

I INTERNATIONAL CONFERENCE

QUALITY SYSTEM CONDITION
FOR SUCCESSFULL BUSINESS
AND COMPETITIVENESS
PROCEEDINGS



АСОЦИЈАЦИЈА
ЗА КВАЛИТЕТ И
СТАНДАРДИЗАЦИЈУ
СРБИЈЕ



**ASSOCIATION FOR QUALITY AND
STANDARDIZATION SERBIAN,
IN COOPERATION WITH
LOCAL GOVERNMENT OF KRUSEVAC CITY
AND COLLEGE OF BUSINESS ECONOMICS AND
ENTREPRENEURSHIP**

ORGANIZE

I INTERNATIONAL SCIENTIFIC CONFERENCE

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SUCCESSFULL BUSSINESS AND
COMPETIVENESS”**

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P R E F A C E

*During the period from 28th to 30th November 2013th year will be held fifteenth anniversary conference **QUALITY SYSTEM CONDITIONS FOR SUCCESSFUL BUSINESS AND COMPETITIVENESS** organized by Association for Quality and Standardization of Serbia, with support of local government of Krusevac city and the College of Business Economics and Entrepreneurship from Belgrade.*

In addition to the jubilee of fifteen years, this collection is significant because this is our first international conference with higher level of organization which improvements of quality of infrastructure exceeds the boundaries of the Republic of Serbia

Through a multitude of papers covered the following topics : Food Safety Management , Knowledge Management , Occupational Health and Safety at Work , Improving quality infrastructure in the region; QMS in health , QMS in education, QMS in tourism and the quality of the Bologna process, quality in the automotive industry, Development of an integrated management system; Path to business excellence; Laboratory accreditation; Consumer Satisfaction Index, Establishing a QMS (from practice to practice);, Measurement;, Control and quality of production; Determining the quality of formal higher education, application of new technologies in the educational process; The impact of project management to quality management, Information system - function of the quality system , Quality system at banking and other financial institutions; Legal , economic and technical aspects of environmental protection; Influence of managers on competitiveness and quality of enterprises; The quality system of local governments, public and public utilities enterprises.

At this meeting would lead to the two round tables:

- *CONTRIBUTION METROLOGY COMPETITIVENESS AND SUCCESSFUL BUSINESS*
- *PRESENCE OF HARMFUL SUBSTANCES IN FOOD (MEAT, MILK, HONEY FOR HUMAN CONSUMPTION), FOCUSING ON LEGISLATION*

On behalf of the organizing committee XV scientific symposium to thank to all the authors and co-authors, co-organizers, all admirers of quality domestic and foreign, that contributed to this collection became internationalized.

Bearing in mind the above, we can proudly verify that the Krusevac city in the period 28-30.11.2013. will be the city of quality in the region.

President of the Organizing Committee

Professor Zoran Punoševac PhD

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THE IMPACT OF PROCESS MATURITY ON THE ORGANIZATION MATURITY ACCORDING TO ISO 9004 NORM AND PROCESS MATURITY MODELS

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Vesna Sesar, Lecturer ²,
Marin Milković, PhD, Professor ³

***Abstract:** For every organization that is managed and organized in accordance with quality management principles and demands for continuous improvement, the key is measuring the organization maturity. The ISO 9004 Norm in Annex A represents the self-assessment tool which gives a comprehensive and systematic review of an organization's activities and results due the ISO 9004 Norm requirements. In that way it can be assured that a complete situation of the organization and level of maturity are given. One of the key areas for measuring the organization's maturity is measure of maturity managing processes and organizational process structure. Defining a maturity of business processes in the organization is a way to measure a maturity management processes. The purpose of this article is to establish the connection between process maturity and organizational maturity in its function of sustainable management and to compare process maturity models.*

***Keywords:** maturity levels, organization maturity, process maturity, quality management, sustainable management, self assessment models*

