

APPLICATION OF LEAN MANAGEMENT METHODS AND TECHNIQUES IN NON-PRODUCTION DEPARTMENTS OF SELECTED ENTERPRISES – RESULTS OF THE STUDY

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Abstract

A growing number of implementations of the lean management concept and training courses carried out by various entities (both private and public) are the evidence for the growing interest in lean management of companies operating in Poland. At the same time the literature turns more and more attention to a certain universalism of the Japanese concept which refers to the possibility to apply lean management methods and techniques not only in production departments. For example, it is applied in local government units, non-profit organizations but above all, in various functional units: HR, accountancy, sales, marketing. The purpose of this paper is to present and characterize lean management methods and techniques used in non-production departments on the example of selected enterprises. The article presents the results of empirical studies conducted in Polish business practice. 20 production companies were covered by the study which made use of an in-depth interview.

Keywords: *kaizen, standardization, visual management, 5S, VSM (Value Stream Mapping), non-production department.*

1. Introduction

Lean management is a Japanese management concept which consists of maximum effort to make an organization slimmer in different functional areas. It refers to organization and optimization of business processes, not only the production ones but also office, service processes (Locher, 2012, p. 12). It should not be confused with outsourcing which refers to sourcing certain processes externally. Lean management is a broader concept since it involves elimination of waste (Krasinski, 2014, p. 30). According to Ford (2007), waste is lack of capacity to use human labor during the manufacture

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of a given product: *'my theory of waste focuses not on the product but on the work done to manufacture it ... We are interested in the use rather than behavior. We want to use raw materials up to the maximum extent so as not to waste people's time. Raw materials cost nothing. They are of no importance until they get into the hands of someone who knows how to use them'* (Ford, 2007, p. 91). According to Shigeo Shingo there are seven types of waste:

- 1) Overproduction – manufacture of larger quantity of products than needed at a given time, improper flow of information.
- 2) Defects– insufficient quantity of materials, poor quality materials.
- 3) Unnecessary inventory – excessive quantity.
- 4) Inadequate manufacturing methods – use of inappropriate tools, manufacturing processes.
- 5) Excessive transportation – unnecessary movement of goods, people and equipment.
- 6) Waiting – lack of manufacturing materials, information on the number of the manufactured products.
- 7) Excessive motion– due to inappropriate organization of the workplace (Czerska, 2009, p. 32).

Companies with the implemented lean management concept strive to provide customers with maximum value and minimize waste. Lean management involves improvement of processes through highlighting problems that need to be improved. Any company applying the principles of lean is trying to maximize the value delivered to customers and minimize waste. Lean organizations achieve these goals by optimizing the flow of goods and services driven by demand (Locher, 2012, p. 15).

Lean management consists of management methods and techniques (Table 1) which are to contribute to eliminating waste and stabilizing processes. It is an exemplary collection which may vary depending on the company, industry. A basic tool in lean management is standardization. According to Imai (2012) it is the foundation on which Japanese management methods and techniques are based, which explains the reasons of the failure to maintain lean management in foreign enterprises. The problem has been noticed particularly during the last decade when kaizen and other strategies have begun to earn growing popularity in the world. Unfortunately, the numerous benefits there from have been squandered due to lack of solid foundations in the form of standards. (Imai, 2012, p. 89).

However, we should not only focus our attention on the tools and methods of lean management. Without the transformation of the workflow processes the implementation of the selected tools or methods may lead to isolation of functional departments. Therefore it is important to get to know all the business processes and to identify those that influence delivering value to customers (Locher, 2012, p.17) which may be done by Value Stream Mapping. It is a

technique that allows to get to know the entire process from the supplier to the customer along with the flow of materials and information. It is a description of activities implemented in the process (Rother & Shook, 2009, p. 4).

The concept of lean management was first applied in production departments (lean manufacturing). However, the literature and business practice show that it is more and more often applied in non-production departments. The question is which lean management methods and techniques may be applied? The purpose of this paper is to present and characterize lean management methods and techniques used in non-production departments on the example of selected enterprises. The article presents the results of empirical studies conducted in Polish business practice.

