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Step to Sustainable Production

MOTSP 2010

2-4 June 2010, Rovinj, Croatia

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INTRODUCTION

The venue of the 1st International Scientific Conference on "Management of Technologies – Step to Sustainable Production" (**MOTSP 2009**) is Šibenik, the town of the famous Croatian scientist and inventor **Faust Vrančić** (1551 Sibenik – 1617 Venice), and it will take place from 10-12 June 2009. The **MOTSP 2009 Conference** will provide an opportunity for researchers, scientists, engineers, and technologists from a wide variety of fields to come together and share their synergy of management of technology and sustainable production.

The management of technology, stimulation of innovation, invention and transfer of technology are assumed to be some of the important challenges of the developed and transition countries. The technology is considered to include all knowledge, products, processes, tools, methods and applied systems in the production of goods or services. With the climate undergoing drastic changes since the mid 20th century, it is critical to cut down greenhouse gas emissions to less than half of the current level to stabilize it. Inevitably, there will be accelerated increases in efforts that bring together the wisdom of international industrial and academic communities for the purpose of making shifts towards sustainable living, including the establishment of sustainable production through the cyclical and multi-step use of resources hand-in-hand with the departure from dependence on scarce resources, and the development of zero-emission social infrastructure through promoting the use of renewable energy.

Some of the challenges are very important as support to decision-making in strategic and operative considerations of some companies and government bodies. How can development requests of sustainable manufacturing (LCA, LCM) be included in the product? How can we stimulate 'green production' with proper knowledge and EU, CRO/SLO legislation? How can we reduce the possibility for the location of 'dirty industry' and increase support of the community, media and raise awareness of state structures. All of these facts are additional challenges in the process of accession to EU and using EU funds. Papers run a gamut from highly technical subjects that involve both theory and practice to non-technical areas that include sustainability, psychology, sociology, philosophy, and law.

Assoc. prof. Predrag Ćosić, Ph.D.

Chairmen of the Organizing Committee

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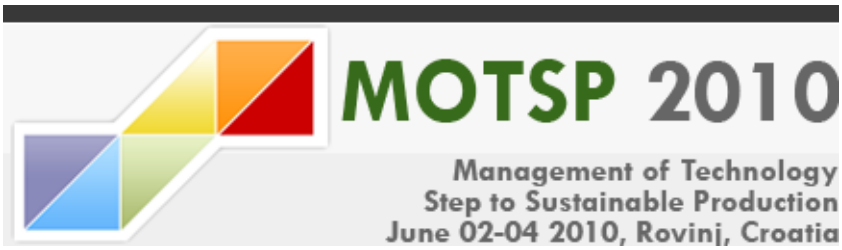

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VALUE STREAM ORIENTED PROCESS MANAGEMENT

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Abstract

Value Stream Mapping and Process Management are accurately defined methods which are used worldwide in nearly all types of businesses. Both methods possess great similarities in their basic intentions although they are coming from different backgrounds. So far these methods have been treated separately in science and practical application. Within this paper the similarities and analogies are discussed and new opportunities regarding effectiveness and sustainability of implementation, opened up by the combination of these two methods, are shown.

Keywords: Value Stream Mapping, Process Management, Lean Management, process optimization, Value Stream oriented Process Management, Process Life Cycle

1. INTRODUCTION

Practical application and current research activities have shown similarities between the approach of Process Management (PcM) and the approach of Value Stream Design (VSD) in many aspects. It is obvious, that a combination of these two methods provides mutual benefits and synergies and offers the opportunity for improved new procedures to apply these methods. Based on these basic considerations two hypotheses concerning the so called Value Stream oriented Process Management (VSoPcM) and the Value Stream Management System (VSMS) are created.

Hypothesis 1 (Value Stream oriented Process Management): Value Stream Design is methodically expanded by the holistic aspects of Process Management Systems. The orientation of Value Stream Design to increase efficiency is broadened by the aspects of increasing effectiveness and continuous improvement.

Hypothesis 2 (Value Stream Management System): Process Management profits by the alliance to Value Stream Design. The qualitative approaches, used by Process Management Systems are expanded by quantitative aspects of Value Stream Design. In particular the 4-Step-Method is expanded by implementing formal principles/guidelines of the Value Stream Design in step 2 and especially in step 3.

