the study, we noticed that, once employees were trained and overcomed the difficulties in understanding/applying the new concepts, the improvements were evident. Thus, proper consumption, proper procurement planning and raw material deliveries over time, eliminating thus production blackouts, represent important improvements achieved by the company.

KEYWORDS: *company, Kaizen management system, continuous improvement, savings.*

1. INTRODUCTION AND RESEARCH DESIGN

Nowadays, companies are struggling to adjust innovation efforts to business strategies in order to improve performance (Cadaru & Bădulescu, 2018) as knowledge and innovation-based economy is considered as a key factor for competitiveness (Bădulescu et al., 2018). The desire of increasing competitiveness is a characteristic of companies that operate in a tough competitive environment. In this sense, continuous incremental improvement represents an important tool to achieve competitive advantages (Garcia-Sabater & Marin-Garcia, 2011). According to Holtskog (2013), continuous improvement represents "a long term, often management driven, effort that has deep cultural implications in the workplace".

The term "Kaizen" was enunciated by Masaaki Imai in the mid 1980s and is regarded as a key element related to the competitiveness of Japanese companies (Suárez-Barraza et al., 2011). Kaizen represents a Japanese philosophy or practice aiming to determine continuous improvement of processes in any kind of business (Kiran, 2017). Macpherson et al. (2015) revealed that, in Japan, Kaizen philosophy involves worker creativity and determines employees to achieve proactive changes and innovation in the workplace. Recht and Wilderom (1998) argued that, although

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national culture contributed in a large extent to the success of Kaizen philosophy in Japan, in terms of transferability outside Japan, the success of Kaizen-oriented suggestion systems is related more to organizational culture and less to national culture. Thus, Kaizen principles have been adopted and applied in organizations all over the world "as a way to improve production values while also improving employee morale and safety" (Srinivasan & Shah, 2018). However, Brunet and New (2003) concluded that Kaizen has a unique evolution within each organisation as a consequence of a changing business environment. Smadi (2009) stated that, if it is properly implemented, Kaizen model can contribute to continuous improvement and increase competitiveness. Also, he suggested that the implementation of Kaizen philosophy request the development of an adequate organizational culture that will encourage creativity.

Our research paper aims to analyze the impact of implementing Kaizen principles on a company's performance. We will consider a manufacturing company and within that company, the first very important department in which Kaizen principles were implemented, the process being, at present, in progress at the level of the company. Thus, taking into consideration the Tailoring Department (which is the core department of the company's production structure) of the selected company, we will reveal the improvements regarding stock control that have led to obtaining benefits in terms of cost savings. The study presents the results of a two-year (2017 and 2018) implementation of the Kaizen system within the Tailoring Department.

The research paper uses a descriptive design with the case study method. The study is based on a systematic analysis of the internal data of the company. We will describe the steps taken in the process of implementation of Kaizen management system and, by correlation with the information available in the company database, we will reveal the improvements achieved by the company.

This research paper has the following structure: section 2 presents the theoretical framework, section 3 presents the case study and includes the company description, the analysis of the selected indicators and the results of the study and section 4 presents the conclusions of the study.

2. THEORETICAL FRAMEWORK

Several studies focused on analyzing the impact of implementing Kaizen principles in a manufacturing company. Thus, Arya and Choudhary (2015) revealed important positive impacts on the production techniques and lead times as a consequence of implementing Kaizen practices, which has resulted in savings in terms of money and time. Singh and Singh (2018) also studied the effects generated by the implementation of Kaizen in a manufacturing company and their results indicated important benefits and savings of money annually. Cwikla et al. (2018) studied the continuous improvement system by implementation of Kaizen practices in a production company from Poland and revealed its effectiveness in terms of economic benefits and quality improvement. Alvarado-Ramírez et al. (2018) studied the implementation of Kaizen practices in order to ensure continuous improvement in medium and large manufacturing and service companies from two Latin American countries and revealed the economic and human benefits obtained. Kumar (2019) stated that, due to the implementation of Kaizen principles, the manufacturing process becomes leaner, simple and fitter. Kaizen contributes to the removal of various defects and to improve in a continuous manner the products and the production processes. Mitra Debnath (2019) also pointed out that, through different methodologies that have been applied to implement Kaizen management system in a manufacturing company from India, many positive effects were generated leading to enhanced customer satisfaction. The study of Goyal et al. (2019) represents another evidence of the benefits obtained by the introduction of Kaizen practices, i.e. waste reduction, cost saving, and other resource savings.