1. INTRODUCTION

Business process management is a combination of managerial approach and appropriate technology with the purpose of improving a company's performance. Business Process Management, BPM, is a systematic approach of business improvement, which is based on formation, measurement, analysis, improvement and management of processes. As a methodology, it relies on business approach of changes management in order to improve business processes, and its final objective is to accomplish the organization's overall business objectives, where the changes include the total process life cycle: from defining and modelling to performing, analysing and optimizing the processes. The objective of every organization is to reach the highest maturity level which enables the organization's continuous improvement and development. Depending on the maturity level and the area where it is used, the approach consists of a certain number of Process Areas that are to be improved in order to reach a certain maturity level. Each maturity level can be divided into several areas of key processes that indicate those areas which an organization should focus on so as to improve its process. Key process areas identify the problems that the organization has to face in order to achieve a new maturity level. Each key process area represents numerous activities which, once they have been completed, accomplish the objectives needed for improvement of process capability. The path towards achieving these objectives in various key process areas can be different for each project, and they ultimately have a direct impact on reaching the organization's objectives, or its maturity.

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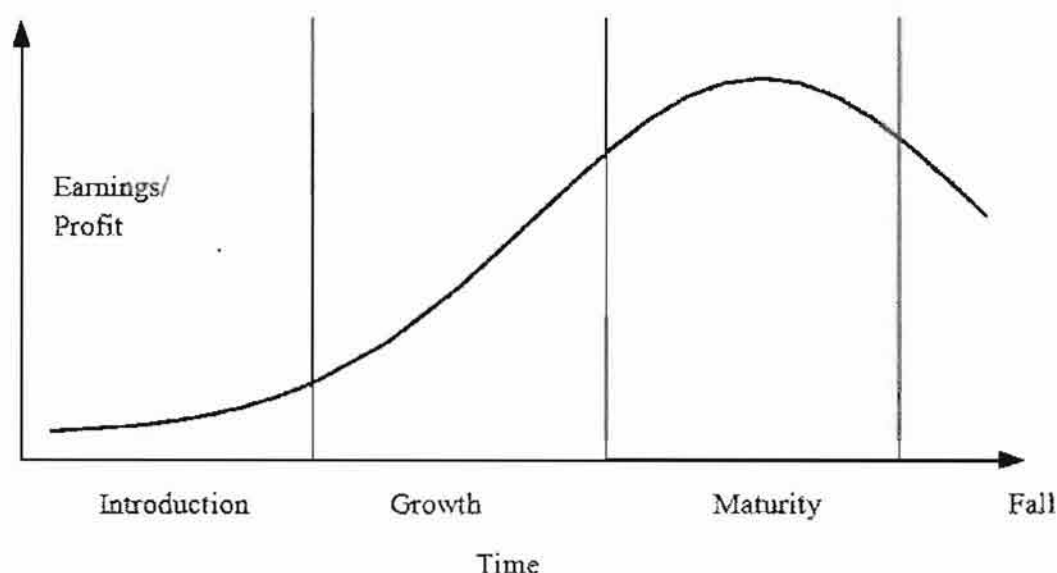
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2. ORGANIZATION MATURITY AND SUSTAINABLE MANAGEMENT IN THE CONTEXT OF QUALITY MANAGEMENT

Latest revisions of ISO 9001 and ISO 9004 norms have had an influence on new consideration related to quality management systems implementation, and their complementarity has determined the increasing need for observing that concept as a modern managing concept of integral management with the objective of organization's sustainable success. The text itself of the new revision of ISO 9004:2009 Norm at the end of its preface, states that the managing with the purpose of achieving organization's sustainable success is the main change in the norm, which has then influenced the significant changes in the norm structure and its contents. The thing that still remains unaltered and that greatly affects the concept and philosophy of quality management includes basic principles and a demand for constant improvement with the condition of proving the above mentioned. In such concept, the norms of class 10 present a huge help, together with the ISO 9004:2009 Norm and its Annex A, which provide the organization with self-assessment tool, assessment of its strong and weak characteristics as well as the organization's maturity level from the quality management aspect.

