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## **THE SIGNIFICANCE OF LEAN CULTURE IN WAREHOUSE MANAGEMENT**

### **Abstract:**

The aim of the paper is to present the essence and benefits of the application of the Lean Management concept, both from the theoretical and empirical point of view (case study). The paper consists of two parts. In the first theoretical part there has been presented the concept of Lean Management, the main characteristics, the rules for the implementation and the advantages. In the second entirely empirical part there have been analyzed the results of the implementation of the Lean concept in warehouse management of the analyzed company. There has been carried out the assessment of the implementation of the discussed concept by means of the guidance of specialists dealing with lean management conducting Lean training in the surveyed company. Lean management has huge impact on the improvement in innovativeness and competitiveness of the analyzed company on the Polish market.

### **Keywords:**

lean management, Lean culture, logistics

**JEL Classification:** R40, Z19

## Introduction

The word “lean” comes from American English and, in case of manufacturing systems, it means “slimming” production in relation to the necessary material resources, maintained inventory of finished products and work in progress and utilized space of production halls (Kubis, 2005). Lean attitude to management refers to manufacturing products or services compliant with customers’ expectations, with a minimum cost and optimal use of resources, by elimination of waste in the whole area of the enterprise activity (Narasimhan et al., 2006; Shah&Ward, 2003; Vonderembse et al., 2006).

The creator of the “lean” concept was John Krafcik who, for the first time, used it in 1988 in his paper published in "Sloan Management Review" (Krafcik, 1988). *Lean Management* is the low-cost approach to management, aimed at eliminating waste and increasing value added of activities. Increasing value added can be performed by simplifying the internal structures and procedures in force in all departments of an enterprise. This may also take place by the application of a set of techniques to make these goods (products or services) be manufactured using the smallest possible amount of means of production, the quality and in time required by customers (then the concept of *lean manufacturing* is used). The source of the Lean concept, apart from American good practices, was also the theoretical methodology of the conduct directed towards constant improvement (PDCA) by W. Edwards Deming, which – although it came into existence in the USA – had the first practical implications only in Japan, probably due to its surprising compliance with the principles of the Confucian philosophy (Baskiewicz&Nizialek, 2013).

In Poland, the Polish translation of the term of lean management (or lean production) was adopted but the English expression is used equally often (Womack&Jones et al., 2001).

The Lean Management system gained in popularity due to the presentation of the way by means of which enterprises may radically change their performance by the application of the approach. In their book, Womack, Jones and Ross presented the results of the international research program IMVP (*International Motor Vehicle Program*) developed in years 1984-1990 in the automotive sector (Womack&Jones et al., 2001). In the study, they compared the parameters of the expenditure and results in Japanese, American and European enterprises. The Japanese company Toyota Motor Corporation with Toyota Production System was recognized as the leader. The authors recognized this system as the first “slimmed” production system, calling it “lean manufacturing” (Womack&Jones et al., 2001). According to the authors, lean production provides an opportunity to manufacture more and more using less and less – less human effort, equipment, time and place – while simultaneously approaching the achievement of the objective which is providing clients with exactly what they want. It is possible by means of the reorganization of all enterprise activities, i.e. (Kubis, 2005):

- order of project, administrative and executive activities,
- organization of materiel,

- functions of machinery,
- human activities.

Similarly, Shah and Ward (2007) define lean production as “an integrated socio-technical system whose main objective is to eliminate waste by concurrently reducing or minimizing supplier, customer, and internal variability.”