The implementation of Kaizen principles is not a simple procedure and researchers have revealed some factors that facilitate this process. Maarof and Mahmud (2016) identified some factors that lead to the successful implementation of the Kaizen system, i.e. good communication between top

management and employees, a clear and coherent corporate strategy, the presence within the organization of the personnel promoting the implementation of Kaizen system, good knowledge management and also employee empowerment. On the other hand, the challenges regarding implementation of Kaizen in the organization are given by factors such as resistance to change, lack of motivation of employees as a result of an inefficient reward system, insufficient understanding of the strategic direction of the company and lack of ability in managing the continuous improvement process (Maarof & Mahmud, 2016).

Higuchi et al. (2015) highlighted the importance of managerial training and showed that Kaizen's training improved managerial skills (the researchers noticed that the effects had been preserved for at least two years). Practically, the participants to Kaizen training have generated more value added by learning to eliminate wastes in the production process. The same idea that teaching Kaizen management practices leads to a significant improvement of the participants' business practices and performances, was previously supported by Mano et al. (2014). In his study, Magnier-Watanabe (2011) analyzed the organizational and knowledge preconditions of Kaizen and highlighted the fact that firm's organizational characteristics and knowledge management practices must be in accordance with the requirements of Kaizen philosophy.

Human resource represents a very important variable when referring to Kaizen events thus, several studies (Farris et al., 2009; Glover et al., 2011) focused on revealing the key success factors that influence human resource outcomes.

3. CASE STUDY

3.1 Company description

The study was conducted in a manufacturing company that expressed the desire not to disclose its name. It is a company with Belgian subscribed capital, which produces high-quality sofas designed for customers from all over Europe. The factory is located in the North-West region of Romania and has about 400 employees. As the business environment in this sphere of activity is characterized by high competitiveness, the company has faced various challenges that have led to rapid growth, high demand on the market but, at the same time, high pressure on the production plant. This drew attention to issues such as the high costs, the long period of time elapsed between receiving the orders and delivery, delays in deliveries to customers etc.

Taking into consideration the problems that have arisen, the top management of the company has decided to focus on improving production processes, identifying wastes and, at the same time, eliminating them, leading to the establishment of the "company vision" and the implementation of Kaizen culture.

The company's vision has enabled all members of the organization to become aware of expectations, high levels of engagement and openness to change.

Within the company, there are two flows that support any kind of activity, namely:

- The information flow - represented by the ways of communication used, how they are deployed inside and between the departments that make up the structure (departments within the production structure) and, last but not least, between the structures that make up the company (those from Belgium, Romania, Ukraine).
- The materials flow - represented by the way in which the resources in the production structures are used and transformed.

3.2 Implementation process, results and discussions

In order that improvements generate results from the production process to the final customer, it has been decided to implement them in the core departments of the production structure. Within the company, the production-related departments are as follows:

- Cutting Foam – the department that has the purpose of turning the foam blocks into

elements necessary for gluing on the casing of the sofa.

- Wood and Wood Debarking – the department that transforms the wood into pieces that will form the sofa casing.
- Cutting fabrics and leather – a department that transforms fabrics and leather into pieces that will form the covers of the sofa. This department is called the Tailoring Department.

Due to fact that the basic departments were generating losses from all points of view, the management decided that the attention will be directed towards the Tailoring Department. This department faced difficulties in complying the due dates set for the next production process, which seriously affected the entire production chain and, implicitly, the final customer.

Figure 1 presents the operational flow within this department.

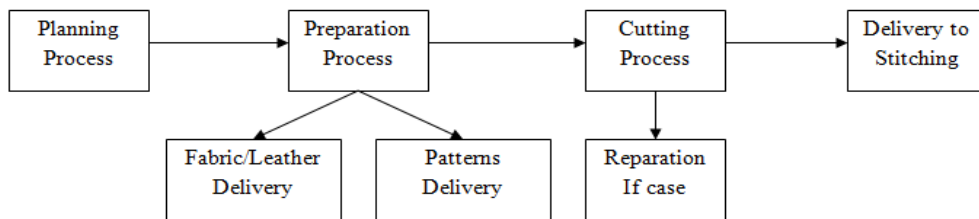


Figure 1. Operational flow within the Tailoring Department

Source: Authors' elaboration

In order to be accurate, the study focused on the *stocks* (which play a vital role in the department's work and result), *production processes* and, last but not least, *human resource*, which has been shown to play an important role in achieving the targets.