2.1. Organization maturity in the context of quality management

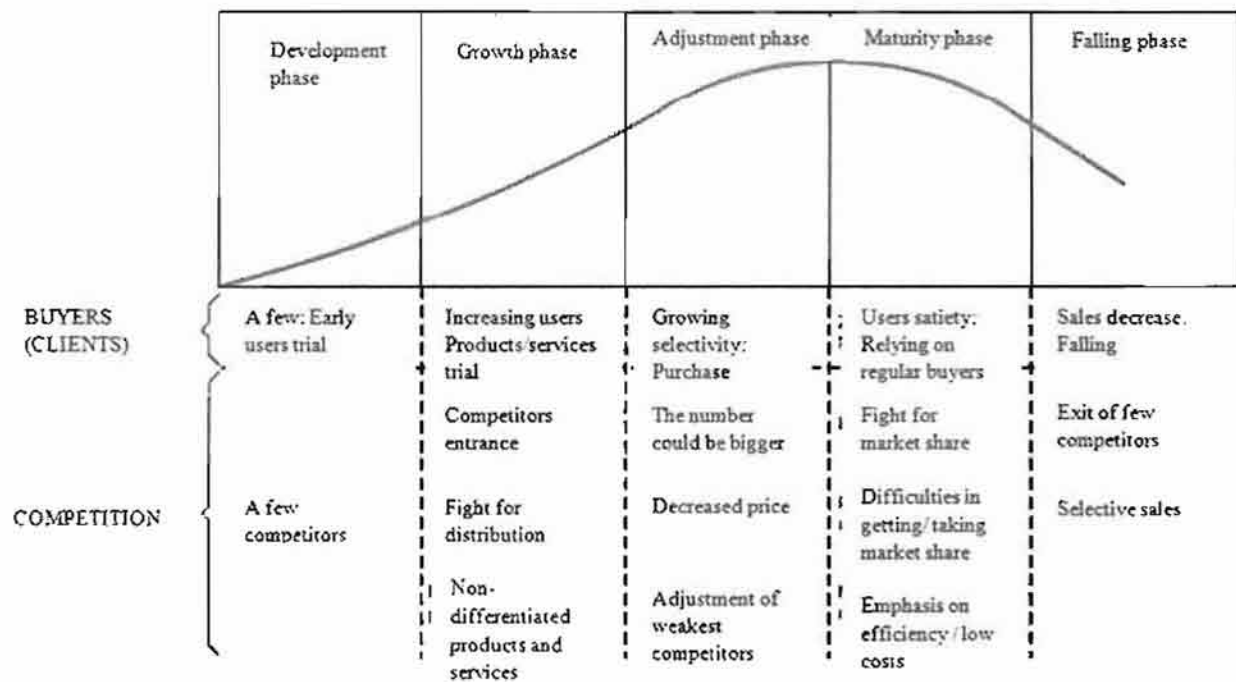
Organization maturity can be observed through several aspects. This is usually during the phase of growth process and company's development. Many scientists researchers have depicted the maturity phase as the phase of growth model (Mintzberg model, Miller-Frieser model, Kimberly-Milles model and Lippitt-Smit model) in the organization's lifespan, which is normally followed by activities decrease in the sense of earnings and profit (see picture 1).



Picture 1: The impact of organization's maturity phase on company's earnings and profit⁴

Besides the organization, maturity phase refers also to a lifespan of industry branch in the context of buyers and competition which can be seen if we analyse picture 2. On pictures 1 and 2 we can notice that, in this context, the organization's growth and development are directly connected to a product, or the phase of product's lifespan.

