

Dialectics in Automatic Production

Kunica, Zoran

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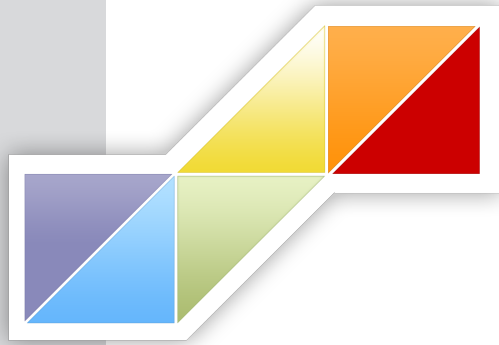
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**Management of Technology
Step to Sustainable Production**

MOTSP 2010

2-4 June 2010, Rovinj, Croatia

Conference Proceedings

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Management of Technology – 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

SESSIONS

Session1:

Industrial Engineering and Operations Management, Operations Research, Production Economics

Session2:

Production Engineering
(CIM, Cax, Product Design, Rapid Prototyping, Manufacturing Technologies)

Session 3:

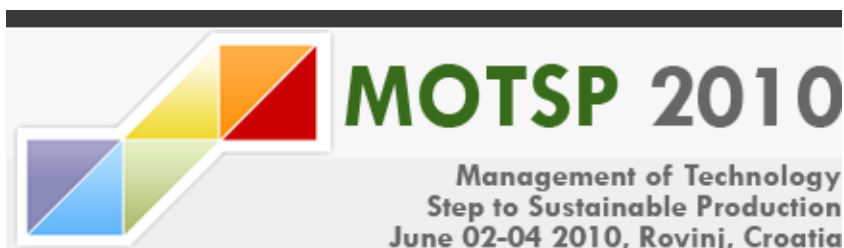
Sustainable Development
(Sustainable Production, Energy Efficiency and Renewable Sources, Green Scm, Recycling, Waste Management)

Session 4:

Management
(Organizational Management, Entrepreneurship, Knowledge Management, Education)

Session 5:

Social Responsibility



CONFERENCE PROCEEDINGS

[Home](#)
[Introduction](#)
[Contents](#)
[Authors](#)
[Sponsors](#)
[In Memoriam](#)

[Session1](#)
[Session2](#)
[Session3](#)
[Session4](#)

Invited Papers

Igor Čatić , Maja Rujnić-Sokele	Synthesiological Approach to Artificial Materials Technologies
Zoran Kunica	Dialectics in Automatic Production
Alberto G Canen	Cultural Auditing: A Tool for Logistics Management Performance
Valentina Gecevska, Paolo Chiabert , Franco Lombardi, Franc Cus	Product Lifecycle Management Concept for Innovation and Concurrent Business Environment

[on top](#)

Session1: Industrial Engineering

Operations Management, Operations Research, Production Economics, Logistics and SCM, Quality Control, Maintenance

Cosic Predrag, Lisjak Dragutin, Antolic Drazen	Investigation of Using Multicriteria Optimization in Process Planning
Tomaž Perme, Matjaž Novak, Rok Strašek, Iztok Kavkler, Alen Orbanic	A Model for Technical Optimisation of the Distribution Centre
Tomaž Perme	Modeling and Discrete Simulation for the Sustainable Management of Technology
Monika Fedorčáková, Juraj Šebo	Application of the Queuing Theory Model with Stochastic Creation of Servicing Channels