In other words, it is necessary to identify the most frequent reasons of errors and wastefulness in the company. According to the original classification by Taiichi Ohno (Liker, 2004), these are:

- overproduction – e.g. manufacturing too much and/or too fast, the result of which is increasing inventory levels and inappropriate information and/or materials flow;
- inventory – e.g. surplus stock and delays in information or products which results in excessive costs and poor customer service;
- defects – e.g. errors of office workers, production shortages, defective deliveries;
- transport – e.g. unnecessary movement of people, information and materials, bringing about wasted time, effort and rising costs;
- movement – e.g. inappropriate organization of workplaces, resulting from non-ergonomic management of workspace;
- waiting – e.g. long periods of inaction of people, information and materials, which results in improper flows and long production cycles;
- redundant processes – e.g. use of inappropriate tools, procedures, methods, often in a situation when an easier solution may become more effective.

The analysis of the terms of Lean Management was also conducted by M. Lisiński and B. Ostrowski (2006), who indicate a large variety of the approaches to this concept. According to them, it can be regarded as “mega-method” which includes a set of principles, concepts and techniques, aimed at the elimination of wastefulness and the implementation of the efficient management system. It is also presented as a vision whose main feature is the idea of constant improvement and also an image of an ideal enterprise. Lean Management is also regarded as a system integrating the objectives of the company along with the objectives of the external partners, which includes lean manufacturing, lean product development, lean supply chain and lean customer service (Lisiński, Ostrowski, 2006). Therefore, the essence of Lean is the complexity of activities and the acknowledgement that the projects undertaken, aimed at making an organization lean, should not end but run constantly, adequately to the requirements imposed by a dynamic environment (Bartusiak, 2000).

## **Lean thinking**

The concepts discussed above indicate that the Lean concept does not have one definition but in each of them there may be identified the terms such as “lean”, “wastefulness” or “elimination”. This, in turn, clearly distinguishes traditional management from Lean management (Table 1).

**Table 1: Mindset characteristic of *Lean Management* compared to traditional systems**

<b>Mindset according to <i>Lean Management</i></b>	<b>Traditional mindset</b>
Scheduled tasks and activities are established in discussion with employees	Production plan and desired performance are determined authoritatively
Cost reduction is the result of an increase in productivity of employees	Cost reduction is the result of investments and automation
Progress can only be achieved through a large number of simple solutions	Progress is possible due to complex solutions
Production materials with defects are eliminated	Defective production materials are repaired within a specific time
Planning and organizing processes takes place depending on the development in a situation	Planning and organizing processes is the responsibility of the management
Errors are immediately removed and wastefulness is eliminated; rejection of errors at source	Errors and wastefulness are in every system
An employee feels responsible for costs	An employee generally does not feel responsible for costs

Source: K. Zimniewicz, *Współczesne koncepcje i metody zarządzania*, Wydawnictwo Naukowe PWE, Warszawa 2009, p. 47.

The popularization of this concept in the world brought about that more and more advisory and consulting companies supplemented their offer with the implementation of Lean. A lot of them developed their own methods and enriched Lean with further benefits for companies. The Capgemini company presented their way of how to increase durability of the implemented changes based on Lean culture. It consists of six steps, which, according to the founders, increases the involvement of the staff in constant searching for and eliminating wastefulness at their workplaces. Apart from that, there were isolated two repeated areas which, in many cases, limit the maintenance of management in accordance with Lean Management in the firm. These are: the resistance of employees against changing habits and no concentration of their activities on aiming at perfection, which is natural while implementing radical changes in an organization. Therefore, the consulting company suggested six steps of implementation of changes.

1. The first step of the Lean implementation, applied in methodology, is so called building readiness for changes. This means that, in the first place, high-level managers must thoroughly familiarize themselves with the Lean philosophy and select some people from among employees who will be responsible for the implementation of new work culture at all levels, and also for the isolation of working groups.

2. In the second step, there are examined clients' expectations, which is subsequently passed directly to employees manufacturing a product. Operational workers find out measurable values such as a plan of tasks to be performed or quality ratios. The aim of this stage is to increase awareness of the responsibility of production workers for their tasks in a workplace.

3. Another step is so called look at value stream, during which employees get to know the idea of adding value in value stream. This means that they will be able to distinguish between activities which, in the eyes of customers, increase value and the ones regarded as wastefulness.

