

Lean Tools and Techniques for Global Project Management

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The purpose of this article is to show the essence of Lean Management, management practices applied by companies, and the possibility for this method to be used to further improve management in an organisation. This article uses a review of existing literature, studies and reports relating to management.

Keywords: Lean Management, management, 5S, SMED, TPM, Kaizen, Poka Yoke, TQM, Six Sigma.

1. INTRODUCTION

The purpose of this article is to show the essence of Lean Management, management practices applied by companies, and the possibility for this method to be used to further improve management in an organisation. This article uses a review of existing literature, studies and reports relating to management.

2. THE CONCEPT OF MANAGEMENT

There are many management concepts. Each concept is focused on the achievement of the organisation's objectives in the best and most effective way, although many of them fail to work in practice as each organisation is different and operates within a different environment or culture. Among management concepts one may distinguish classical, behavioural and quantitative concepts. The classical concept includes scientific management and administrative management. The founding father of the scientific management theory is Frederick Taylor whose primary focus was on worker productivity. He introduced, among other things, a piecework system and rest breaks. Scientific management consists in observation and experiences that are to make the work more effective. Administrative management puts an emphasis on managing an organisation as a whole. The administrative management theory was developed by Henri Fayol, Max Weber and

Chester Barnard. The behavioural theory was the opposite of the classical theory. It referred to a greater extent to the psychological aspect of management. Hugo Münsterberg, a German psychologist, is considered to be the pioneer of that concept. According to the behavioural management theory, one should focus on the behaviour of individuals and group processes so as to better select and motivate employees. An important role in the behavioural approach was also played by the experiments carried out by Elton Mayo in the Western Electric plant in Hawthorne. Through these experiments Mayo proved that the piecework system was not always effective because worker behaviour was also affected by the attitudes of their co-workers. Maslow and Douglas McGregor also contributed to the behavioural management theory. According to Maslow, man is motivated by a hierarchy of needs, including, among other things, social acceptance and human relationships. McGregor developed the X Theory that corresponds to the assumptions of the scientific management, and the Y Theory which refers to human relations and more positively to employees by assuming, among other things, that people are innovative in the resolution of problems, self-motivated to achieve goals, and that their intellectual capabilities are only partially used in organisations. The quantitative management concept is yet another management theory. It is based on mathematical models that support

problem resolution. The operations management is a similar concept which, while not relying so heavily on mathematics, uses quantitative management techniques to solve various management problems, e.g. linear programming. These three concepts of management: classical, behavioural and quantitative need not be mutually exclusive. There are also systemic and situational concepts of management that in a way integrate both classical, behavioural and quantitative approaches. The systemic concept treats an organisation as a system that is comprised of such elements as expenditures, transformation processes, results and feedback. Situational management is a concept that says that any organisation's success depends on that organisation's reaction to its environment and on its ability to adapt to the situation it encounters. Among the multitude of management concepts one may distinguish several contemporary ones that are most frequently used, such as: time management, i.e. a concept that focuses on the time of the various processes (time treated as a strategic element); knowledge management, i.e. the best use and development of knowledge; TQM, i.e. total quality management, aiming at the highest level of quality in an organisation; reengineering: a concept of fundamental changes within an organisation that is focused on cost reduction and effectiveness of a business; outsourcing, i.e. transferring certain business functions to outside suppliers; benchmarking: analysing and comparing oneself with other organisations that are market leaders in their respective sectors; virtual organisation: a concept that consists in forming a network of independent partners who act voluntarily and with mutual respect to achieve common goals; and Lean Management. In the era of today's globalisation and competition it is impossible to say which of those concepts is the best for an organisation. The notion of business environment is also critical in this case. For an organisation to be able to operate effectively and make a profit, it must adequately react and adapt to its micro- and macro-environment. The microenvironment includes those organisations that affect the company directly. The macro-environment includes all social, cultural, economic, technical, legal and political conditions. There is also a general environment and competitive environment. The general environment includes the state of economic development of a country, level of education of its population, as well as other social and economic factors. The competitive environment determines

the unique and distinct nature of operating conditions as each sector has its own manufacturing technology, competitors, customers and other specific factors.

