

INTEGRATING ROLE OF LEAN IN MATERIAL FLOW MANAGEMENT

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Abstract

The article presents the lean management conception that is a systematic approach to identifying and eliminating waste through continuous improvement of logistic processes in the production systems related to delivering the product in accordance with the customer demands. Lean management may be used in modeling and solving the problems between conflicting enterprise targets and releases the frequently hidden potential of company systems. It is a helpful tool in understanding material and informational flow. Implementation of the lean approach in a company allows to integrate current management concepts which focus only on some areas in such a way that execution of strategic goals does not create conflicts nor inhibits development.

Keywords: lean management; material flow, information flow

1. INTRODUCTION

More and more companies seek new ways of development to maintain their competitiveness on the market and to meet the demands of their customers in the best and possibly the most optimal way. In order to gain an edge over their competition, enterprises optimize at least one of the following elements: expenses, increase of profits and directions of development. That is why various concepts of company management, sometimes very different and diverse, appear and are implemented. That, in turn, causes changes in the functioning of the organization and, above all, influences motivation of the employees and their involvement in the developmental processes. Manufacturing and logistic processes are key elements which undergo improvement. Nowadays, a common practice is to apply a thorough analysis of those processes, taking into consideration all their stages of execution. That analysis is to assess the stream of added value, especially executed material and information flows. Such approach allows an enterprise to eliminate redundant activities and those that require improvement. Therefore, such an approach should be chosen as to create a self-improving organization, aimed at effective management of its resources to meet demands generated by the market in order to obtain the highest possible profits [1]. The lean concept seems to be the one which allows to achieve such goals. It integrates various approaches and concepts of management of the company or the supply chain. This paper is an attempt to present such approach to the *lean* concept..

2. LEAN AS AN INTEGRATOR OF THE CONCEPT OF MANAGEMENT

Lean Management is a management philosophy which comprises a whole set of approaches, tools and characteristics that have one primary goal: to eliminate waste and create value of products and processes. Lean here means use of less organizational resources if compared to 'normal' conditions in which a company functions. For example, in case of mass production it may mean half of effort of the people, half of space in the factory, half of tools, half of investment and half of time required to design the product introduced to the market which, as a result, is introduced two times faster. Moreover, it requires to keep significantly less than half of supplies and allows to make a wide variety of products without defects, ensuring competitive advantage [1,2]. Therefore, execution of management according to that concept aims at making redundant all activities which are not necessary and executing the necessary activities well in the first run, in correct order and in such a way that the order submitted by the customer turns into a delivery many times cheaper, faster, better, more pleasantly for the employees and, at the same time, increasing profitability of the

enterprise. The origins of the lean concept can be found in the Toyota Production System (TPS), which is considered to be the first lean manufacturing process ever created. The foundation of that concept is based on well known and popular management concepts such as Just in Time (JIT), Total Quality Management (TQM), value-based management and competency-based management. The essence of JIT method is to supply materials and/or services exactly in the moment when they are needed, in an adequate place and correct quantity. The purpose of JIT method is to ensure promptness of production and supplies, at the same time keeping losses at the lowest possible level, which results in improvement of quality of the product. That requires keeping the storage quotas at the minimum, prompt detection and removal of faults and damaged elements, materials and inadequate labour [3].

TQM is a complex philosophy which systemically comprises problems related to quality. Owing to continuous involvement of all members of a given organization in the process of improvement of quality of a product (service), their activities and establishing targets for the organization in such a way as to meet the demands and expectations of the customer [1,3].

Competency-based management represents one of the human resource trends and is a way to conduct personal policy in order to provide qualified staff which will facilitate development and execution of goals assumed by an organization. competency-based management facilitates changes and makes organization more flexible in an ever-changing environment [3].

Value-based management is a concept related to long-term strategy of an organization. That concept is based on an equilibrium between satisfied customers, employees and effective financial flows. In such configuration, a company can be successful and satisfy its shareholders. Creating value is a complex process which requires the company to supply its customers with a product which meets their demands [3].

In order to set the course for improvement of the organization, it is necessary to understand the lean concept. It should lead to a situation where a proficiently working company is also flexible (able to adjust to the ever-changing environment) and agile (rapidly and dynamically reacting to changes).

A lean enterprise creates its organizational order and management of processes in such a way that its customers, who order a specific product, pay for its manufacturing, not for functioning of a complex organizational structure, warehouses, plants, means of transportation, maintenance and bureaucracy [4]. A customer's order usually goes through many departments, e.g. sales, customer services, planning, supplies, manufacturing, logistics and accounts, finally making its way to the financial department which assesses effectiveness of each of those departments in order to deliver the ordered product to the customer. Each of those departments works according to the assumed policy and executes its own tasks and goals. Individual policies applied to those departments make the order execution time much longer, while it is the most important process of those occurring in an enterprise, as its efficiency is strictly related to the rate of incoming cash and to the rate of fulfillment of liabilities. In a way, introduction of lean management necessitates integration of conducted activities and channels them towards a common goal which is co-operation of all departments [1, 4].