4. In this step the staff responsible for the Lean implementation in the company make sure if employees are sufficiently involved and if they appropriately understand how to look for the sources of wastefulness in their workplaces.

5. The fifth step is the implementation. Trained employees become responsible for their work. They may decide on stopping the production line if, according to their assessment, it will protect the plant against an increase in losses. At the same time, there is created the culture of prevention of losses before they reoccur.

6. In the last step, the structure of the plant is simplified, workplaces are standardized so as to obtain an interrupted time of the flow of manufactured goods. All employees, irrespective of the level they occupy, are heavily involved in the implementation of Lean and improvement of their work. On the other hand, new products are introduced in accordance with the principles based on Lean Manufacturing (Capgemini materials, 2014).

The Lean rules can be applied in every type of environment, even regulated one. It is necessary to remember, though, that every firm performs activities which do not provide value added for customers. Moreover, the applied tools and techniques are mainly dependent on specific situations and needs.

Therefore, the Lean concept is complex in nature. Its objective is to decrease the amount of wastefulness in value stream of every process. It is connected with a specific model of lean company management. The listed rules indicate that Lean enterprises should be focused on customers' needs. The organization of internal processes and the company structure, being subject to these needs, at the same time, should meet the requirements for the optimization of the involved resources and minimization of costs and losses as long as customers obtain exactly what they need at the time when they need, in the amount they need, with no defects or hidden defects. In the view of the above, the manager of a Lean company should, above all, aim at (Hopp et al., 2004; White et al., 1999; Alukal, 2003):

- orientation to customers;
- introduction of group work;
- constant improvement in the functioning of an organization;
- flattening hierarchy and organizational structure;
- elimination of errors as close to the place of their occurrence as possible;
- elimination of surplus stock;
- maintenance of continuous flow of materials;
- wide application of outsourcing.

However, the most important issue in the course of the implementation of Lean culture is changing organizational culture. It is the most essential, which, unfortunately, is not often taken into consideration sufficiently by managers. The negligence of this significant element will result in poor results of the implementation of this concept. Cameron and Quinn (“Organizational culture – diagnosis and change”) prove that changing organizational culture requires personal change, most of all, of managers and conducting the program of their personal development. The consequence of the above is the involvement of the whole staff of the company in activities compliant with Lean culture. The involvement of employees is noticeable, among others, in reporting appropriate suggestions for improvements in every area of the functioning of enterprises, processes and workplaces. The introduction of such improvements, on the one hand, will bring about a decline in human effort, time, complicated equipment, space and, on the other, aims at the improvement in the operation of companies and achieving competitive advantage (Piasecka-Głuszka, 2013).

### **The application of Lean in warehouse management - case study**

Nowadays, a huge challenge for enterprises dealing with services is, most of all, increasing efficiency. An effective method may become the implementation of Lean culture in an organization. The surveyed company was subject to transformation due to the implementation of the concept of Lean Management.

Lean Management functions very well in production companies. The concept leads to the elimination of losses but also allows for increasing flexibility of an organization, simultaneously providing an opportunity for better use of own resources in a company. An increasingly significant and up-to-date challenge is the transfer of solutions and practices which were applied in many Toyota factories to the environment of the service company. The transformation aimed at the implementation of Lean culture was chosen by the global company with the logistics warehouse in Poland, which is the subject of the research of the following considerations.

Initially, there was prepared the schedule of the project of building Lean culture in the investigated company, which included the Lean Tools and Lean Games training, the analysis of the present status (identification of problems), and also preparation for workshops along with the summary of the project. The implementation of the program was initiated with workshops with the management of the company during which there were defined the main areas where Lean culture could result in market success of the company. There were specified the objectives of the program of building Lean culture in the following categories<sup>1</sup>:

- customer – increasing value added, raising the level of customer satisfaction, solving operational problems with customers, identifying common goals for all participants of the logistics chain,

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<sup>1</sup> *Materials provided by the analyzed company.*

- employee – motivating and involving a team of employees in constant identification and elimination of wastefulness and creation of value added for customers,
- increase – creating competitive advantage, providing conditions for revenue growth and market share,
- efficiency – an increase in productivity of processes and flexibility of the logistics chain.