This paper corroborates hypothesis one and formulates fundamental thoughts of Value Stream oriented Process Management (VSoPcM).

2. DEFINITION OF PROCESS AND VALUE STREAM

As indicated in Figure 1, processes have inputs and outputs that confine a process to the contiguous processes (upstream and downstream) and fulfill the process purpose. The input (to be considered as an activated incident), the actual process flow and the required resources as well as the output (outcome) are basic parameters to define a process. Processes are confined on a temporarily base as well as with regards to the content. Within the process the responsibilities for the sub-processes/activities are defined as well as the required information. The process objectives are derived top-down from the overall business objectives. They can cover general quality aspects of the business such as cost and time aspects. The commitment of process responsibilities completes the required parameters of a process [1].

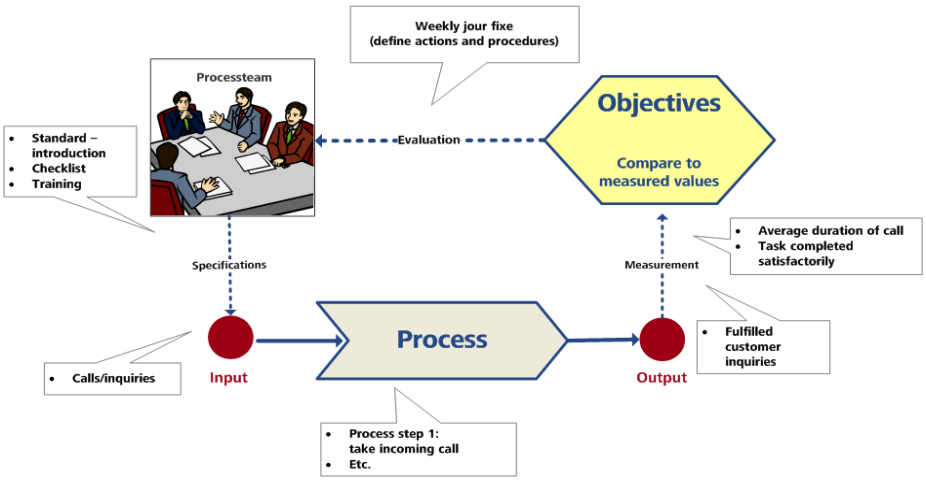

Figure 1 - Process Management

A value stream includes all activities, i.e. value-adding, non-value-adding and supporting activities that are necessary to create a product (or to render a service) and to make this available to the customer. This includes the operational processes, the flow of material between the processes, all control and steering activities and also the flow of information (see Fig 2). Taking a value stream view means considering the general picture of an organisation and not just individual aspects [2].

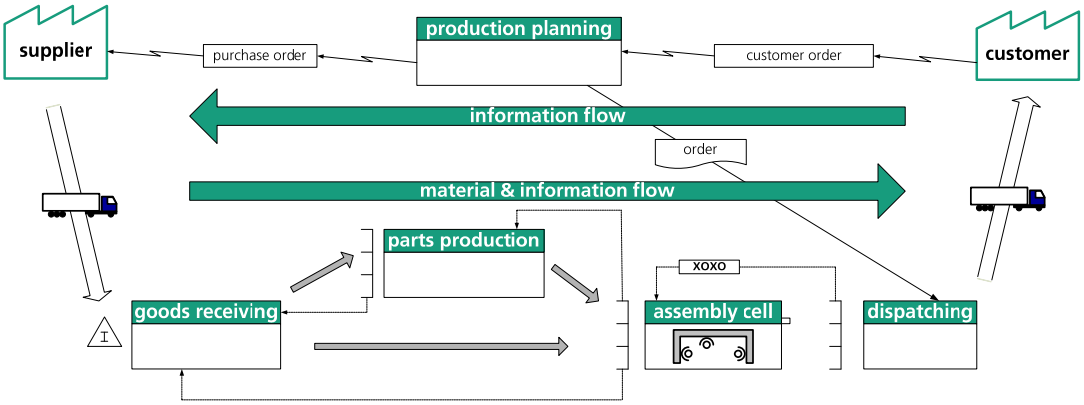

Figure 2 - Picture of a value stream (the so-called value stream map)