Table 1. Selected methods and techniques that make up the concept of lean management

Name	Classification
Just in Time	Method
Hoshin Kanri	Method
Total Quality Management	Method
Six Sigma	Method
Kanban	Technique
Kaizen	Technique
Value Stream Mapping	Technique
Poka yoke	Technique
5S	Technique
Andon	Technique
TPM (Total Productive Maintenance)	Technique
SMED (Single Minute Exchange of Die)	Technique
Standardization	Technique
Visualization	Technique

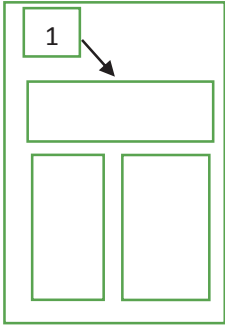
2. Characteristics of the selected lean management methods and techniques

Based on literature and the author's empirical studies it can be concluded that selected lean management methods and tools are used in non-production areas. They can be used in the sales, marketing, purchasing, accounting, human resources management departments (Locher, 2012, p. 9-10). In addition, it should also be noted that more and more companies providing services and local government units decide to implement lean management.

All companies, both manufacturing and those providing services, are similar. Their businesses are based on a series of processes which, taken together, allow them to perform business tasks. In fact, certain processes and functions such as hiring employees, ordering materials, accountancy, invoicing, etc., are common to both types of companies (Byrne, 2013, p. 177). Such a large number of implementations of lean management may be the result of the effects of application of this concept which include: reduction of the number of complaints, higher product quality, improved relations with employees, reduction of wastefulness, increase in job satisfaction, increase in employee education (Podobiński, 2014, p. 86). Lean methods and tools that can be used in non-productive departments include (Locher, 2012): standardization, visual management, 5S, kaizen, and kanban.

VSM Standardization of work, as mentioned earlier, is one of the foundations of the described concept. It is the best, the easiest and the safest way to perform a specific activity. Thanks to standards it is possible to prevent errors and process variation (Miller et al., 2014, p. 172). Standardization presents which activities make up a process and in what order the tasks are to be performed. It is important in case of training new employees. It may be used in case of the process of handling order (Table 2). Standards may be improved. Employees should influence their creation and changes. However, it is important that they are being complied with. Thanks to it each employee performs a given activity in the same way, which allows eliminating volatility. Experienced people should not create standards as they tend to forget about the fundamental, obvious activities in the process.

Table 2. Example of the standardized work instruction.

Standardized work instruction			
Process: Handling orders			
Operation: Entering the order			
Task	Key points	Duration	Visual indication
Entering an order	<ul style="list-style-type: none"> - First enter the title and then individual items - To ensure appropriateness of processing the order, all the mandatory fields need to be filled in -etc. 	<ul style="list-style-type: none"> - 5-10 minutes per order - Enter on the day the order is received 	

Source: Locher (2012, p.42).

In addition, based on the author's observations of the participants, it can be stated that standardization occurs in the form of e-mail templates that include orders, operational instructions in a project, the so-called template (showing what documents should be included in the file and what activities should be performed), and documents used to perform stock-taking.

In addition, the so-called template has a visualization of the process applied. At every stage of the project the color of the tab in the program is changed. The expected benefits, thanks to the use of visualization, is reduction of waste by reducing unnecessary movement and waiting.

Another lean management technique used in non-production departments is 5S. It refers to organization and order in the workplace. It is a Japanese tool consisting of five words beginning with the letter „s”. In the literature you can find the equivalent in Japanese and English:

- 1) Seiri (sort) which means selection. It relates to division into necessary and unnecessary objects at a particular moment. Unnecessary materials are marked with a red label.
- 2) Seiton (set in order) which means systematic. It relates to arranging necessary things in such a manner that they help perform everyday tasks.
- 3) Seiso (shine) which means cleaning. Every employee should take care of the cleanliness of their workplace.
- 4) Seiketsu (standardize) which means standardization. It relates to formal representation of the implementation of the three previous points (seiri, seiton, seiso) and the determination of tasks and persons responsible.
- 5) Shitsuke (sustain) which means self-discipline. It is the biggest problem in companies operating in Poland. It relates to compliance with earlier stages and monitoring the implementation of the previous points (Paton et al., 2011, p. 324) .