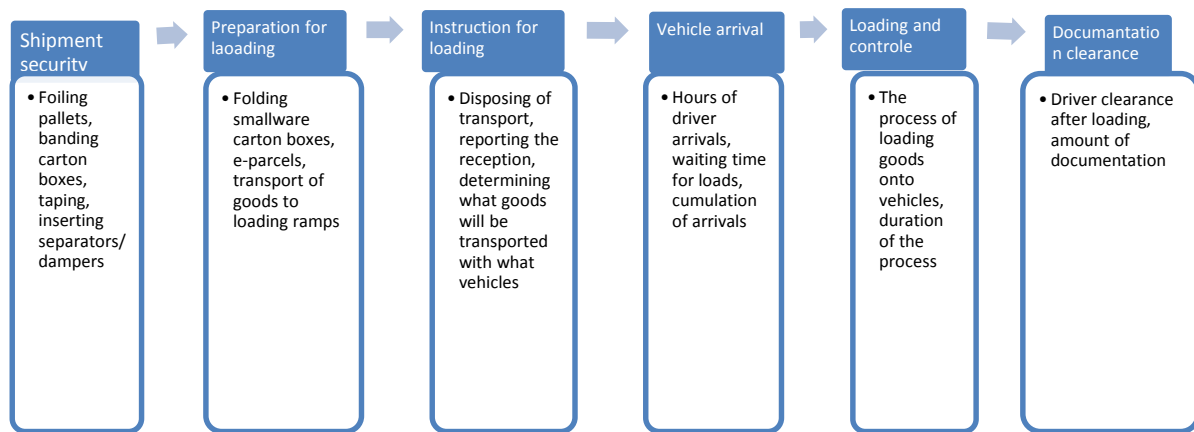
The main intentions aimed at the improvement of the functioning of the surveyed company included the improvement in the following indicators<sup>2</sup>:

- an increase in the margin by 2% in 2014 compared to 2013 – an increase in EBIT (Earnings Before deducting Interest and Taxes) by 300 TPLN;
- a decrease in the number of errors by 25% in 2014 compared to 2013 – a decrease by 50 errors;
- a decrease in the amount of damages by 25% from January 2014 compared to 2013 – a decrease by 380;
- an increase in productivity by 10% on the basis of synthetic performance indicator according to the ML report, from April 2014 compared to 2013;
- the implementation of 120 Kaizen in 2014;
- building awareness and involvement of employees in Lean Culture, particularly taking into account the management staff.

The areas included by workshops are the three areas with reference to which there were identified the problems and also presented the solutions using Lean Management techniques. There were also specified the problems the participants of the workshops worked on (divided into groups) to find appropriate solutions. Initially, there was defined the warehousing process individual tasks performed in the warehouse, which is graphically presented in Figure 1.

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<sup>2</sup>*Ibidem.*

**Figure 1: The warehousing process in the analyzed company**

Source: Materials provided by the analyzed company

There were also specified some problems in the warehousing process, which are presented in Figure 2. They are directly related to the issues such as<sup>3</sup>:

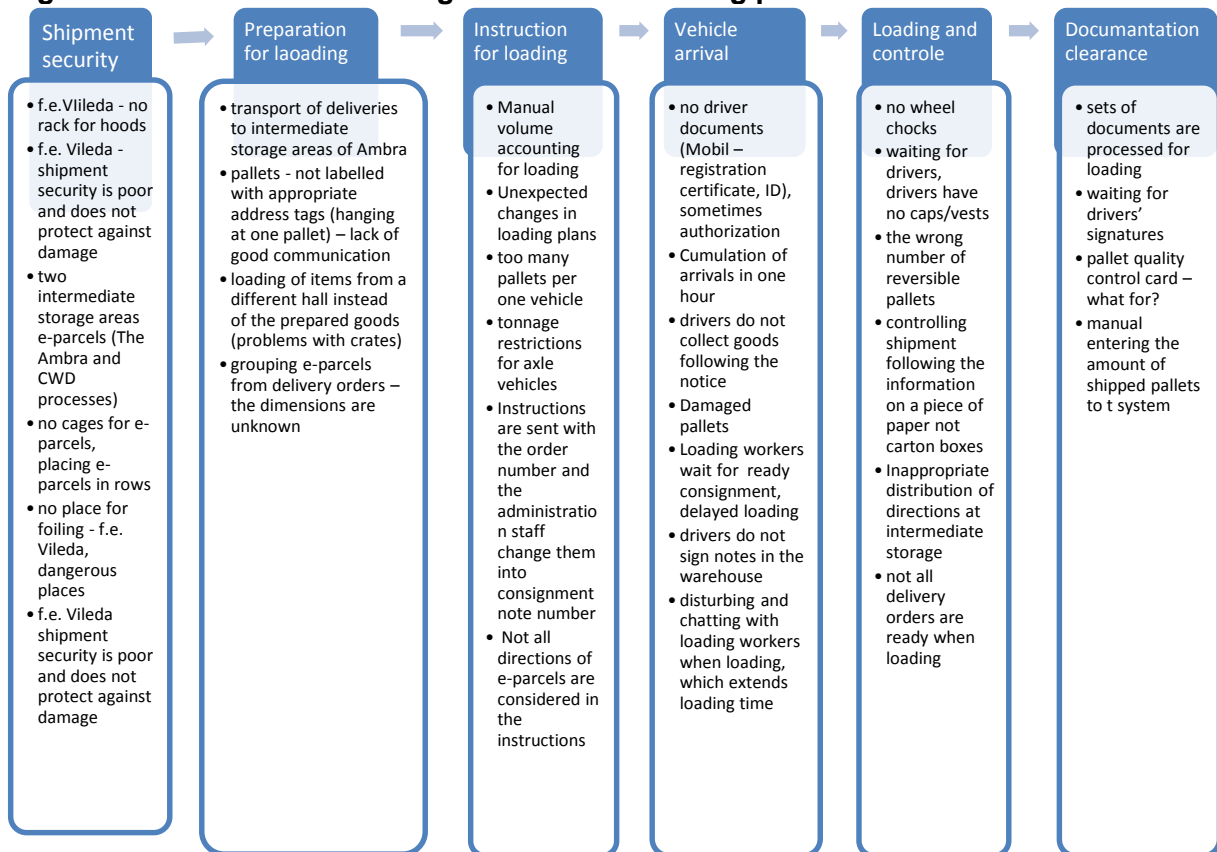
- e – parcel process – the problem is too complicated process of preparing e-parcels. There are involved the warehouse workers, a person from administration department and also a dispatcher. The objective is to eliminate excessive processing, freeing space in the warehouse and the resources themselves with reduction of errors;
- distribution of loading ramps – The problem is too long C/T of loading pallets on a vehicle, a long time of getting to pallets. The objective in this area is the elimination of excessive movement, shortening the time of loading onto vehicles (mix), releasing the resources and reducing the amount of errors;
- e-parcel labelling – The problem is sticking two labels to CWD e-parcels. Two warehouse workers work on that from the moment of the implementation of e-parcels in the logistics warehouse. The objective is to eliminate excessive processing, reducing costs and the amount of errors;
- communication problems and elimination of errors – the objective is to eliminate errors which occur as a result of communication problems of lack of understanding of commands, reducing the amount of damages and better workflow;
- system acceptance – illegible customer labels by HTS, lack of labelling standard while processing returns, the need to manually create the notices of returns in the system;
- lack of labelling standard while accepting returns;
- physical acceptance (warehousing) – the average measurement time - 10h 55min. The elements hindering current warehousing of deliveries include: lack of a dedicated person dealing with unloading, distribution and warehousing of deliveries, accepting deliveries in virtual locations, retention of deliveries at ramps on intermediate storage areas;