Given the above mentioned aspects that represent subjects of the study, the subsequent steps were followed in order to improve the company's performance (Imai, 2012): 1. problem defining; 2. quantifying the problem; 3. goal setting; 4. analysis of root causes; 5. immediate action; 6. checking countermeasures taken; 7. evaluation of the results, but also of the processes; 8. standardization of processes.

3.2.1 Production processes and human resources

Within the Tailoring Department, the production processes were mapped using VSM (value stream mapping) method, which revealed a series of procedural errors, namely raw material processed manually instead of automatic processing, misuse of production tools in processes, inadequate internal logistics.

It was decided to take a random product order and, following the value stream mapping, the following were found: the total execution time of the order within the Tailoring Department was 27 866 seconds, from which *time with value* (what the customer pays) – 11 208 seconds and *time without value* – 16 658 seconds. Thus, the analysis of the resulting values showed that the time without value was higher than the time with value. This led to the next step of the analysis, more in-depth, that revealed the composition of the time with and without value.

Composition of time with value: - Transformation: 10071 seconds;
 - Inspection / control: 429 seconds;
 - Transport / Movement: 708 seconds.

Composition of time without value: - Pending / Stock: 16.508 seconds;
 - Inspection: 60 seconds;
 - Transport / Movement: 90 seconds.

Figure 2 below shows the distribution of the total execution time (with and without value) of an order, taking into consideration all the production processes carried out within the Tailoring Department, as identified using the VSM method.

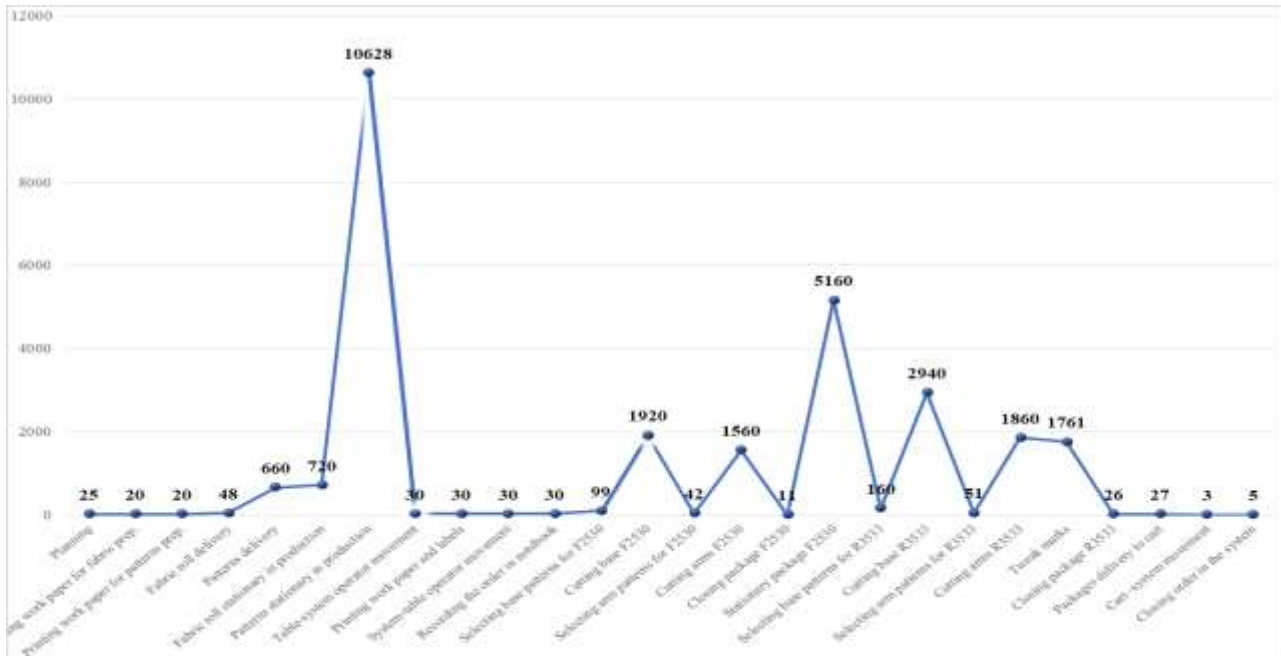


Figure 2. The distribution of the total execution time of an order within the Tailoring Department

Source: Authors' elaboration based on internal data of the company

The negative impact of nonconformities imposed the setting of objectives, root cause analysis and several corrective actions.

