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## The Use of Lean Management Tools in Production Companies with Implemented Total Quality Management (TQM)

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### **Abstract:**

**Purpose:** The article compares the eight principles of TQM with selected Lean Management tools in order to identify possibilities to optimize quality processes in production companies.

**Design/Methodology/Approach:** The aim of the research was to identify Lean Management tools that can support the eight principles of the TQM concept implemented by manufacturing companies. The theoretical and cognitive objective was to review the subject literature and scientific studies in the field of broadly understood quality management. The analysis of the presented problem made it possible to notice the previously unidentified potential of the TQM concept to improve quality processes in terms of effectiveness.

**Findings:** The generated conclusions will allow TQM concept-based manufacturing companies to increase the probability of effectiveness of quality processes using selected Lean Management tools.

**Practical implications:** Lean Management tools have been presented in a form that enables their practical application in the TQM concept. The result of the conceptual work are recommendations for companies that employ the TQM concept, as to the possibility of implementing individual Lean Management tools in this concept.

**Originality/Value:** The authors present the possibilities of using individual Lean Management tools in businesses that operate on the basis of the TQM concept. The implementation of Lean Management elements requires many activities that lead to far-reaching changes in the functioning of the business, which, however, bring undeniable benefits in the organizational and economic domains. An organizational culture based on Lean Management is the foundation of effective and modern quality management, also in companies that already function on the basis of the TQM concept.

**Keywords:** Lean Management tools, Lean Management, TQM, quality, production.

**JEL:** L11, L15, M14.

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## **1. Introduction**

The proposal to use Lean Management tools in the Total Quality Management (TQM) concept may contribute to the discovery of previously unidentified optimization solutions in production companies. By definition, the concept of TQM should cover the completeness of the aspects affecting the quality processes.

The aim of the article is to analyze the eight principles of the TQM concept in the context of identifying their potential to optimize quality processes, with the use of appropriately selected Lean Management tools. The article is conceptual in its nature, the research scheme is based on the correlation of Lean Management tools with more effective implementation of quality processes in production companies that operate on the basis of the TQM concept.

The result of the conceptual work are recommendations for companies that employ the TQM concept, as to the possibility of implementing individual Lean Management tools in this concept. The proposed research scheme allowed for a clear presentation of the role of selected Lean Management tools in the optimization of quality processes occurring in production companies that operate on the basis of the TQM concept.

This article is based on an extensive literature analysis in the field of the TQM and Lean Management (also Lean Manufacturing) concepts; the research made it possible to determine the potential compatibility of the quality processes based on the TQM concept with selected Lean Management tools.

## **2. Characteristics of the TQM concept**

The subject literature provides a wide variety of approaches in the way of defining the concept of Total Quality Management (TQM), defined as comprehensive management through quality (Boaden, 1997). Differences in the ways of defining result mainly from theory and practice connecting and interweaving. The eight principles of TQM include elements specific for a given enterprise - TQM is applicable not only in industrial enterprises, but also in services, healthcare, education organizations, etc. (Karaszewski, 2001).

TQM definitions vary in the degree of detail. Some only cover the essentials, while others also show the techniques and tools used. Nevertheless, the vast majority of definitions contain eight similar principles concerning (Karaszewski, 2001):

- Customer orientation;
- Leadership;
- People's involvement;
- Process approach;

- Systemic approach to management;
- Continuous improvement;
- Decision-making based on facts and
- Relationship management.

For the purposes of this study, the following definition was selected (Skrzypek, 2000): “TQM (Total Quality Management) is a quality management system based on the way of thinking of the entire company staff. It is a holistic and systematic approach to organization management based on continuous improvement of the quality of products and services from the customer's point of view. TQM is a method of management that leads to the company's success through appropriate strategy, processes, education, motivation, commitment, tools and resources. The company's success is expressed in the satisfaction of the customer”.

The accuracy of E. Skrzypek's definition is confirmed by others in their research (Sreedharani et al., 2018). Sreedharani and others argue that the key success factors for an enterprise that accompany the implementation of TQM include: top management commitment, effective leadership, staff training related to customer requirements, effective supplier management and continuous improvement.

Das *et al.* (2008) also believe that the involvement of top management is obligatorily the most important component of the successful implementation of TQM in an enterprise. In addition, the key success factors that accompany the implementation of TQM in the enterprise include effective leadership, training and education of production personnel, focus on the customer, cooperation with suppliers, effective process management, continuous improvement, communication, teamwork and cultivation of organizational culture (Das *et al.*, 2008).

Although the TQM and Lean Management concepts differ from each other in their functioning, their most important goal seems to be common – *Continuous Improvement*. Continuous improvement focuses on reducing waste and using resources efficiently, which leads to greater customer satisfaction and financial benefits for the entire organization (Andersson *et al.*, 2006).