⁴ <http://www.kognosko.hr/?Nova/Alati+metode+kontrolinga> (accessed on 25/07/2013)



Picture 2 The model of industry branch lifespan⁵

In contrast to the maturity analysis as the growth and development phase of an organization or industry branch, in quality management systems it is the maturity that corresponds to the degree of organization's quality management, and that happens in the context of sustainable success and demands for constant improvement. Therefore, Annex A provides a self-assessment tool, or self-assessment that provides the assessment of activities and level of organization's quality management with the purpose of setting new quality objectives, or management in the context of constant improvement. The norm assesses the organization maturity through analysis of efficacy and productivity (efficiency and effectiveness) that are accomplished through⁶:

- understanding and meeting the needs and expectations of interested parties,
- keeping track of changes within the organization,
- identifying possible organization's parts suitable for improvement and innovations,
- defining and implementing strategies and policies,
- setting and implementing relevant objectives,
- quality management of its processes and resources,
- trusting its people, with the purpose of increasing motivation, commitment and involvement, and
- establishing mutually beneficial relations with suppliers and other partners.

2.2. Maturity model and self-assessment tool

ISO 9004:2009 Norm provides an explanation of self-assessment procedure and determines it is a comprehensive and systematic review of an organization's activities and results compared to the ones that are defined or set through particular norms and plans. In doing so, it is emphasized that self-assessment can provide an overall view on organization's performance as well as the maturity degree of organization management system. This ensures identification of places and areas suitable for improvement and innovation as well as determination of priorities for preventive and corrective actions. Output results of conducted self-

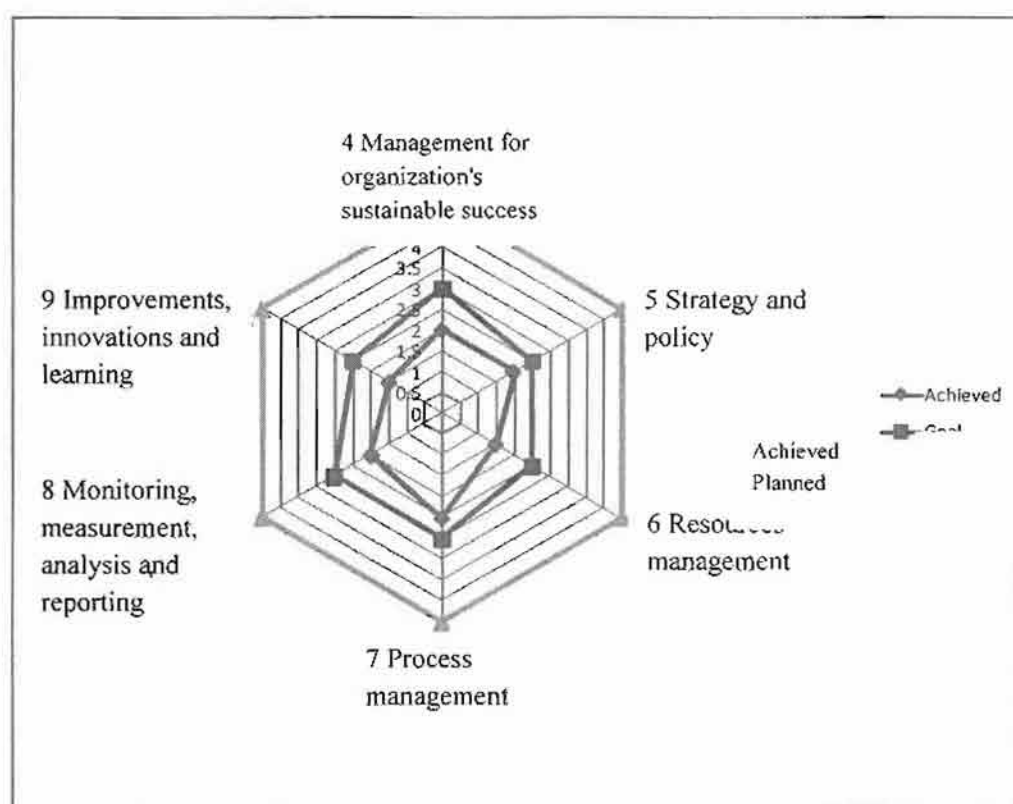
⁵B. Umihanić, PhD: PPP predavanja Poduzetnički Menadžment_3_Modeli rasta brzorastućih preduzeća, Univerzitet u Tuzli, Ekonomski fakultet, 2013