Yung-Cheng Wang, Jui-Chang Lin, Shih-Fong Chiu	Automatic Inspection System for Dimensional Measurements of the Saw Blade Milling Cutter Copyright © Faculty of Mechanical Engineering and Naval Architecture Zagreb, Cr
Florin Chichernea, Alexandru Chichernea	Value Management and Design of Industrial Equipments
Vito Tič, Milan Kambič, Darko Lovrec	Application of Condition Monitoring System for Mineral Oils
Svetoslav Dimkov	Flexibility Research of the Business Systems of the Middle- Range Industrial Enterprises in Bulgaria
Anita Babić, Hrvoje Cajner, Nikola Šakić	Using Historical Data Analysis in Problems of Mixtures
Shpetim Lajqi, Jürgen Gugler, Naser Lajqi, Ahmet Shala, Ramë Likaj	Experimental Possibilities for Determination of Suspension Parameters by the Simplified Model of a Passenger Car
Ile Mircheski, Sofija Sidorenko	An Analysis of Four Concepts for Driver's Seat Comfort in Passanger Vehicles
Dušanka Stojanović, Vesna Aleksić Marić	Estimate Cost of Investment in Information Security – Application of the Monte Carlo Method
Ramë Likaj, Kumbim Shala, Venet Shala	Sensitivity Analysis in Designing the Production Systems and Economic Interpretation
Michał Rogalewicz, Agnieszka Kujawińska	Traditional SPC or Multivariate SPC – What to Choose?
Ognjan Lužanin, Miroslav Plančak, Mladimir Milutinović	PNN-Based Classifier for Recognition of Simple and Complex Static Hand Gestures
Hristofor Koev, Svetoslav Simeonov	Concerning Error Arised from Angular Deformation of Helical Grooves Clutch
Dušan Gošnik, Matej Hohnjec, Marko Mihčić, Dejan Petrović, Vlado Obradović, Nikola Trajković	Innovate or Die! Six Sigma as a Step to Innovation Based Sustainable Production Processes
Heset Cakolli, Nijazi Ibrahim, Azem Kçyky, Halil Demolli	Simulation of Movement of Transportation Vehicles During Steep Roads
Davor Donevski, Diana Milčić, Dubravko Banić	Data Analysis for Optimal Printer Characterization
Igor Fürstner, Zoran Anišić, Robert Freund	Implementation of Adaptive Product Configuration As An Additional Tool for Sustainable Product Lifecycle
Marc Kane, Victor Starzhinsky	Modelling of Development and Variation in Quality Parameters of Gears in the Course of their Machining
Arijan Abrashi, Nedeljko Štefanić, Miroslav Kovačec	The Advantages of Using Diploid Chromosomes in Solving Permutation Class of Problems

[on top](#)

Session2: Production Engineering

CIM, Cax, Product Development, Product Design, Rapid Prototyping, Manufacturing Technologies

Slavko Božič	The Details of Planning Product for Motorcycle Industry
Peter Štrukelj, Slavko Dolinšek	Internationalization of R&D in Two High-Tech Clusters and Cooperation of R&D Units in Those Clusters
Vesna Mandić, Dragan Adamović, Zoran Jurković, Milentije Stefanović, Miroslav Zivković, Saša Ranđelović, Tomislav Marinković	CAE Analysis of Ironing Process with Experimental Verification
Hasse Nylund, Minna Lanz, Ari Ranta, Kimmo Ikkala, Reijo Tuokko	Developing Competitive and Sustainable Performance Metrics for an Intelligent Manufacturing Environment
Maud Rio, Tatiana Reyes, Lionel Roucoules	A Framework for Ecodesign: An Interface Between LCA and Design Process
Darko Lovrec, Vito Tič	Virtual Engineering in Hydraulic Tank Design
Yung-Cheng Wang, Lih-Horn Shyu, Chung-Ping Chang	Finesse Effect on the Measurement Accuracy of Fabry-Perot Interferometrical Displacement Measurement
Filip Górski, Wiesław Kuczko, Radosław Wichniarek, Adam Dudziak, Maciej Kowalski, Przemysław Zawadzki	Choosing Optimal Rapid Manufacturing Process for Thin-Walled Products Using Expert Algorithm
Maciej Kowalski, Radosław Paszkiwicz, Przemysław Zawadzki, Filip Górski	Automatic System for 3D Models and Technology Process Design
Maciej Kowalski, Radosław Paszkiwicz, Przemysław Zawadzki	VR Techniques in Work Stand Design
Viera Poppeová, Juraj Uriček, Peter Šindler, Vladimír Bulej	The Concept of HSC Milling Machine with Hybrid Kinematic Structure Application
Viera Poppeová, Juraj Uriček, Vladimír Bulej, Ondrej Tabák	The Trends in Automation of Plasma Cutting Process
Marko Reibenschuh, Franci Cus, Uroš Zuperl	Comparison of Different Optimization and Process Control Procedures
Marius Tufoi, Ion Vela, Constantin Marta, Viorel Bizau, Mihaela Stroia	Modern Methods of Withdrawal of Semi-Finished Products at Installations of Continuous Casting
Chavdar Sazdov, Vilhelm Hadjiiski, Stefan Stefanov, Rumén Mitev	PET Bottles Stability Loss Process Modeling
Milan Kostelac, Jovan Tepić, Dražan Kozak	Justification for Use of Tightening Elements in Joins Between the Wheel-Head and the Axle
Nijazi Ibrahimi, Sadullah Avdiu, Riad Ramadani	Optimization of Parameters of Two-Step Helical Gearboxes
Beqir Hamidi	Reduced Dynamic Model Wing Excavation with Rotor