3. THE HISTORY, CONCEPT AND ESSENCE OF LEAN MANAGEMENT

Lean Management is one of the contemporary management theories that is being more and more frequently implemented by companies operating in Poland. The beginnings of that concept date as far back as 1903 when Frederick Taylor, the author of the scientific management theory, wrote about standardisation, prevention of machine failures and waste. It was also significantly affected by the notion of quality and the development of fourteen quality points by Deming who pioneered the philosophy of quality management. After World War II, Deming went to Japan where he taught Japanese engineers how to manufacture high quality products without investing in expensive equipment. The Lean Management theory has been perfected and improved since that time mainly by Japanese engineers working for Toyota. It is Toyota and its Toyota Production System that are considered to be the birthplace and the core of this management concept. The beginnings of the Toyota Production System and, therefore, those of the Lean Management itself, date back to 1940s and 1950s. Eiji Toyoda and Taiichi Ohno were the main forerunners of this system. Taiichi Ohno was responsible for innovations based on problem resolution in Toyota. In 1946 he was appointed the head of the Machining Department that became the laboratory for Kanban formulation and development of flow-based production. Ohno became a director at Toyota in 1954, General Director in 1964, Senior General Director in 1970, and Vice President in 1975. Nagoi Eiji Toyoda was a nephew of Sakichi Toyoda, the founder of Toyota Group, and thus a cousin of Kiichiro Toyoda who offered him a job at Toyoda Automatic Loom Works. Kiichiro assigned his cousin tasks relating to automotive industry, first in Tokyo and then at the headquarters in Kariya. Eiji moved to Toyota Motor co., Ltd., where, in 1945, he was appointed a director. In 1982, Toyota Motor merged with Toyota Sales to form Toyota Motor Corporation. Eiji was then appointed the Chairman of the Supervisory Board, while Shoichiro, Kiichiro's older son, became the

President of the corporation¹. After the crisis in the company that took place in 1949, Eiji Toyoda visited Ford's River Rouge Plant that was one of the most effective manufacturing plants in the world. He wished to implement in Toyota the solutions that he had studied at Rouge but a mere copying and improvement of Rouge solutions proved to be a difficult task. Having returned home to Nagoya, Eiji Toyoda and his production genius Taiichi Ohno quickly concluded that mass production would never work in Japan. Those were the uncertain origins of what was later called the Toyota Production System and, ultimately, the Lean Management. The system was based, among other things, on the elimination of all waste; just-in-time production; employee commitment; continuous improvement; and many other techniques and tools that contributed to Toyota's success which captured the world's attention in the 1980s with its quality and productivity. Japanese cars had longer useful lives than the American cars and required much fewer repairs. By the 1990s it became clear that there was something special about Toyota even when compared with other Japanese automobile manufacturers. It was all about the designing and manufacturing method that led to an incredible consistency of the process and product. Toyota manufactured cars in a quicker and more reliable way and, what is more, at competitive costs, even considering the relatively high wages of Japanese workers. It was equally impressive that each time when Toyota revealed some evident weakness and it would seem that it was vulnerable to the blows of its competitors, it miraculously managed to eliminate the problem, thereby only further enhancing its position.² The Lean Management theory has its application not only in production but also in various other industries, including, among other things, in logistics, services, or in the office. The Lean theory involves not only the management of manufacturing processes on the production floor, but also the implementation of such tools as 5S,