<sup>3</sup> *Ibidem.*



- lack of control of warehousing in blocks (the intended location labelled with a marker on pallets or with a pen on a delivery receipt);
- warehousing: no place for storage of goods. The paper version includes the information on how much goods there should be in a location, an electronic version is not available in all projects (lack of Office package), stocktaking is not performed at the beginning of a day, therefore, the data from the printout do not necessarily cover the existent amount (goods collected for orders);
- lack of designated places and consolidated pallets with carton boxes for completion;
- an increase in the involvement of employees;
- no employees dealing with board meetings;
- no board meetings following corporate standards.

**Figure 2: Problems at each stage of the warehousing process**



Source: Materials provided by the analyzed company

The activities which allowed for the performance of tasks were the steps of the 5S method, the application of which enabled the identification and elimination of wastefulness. By means of this, only the tools necessary for work were in workplaces and employees would not waste time searching for the tools they needed. The 5S technique also affects the reduction in the total time of manufacturing and costs since well-maintained machines are less exposed to failure and all problems and irregularities are promptly noticeable. To achieve this, there were used so called “red cards” during workshops in all places and points where the due order was not kept.

There was a segregation of duties and, at the same time, the delegated person was responsible for the appropriate performance of a task to eliminate all difficulties.

The logistics warehouse company also used the Kaizen method, which consists in the company development, its innovativeness, efficiency, not as a result of revolutionary changes or large investments but due to systematically and patiently undertaken small steps enabling development and having impact on the quality of work. This was the case of the investigated logistics warehouse. By means of this method, the following were performed successfully <sup>4</sup>:

- designation of places and consolidation of pallets with carton boxes for completion;
- optimization of printouts in a new project – among others, a possible change of a printing place;
- implementation of the standards of distribution of labels;
- development and implementation of the list of priorities for employees on a workday;
- developed and implemented solutions concerning the visualization of processes (among others, the implemented boards, at each stage, monitoring standard deviations, visualization of pallet construction, a monitor with an online message concerning current workload, others developed by the Team);
- development of standards of labelling warehouses and other premises;
- others – after consulting the coordinators of individual projects.

Moreover, there was implemented the system of board meetings and so called “Problem Solving”<sup>5</sup>:

- board visualization;
- the selected people holding board meetings;
- the implemented instructions for effective board meetings;
- the selected clues for board meetings;
- development and implementation of standards of solving problems concerning board meetings using Lean Tools (minor problems - 5 x Why, average problems - Kaizen, complex problems - A3 card);
- the implementation of board meetings for the management of the analyzed company.

## **The assessment of the implemented Lean concept in the analyzed company**

Each treatment lasts and is effective only if a patient strictly follows a doctor’s advice, takes medicines every day, and finally, changes their lifestyle and thus prevents the

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<sup>4</sup> *Materials provided by the company.*

<sup>5</sup> *Ibidem.*

recurrence of the symptoms. This simple analogy perfectly describes the way and time of implementation of tools and methods in the field of Lean Management.

In case of the company in question it was (and still is) “healing” the company and restoration of its performance. However, without an active participation and involvement of all employees not much would be achieved. The workshops, aimed at creating Lean culture, allowed for successful initiation of care and constant improvement in the enterprise activity using the method of small steps. One or two training sessions are not enough, therefore the company is planning to organize this type of workshops to improve the operation of the company and also to provide services to the customers at the highest level. Consecutiveness of events is necessary for fluent implementation of changes and, at the same time, it allows to notice the results of activities as early as from the initial stage of the introduction of principles of Lean Management. While implementing this type of methods in the company “structures”, above all, it is essential to lead to the change in the culture of thinking in the company, which is always the most difficult and time-consuming stage. Also, it is important to constantly encourage people to become better and show benefits from self-development and one’s own work.