3. THE CONCEPT OF INTEGRATED SYSTEM OF CONTINUOUS IMPROVEMENT

Lean is a way to perfect organization through gradual and continuous elimination of waste in all aspects of its activity and through integration of its actions within the stream of value creation. The lean concept allows to trigger previously unused resources of human creativity and to utilize them for actions and processes that occur in an enterprise. In order to enable the employees to influence the actions of an enterprise, it is necessary to introduce autonomization and make them aware of the goals of their own organization that they will subsequently execute. Such approach to lean management necessitates the need to incorporate that strategy into a development strategy for the organization. Balanced scorecard [5] is currently the leading method of realization and communication of strategy that takes a classical approach and presents the strategy in four views: financial, customer approach, internal processes, training and development. The relationship between balanced scorecard and lean management can be seen in its application to assess

effectiveness. First of all, the scorecard concept identifies factors which influence the future score that a given enterprise can achieve, allowing to focus on the key processes and resources. Another positive aspect of using the scorecard, which is also related to the lean approach, is a possibility to translate the score achieved with use of non-material resources into measurable indicators that reflect the progress of execution of the strategy. As the strategy perfectly blends various management philosophies, they are also reflected in BSC, i.e. value-based management in a financial perspective, ECR in a customer perspective, risk management, environmental management in an internal process perspective, competency management in a training and development perspective [5]. Fig. 1 shows the integration role of the lean concept. The concept of integration of various areas of company management shown on fig. 1 is based on the methods and tools offered as parts of the lean concept. Assumptions of the Total Productive Maintenance method are used as the leading concept [2].

According to the presented concept, lean becomes a philosophy which fills the gaps between various areas of management. The main element is to build a strategy based on an increase of value for customers, stakeholders and employees. The strategy map decomposes it into four BSC perspectives, which facilitates setting tasks for execution [1,5]. Those tasks are incorporated into various management pillars executed within the company. Through monitoring the values of key indicators for each of those pillars, it is possible to obtain information about the progress of the continuous improvement process and to define groups of issues to solve within each of the pillars.

Areas of management of a company included in the concept (Fig. 1.) are subject to continuous assessment, which results should be a perfectly working system of continuous improvement. Factors taken into consideration during the assessment are listed in Table 1.

Table 1. Factors taken into consideration during the assessment

5S	5S trainings; implementation of particular steps in each department; creation of formalized 5S standards, creation of audit plans, execution of audits, self-evaluation plan, continuous improvement of standards
Measure	Setting operational indicators; updating indicators; creation of employee motivational plans based on those indicators; strategic initiative plan; created indicators and goals in accordance with established KPI on each level of organization
Visual management	Establishing content of visual management tables; creation of label, poster, etc. formats; regular update of their content; periodic meetings at the tables; employees submit ideas for improvement
Communication	Establishing communication standards between workers and Lean Leaders (management); periodic meetings; periodic meeting plan; reports from those meetings; cohesive plan used in monitoring of management of continuous improvement
Competency management	Established and formalized standards for each position; periodical positional trainings; creation of competency matrices; training plan; audits and improvement of standards and competency; mutual training among employees; improvement of the training process
Safety management	Risk level communication exists; establishing adequate risk indicators; formalized risk policy; H&S audits; periodical positional trainings; participation of operators in creation of H&S standards; improvement of resources for control of behaviour and working conditions; monitoring of safety breach cases

Environmental management	Environment protection communication exists; establishing and presentation of environment protection indicators; selective waste sorting; formalized company environmental policy and standards; environmental audits; specialist environmental trainings; improvement of environmental management; monitoring environmental risks
TPM	Problem-solving projects; problem-solving trainings for teams, utilization of Pareto and PDCA analytic approaches for problem solving; 5S utilized in relation to the machinery stock; defining standards of autonomous handling, operators improve the plan and scope of autonomous handling; formalization and execution of a preventive plan; establishment of machinery monitoring indicators; analysis of defects and faults as grounds for reduction of failures and stoppages; cost optimization of preventive measures
Product conception management	Detailed insight and execution of customer demands; introduction of new products taking into consideration available company resources; progressive withdrawal of products and materials with low rotation; taking into consideration market demands while designing products; detailed definition of the new product introduction process and its continuous improvement; new products introduced according to project management approach
Process concept management	Defining goals for each department; executed analyses are aimed at elimination of wastage; establishment of indicators to assess the production process; co-operation between departments in order to eliminate problems and improve company performance; continuous simplification and improvement of processes
Quality management	Following H&S regulations; monitoring and continuous improvement of product quality; conduct of quality audits; monitoring and analysis of losses due to lack of quality; employees follow established quality policy; coherent quality management plan; utilization of various tools to maintain and improve product quality (poka-yoke; problem-solving; Visual management; SPC, QFD); target quality indicator for first-batch products reaching 98%
Flow management	Joining production stages into hives or lines; monitoring levels of supplies and adjusting them according to ever-changing demands; line balancing; implementation of FIFO rule and pull system; utilization of 'stream mapping' tool for management of flow effectiveness improvement
Lean Office	Defining processes in each area and assigning them owners and responsibilities; a formal and synchronized information flow exists; 'lean' execution standards exist; monitoring and management of processes; workflow monitoring; continuous improvement of processes with utilization of various tools (PDCA, interdisciplinary teams, Kaizen, etc.)