standardised work or visual management in the office environment or as part of the customer service process. Lean application in the office environment facilitates, among other things, the problem resolution process, as well as the process of problem identification and elimination. Toyota's success and the management system that it developed captured the attention of other countries, as well, including those in Europe. Many companies tried and still continue to try to implement the tools and techniques of that system, although the results they obtain are not quite what they have expected, as the key to Toyota's success is not only in the tools and techniques of lean manufacturing, but also in the company's specific organisational culture. There are many different definitions of the Lean Management theory. The literature fails to define the Lean concept in an explicit and unambiguous way. Sometimes it is called Lean Manufacturing, sometimes Lean Management or, alternatively, the Toyota Production System (TPS), while earlier it was called JIT (Just-in-Time), ZIP (Zero Inventory Production), Kanban or WCM (World Class Manufacturing). Some derivative names of that concept have also been developed, such as Lean Enterprise, Lean Thinking or Lean Organization. In Poland, it is mainly interpreted and understood as lean production, lean manufacturing, lean management, lean enterprise or lean organisation. Globally, however, it is the term 'Lean Management' that is now widely accepted and used. Lean Management means the reduction or elimination of any losses and the implementation of automation mainly through numerically controlled equipment. It means that manufacturing processes are designed and carried out in such a way so as to make more with increasingly less human, material, time or territory resources. Hence the designation of the concept as 'lean'. J.P. Womack, D.T. Jones and D. Ross in their book entitled *The Machine That Changed the World* define lean production as follows, 'lean production is lean because it uses less of everything when compared with mass production – half the human effort in the factory, half the manufacturing space, half the investment in tools, half the engineering hours to develop a new product in half the time. Also, it requires keeping far less than half the needed inventory on site, results in many fewer defects, and produces a greater and ever growing variety of products'. Lean Management is quite aptly defined by M. Lisiński and B. Ostrowski as, 'a method for improving operations of an

¹ K. Shimokawa, T. Fujimoto (Eds.), *Lean management: narodziny systemu zarządzania: rozmowy z Taiichi Ohno, Eiji Toyoda i innymi osobami, które ukształtowały system zarządzania w Toyocie*, Foreword to the Polish edition by Tomasz Koch and Tomasz Sobczyk; [translation by Anna Zdanowicz, Tomasz Sobczyk], The Lean Enterprise Institute Polska, Wrocław 2011, p. 6.

² Liker J. K., *Droga Toyoty – 14 zasad zarządzania wiodącej firmy produkcyjnej świata*, MT Biznes, Warsaw 2005, pp. 29-30

organisation which, by constantly eliminating waste, optimises the creation and flow of value within the entire manufacturing process. Its purpose is to embed quality in the manufacturing process while at the same time adopting cost reduction as a rule.' The essence and main objectives of Lean Management are mainly to eliminate waste in order to achieve profit using as few resources as possible. Waste includes in particular all those actions that consume resources without creating any value. There are seven types of waste: defects that need to be fixed; inventories; overproduction; unnecessary transport; unnecessary motion of employees; waiting caused by failure or shortage of parts; and over-processing. There is an eighth type of waste that is being more and more frequently added to the aforementioned seven types, namely the under-utilised human potential. Henry Ford put a lot of emphasis on the elimination of waste. As he stated, his 'theory of waste goes back of the thing itself into the labour of producing it.'³ After all, when purchasing a product, the Customer wants to pay only for those activities that actually lead to the manufacturing of a good product and not for those that are wasted.

4. LEAN MANAGEMENT TOOLS AND TECHNIQUES

The Lean Management theory comprises many management tools and techniques. There is no clear term, or division into tools and techniques, found in the literature. One may encounter such terms as Lean Management tool, technique, system, methodology or philosophy. Undoubtedly it can be said that all those tools, methods and techniques are essential elements of Lean management, and that they build this whole system. In the literature, one may also find a division of Japanese concepts, methods and techniques into three levels:⁴ level 1 – concepts (philosophy, orientation, approach), level 2 – method (general method), level 3 – technique (specific method, technique, tool).