3. VALUE STREAM DESIGN AND PROCESS MANAGEMENT

3.1 Value Stream Design

VSD was originally developed as a method within the Toyota Production System [3] and is an essential element of Lean Management [4]. It was first introduced as an independent methodology by Mike Rother and John Shook. VSD is a simple, yet very effective, method to gain a holistic overview of the status of the value streams within an organisation. Based on the analysis of the current status, flow-oriented value streams are planned and implemented for the target-status. In order to assess possible improvement potential, VSD considers, in particular, the entire operating time compared with the overall lead time. The greater the distinction between operating and lead time the higher the improvement potential [5,6,7]. By defining future states, VSD uses a 4-Step approach including an "action plan" to describe necessary actions and activities (what, by whom, until when) to improve the value stream.

Originally the method was described only for simple and discrete production process chains, but quickly the need for an extension towards mixed model value streams was discovered. Erlach and Duggan described approaches dealing with that [6,8].VSD was primarily developed as a method for the improvement of production processes. Therefore, Rother and Shook have defined seven guidelines for establishing an

efficient, customer-oriented value stream. Meanwhile, Fraunhofer Austria has defined eight guidelines to do so [9] and introduced further advancement of VSD by combining it with MTM (Methods-Time Measurement) [10] to increase productivity and lead time. Furthermore, the method VSD has been adapted to the needs of administrative processes. Therefore, alternative guidelines and new ways of visualization have been defined by Wiegand [11,12].

3.2 Process Management

Process Management causes a sustainable improvement of working procedures in the organizational structure: Activities are geared towards the added value. Process management is the combination of activities which includes the planning and monitoring the performance of a process. Process management is the application of knowledge, skills, tools, techniques and systems to define, visualize, measure, control, report and improve processes with the goal to meet customer requirements profitably. This improves the employees' incentive to work, because they are able to recognize the importance of their contributions in the overall context. The hub in the Process Management concept is the Process Life Cycle (see Fig. 3). The Process Life Cycle indicates and determines each stage of the life cycle of a process within a Process Management System. It starts with the incorporation of the process into the process map and it ends with the shutdown of the process. The Process Life Cycle defines the steps in the cycle of a process in the Process Management System in form of phases and phase transitions. Phase 1 and 2 represent the design and conception of processes. Phase 3 and 4 specify the recurring ("daily") work of implementing processes. The entire Process Life Cycle can also be considered as two processes („to design a process" and „to operate and control processes") according to the described phases. Another view is the combination of phase 2 and 3 focussing the "management of single processes", the combination of phase 4 and 1 focussing "management of multi processes" [1].