Rajcho Ilarionov, Nikolai Shopov, Ivan Simeonov, Nikolai Madzharov, Hristo Kilifarev	Ultrasonic Method for Metal Recognition by Means of Fast Wavelet Transformation
Juliya Petrova, Inna Byelyayeva, Halina Sinitsina	Cyclical Stresses in Stiffened Cylinders

[on top](#)

Session3: Sustainable Development

Sustainable Production, Energy Efficiency, Renewable Energy Sources, Sustainable Logistics, Recycling and Waste Management

Tihomir Opetuk, Ivan Zolo, Goran Dukic	Greening Elements in the Electrical Distribution Networks
Stefan Schmidt	Sustainable Logistics – Case Study of an Automobile Manufacturer
Štefan Bojnec, Drago Papler	Investment Efficiency Appraisal for Different Sizes of the Solar Electricity Plants
Štefan Bojnec, Drago Papler	Efficient Energy Use and Renewable Sources of Energy in Slovenia: A Survey on Public Perception
Maria Giovanna Trotta	PLM: Sustainability and Knowledge Management as Keys in a Complex System of Product Development
Dušan Šebo, Katarína Halagovcová, Henrieta Nakatová	Technology of the Mine Waste Water Disposal
Neven Lovrin, Željko Vrcan	Energy Saving in Modern Gearboxes Using HCR Gears
Tahir Sofilić, Alenka Rastovčan-Mioč, Mario Čosić, Vesna Merle, Boro Mioč, Una Sofilić	Steel Slag Application in Croatian Asphalt Mixture Production
Rajfa Musemic, Adisa Vucina, Azra Basic	Modeling Environmentally Sound Management System of Waste Oil
Ivana Ignjatović, Dragan Šešlija, Slobodan Dudić	Increasing Energy Efficiency of Compressed Air Usage for Sustainable Production of Food and Beverage
Claudia De Giorgi, Clara Ceppa, Beatrice Lerma	New Products and Processes from Sustainable Waste Management
Silvia Barbero	Systemic Design in Energy Sector: Theory and Case Studies
Jurica Dolic, Jesenka Pibernik, Iva Bilusic	Consumer Interpretation of Recycling Symbols Used for Printed Products

[on top](#)

Session4: Management, Marketing and Social Responsibility

Management of Technology, Engineering Management, Organizational Management, Innovations, Education,

Business Process Improvements, Process Mapping and Modeling, Strategic planning

Ivana Plazibat, Ivona Šustić, Anita Krolo Crvelin	Applying Total Quality Management in Retail Industry
Zdenko Zeman, Marija Geiger	Beyond Anthropocentrism – Animal Welfare and Social Responsibility
Svetlana Mihic	Mass Customization – New Way Out for Sustainable Production
Christian Morawetz, Peter Kuhlang, Karl Wagner, Wilfried Sihn	Value Stream Oriented Process Management
Aleksander Janeš, Slavko Dolinšek	Do We Need a New Compass for the Journey Through the Global Crisis?
Miroslav Kotevski, Radmil Polenakovik	Need for Successful Succession Planning for Sustainable Company Growth
Bisera Kajmakoska	The New Product Development Process Models and their Modifications
Daniela Popova	The Human Resource Management (HRM) in an Entrepreneurial Network – Some Professional Issues of the Bulgarian Craftsmanship
Anne-Marie Salmi	Competitive Advantage Model Creation for Environmental Technology SMEs – A Cross Case Study
Ana Arzenšek	Qualitative Study of HRM Schemas During Economic Crisis
Marjan Leber, Andrej Polajnar	Innovation Power of Slovenian Companies
Agnieszka Kujawinska, Michał Rogalewicz, Maria Pilacinska	Classification of Manufacturing Process State Evaluation Method
Nedeljko Stefanic, Natasa Tosanovic, Miro Hegedic	Current State Analysis of Production Process by Value Stream Mapping
Borut Buchmeister, Andrej Polajnar, Iztok Palcic, Joze Pavlinjek, Natasa Vujica Herzog	Trends of Future Developments - a Step to Sustainable Production and Social Systems
Jane Paunkovic, Ivica Stojkovic, Zoran Stojkovic, Srdjan Zikic	Awareness of Organizational Culture Is Important for Sustainable Implementation of E- Health
Zorka Jugović, Jelena Bošković, Danijela Pecarski, Aleksandar Peulić, Zoran Jevremović	Windows Mobile Platform for Economic Analysis of Agriculture Production
Thomas Edtmayr, Peter Kuhlan, Wilfried Sihn	Methodical Approach to Design Workplaces and Increase Productivity Based on Value Stream Mapping and MTM
Clara Ceppa	Resources Management Tool to Optimize Company Productivity