Level 1 includes Kaizen and Lean Management. Level 2 includes Just-in-Time and

Hoshin Kanri, while level 3 includes Kaizen, Kanban, Andon, Poka-yoke, Quality Circles, 5S. Level 1 encompasses Kaizen and Lean Management which influence management in an organisation in the most general and comprehensive way. It is worth noting that Kaizen is mentioned twice: first on level 1 where we think about the general philosophy of continuous improvement that is present in the corporate culture of all companies which apply Japanese management concepts, and, second, on level 3 because Kaizen is also a tool through which employees may report and implement their own ideas for minor improvements. Lean Management, in turn, is an approach which provides that all processes in an organisation should be 'lean' in order to eliminate all types of waste that may result from general waste (*muda*), overburden (*muri*) or unevenness (*mura*). Level 2 encompasses general methods which include, among other things, Just-in-Time and Hoshin Kanri. These are also comprehensive methods that, on the one hand, affect the strategy of the entire company and, on the other hand, also extend to operational levels. It should be noted, however, that the concepts included in level 1 form a common basis for all the Japanese methods and techniques. The fact that Lean Management is a philosophy that is implemented in an organisation, among other things, by applying the Just-in-Time method which, in turn, encompasses a number of techniques and tools, such as, e.g., Kanban, Andon or Poka-yoke, may serve as an example of such interrelation.⁵ Many methods and techniques complement each other, and one tool cannot work without the other and *vice versa*. To fully understand what the various tools are all about, the value, as well as the pull and push systems need to be defined. 'Value' is the right product value from the customer's point of view, reflected in the product's price and market demand.⁶ The 'pull system' refers to the Lean concept and means that we produce and 'pull' only as much as we need according to the actual orders from customers. The 'push system' is the opposite of the pull system and it means production based on forecasted orders, i.e., we manufacture first and then 'push'

³ H. Ford., *Dziś i jutro (Today and Tomorrow)*, ProdPress.com, Wrocław 2007, p. 91.

⁴ M. Krasieński, *Kulturowe uwarunkowania wykorzystania japońskich koncepcji, metod i technik zarządzania*, Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław 2014, p.12.

⁵ Op. cit. pp. 12-13

⁶ Ch. Marchwiński, J. Shook, A. Schroeder (Eds.), *Leksykon Lean: ilustrowany słownik pojęć z zakresu Lean Management*, Foreword to the Polish edition by Tomasz Koch and Tomasz Sobczyk, The Lean Enterprise Institute Polska, Wrocław 2010, p. 103.

the product. This system applies to large production batches. Among the many Lean methods and tools, one may distinguish those that are the most important and popular ones, as applied by organisations:

- 1) JIT (Just-in-Time): a system which means making only what is needed, when it is needed, and in the amount needed. Heijunka, i.e., production levelling, is one of the elements of the Just-in-Time system. The purpose of JIT is to completely eliminate all waste, ensure the best quality, the lowest possible cost, the most effective use of human, financial, material and information resources, and the shortest possible times both in production and deliveries.
- 2) Kaizen: a practice of continuous improvement relating to everyone: top executives, managers and workers. In Japan, numerous systems have been developed to enhance Kaizen awareness. Kaizen may relate to a system or flow, or to a process. The flow Kaizen is designed for management, while the process Kaizen is for work teams and their leaders. The flow Kaizen focuses on the flow of materials and information, with the process Kaizen focusing on people and individual processes. The main Kaizen concepts include:⁷ Kaizen and management; process vs. result; PDCA/SDCA; quality first; use of data; the next process is the customer. The first concept has two components: maintenance and improvement of standards. Maintenance refers to maintaining current technological, managerial and operating standards so that everyone can follow the relevant standard operating procedures. Improvement, in turn, refers to activities directed towards improving current standards.⁸ The second concept provides for the improvement of processes in order to improve results. The PDCA/SDCA concept refers to the improvement of processes through PDCA (Plan-Do-Check-Act) and SDCA (Standardise-Do-Check-Act) cycles. The quality concept means that a company should give top priority to quality. The use of data means that a company must gather

and analyse data to effectively implement Kaizen.