Objectives

- Analysis of the planning process - which led to the definition and mapping of the informational flow.
- Analysis of the preparation processes.
- 5S Implementation (sort, set in order, shine, standardize, sustain).
- Implementation of visual management.

Root Cause Analysis:

- Lack of staff training on planning, preparation, production process.
- Lack of activity definition - which led to a "pushed" production type and, as a result, semi-finished products were prepared for the next process, whether or not it was needed.

Corrective actions:

- Staff training and standardization of the planning process.
- Implementation of 5S in all department structures.
- Implementing visual management with product typologies.
- Implementing KANBAN for the patterns usage in the production process.
- Creating the environment for "LEAN" production, with strategic process rearrangement using ECRS (Eliminate, Combine, Rearrange, and Simplify) in order to reduce and eliminate losses.

3.2.2 Stocks

The Tailoring Department uses leather and rolls of fabric as raw materials, which represent high value acquisitions. Lack of control over the raw material consumption has generated stock corrections over time, resulting in production blackouts, failure to respect delivery times for the next process, and implicitly for the final customer.

The *stock of leather* represents the most valuable stock. Thus, the stock of leather represents the variable which has generated the company's biggest financial losses, since acquisitions are made in high quantities at negotiated prices (when there is stock control). In this case, at the beginning of 2017, the corrections made up to over 500 production blackouts, with high acquisition costs and, at the same time, an important number of customers with postponed delivery date.

The first steps towards improvement were the implementation of 5S (sort, set in order, shine, standardize, sustain), identification/definition of leather usage stocks (active, low movement and obsolete/out of collection). These actions were made in the first part of the year 2017, when internal consumption errors were also identified.

Figure 3 shows stock corrections and their impact on stocks movement. It can be easily noticed that maintaining the implemented 5S concept has led to a correct and rational consumption of the materials in the production process.