Vesna Janković	Reality Hacking: ICT and Sustainable Development
Tatjana Horvat	The Impact of Financial Crisis on Social Responsibility in Slovenian Annual Reports
Sabahudin Jašarević, Safet Brdarević, Fikret Brdarević, Magdalena Diering	Influence of the Activity of Organization to Achieved Effects of Introduced Quality System
Dan Săvescu	Some Aspects Regarding the Concept "Research for Business"
Helena Trbusic	Business Ethics and Managing Reputation
Nikša Dubreta	Sustainability Within Non-Technical Field of Engineering Education

[on top](#)

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].

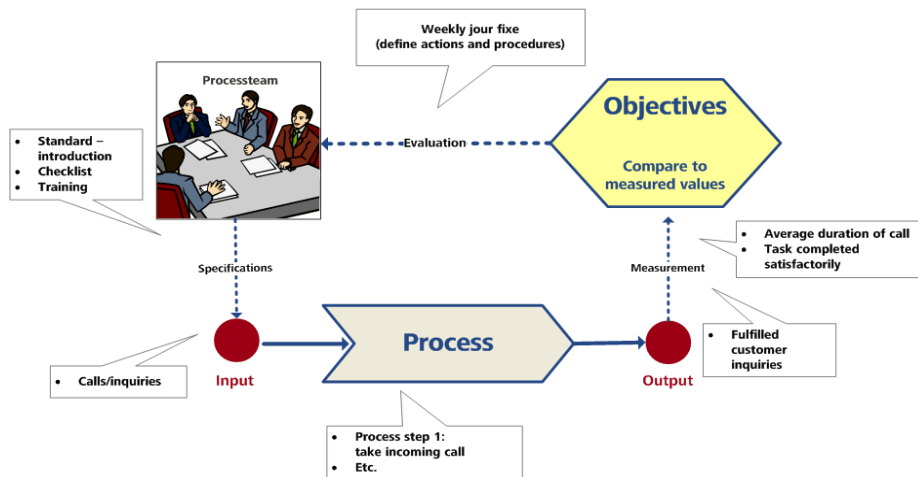


Figure 1 - Process Management

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].

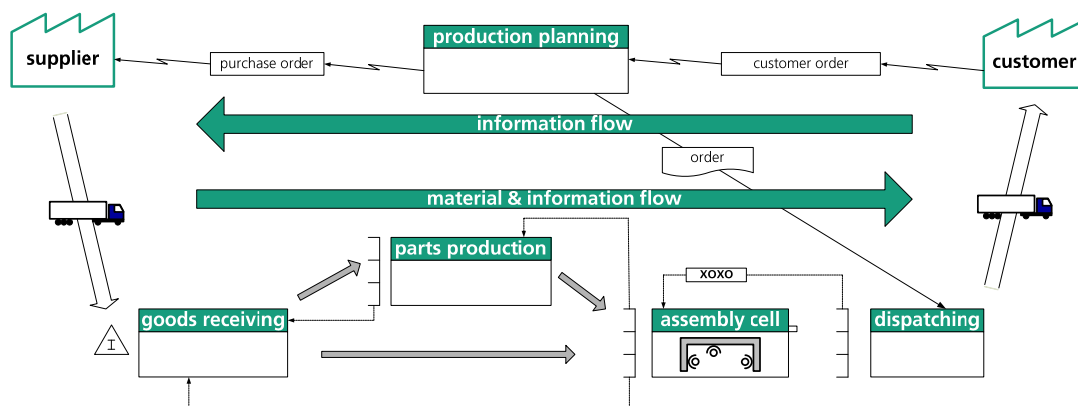


Figure 2 - Picture of a value stream (the so-called value stream map)

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].