- 3) Kanban: an important element of lean production. The Kanban system makes it possible to define the volume of production in each of the processes. It is often called the nervous system of lean manufacturing because it manages production in the same way the brain and nerves control human body. The key benefit of the Kanban system is the elimination of overproduction. Its objective is to produce only as many goods as have been ordered, in the time and quantity specified in the order.⁹ Kanban is a signal that gives authorisation and instruction for the production or withdrawal of items/goods. Kanban may take the form of, e.g., cards, triangular metal plates or electronic signals. Kanban cards contain information such as part name and number, external supplier or internal supplying process, pack quantity, storage address, barcode. In the Kanban system, each of the processes makes as many products as are needed to replenish those that were taken earlier by the subsequent process. Workers in the consuming process take from the supplying process only as many parts as they need and only when they need them. This system of 'pulling' starts with the customer's order. It is called the pull system.¹⁰ There are two types of Kanban: transportation Kanban and production Kanban. Transportation Kanban gives a signal when parts should be supplied to the production line. This Kanban can also be split into supplier Kanban and internal Kanban for communication among internal processes. Production Kanban is used for providing operating instructions within processes. This Kanban is split into a production-ordering Kanban and signal Kanban which indicates when changeover is needed. Kanban has four functions to fulfil: it prevents overproduction (and over-movement) of materials between production processes; delivers specific production orders to processes based on replenishment principles; serves as a visual control tool for production supervisors that enables them to

⁷ M. Imai, *Gemba kaizen: zdrowo rozsądkowe, niskokosztowe podejście do zarządzania*, MT Biznes, Warsaw 2006, p. 40.

⁸ Op. cit., pp. 41-42

⁹ L. Kornicki, Sz. Kubik (Eds.), *Kanban na hali produkcyjnej*, ProdPress.com, Wrocław 2009, p. 11.

¹⁰ Op. cit., p. 11.

determine whether the production is ahead of or behind schedule; is a tool of continuous improvement.¹¹

- 4) Hoshin Kanri: it refers to the strategy of a company and to quality management. It is a very comprehensive and consistent method that encompasses all levels of the organisation and focuses on quality and co-operation among people from all management levels as its key priority.
- 5) Jidoka: a method whose objective is to detect abnormalities and stop the production line whenever a defect occurs. Jidoka highlights the causes of problems because work stops immediately when a problem first occurs. This leads to improvements in the processes that build in quality by eliminating the root causes of defects. Andon is one of the Jidoka tools.
- 6) Standardised Work: a method that eliminates and prevents defects and waste. Standardisation elements include, among other things: visual and audio signals; red labels that are used to mark items which are not needed for manufacturing activities; information boards; outlines and lines; Andon and Kanban.
- 7) Visual Management: it is used to show in a clear manner the various parts, tools, activities, as well as production indicators. Its purpose is to facilitate work, notice product defects and detect any irregularities. Visual Management tools include, among other things, Andon and Jidoka.
- 8) SMED: a method for quick process and equipment changeovers. Changeovers can be split into internal and external ones. Internal changeovers include all those activities that have to be performed while the machine or equipment is stopped. External changeovers, in turn, include all those activities that can be performed before the equipment is stopped or after the process is re-started to make a new type of product.
- 9) TPM (Total Productive Maintenance): a system for in-house machine and equipment maintenance by operators and maintenance personnel. OEE (Overall Equipment Effectiveness) is one of the TPM tools. OEE is a measurement used in TPM to determine how effectively machines are used.
- 10) Value Stream Mapping: a method for presenting all stages of material and information flow, starting from an order through to delivery. This method is used for analysing the current state and any problems encountered by the product from the order, through the manufacturing process, to the delivery.
- 11) Ideal and Future State Value Stream Map: The purpose of creation current state of Value Stream Map is to identify and show sources of waste and “Kaizen Bursts” ideas/Kaizens for the future, ready to implement to reality in short period time, up to 90 days. Future Value Stream Map and ideal state gives possibility to plan to achieve your shared vision of where the process needs to be; the simplest way to do this is to plan a series of improvements, each taking 2 to 3 months (max 90 days), and use your value stream map to communicate what you want to do to Managers and Directors.
- 12) Heijunka: a method for production levelling by product and by volume over a fixed period of time. Heijunka box is one of the levelling tools. The box has slots wherein Kanban cards are placed. Columns in the box represent the pitch, i.e. the rhythm of the batch, and the rows represent products. The pitch is task time multiplied by pack-out quantity. Cards are loaded into the box according to the pitch. Levelling by product means that customer orders (Kanban cards) are placed in the box in the agreed sequence by product type. The sequence can be chosen, for instance, in such a way so as to minimise changeover times or split large production batches and distribute them evenly over the entire day.
- 13) PDCA: a cycle that refers to process improvement. It is made up of the following elements: Plan, Do, Check, Act.
- 14) Six Sigma: a method for improving quality and customer satisfaction whose objective is to analyse processes and detect defects even before they occur.