It seems to be a simple tool that saves time (an employee does not have to look for equipment, tools) and affects the aesthetics of the workplace, which is important especially in departments with direct customer contact. It involves arranging the necessary tools and documentation in such a manner that they will facilitate work. The most difficult stage is self-discipline. Therefore 5S audits involving checking compliance with the standards play an important role. The expected benefits of the application of 5S is the reduction of wastage by eliminating unnecessary movement, which may affect faster execution of customer orders.

Technique that may be applied in non-production departments is kaizen. It involves continuous improvement of processes. It relates to reporting small changes in a continuous manner by all members of the organization ‘...*this continuous improvement of the existing organization should engage both top*

management, mid-level staff and all other employees. Kaizen encompasses the entire organization and all entities operating as its part' (Ćwiklicki & Obora, 2009, p. 17). Kaizen does not involve a series of workshops, training courses. It cannot be a one-off situation.

Kaizen can be divided into two types. The first relates to everyday management. Each day an organization faces unforeseen situations, failures, problems that must be eliminated as soon as possible. The second type of kaizen refers to the improvement of standards (Liker & Convis, 2012, p. 147).

Due to the commitment of all the company employees in submitting ideas it is possible to improve the entire value stream and, ultimately, also the entire company. The kaizen system is assumed to be holistic (Figure 1). At first, the ideas submitted by employees relate to a single workstation, unit. However, accumulation of ideas makes the many processes that affect the entire department improve. Improvements applied in a given department may be implemented to other departments, which makes it possible to improve the entire value stream.

Kaizen is often used in non-productive departments in the form of the so-called book of ideas. Each employee may submit their improvement idea which is then reviewed by the supervisor. Unfortunately, compared to the Japanese culture, Poles are not in the habit of self-development. Therefore, kaizen is often correlated with cash bonuses. An employee is rewarded with additional remuneration for each implemented idea. Thanks to the use of kaizen the expected benefit is the possibility to eliminate all types of waste (overproduction, defects, unnecessary inventory, improper manufacturing methods, excessive transportation, waiting, unnecessary motion). An applied and implemented idea may contribute to a change in the entire or a part of the process.

Another management technique used in non-productive departments is kanban. This technique is used in the Just in Time method. It enables companies to manufacture the quantities of products ordered by the customer, which results in low level of inventories (Hopp & Spearman, 2000, p. 163). It is based on two principles: pulling and supplementing. The first is the negation of manufacturing with the use of maximum capacity. Manufacturing should be focused on the quantities required by the customer. The order should trigger production. The second principle applies to restocking components, tools (Liker, 2005, pp. 177-178). The introduction of kanban results, among other things, in: increased productivity and time savings (Krawczyk, 2011, p. 272) which influences reduction in waste through eliminating unnecessary movement, overproduction and excessive transportation. The kanban system is designed to track the performed work. Thanks to visualization, by using

kanban cards and board it is possible to analyze what is the actual stage of the task realization (Hammarberg & Sundén, 2015, p. 72).

The tool that may be applied in each type of enterprise and in all departments is Value Stream Mapping. It involves visualization of the process and dividing activities into two categories:

- 1) Activities creating value for the customer.
- 2) Activities not creating value for the customer (Jones & Womack, 2007, p.1).