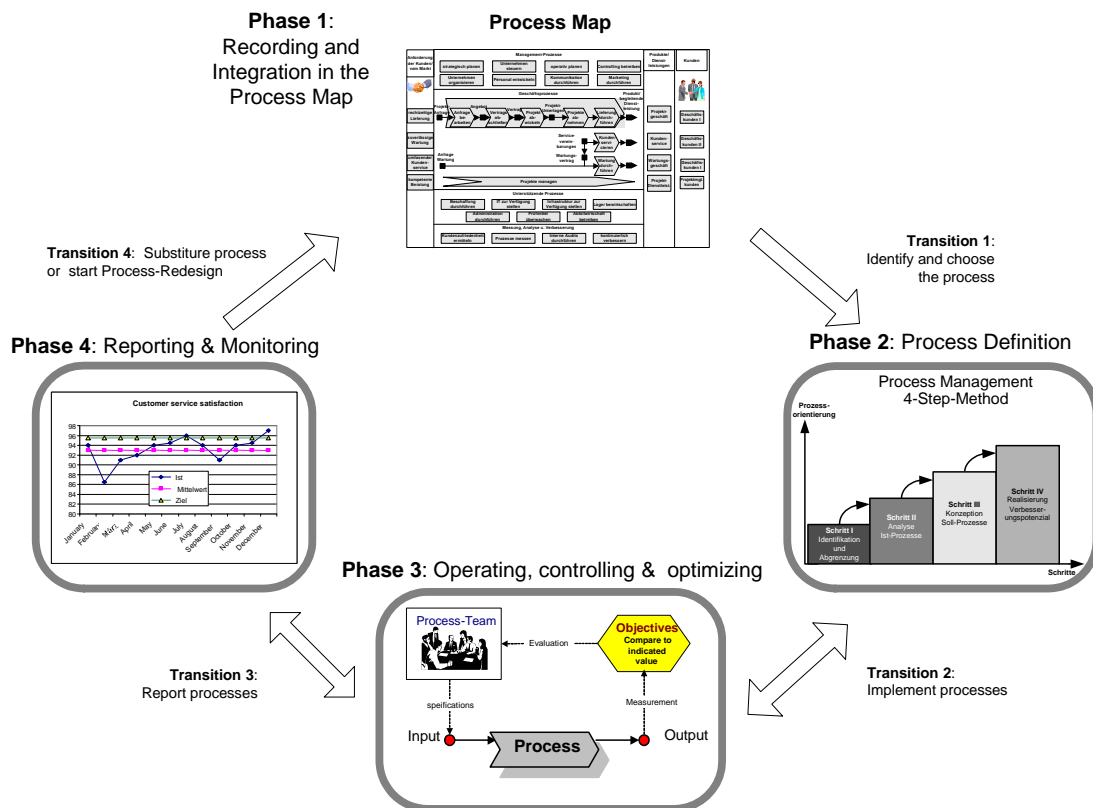


Figure 3 - Process Life Cycle [1]

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.