¹¹ A. Smalley, *Poziomowany system ssący: przewodnik w zakresie doskonalenia systemu produkcyjnego wg zasad Lean dla specjalistów z planowania i sterowania produkcją, produkcji i technologii*, Foreword to the Polish edition by Tomasz Koch and Tomasz Sobczyk, The Lean Enterprise Institute Polska, Wrocław 2011, p. 107.

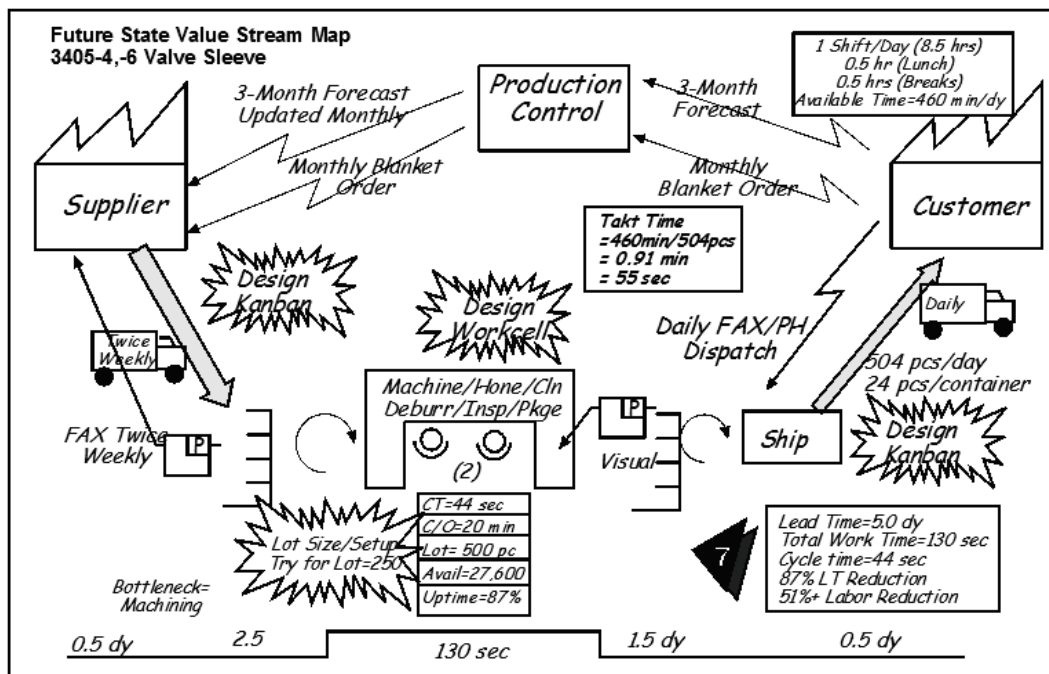


Fig. 1. Future State Value Stream Map.

Source: Toyota Production System (TPS) - <http://missiontps.blogspot.com/p/value-stream-mapping.html>

- 15) 5S: one of the tools of standardised work. It is made up of the following elements: sort, set in order, shine, standardise, sustain.
- 16) TQM/TQC (Total Quality Management/Total Quality Control): it refers to quality management and responsibility of all employees for product quality and its continuous improvement. The PDCA cycle is one of TQC elements.
- 17) 5 Why: a tool that consists in asking ‘why?’ whenever a problem occurs in order to detect its true root cause.
- 18) Andon: a tool used to detect any abnormalities within a process. It is a system of multi-coloured signal lights that may show, among other things, the status of the machine, operator delays, or a quality problem.
- 19) Poka-yoke: a method for avoiding mistakes. It may, e.g., mean designing machines or products in such a way so as to prevent their installation in an incorrect manner.