In the subject literature, many similarities can be found between the concept of TQM and Lean Management (Anvarii *et al.*, 2011; Kuvvetli *et al.*, 2019). However, it should be remembered that TQM is a universal concept that can fit into almost any industry branch, while Lean Management is a philosophy, which cannot be implemented without specific conditions.

### **3. Lean Management as a Management Philosophy**

Since the 1950s, the Japanese approach to management differed from that known in Europe (Liker *et al.*, 2008). Japanese companies focused on incremental

improvement, while European companies believed in changes resulting from innovation following a technological breakthrough.

Currently, when deciding to introduce changes or undergoing a restructuring process, most companies around the world use tools derived from the Lean Management philosophy, to a greater or lesser extent (Guptai *et al.*, 2013); even if the names of these tools are not directly associated with the Lean Management philosophy. The reason is simple – many studies and many organizational stories (casestudy) have confirmed that Lean Management is one of the most effective business concepts (Sreedharan *et al.*, 2017).

The task of the company based on the Lean Management philosophy, is to rank activities leading to the formation of value in the most effective way (Saieg *et al.*, 2018). Performing tasks that are part of processes should not cause unnecessary complications for employees – staff should be guided by efficiency and effectiveness by rejecting or simplifying activities that do not add value to the processes.

The Lean Management philosophy is expressed through a "lean" approach to production processes; Lean Management inspires how to produce more with less consumption and less work, time, equipment and space (Jazani *et al.*, 2018). Customer satisfaction should always be a determinant of the effectiveness of processes performed in an enterprise operating on the basis of the Lean Management philosophy (Wójcik *et al.*, 2015).

The main assumption of Lean Management is not to use Lean Management tools or modify documentation in the enterprise. Lean Management changes the current functioning of the company and the processes that take place in it (Pontei *et al.*, 2018). The functioning of the supply chain is changing, as is the management model of directors, the decision-making process of middle managers and the mentality of regular personnel (Ohno, 1988). The fundamental assumptions of Lean Management (smooth flow, customer value, drawing system, waste minimization etc.) have become a paradigm in many companies. Lean Management should cover the entire organization, because only then is it possible to perform a comprehensive analysis of processes and identify actual and potential losses (Šurinová *et al.*, 2014).

The essence of Lean Management is to obtain high productivity of production and work, efficient organization and management, high-quality production and services as well as satisfactory economic results, and the goal is to adapt the enterprise to the current, market conditions of management through thorough transformation of the organization, management and functioning (Asiński *et al.*, 1999).

Lean Management is a response to the growing complexity of management processes, which contributes to a significant loss of organizational resources due to activities that do not add value (Parkes, 2015). Lean Management helps to remove most non-value-added activities from the process of manufacturing or delivery of

products and services. Production processes are seen as value streams from the customer's perspective. Value streams are sequentially arranged actions that must be undertaken in order for resources to be transformed into products or services expected by customers (Szkudlarek *et al.*, 2011).

Tools, techniques and methods derived from the concept of Lean Manufacturing do not focus only on labour or machines, but also strive to shorten the time of performing activities, eliminate non-added-value processes, while improving and standardizing procedures (Gonzalez, 2019).

Inept implementation of Lean Management tools in the enterprise often gives very similar effects to the inept implementation of the TQM concept. The reluctance of employees towards change results from inadequately conducted training on the functioning of quality processes. The lack of access to information may consequently lead to a lack of belief in the rightness of the change, which directly or indirectly affects the employees' morale.

Not unlike in the case of the TQM concept – when implementing Lean Management tools, the involvement of the top management is obligatory; employees should know that the position of leaders and managers expressed during meetings/training is consistent with the expectations of the top management. Otherwise, there may be organizational chaos caused by disorganization, which is not conducive to building an effective organizational culture (Podobiński, 2015).

#### **4. Principles of TQM and the Use of Lean Management Tools**

The eight principles of the TQM concept cover the fundamental elements of the functioning of any enterprise. A holistic quality management in a company requires a comprehensive approach to the implementation of all processes from the top management.

The concept of TQM indicates what ought to be done in order to ensure the effectiveness of the quality processes occurring in the organization, but at the same time it does not indicate how this should be achieved. The proposed Lean Management tools have the potential to support the implementation of the eight TQM principles in manufacturing companies.

The following list is a proposal of the authors of this study for leaders/managers employed in manufacturing companies. The appropriate implementation of selected Lean Management tools has a chance to increase the effectiveness of the quality processes occurring in the organization, as well as to contribute to strengthening the organizational culture.

The presented principles of the TQM concept are compared with selected Lean Management tools in Table 1.