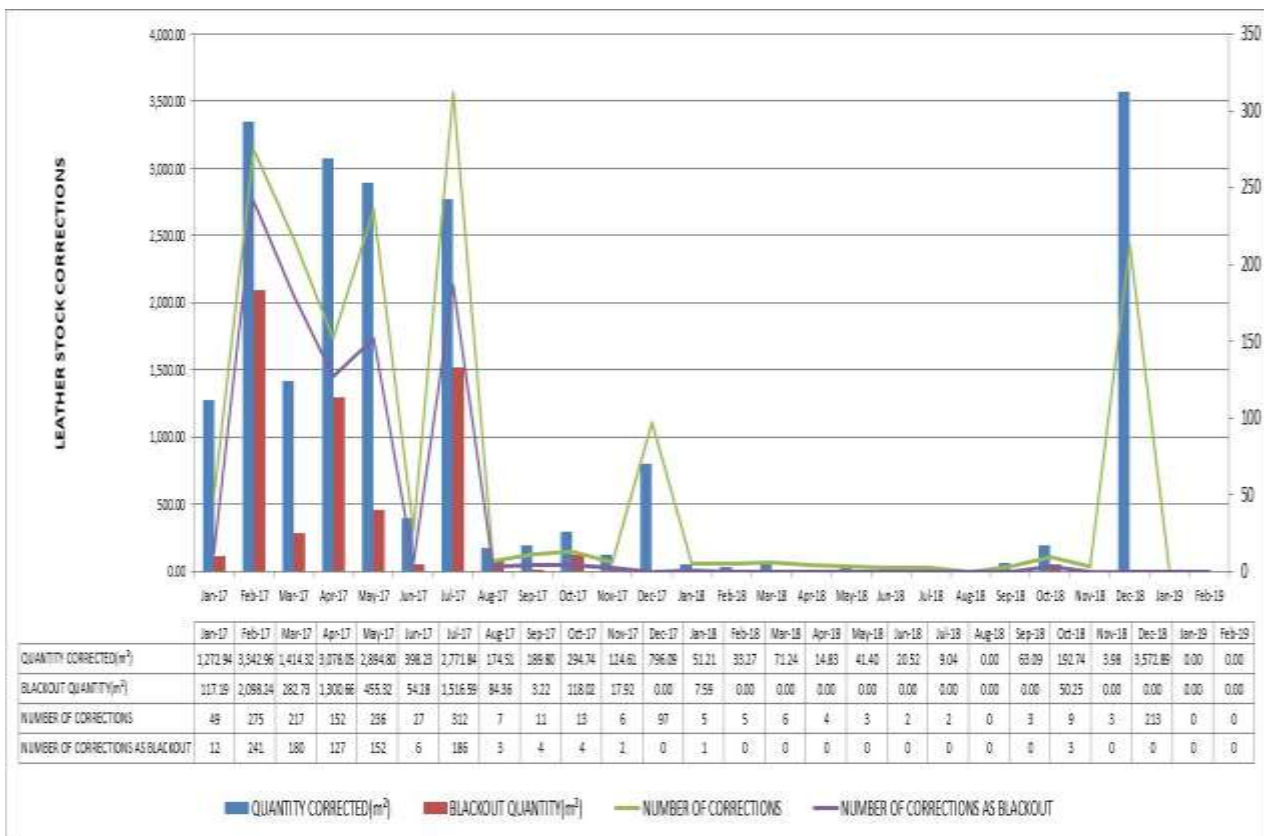


Figure 3. Leather stock corrections between January 2017 and February 2019

Source: Authors' elaboration based on internal data of the company

Figure 4 presents the value expression of leather stock corrections made between January 2017 and February 2019.

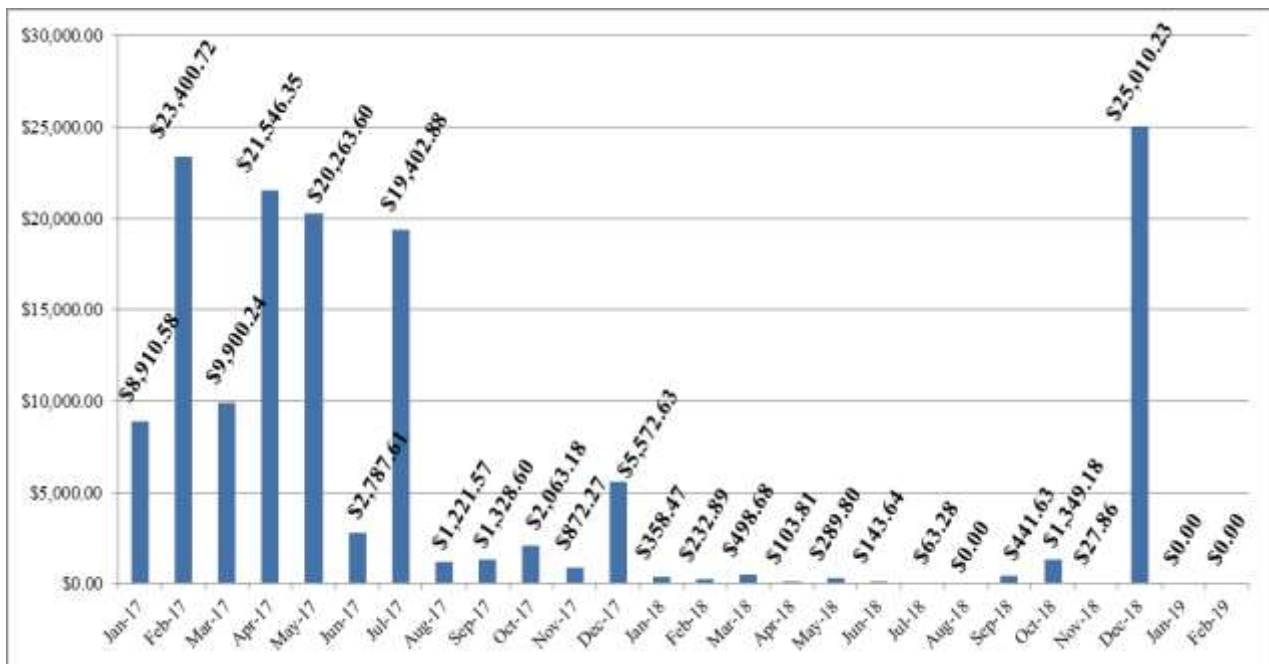


Figure 4. The value of leather stock corrections made between January 2017 and February 2019