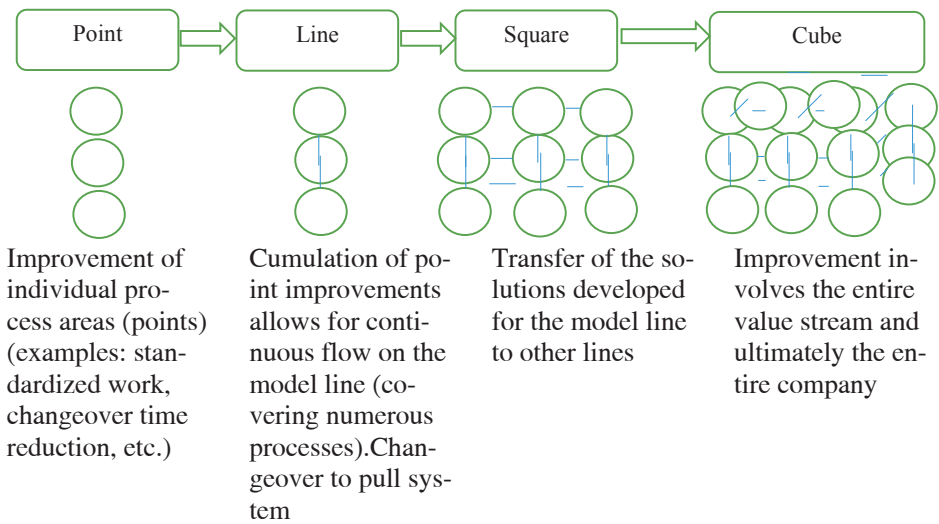


Figure 1. Accumulation of improvements from the point to cubic improvement

Source: Hamel (2014, p. 33), in Hirano (1990).

Value Stream Mapping involves building two maps: the current status and the future status. The future status map presents the flow of materials and information. It is the basis for identification of waste (Jap. muda) and determination of the time required for the manufacture of the finished product (Lead Time and Processing Time) (Czerska, 2009, p. 47). The future status map, that will eliminate bottlenecks and improve material and information flows, can be built based on the current status map. Identifying all of the tasks implemented in the process is very important not only among new employees but also among the experienced ones. Some activities previously performed may turn out to be unnecessary or may be simplified. Therefore, this tool is applied in all departments of the company.

3. Research methodology and characteristics of the research sample

Empirical studies were conducted among 20 enterprises that apply the concept of lean management. The method that was applied was the In Depth Interview. The sample was selected at random (the main criterion involved the consent for the participation in the study). Most of the companies were located in Lower Silesia. The interviews were conducted among senior management. In addition to questions about the characteristics of the examined entity (the source of the capital, the headcount) the interview included questions about:

- characteristics of the selected lean management methods and tools (when they were implemented, in which departments),
- entities involved in the implementation of lean management (external company, special unit in the company),
- barriers during the implementation (including cultural ones),
- factors affecting implementation of lean management along with specification of the impact of each of them (no impact, small, medium, large, decisive),
- positive effects of the application of lean management,
- negative effects of the application of lean management,
- ways to counteract negative effects,
- criteria for the assessment of lean management.

The author used the following research *hypotheses*:

H1: Selected lean management methods and techniques are applied in non-production departments in companies operating in Poland with varying capital of the dominant owner.

H2: The dominant non-production department which applies the selected lean management methods and techniques is the purchasing department.

H3: The most frequently used lean management technique is standardization.

Ultimately, 17 companies that apply the concept of lean management across the entire company or in the selected non-production departments, i.e.: Accounting (4 companies), Purchasing (15 companies), Traffic Maintenance (11 companies), Warehouse (11 companies) Quality Department (12 companies), qualified for the analysis. Companies with American (4 companies), German (4 companies), Korean (1 company), Polish (4 companies), British (1 company), Swedish (3 companies) capital participated in the study. The sample is not representative and therefore the results should not be generalized. The results are of a sample survey nature, serve as an exemplification of specific observations and require further research.

4. Description of lean management methods and techniques in enterprises – presentation of the results of the study

Based on the study the author has identified 5 lean management methods, techniques applied in non-production departments. These are: kaizen, kanban, 5S, visual management, standardization.