**Table 1.** Comparing the principles of the TQM concept with selected Lean Management tools

#	TQM PRINCIPLES	LEAN MANAGEMENT TOOLS THAT CAN SUPPORT TQM PRINCIPLES
1.	Customer Orientation	Standardization
2.	Leadership	Genbutsu Gemba
3.	Engaging People	Suggestion System
4.	Process Approach	Value Stream Mapping (VSM)
5.	Systemic Approach To Management	Hoshin Kanri
6.	Continuous Improvement	Empowerment
7.	Fact-Based Decision-Making	PDCA
8.	Relationship Management	Nemawashi

*Source:* Authors' own study.

- **Standardization in Customer Orientation** – the goal of any organization that is not a non-profit one is to generate profit. The main source of income for manufacturing companies are customers who buy the goods produced, therefore customer focus is the first of eight principles in the TQM concept. According to the Lean Management philosophy, the standardization of procedures and instructions reduces the probability of employee error at work stations (Degirmenci *et al.*, 2013).

A clear and systematic description of the activities addressed to the staff contributes to increasing the efficiency of employees. The Standardization affects the increase the quality of control of production processes, the reduction in variability (which leads to the improvement of the quality of manufactured products) and the prediction of potential irregularities.

The Standardization, understood through Lean Management, ensures an improvement in efficiency in the company, while increasing productivity and shortening the time of order fulfillment, almost immediately after its implementation (Lu *et al.*, 2015). The standardization allows employees to increase their creativity by generating improvement proposals. In addition, the Standardization improves the discipline of employees and increases their commitment.

It should be assumed that compliance with the first principle of the TQM concept in manufacturing companies will be more effective thanks to the Standardization; the Standardization is conducive to the improvement of routine activities, and so it leads to the continuous optimization of the adopted operating patterns. The Standardization limits the ability to perform the same activity in different ways, which reduces the risk of customer complaints (dissatisfaction) caused by employee errors (Bragança *et al.*, 2015).

- **Genbutsu Gemba in Leadership** – contemporary subject literature offers many references to how to be an effective leader or what is the difference between traditional management and modern management. The current trends indicate that the leader/manager is responsible for the functioning of the team both in a holistic and individual context (it is the leader who is responsible for the development of team members; the leader is responsible for motivating and engaging employees as well as finding and directing subordinates on the path of development appropriate for them).

Genbutsu Gemba ("management by walking") seems to fit perfectly into modern leadership trends (Soares *et al.*, 2012). Genbutsu Gemba is an effective Lean Management tool for monitoring and interaction between management and production personnel. Genbutsu Gemba enables managers to have direct contact with employees in their natural work environment. By using this tool regularly, managers show appreciation for the work of production personnel, as well as raise employee morale through their presence in the production hall (they also gain the trust of their colleagues) (Romer *et al.*, 2020; Mičieta *et al.*, 2013).

- **Suggestion System in Engaging People** – the probability of achieving better results by an enterprise is higher if the people working in this enterprise have a real influence on the principles of functioning of individual processes (Hadii *et al.*, 2013). The individual sense of importance, which is built through personal influence on organizational issues, favours the involvement of the staff in the pursuit of the company's goals. The suggestion system is a useful tool for organizations focused on the continuous improvement of quality processes because it seems to have a relatively large potential in the context of engaging staff through stimulating creativity (Dziuba *et al.*, 2019).

Ideas in this system can be submitted by all employees, regardless of their position, but employee suggestions should be formalized. Prior to implementing this system, managers should thoroughly explain to all employees how the system works – what points are awarded for and on what basis it is possible to be paid a financial reward. The implementation of this system is associated with the promotion of the principles of its functioning among the staff as well as with the separation of a special organizational unit which is responsible for evaluating suggestions in terms of their usefulness/importance (how much a given idea will affect the improvement of the process to which the suggestion relates) and possible implementation suggestions (Gołaś *et al.*, 2016).

- **Value Stream Mapping (VSM) in Process Approach** – Value Stream Mapping is a Lean Management tool for analyzing the flow of materials and information necessary to deliver a product of compliant quality to the

customer. The advantage of using Value Stream Mapping is the possibility to visualize the process flow in a graphical form and enable each employee to get acquainted with the value stream (Abdulmalek *et al.*, 2007; Wirkus *et al.*, 2011). Due to its ability to collect and analyze information, the tool has gained popularity in the process of continuous improvement (Manjunath *et al.*, 2014).

In an enterprise that operates on the basis of a process approach, the actions taken should increase customer satisfaction by meeting the customers' requirements. The implementation of this goal must be associated with the identification of dependencies between the activities performed in the company and the customer's requirements in all processes, not only at the final effect stage. The separation and visualization of processes enables easier monitoring, obtaining data on the functioning of the company and improvement (Chiarini, 2011), therefore Value Stream Mapping appears to be an effective part of supporting the Process Approach in the TQM concept.