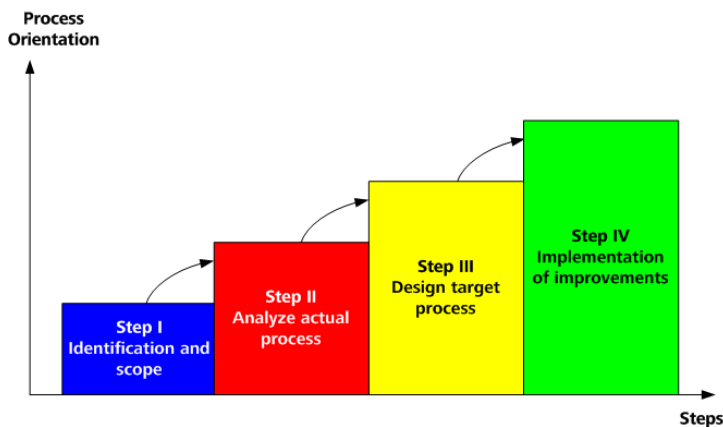


Figure 5 - 4-Step approach of Process Management

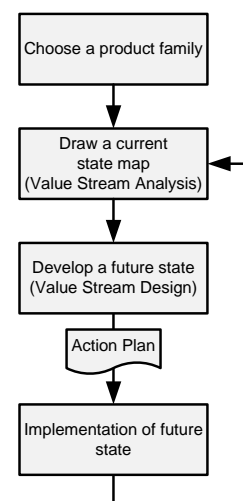


Figure 6 - 4-Step approach of VSD

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 qualified 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.

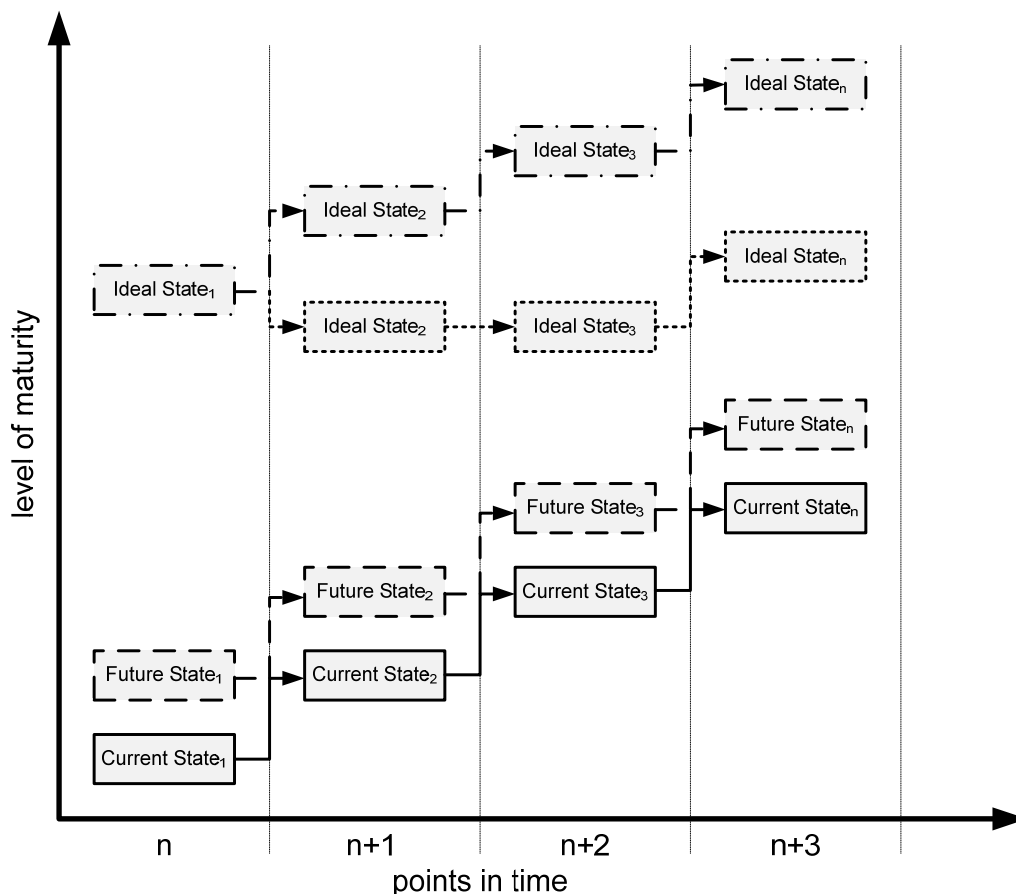


Figure 7 - Development of current, future and ideal state

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.