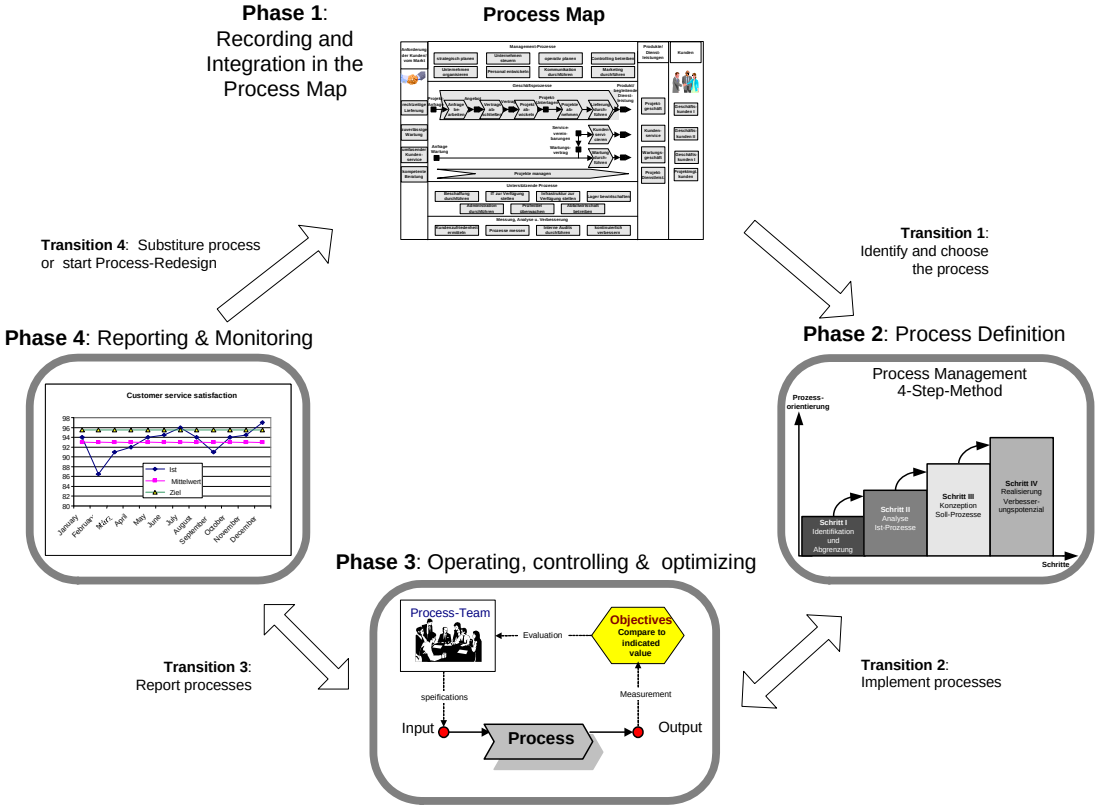

Figure 3 - Process Life Cycle [1]

To define a process in the sense of disclosing and realising potentials for improvement, the 4-Step-Method (see Fig. 5) is used. The 4-Step-Method is a generic approach in PcM and consists of [13]:

Step I: Identification and Scope

Step II: Analysis of actual (as-is, current-state) processes

Step III: Design target (to-be) processes

Step IV: Implementation of improvements

Step two is keen on coming up with the so-called improvement list (see Fig. 4), which is used for tracking the considered actions for the purpose of improving the process. It is similar to the VSD action plan but covers broader aspects and parameter. These 4 steps are implemented through process team meetings. The process team consists of the process owner and the members of the process team working within or outside the process.

improvement-list			**process:**			**processteam:**				
no.	**admission day**	**description (e.g. problem, failure, trouble, error,..)**	**improvement action**	**importance**	**effort**	**realization costs**	**realization benefit**	**responsibility**	**due date**	**Status**
1										
2										
…										

Table 1 - Improvement-list

The continuous improvement of the process takes place in phase 3 and 4 of the Process Life Cycle in a structured meeting called process-jour-fixe. The aim of the process-jour-fixe is to continuously check the process-interfaces, the process-performance and the satisfaction of the process-customers [14].

4. COMPARING TWO APPROACHES TO OPTIMIZE PROCESSES

By comparing the two 4-Step approaches (see Fig. 5 and 6) within VSD and PcM many similarities arise.

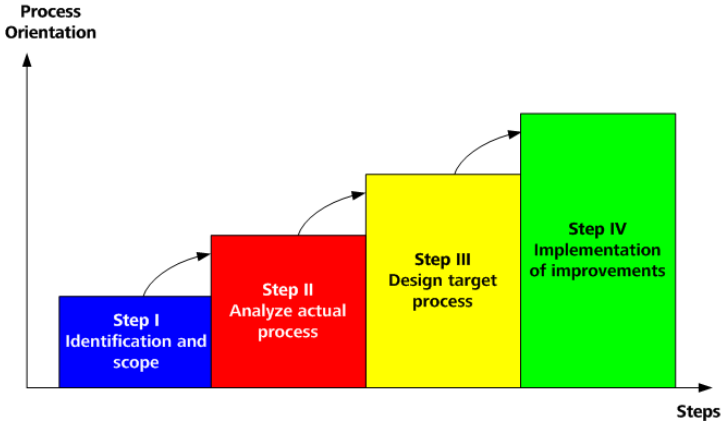

Figure 5 - 4-Step approach of Process Management

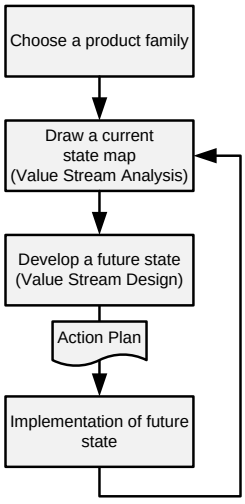

Figure 6 - 4-Step approach of VSD

In VSD as well as in PcM, the first step is to limit and define the scope of improvement, by choosing a product family on hand or identifying and encircling a certain process on the other hand. This is in both cases an important and crucial step in order to identify and combine similar processes, but also to separate value streams or processes. Of course this step is also necessary to limit the improvement scope and to make the effort predictable up to a certain degree.