⁶EN ISO 9004:2009 Norm

assessment procedure are in fact high-quality input data by the management, and hence they point to strengths and weaknesses, and the maturity of organization management. Therefore, self-assessment during a certain period can indicate the improvement trends or vice versa, and it can be of great assistance while making quality decisions for sustainable management. Self-assessment procedure is conducted on two levels:

- self-assessment of key elements – conducted mostly by the top management
- thorough self-assessment – conducted by operative management and process owners (managers).

Methodologically, the organization conducts a self-assessment procedure through a 'step by step' method, which defines a volume, subject and the area of procedure implementation in the sense of selecting certain organization parts that are assessed and the self-assessment mode. Thus, the norm provides an example of modes network diagram of final assessment of organization management system through the body items of ISO 9004 Norm. For the further progress of this work, it is important to notice that the self-assessment model and creation of organization's maturity assessment includes an important feature of process maturity assessment, or the organization's process structure.



Picture 3 Result of final assessment of organization management system through body items of ISO 9004 Norm.⁷

3. THE CONCEPT OF PROCESS MATURITY AND PROCESS MATURITY LEVEL

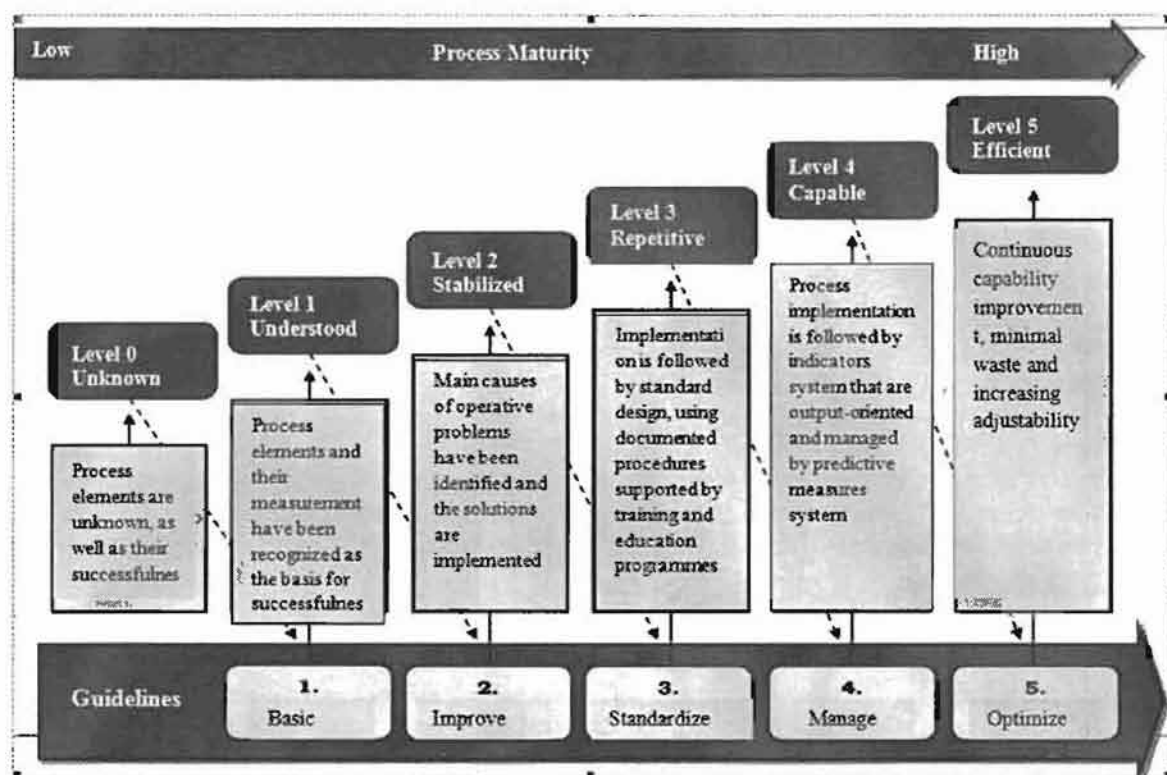
In compliance with the process maturing, there is also the concept of Process Maturity, which becomes extremely important in accepting the process view by an organization.