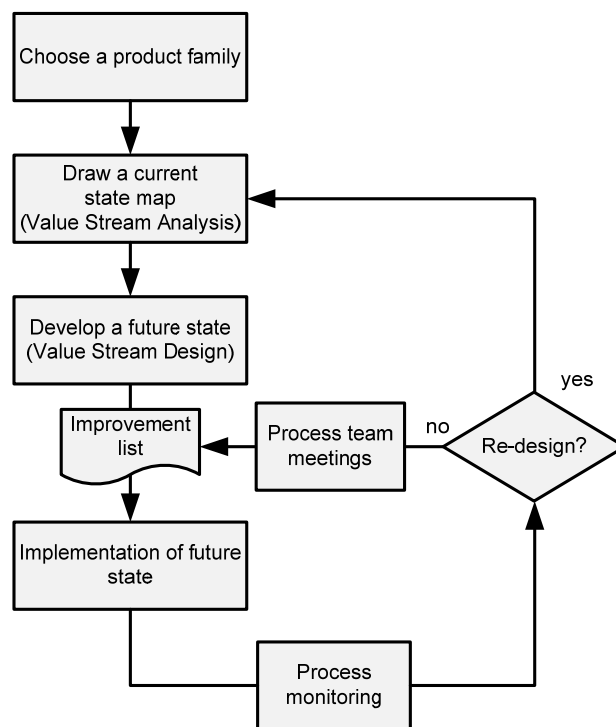


Figure 8 - Enhancement of the 4-Step approach of VSD by Process Management

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.

8. REFERENCES

- [1] Wagner, K.; Patzak G. (2007): *Performance Excellence – Der Praxisleitfaden zum effektiven Prozessmanagement*; Carl Hanser Verlag München, Wien, p.78-90
- [2] Kuhlmann, P.; Minichmayr, J.; Sihm, W. (2008): *Hybrid Optimisation of Added Value with Value Stream Mapping and Methods-Time Measurement*; Journal of Machine Engineering, 8 (2008), 2; p. 23
- [3] Ohno, T. (1988): *Toyota Production System beyond Large-Scale Production*; Productivity Press, Portland USA – after Ohno, T., 1978. Toyota seisan hōshiki; Diamand, Inc., Tokyo, Japan.
- [4] Liker, J. K. (2009): *Der Toyota-Weg : 14 Managementprinzipien des weltweit erfolgreichsten Automobilkonzerns* - 6., leicht veränd. Aufl. . - München : FinanzBuch-Verl., 2009; p. 29-30
- [5] Rother, M.; Shook J. (2006): *SEHEN LERNEN, mit Wertstromdesign die Wertschöpfung erhöhen und Verschwendung beseitigen*, Version 1.2, Lean Management Institut Aachen, Aachen, 2006; p. 29
- [6] Erlach, K. (2007): *Wertstromdesign – Der Weg zur schlanken Fabrik*, Springer-Verlag Berlin Heidelberg, 2007; p. 10, 92, 114 - 129
- [7] Klevers, T. (2007): *Wertstrom-Mapping und Wertstrom-Design : Verschwendung vermeiden - Wertschöpfung steigern*, Landsberg am Lech : mi-Fachverl., Redline, 2007
- [8] Duggan, K. J. (2007): *Creating mixed model value streams: practical lean techniques for building to demand* - 6. print. - New York, NY : Productivity Pr., 2007
- [9] Sihm, W. (2007): *Schlanke Prozesse durch Value Stream Mapping - oder was man vom Toyota Produktionssystem lernen kann!*; Keynote-Speech, 5. Prozessmanagement Summit, Vienna, 2007
- [10] Kuhlmann, P.; Minichmayr, J.; Sihm, W. (2008): *Hybrid Optimisation of Added Value with Value Stream Mapping and Methods-Time Measurement*; Journal of Machine Engineering, 8 (2008), 2; p. 23 - 32.
- [11] Wiegand B.; Franck P. (2006): *Lean Administration 1: So werden Geschäftsprozesse transparent*, Version 2.0, Lean Management Institut, Aachen, 2006
- [12] Wiegand B.; Nutz K. (2007): *Lean Administration 2: So managen Sie Geschäftsprozesse richtig*, Version 1.0, Lean Management Institut, Aachen, 2007
- [13] Wagner, K.; Käfer R. (2010) *PQM – Leitfaden zur Umsetzung der ISO 9001*, Carl Hanser Verlag 5. komplett überarbeitet und erweiterte Auflage, München, Wien
- [14] Wagner, K., Dürr W. (2006): *A Five-Step Method for Value-Based Planning and Monitoring of Systems Engineering Projects*; Proceedings of the 32nd EUROMICRO conference on Software Engineering and Advanced Applications (EUROMICRO-SEAA'06); p. 6 – 7