In both approaches, the current state is analyzed in step 2. PcM uses flow-charts or similar charts to visualize the current situation, VSD draws a current state map using the typical VSD-symbols. A remarkable difference occurs in the recording and analysis of data. Whereas VSD is quite strongly focused on the distinction between operating and lead time, PcM focuses on different performance indicators as well as on soft facts that cannot be measured with numbers that easily. Although not visible in the figures above, a similarity in step 2 is the focus on customer demand and customer requirements in both approaches.

The third step is in both approaches characterized by the design of a future (target) state. Whereas VSD uses eight guidelines to create an efficient, customer-oriented value stream to elaborate the future state, PcM uses a great variety of methods or tools (e.g. FMEA, Q7, Ishikawa-Diagram, ...) to identify room for improvement and to elaborate the target state. Similarities are designed first by way of designing a future state that encompasses in both states an ideal state which is free from restrictions (e.g. floor space, availability of qualifies employees, etc. After that, the desired future state is derived from the ideal state, under the assumption that it can be implemented within a reasonable time frame. As visualized in Figure 7, the ideal state is subject to change. Step 4 is again quite similar in both approaches and the planned improvements are implemented.

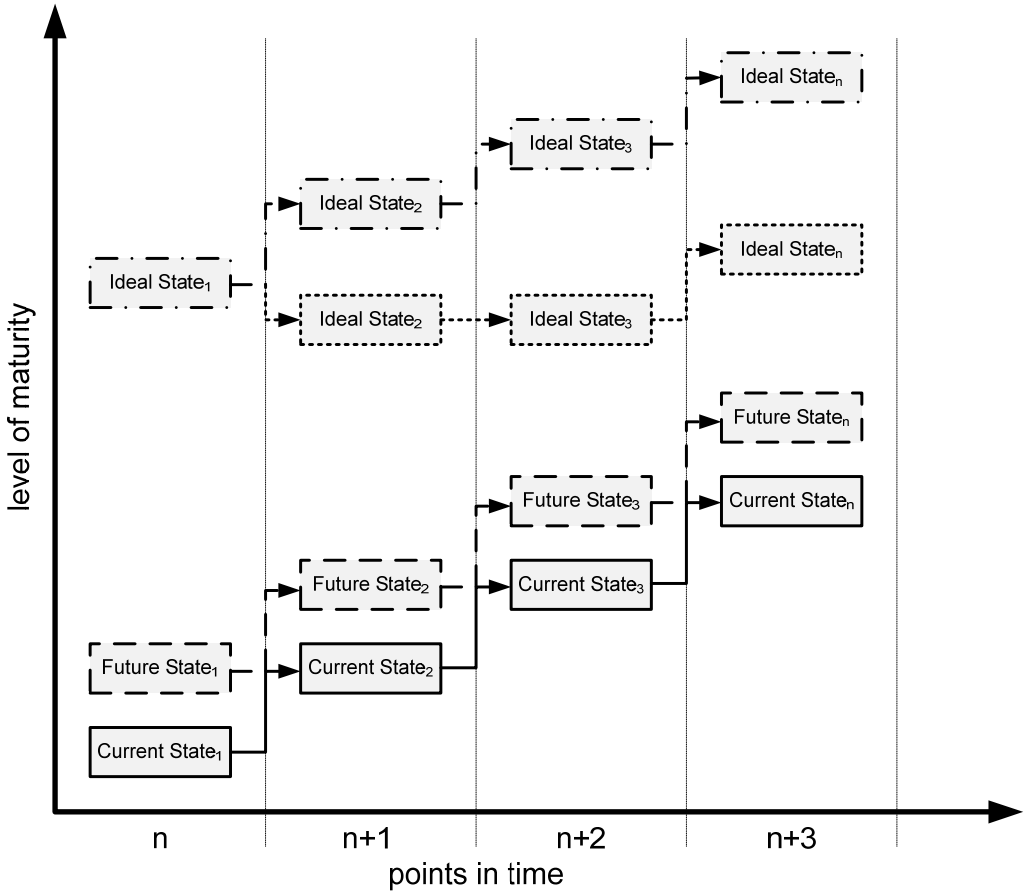

Figure 7 - Development of current, future and ideal state

During the execution of the 4-Step approaches (in Process Management as well as in Value Stream Design) the “as is” situation is determined and an ideal state is defined as well as a target state is described at point-in-time “n”. Through the realisation of improvements, summarized in the action plan or the improvement-

list, a new current “as is” state occurs at point-in-time “n+1”, which can be achieved within the economical, organizational and time-delimited requirements. The objective here lies in the transference of the “as is” situation as described by point-in-time “n” to the target state described by point-in-time “n+1”.