Lean methods and techniques applied in all enterprises were first of all implemented in production departments. After the lapse of 2 to 3 years they have been implemented in non-production departments. Below you can find the characteristics of individual lean management methods and techniques based on descriptions made by the entities covered by the study. Lean management methods and techniques applied in the enterprises covered by the study are presented in Table 3:

Table 3. Lean management methods and techniques in the tested sample

Lean management method/technique name	Number of companies
Kaizen	15
Kanban	1
5S	14
Visual management	17
Standardization	17

Kaizen

Most problems in the functioning were caused by the Kaizen technique. In face-to-face interviews with the management staff the author learned that the number of improvements introduced under kaizen in some companies is imposed from above (6 companies). This means that each employee „must” submit a certain number of ideas in a given period of time. Such action is contrary to Japanese values. In addition, the value of an idea that has been presented solely for the sake of recording improvement seems puzzling. The kaizen idea refers to submitting ideas which are necessary and will eliminate waste (all forms of it). Therefore, the number of improvements should not be ordered as this may produce an undesirable effect in the form of unnecessary changes. However, it is very difficult to encourage employees to kaizen in the Polish culture. This is due to the lack of understanding for the aim of improvements and due to culture factors. Application of cash bonuses for improvements is a method of motivating employees. There are situations of random draws in order to once a year select the best improvement, which is also associated with an additional cash bonus. One of the companies covered

by the study awards points for improvements. The number of points depends on the cost savings for the organization. Points may be exchanged for prizes or money. All companies applying kaizen managed to reduce waste in the form of inappropriate methods of manufacture

Kanban

In one of the companies under study kanban has been implemented in a non-production department. Kanban cards are used to measure the consumption of office supplies (pens, pencils, notebooks, sticky notes, tape) per employee. In addition, after the minimum status is exceeded an order is placed. Every employee who had collected materials is required to enter their name and surname into the book of collection and to place the kanban card on the board. At the end of the month the value of collections per employee is calculated. Management staff are trying to standardize certain level of office supplies which is currently highly variable. It is estimated that this measure will save about PLN 20 000 per year. The benefits of using kanban is the reduction of waste in the form of unnecessary inventory and overproduction.

5S

The study has allowed for identification of barriers existing in the functioning of the 5S technique. None of the examined enterprises applies the last step, i.e. self-discipline (Jap. *shitsuke*). This is due to the differences between the Polish and Japanese cultures. Furthermore, three enterprises apply 3S and one applies only 2S. This situation takes place in companies that have participated in the system transformation, i.e. the transition from centralized economy to market economy. A large number of employees has more than 30 years of work experience. They believe that the manner to perform a given activity has not changed and it should stay unchanged. They feel reluctant about the introduction of changes at their workplace. In addition, inciting younger employees can be observed. Few employees are willing to participate in training courses. The benefits of using 5S is reduction of waste by eliminating deficiencies in tools.

Standardization and visual management

Standardization and visual management are found in all enterprises. Their application, according to the respondents, accelerates the process of communication and simplifies processes in an organization. In addition, it

improves the process of induction for new employees. Standardization and visualization are used in the form of workstation descriptions. Drawings and photographs show the way a workstation should look like, which is assessed during 5S audits. The application of standardization and visual management made it possible to reduce waste in the form of: inappropriate manufacturing methods, downtime, and unnecessary movement.

Standardization and visualization are used in internal computer programs. Every employee after entering a file is presented with activities that must be performed. Having finished working in a given program they should go back to the standardization card and tick which activities they have completed, thanks to which a color indicating the level of progress is displayed in the tab (visualization). In one of the companies (Korean) there has been identified too big a number of standards which resulted in lack of clarity and readability. The employees did not know which standard they should adhere to. After reporting the problem it was solved during the daily meetings of lean coordinators. The applied selection of standards reduced their number to 40. The other companies did not identify the problem of a large number of standards.