- **Hoshin Kanri in Systemic Approach to Management** – The Hoshin Kanri tool was developed in Japan by Yokogawa Hewlett-Packard in the early 1970s (Witcher *et al.*, 2000). In the mid-1980s, Hoshin Kanri began to gain popularity; some European and American companies started to implement their own versions of this tool (including Xerox Corporation, IBM). Hoshin Kanri is a Japanese variant of Management Objectives (Bagci, 2020). In companies that use this tool, employees who supervise individual processes should, set goals chronically (monthly, quarterly, annually) and strive to achieve them, together with their subordinates. Goals throughout the organization (in all processes) should be consistent with one another. Moreover, the established goals should be measurable, and their implementation should be monitored (Konieczka, 2021).

The holistic approach to process management in the entire organization seems to fit perfectly into the main assumptions of the Systemic Approach to Management because, according to the Systemic Approach, the organization should be treated as a homogeneous system that consists of interrelated elements so the objectives pursued in individual cells should be synchronized with one another; a process optimization in one cell should influence the optimizations of processes in other cells or a mega process that covers the entire organization. It is also worth noting that one of the goals of Hoshin Kanri is to improve communication between individual cells functioning in the organization – thanks to the elimination of "bottlenecks" which originate in the flow of information, it should be expected to reduce waste that generates losses (Konieczka, 2021).



- **Empowerment in Continuous Improvement** – Empowerment defines the principles of employee participation in eliminating dysfunctions occurring in processes and pro-efficiency activities at workplaces (Walentyńczak, 2014). Empowerment focuses on stimulating the creativity of employees, which can contribute to increasing the potential of staff (Maciak *et al.*, 2010). The effect of implementing this tool in the enterprise may be a greater ability of individual employees to solve current problems (Jones *et al.*, 2013).

Continuous improvement as a principle of TQM creates a number of opportunities for the use of the Empowerment tool in a production company, the more that both Continuous Improvement and Empowerment have their source in the Lean Management philosophy.

- **PDCA in Fact-Based Decision-Making** – The Plan-Do-Check-Act (PDCA) cycle, also known as the Deming cycle, was developed in 1930. Initially, the PDCA cycle was used as a product quality control tool. However, it was quickly noticed that this cycle could be used as a tool that enables the development of process improvements at the level of the entire organization. The PDCA cycle is a philosophy focused on continuous process improvement (Schmidt, 2019). The implementation of this philosophy in the company has the potential to enrich the organizational culture by emphasizing the continuous optimization of processes (Realyvásquez-Vargas *et al.*, 2018).

The information overload in the corporate turmoil does not facilitate decision-making. An effective leader is a leader who can separate useful information from unnecessary information. PDCA helps to hierarchize and systematize knowledge (Dudin *et al.*, 2015), therefore it appears that PDCA can be helpful in matters of fact-based decision-making, and thus can support the seventh principle of the TQM concept.

- **Nemawashi in Relationship Management** – *Nemawashi* is the Japanese term for "ground preparation". In a business context, *Nemawashi* helps to create a 'ground' for negotiation and to reach consensus at a later stage (Liker, 2005). *Nemawashi* aims to remove obstacles/barriers that hinder the decision making or approval of either negotiation party (Fetters, 1995). The primary reason for using *Nemawashi* is to maintain a harmonious environment amongst employees. In practice, this means that if a new proposal is to take root, survive and develop, it must be carefully prepared in advance. The main goal of *Nemawashi* is to accurately present the position of all parties involved in the negotiations. If stakeholders disagree and negotiations have come to a standstill, the matter should be brought to decision-makers for further guidance (Sagi, 2015).

Nemawashi seems to be a very helpful tool in matters related to Relationship Management as it helps to understand the position of other parties involved in the negotiations. Effective Relationship Management should focus on continuous nursing of harmonious cooperation, which is possible by finding agreements in contentious issues; the Nemawashi tool is used to arrive at a conclusion that is satisfactory for all sides.

## **5. Conclusion**

Lean Management tools can support the implementation of the requirements of the eight identified principles of the TQM concept. The Lean Management philosophy can support aspects related to the operational efficiency of production that the concept of TQM does not indicate (the concept of TQM indicates what should be done but does not indicate how to do it).

The eight principles of the TQM concept do not seem to constitute special barriers in the aspect of implementing Lean Management tools into the enterprise, as both the TQM concept and Lean Management tools are focused on continuous improvement. However, it should be noted that the obligatory quality assurance that results from documenting the ongoing processes may limit the full use of Lean Management tools aimed at increasing the efficiency and effectiveness of quality processes.

It should be assumed that the knowledge of staff responsible for management systems in companies with the implemented TQM concept regarding Lean Management tools may translate into the extent of use of individual Lean Management tools in the quality processes occurring in these production companies.

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