- process maturity concept – assumes that the process has its own life cycle (it is estimated according to the degree on which process is explicitly defined, managed, measures and controlled)
- the concept offers a useful theoretical frame for directing the process improvement because it:
 1. provides basis for comparing processes and organizations
 2. recognizes progress of characteristics needed for good processes development
 3. recognizes the need for applying different improvement strategies in different phases of process maturity.

⁷ EN ISO 9004:2009

There are more than 150 process maturity models (QMMG, CMM, Rummler Brache model, QUT's BPO Maturity...)⁸

Organization's entire capability or potential is included in maturity concept which is described by levels as points of estimating a degree of organization's efficiency within a certain time. Picture 2 shows maturity levels as a sort of 'evolution steps' towards reaching a mature process where each level provides new grounds for continuous process improvement. Maturity level includes a set of process objectives which, once they have been achieved, determine an important component of software process. The reaching of each new maturity level leads to a systematic increase of organization process success. First maturity level characterization exists so as to set the grounds for processes improvement comparison on higher maturity levels. From the second to fifth maturity level there are levels described by numerous activities that an organization does in order to improve the software process, and any other process as well, and the activities that are conducted within every project.



Picture 4 Process improvement guidelines for process maturity systematic development⁹

Maturity levels represent an evolution path. Each maturity level contains key process areas that are met by reaching the objectives described in key procedures, under procedures and examples. Besides the first level, each maturity level can be classified into several key process areas which determine those areas which an organization should focus on in order to improve its software process. Key process areas identify the problems that the organization has to face in order to achieve a new maturity level. Each key process area represents numerous activities which, once they have been completed, accomplish the objectives needed for improvement of process capability. The path towards achieving these objectives in various key process areas can be different for each project. Nevertheless, all key process areas objectives have to be achieved so that the organization can achieve the adequate key process area. The adjective 'key' implies there are processes which are not crucial for reaching a certain maturity level. In order to reach a certain maturity level, key process areas have to be primarily achieved and satisfied. In order to reach a key process area, it is necessary to achieve its respective objectives.¹⁰

⁸ Estimation of IS security programme maturity IS-a, available at:

http://www.fer.unizg.hr/download/repository/Case_Study_COBIT_maturitv.pdf (access date 16/05/2013)

⁹ Spanyol, A. (2004), Towards Process Competence, BPM Group, <http://www.spanyi.com> (14.05.2012)

¹⁰ Cindrić J., (2009), Zrelost organizacije (CMMI Capability Maturity Model Integration), *Magistra laderina*, Vol. 4, No. 4, pages no.: 181-193, available at <http://hrcaak.srce.hr/file/78143>, (accessed on 16/05/2013)



Picture 5 Maturity process levels¹¹

4. PROCESS MATURITY MODELS COMPARISON

There are numerous critical attributes when selecting the adequate model for estimating the level of process maturity or competence. The selected model has to explicitly recognize that process competence on organization level includes a balanced combination of improvement and management practice in big cross-functional business processes, and the approach to business activities measuring in process times. Ideally, the selected model should enable comparison of company's success to industrial standards for most of the key business processes.