The aforementioned tools and methods originate from the Toyota Production System, thus being the key elements of Lean Management. Under the Lean theory, management is based, among other things, on the pull system of production. For this system to operate effectively, a number of tools and methods are needed that include, *inter alia*, Just-in-Time, Kanban, Kaizen,

Heijunka, Jidoka or Value Stream Mapping. In the literature, there is no clear-cut terminology used for tools, techniques or methods as they all complement one another. Those presented above are only the most important Lean Management tools that are used by various companies worldwide. In reality, the Toyota Production System relies on an even greater number of Lean Management methods. According to Toyota, Lean Management is not just about tools and techniques of lean manufacturing, but also about the entire organisational culture.

5. LEAN BUSINESS SURVEY RESULTS IN COMPANIES IN POLISH REGION

The main objective of the Business Lean Survey was to check whether companies use Lean techniques in business strategies that eliminate waste, or obtain cost savings. The survey conducted in 2015 was answered by 30 companies. After verification of the completeness of the questionnaires, 26 multinational companies operating in the Polish Region were selected. The group of companies was selected based on previously established contacts. Conducted Employees represented of middle and senior management in large enterprises in Poland (employing over 250 people).

In the analyzed group of companies, twenty of them were from Germany, five from the USA and one was Swedish. Enterprises of the study group

operate in the following industries: automotive, chemical, pharmaceutical, appliances. The surveyed companies had to answer the following questions:

1. Do you use the support of extended companies, services, trainings in scope of implementation of Lean tools (if so, with which of them)?
2. Which tools of Lean Manufacturing Systems (LMS) do you use in order to optimize the production process (if so, with what, for example: (5S, SMED, standardized work, value stream mapping - VSM, Poka-Yoke, etc.)?)
3. Do you have Employee Reward and Recognition Systems for Lean activities (if so, with what)?
4. Which of the Lean tools are the most effective

method in the context of the continuous improvement of production processes?

5. Do you carry out Flow Management workshops focusing on the flow of materials, raw materials and products?
6. Is LMS activities are entered formally under the responsibility of employees?

In the answer to the first question, concerning the use of external companies in Lean tools training, 69% of surveyed companies in Poland replied in the affirmative.

Additionally, the surveyed companies reported that although they use training from external companies but the tools of surveyed companies are being implemented with the participation of internal engineers Lean.

In the answer to the second question: “Which

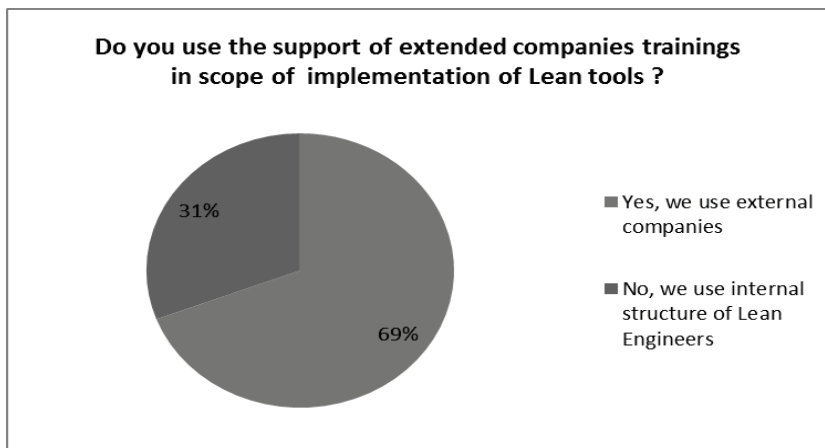


Fig. 2. Structure of answers to question about the support of external companies training and the implementation of Lean tools (%).

Source: Own study based on research results.