The scope of implementation of all objectives and assumptions, which were prepared for the realization in Teresina, included a few areas. Each of them was divided into specific thematic modules:

- Analysis of the current situation – using Value Stream Mapping there were determined and described the main operational problems and challenges created by the customers of the company. Success was precisely measured and, most of all, the reasons for wastefulness were identified by accurate specifying particular activities in the warehousing process. The analysis was concluded with the session of defining some improvement initiatives in which there were involved, most of all, operational workers;
- Complex educational program – during workshops it was addressed to high-level employees. Training aimed at spreading Lean culture and techniques. Training in problem solving techniques was particularly popular with all the employees. The managers also took part in the Lean Leadership program, preparing them for new roles in the company;
- Implementation – on account of a large number of improvement initiatives the implementation was divided into three stages. The first stage concentrated on the foundations of Lean culture – organization of a workplace; visual management – depicting the course of processes in a place of their development, visualizing operational results at individual stages of the process; initiating everyday *board meetings* – short operational meetings, during which there are discussed and analyzed operational results from the previous day, identified and solved current operational problems, discussed the work plan for another day; starting the process of constant problem solving and development

of processes by employees of all levels. Moreover, the attention was drawn to the Kaizen method, which was very useful while accomplishing the initially assumed objectives. The organizers of the workshops hope that the implemented ideas will remain in the company and the involvement among the employees will continue to be high.

During the whole program of workshops in the surveyed company there were specified and eliminated most problems and developed the assumed goals. It brought about some measurable benefits for the company, such as: reduction of errors, maintaining order in the area of the warehouse, systematization of activities or employees' tasks. The highest level of the listed services was to be maintained at the lowest possible cost. In the longer term, productivity was improved, which allowed for dealing with a larger amount of parcels without the necessity of increasing resources, i.e. logistics space, the staff. When the project was ended, there were also observed some positive changes in the behavior and attitudes of the employees. The participants of the workshops were satisfied and thus it was possible to implement the above methods into the operation of the company. Most of all, there raised the awareness of regular operational employees, concerning the course of the logistics process and the ways of creating value added for the customers of the company. The employees felt that they had huge impact on creating the work environment and they got involved in a constant process of reporting and implementing improvement initiatives, which can bring about savings for the company and create value for the customers.

By means of the applied methods, the activity and operation of the analyzed company was positively influenced, at the same time, the objective concerning training of employees, e.g. to hold board meetings, was accomplished. Moreover, there were created the instructions for e-parcels, and also there was implemented a newly designed label for e-parcels. Facilitating the access to working tools, more ergonomic and effective workplaces caused that in the area of the warehouse there is a pleasant work environment. An important movement for the implementation of methods into the "life" of the company was the organization of the card system, which enabled, among others, the elimination of unnecessary objects from a workplace.

## **Conclusions**

The example of the analyzed company in Poland indicates that the implementation of Lean culture in the environment of the service company is possible and brings about measurable business benefits to the company and not only, since it is the concept which strongly binds human resources of an organization. Employees get involved in the transformation of the company and constantly search for further "lean" solutions for their activities. Moreover, they feel responsible for their own and the work of others in an organization.

Summing up, this concept assumes the elimination of all kinds of wastefulness, which is reflected in surplus stock, overproduction or correcting deficiencies or errors in the documentation, unnecessary movement of materials. The listed dysfunctions are significant for quality, costs and duration of processes, both administrative and operational ones. Therefore, not without reason, organizations, irrespective of the type of activity and industry, refer to this concept of management.

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