Source: Authors' elaboration based on internal data of the company

In the review period, the stock of leather also underwent inventory processes which revealed proper consumption, proper procurement planning and raw material deliveries over time, eliminating thus production blackouts. At the company level, all the corrections made represent, in fact, financial losses. Thus, It can be noticed the major difference between the inventory made in July 2017, when the corrections were represented by 2771.84 m², and that made in December 2017, with corrections that were reduced with 71.28%, to 796.09 m². This highlights the positive impact of implementing/maintaining the 5S method on the accuracy of the stock usage during the months between the two inventory moments. As we can see by analyzing Figure 5, the values of corrections made during the inventory from December 2018 are higher, but due to the fact that the top management of the company decided to remove from stock management the types of leather that will not be used in the 2019/2020 collections.

If the numbers are transformed into monetary values, it results the fact that the inventory corrections made in July 2017 accounted for \$19,402.88 and in December 2017, the value of corrections made during the inventory represented \$5,572.63. In December 2018, it was decided to remove from the stock management leather worth \$25,010.23. The leather removed from the company's stock management, was re-sold to companies from the medical footwear industry (in Germany) and bags industry (in Italy).



Figure 5. Leather stock inventory between January 2017 and February 2019
 Source: Authors' elaboration based on internal data of the company

The *stock of fabrics* has a different dynamic, with peculiarities resulting from each typology of stock. One worrying factor was the stock adjustments up to 16749 linear meters, which highlighted a high degree of stock instability and purchasing uncertainty, the worst fact being that the fabric purchases were made from China in their vast majority.

In the first half of 2017, gradual forms of control were implemented (Plan-Do-Check-Act (PDCA) cycle method has been applied), which also helped in the preparation process for an easy identification of the location and type of material required for delivery to production process.

During June 2018, the company implemented a new stockpile control system and, as it is known, any implementation results in unpredictable cases, as evidenced by the high number of errors that once again caused correction increases. The increased number of corrections made after the implementation of the new stockpile control system was generated by the human resource of the company which had to face the changes and encountered difficulties in understanding/applying the new concept. As the difficulties were overcome, it was revealed the positive impact on stock control, which reduced the number of stock blackouts. Thus, the corrections made at beginning of year 2019 showed that the values are much diminished.