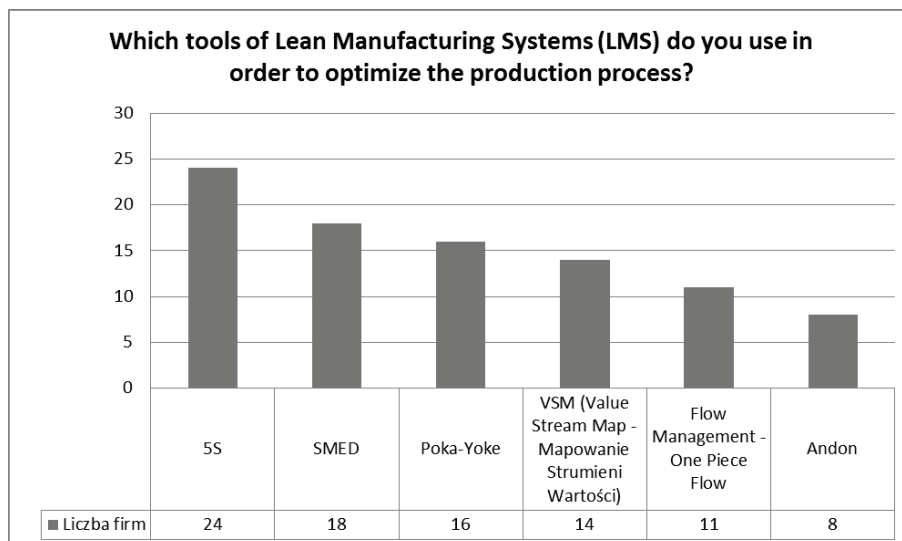


Fig. 3. Structure of answers to question: “Which tools of Lean Manufacturing Systems (LMS) do you use in order to optimize the production process?”.

Source: Own study based on research results.

tools of Lean Manufacturing Systems (LMS) do you use in order to optimize the production process”, most of them highlighted the 5S Tool (24 companies surveyed for 26). Further positions were tools such as SMED (18 companies surveyed), Poka-Yoke (16 companies surveyed), VSM, One Piece Flow management Flow and Andon.

In the answer to the third question, "Do you have Employee Reward and Recognition Systems for Lean activities (financial reward)?" there was no clear position in the surveyed companies. 23% of respondents indicated that rewards its employees for activity Lean, but up 77% limited to other forms of remuneration such as system employee performance review, gift cards and gift certificates.

example: The production workers, Department of Quality, Supply Chain, Warehouse, Sourcing, and even R & D.

On the last question, "Is LMS activities are entered formally under the responsibility of employees?" 90% of respondents answered in the affirmative. Survey results clearly demonstrate, that companies are aware of the essence of Lean philosophies, tools, skilfully use the tools of Lean and use additional support from external professional companies or Coaches.

6. CONCLUSION

The literature and survey research presented above shows that there are many definitions and concepts of management. Which of them is, thus, the best and most effective, and which will make



Fig. 4. Structure of answers to question: "Do you have Employee Reward and Recognition Systems for Lean activities?".

Source: Own study based on research results.

In the answer to the fourth question - which of the Lean tools are the most effective method in the context of the continuous improvement of production processes clearly confirmed (up to 70% of companies have adopted such a position) that the most effective method for long-term process is a tool value stream mapping - VSM. The results of this study indicate that this tool has been successfully adopted by the Polish company.

The answer to the fifth question of the survey regarding the conduct of workshops focusing on the Flow Management was quite varied, i.e. 35% of companies conduct workshops, and 65% do not. In response to this question the company indicated that it is related to the specifics of production and the type of in-house processes. Companies that create flow management workshops often connect it with value stream mapping what require a commitment from all departments to support for

the organisation successful? There is no clear answer to that question because a concept applied in one organisation may prove to be totally ineffective in another. What is more, numerous organisations apply their own methods of Lean Management implementation, depending on their needs, resources, capabilities, industry, etc. With such a wide range of methods, techniques and tools, an organisation must individually select a set of them, taking into account many different factors, including, among other things, the organisation's environment, sector of operation, as well as material, financial, information and human resources that it has at its disposal.

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