Source: own analysis based on [1, 3, 6, 7]

Results obtained from assessment of each area undergoing continuous improvement allow to assess advancement of implementation of the continuous improvement system in the company [3]. A suggested scale of assessment of continuous improvement can be as follows:

Level 1 – activities in the pillar initiated,

Level 2 – construction of the improvement system commenced,

Level 3 – employees involved in the actions, actions are systematic,

Level 4 – Continuous Improvement System established and working, high employee awareness (they initiate actions on their own).

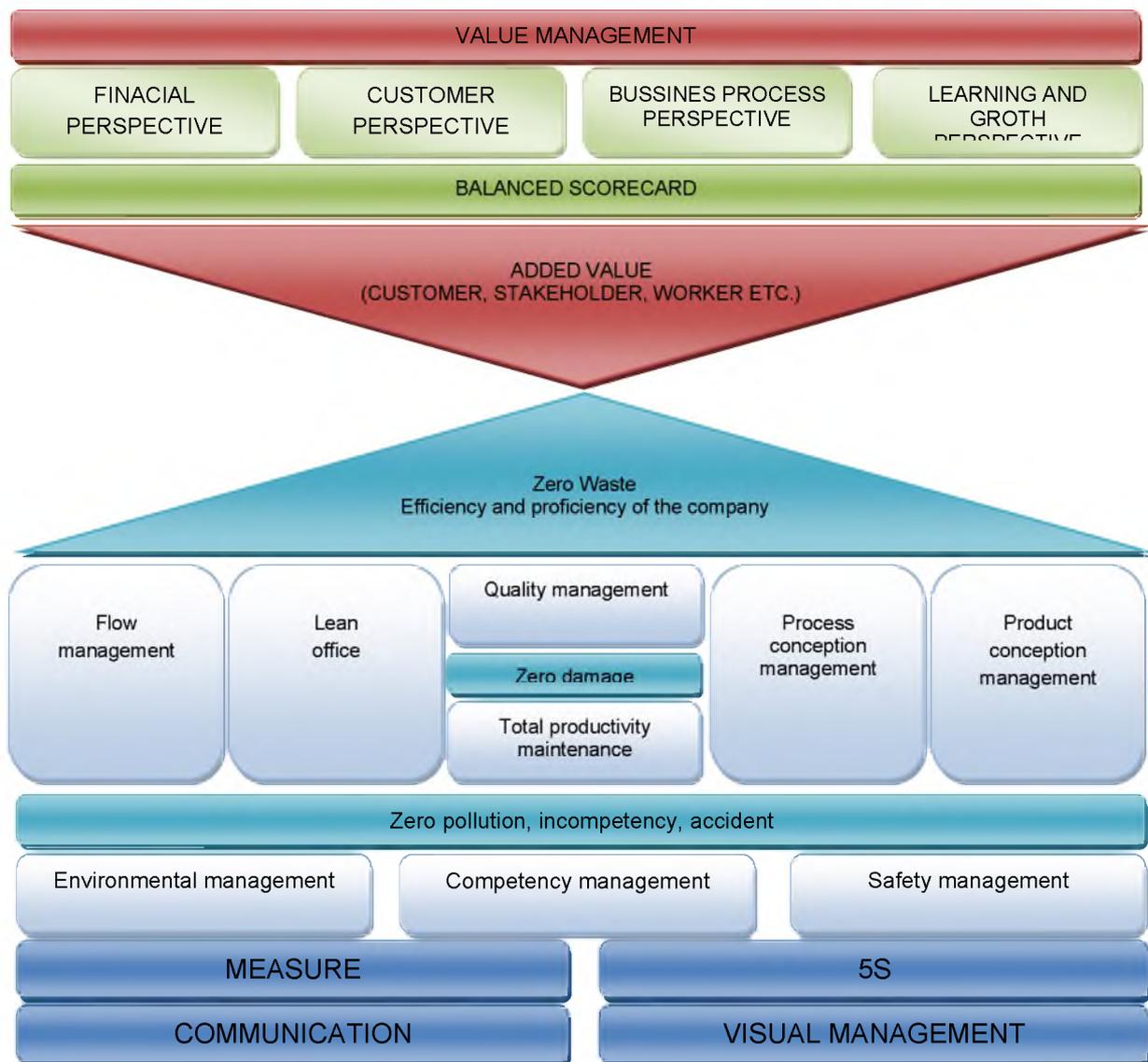


Fig.1. Areas of management of a company included in the concept

Source: own study

4. SUMMARY

Implementation of the lean approach in a company allows to integrate current management concepts which focus only on some areas in such a way that execution of strategic goals does not create conflicts nor inhibits development. Possibility to implement such approach is a result of focusing on material and information flows which penetrate all spheres of management of an organization and which the lean concept accentuates. The suggested approach gives a chance to create a system of continuous improvement in a given organization.

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