5. Conclusion

To sum up, the aim of this article was the representation and characterization of the methods and techniques of lean management used in non-production departments on the example of selected enterprises. The concept of lean management along with management methods and techniques are more frequently applied. Based on the research the author has identified 5 lean management techniques that are used in non-production departments: kaizen, kanban, 5S, standardization, visual management. The reason for their implementation were, among other things, the positive effects for the company. Each of the organizations covered by the study had lean management implemented first in their production departments and then in the non-production departments. Depending on the company they are used in the following departments: accountancy, purchasing, traffic maintenance, warehouse, quality. Based on the research and informal talks, more and more lean management techniques will be implemented in non-production departments, including the VSM (Value Stream Mapping), poka-yoke. The biggest problem is the measurement of the time necessary to complete a task in non-production departments. It is required for Value Stream Mapping but also to manage the process. It may be argued that implementation of the selected lean management methods and techniques in non-production departments is more difficult than in production. There is no flow of materials and finished products and so it is difficult to determine what stage a given

task is at. However, the positive effects of the application of lean management influence the decision of management staff concerning the implementation and transfer of solutions that had been used in production departments to selected functional departments. Thanks to the application of selected lean management methods and techniques the examined enterprises succeeded in reducing waste. The hypotheses formulated by the author have been realized through the test results.

The subject matter of the article is the source of inspiration for the author for the next research project, this time involving the identification of lean management methods and tools applied in local government units.

References

- Byrne, A. (2013). *Jak zrewolucjonizować firmę dzięki Lean Management: czyli jak prezesi, dyrektorzy i właściciele wykorzystują zasady Lean Management do transformacji swoich firm i do zwiększenia wartości dostarczanej klientom*. Wrocław: Lean Enterprise Institute Polska.
- Czerska, J. (2009). *Doskonalenie strumienia wartości*. Warszawa: Difin.
- Ćwiklicki, M., Obora, H. (2009). *Metody TQM w zarządzaniu firmą: praktyczne przykłady zastosowań*. Warszawa: POLTEXT.
- Ford, H. (2007). *Dziś i jutro*. Wrocław: ProdPress.com.
- Hamel, M.R. (2014). *Warsztaty kaizen: praktyczny poradnik jak prowadzić skuteczne warsztaty doskonalenia procesów*. Wrocław: Lean Enterprise Institute Polska.
- Hammarberg, M., Sundén, J. (2015). *Kanban: zobacz, jak skutecznie zarządzać pracą*. Gliwice: Helion.
- Hopp, J.W., Spearman, M.L. (2000). *Factory physics: foundations of manufacturing management*. Boston: Irwin/McGraw-Hill.
- Imai, M. (2012). *Gemba kaizen: zdroworozsądkowe podejście do strategii ciągłego rozwoju*. Wrocław: Profes.
- Jones, D., Womack, J. (2007). *Zobaczyć całość: Mapowanie rozszerzonych strumieni wartości*. Wrocław: Lean Enterprise Institute Polska.
- Krawczyk, S. (2011). *Logistyka: teoria i praktyka, tom II*. Warszawa: Difin.
- Liker, J.K. (2005). *Droga Toyoty: 14 zasad zarządzania wiodącej firmy produkcyjnej świata*. Warszawa: MT Biznes.
- Liker, J.K., Convis, G.L. (2012). *Droga Toyoty do Lean Leadership: Osiąganie i utrzymanie doskonałości dzięki kształtowaniu przywódców*. Warszawa: MT Biznes.
- Locher, D. (2012). *Lean w biurze i usługach: przewodnik po zasadach szczonego zarządzania w środowisku pozaprodukcyjnym*. Warszawa: MT Biznes.

- Krasiński, M. (2014). *Kulturowe uwarunkowania wykorzystania japońskich koncepcji, metod i technik zarządzania*. Wrocław: Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu.
- Miller, J., Wroblewski, M., Villafuerte, J. (2014). *Kultura kaizen: budowanie i utrzymanie kultury ciągłego doskonalenia*. Warszawa: MT Biznes.
- Patton, S., Clegg, B., Hsuan, J., Pikington, A. (2011). *Operations Management*. London: McGraw-Hill Higher Education.
- Podobiński, M. (2014). Skutki stosowania japońskich koncepcji i metod zarządzania w polskim przedsiębiorstwie produkcyjnym. *Nauki o Zarządzaniu*, 1(18).
- Rother M., Shook J. (2009). *Naucz się widzieć: eliminacja marnotrawstwa poprzez mapowanie strumienia wartości*. Wrocław: Lean Enterprise Institute Polska.