At the starting point of every optimization initiative, one must examine whether or not the actual “as is”state in reference to the establishment of the new target state, is as ideal as the previous one, or whether the state has to be adjusted accordingly.

Thus a continuous improvement of processes, which enables greater and smaller leaps forward, is achieved. Based on this step- step-by-step procedure to achieve the ideal state, the necessary amount of resources for improving the processes becomes predictable and can therefore be estimated.

These two approaches, the 4-Step-Method of Process Management and the 4-Step approach of Value Stream Design, have been designed to cause a rearrangement of a process. In the course of a Life Cycle consideration at the Process Management level, the aspects of smaller improvements, thus aspects of process efficiency, are merged with the aspects of greater improvements of a rearrangement for the purpose of accomplishing continuous improvement.

The integration of these ideas, inherent to Process Management, into the method of Value Stream Design enlarges its 4-Step approach. By using the improvement-list in Value Stream Design an additional advantage for the Value Stream Design is generated, because the improvement-list also considers an effectiveness test, beneath the mentioned aspects of efficiency, effectiveness and the continuous improvement. This enlargement of the 4-Step approach of the Value Stream Design is shown in Figure 8.

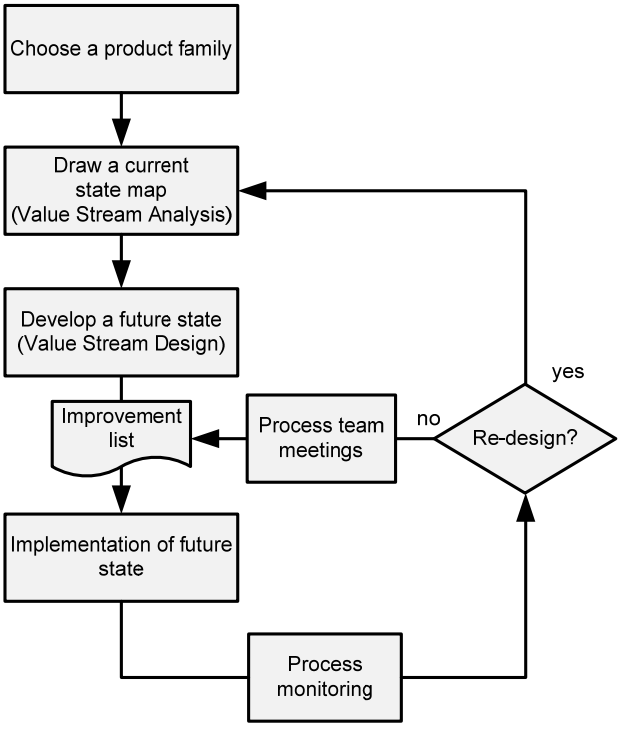

Figure 8 - Enhancement of the 4-Step approach of VSD by Process Management

5. CONCLUSIO

Referring to hypothesis one it is shown that the 4-Step approach of Value Stream Design is reasonably extended by using the improvement-list and the systematic of Process Life Cycle. Implemented projects show the applicability of the described hypotheses and following research projects will deepen the thoughts as well as verify hypothesis two.

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