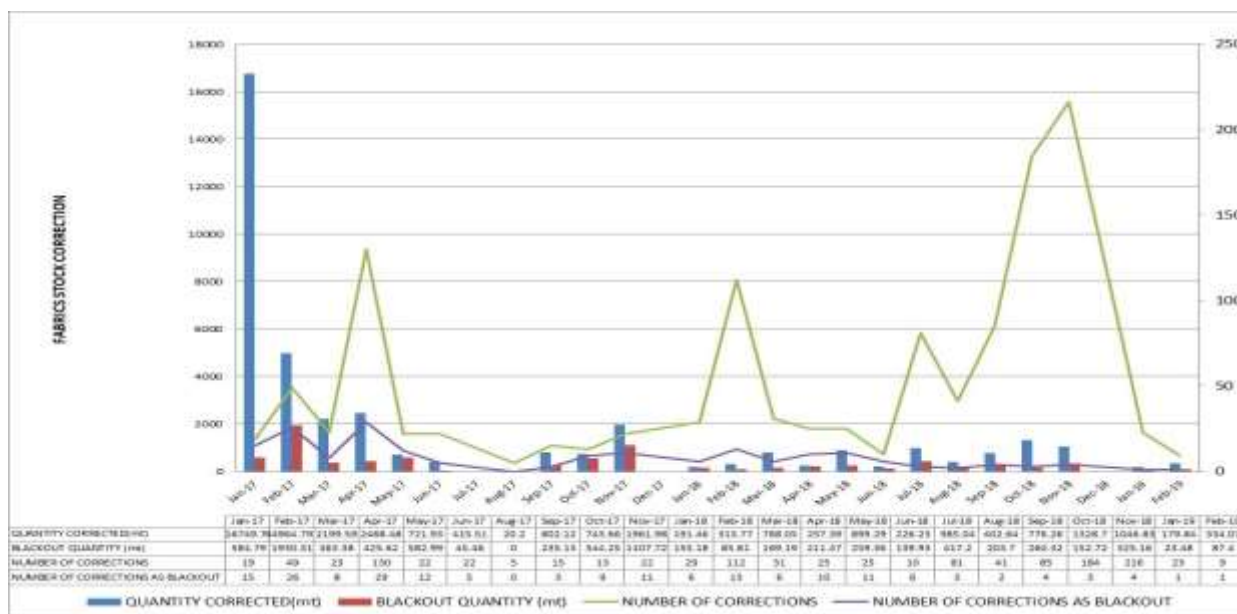


Figure 6. Fabrics stock corrections between January 2017 and February 2019
 Source: Authors' elaboration based on internal data of the company

Figure 7 reveals the value expression of fabrics stock corrections made between January 2017 and February 2019.

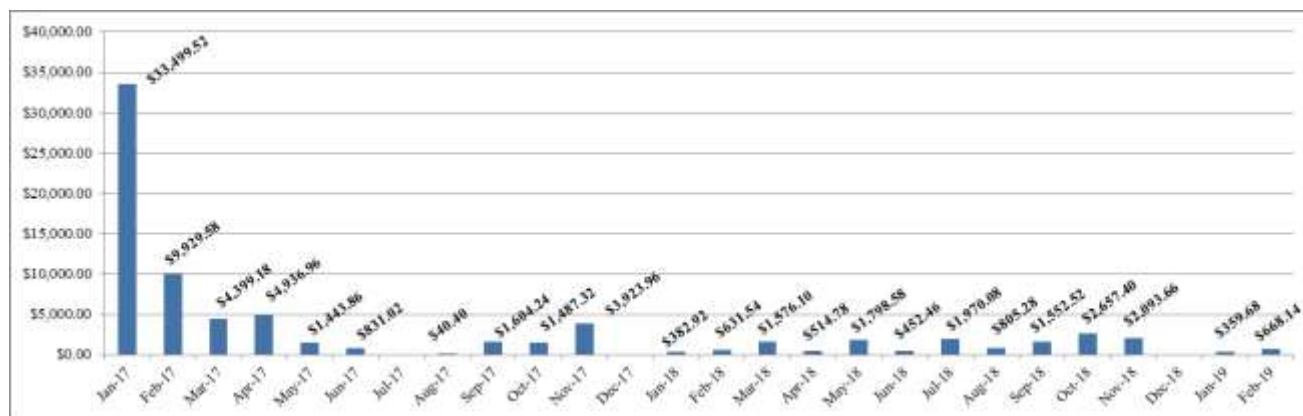


Figure 7. The value of fabrics stock corrections made between January 2017 and February 2019
 Source: Authors' elaboration based on internal data of the company

The inventory from July 2017 highlighted the amount of fabrics that was problematic, mentioning the fact that the stock consisted, at that time, in over 900 types of fabrics that were identified, such as in leather case, as being active fabrics, with low movement and obsolete/out of collection. By comparing the data from the inventories made during the analysed period, it can be observed that the corrections related to the meters of fabrics were substantially reduced. Thus, in July 2017 the inventory revealed corrections of 143032.18 linear meters and, by the end of the year, in December 2017, the corrections made during the inventory decreased to 12326.62 linear meters. This fact brought a 90.68% improvement regarding the accuracy of the stocks. Further, in December 2018 during the inventory the corrections consisted in 7549.32 linear meters, with 1384 stock adjustment movements, meaning that it was a great number of corrections, but with few meters of fabrics. The decreasing values of the inventory during the analysed period shows the fact that the implemented practices lead to improvements materialized in optimized production usage and recordings.

