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Maturity Model for Production Management

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Abstract

The paper presents a model, developed by the author, of the enterprise maturity in the production management area, called the Productivity Management Model. The model's purpose is to arrange a process of integrated implementation of the contemporary concepts of production management to be effective in increasing enterprise productivity. Results of the model verification in 16 enterprises have been presented and conclusions have been drawn from the verification, important for the model improvement.

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1. Introduction

Maturity models were developed as a response to the need of measuring a progress achieved by the organization as a result of continuous improvement. They constitute an attempt of a quantitative evaluation of qualitative features. Becoming more mature means systematic improving organization business processes, that they are capable of delivering higher performance over time [1]. The maturity model is a framework of tools and practices, enabling a comprehensive appraisal of organization's key competencies in managing and improving crucial factors leading to the established goals [2].

The usefulness of organizational maturity models lies in their attempt to systematize all the areas and processes existing in a mature organization, setting precise criteria for achieving different maturity levels in each area, as well as recommending methods and techniques, so called "best practices", for particular levels. Excellence is achieved by reaching higher and higher levels in particular areas, which allows a rational plan of an organization's development to be drawn up.

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The most well-known models were developed in process management, project management, software development, civil service management, quality management, risk management and continuity management, however still is missing a recognised model in the field of the production management.

2. The need for an organizational maturity model in production management

Continuous improvement in production management is aimed at increasing enterprise productivity understood as the relationship between the outputs (goods and services) generated from a production system and the inputs (labor, physical and financial capital assets, materials, energy, and information) provided to create these outputs [3]. Integrated Productivity and Quality Improvement Program, developed by Fukuda and Sase [4] was based on using such production management tools as 5S, JIT – Just-in-Time, TQC – Total Quality Control, TPM – Total Productive Maintenance, Kaizen and Innovations. These tools can be treated, on the one hand, as complex concepts (philosophies), and on the other hand, as a toolbox – set of methods and techniques, which, properly implemented, help to achieve improvement of productivity.

Today the following concepts aimed at increasing productivity are used in production management: LM – Lean Manufacturing [5], TOC – Theory of Constraints [6], TQM – Total Quality Management [7], SS – Six Sigma [8], TPM – Total Productive Maintenance [9], Kaizen [10], BPR- Business Process Re-engineering [11], 5S [12]. These concepts are usually implemented independently from each other or in a way only incidentally linked. The interaction between them as well as shared tools is not taken advantage of as they should be. At the same time these concepts are so closely related that it is sometimes hard to tell whether a given solution is implemented as part of TQM or LM. Is TPM an independent system employed in production management or – as some say – a part of LM? Recently one can hear more and more often about Lean Six Sigma [8], a system combining LM and Six Sigma, or even about TLS [6] – a combination of TOC, LM and Six Sigma. A lot of methods and techniques are used in different concepts. For example, 5S practices and Kaizen philosophy are present in all concepts, SMED is considered a tool of LM and TPM, and Statistical Process Control is seen as an element of TQM, Six Sigma, and Lean Manufacturing as well.

Treating existing management models separately results in creating separate organizational structures, documentation systems, training programs etc. The lack of coordination makes enterprise management very complicated and means that the potential for synergy, coming from the fact that a lot of methods and specific techniques are common for different models, is squandered. Uncoordinated implementation of different concepts also often leads to failure as implementing more advanced tools is not preceded by using less advanced methods. It is therefore clear that pursuing organizational excellence in the field of production management requires simultaneous and coordinated implementation of all the mentioned management concepts.

This discussion was an impulse for the author to develop a Productivity Management Model presented in [6]. Its purpose is to arrange a process of implementation of the contemporary concepts of production and productivity management to be effective in increasing enterprise productivity.

3. Productivity Improvement Model

The main purpose of the Productivity Management Model is to support enterprises in the process of implementing modern management concepts geared towards productivity improvement by means of:

- Identifying the current status of implementation
- Identifying the desired (target) status
- Identifying methods and techniques that must be implemented to transition from the current to the target status.

The general structure of the Productivity Management Model is shown in Fig. 1.

PMM starts at the level of work positions where 5S practices must be implemented in order to:

- Focus on issues relevant at the work position level
- Encourage engagement of all workers to improve their work environment
- Stimulate and develop group focus on improvement ideas and follow-up.

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