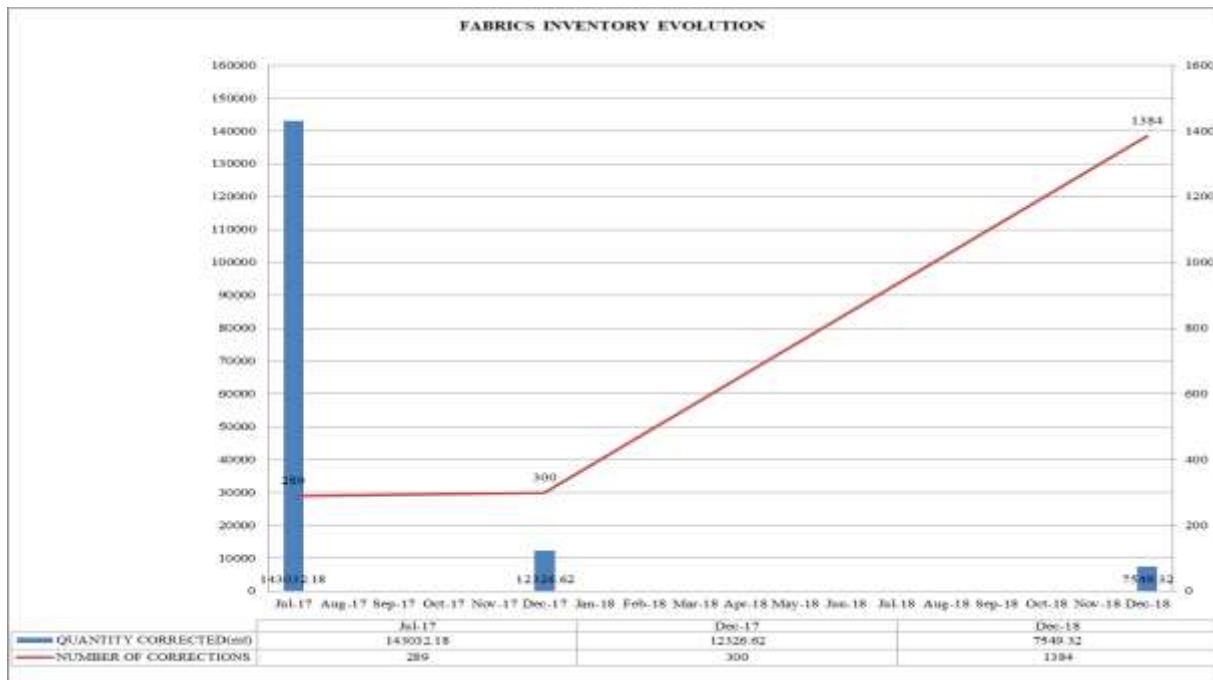


Figure 8. Fabrics stock inventory between January 2017 and February 2019

Source: Authors' elaboration based on internal data of the company

If we relate to financial values, the inventory corrections made in July 2017 accounted \$286,064.36. The control of the stock management was visible until the inventory made in December 2017, when the total value of corrections did not exceed \$24,653.24. With the next inventory, the one from December 2018, the corrections totalized \$15,098.64.

3. CONCLUSIONS

Our study focused on revealing the impact of implementing Kaizen system within a selected company, more precisely, within the department considered to be the core of the production structure. As a consequence of implementing Kaizen tools, the analysis revealed the positive impact on stock control, with reduced number of stock blackouts. Improvements regarding the accuracy of the stocks were recorded both in the case of leather stock, which is the most valuable, and fabrics stock. At the company level, all these positive effects have been translated into important cost savings. Human resource plays a vital role in the succes of implementing Kaizen system and, within the company subject to the study, we noticed that, once employees were trained and overcomed the difficulties in understanding/applying the new concepts, the improvements were evident. As a consequence, a strong team was created, a team that has the ability to identify and report any procedural nonconformity. Thus, proper consumption, proper procurement planning and raw material deliveries over time, eliminating thus production blackouts, represent important improvements achieved by the company.

The company is an example of good practice and a model for the successful implementation of Kaizen management system for companies in the same sector, as well as for companies that activate in other business areas. We believe that the study confirms the success of applying Kaizen principles within the chosen company and we consider that companies in Romania should be more open towards the implementation of a management system aimed at continuous improvement.

The limits of research are given by the fact that the analysis focuses on a single department of the company, which is indeed the most important, and which is the basis for the smooth development of the processes within the other departments of the productive apparatus. For further research, we

intend to extend the analysis to the entire company, by revealing the aggregate improvements, as the implementation process of the Kaizen management system continues in the other structures of the company. In the future, we also intend to analyze more deeply the financial impact of Kaizen management system implementation.

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