Table 1. Process maturity models comparison from the maturity level aspect¹²

Maturity level	Generic maturity model (Lippman)	Process Maturity Model (Rummenhorst-Bräcker)	QUT's BPM Maturity (Rummenhorst)	CMM model (SEI)	WFO Maturity model (All Cornwell)
1	initial	no awareness about processes	compliance	initiation	ad hoc processes
2	repetitive	there is awareness about processes	design	repeating	defined processes
3	defined	moderately successful process redesign projects	implementation	defining	connected processes
4	managed	highly successful process redesign projects	control	managing	integrated processes
5	optimized	continuous management with individual processes	improvement	optimizing	
6	integrated	company management as an integrated processes system			

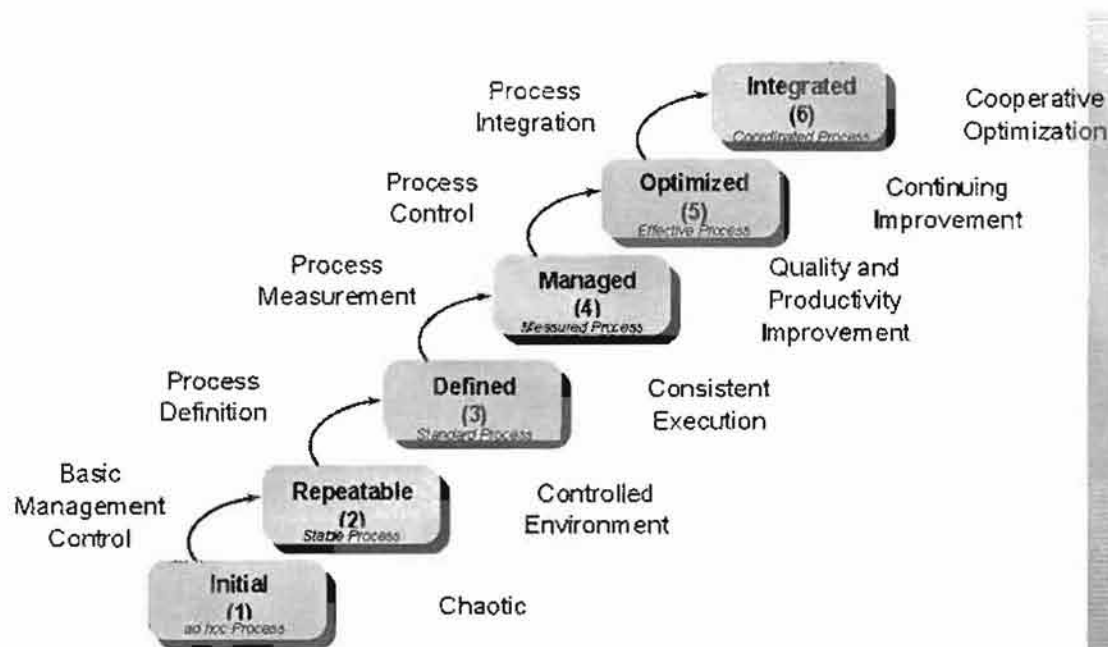
4.1. Generic process maturity model

The experts interested in estimating organization's process direction which is moving towards process competence, should estimate the process maturity model and learn based on the previous experiences. Namely, during the concept popularity, many process maturity models have been developed. There are more than 150 such models according to B. Champlin, the president of BPM Professionals Association. B.

¹¹https://www.google.hr/search?biw=1366&bih=649&q=process+maturity+level+5&bav=on.2.or.r.qf.&bvm=bv.54176721,d.bGE,pv.xjs.s.en_US.kb7XI5Uspss.O&um=1&ie=UTF-8&hl=hr&tbm=isch&source=og&sa=N&tab=wi&ei=wzFeUv3TOMWs0QXLk4GYAQ#facrc=&imgdii=&imgcr=A.SuNZhNns9YvTM%3A%3BB0XzWzqNcA6_nM%3Bhttp%253A%252F%252Fwww.netways.com%252FMethodologyimages%252Fpic1.jpg%3Bhttp%253A%252F%252Fwww.netways.com%252FMethodology%252FPages%252FCMML.aspx%3B407%3B206 (16/05/2013)

¹² Spanyi, A. (2004), Towards Process Competence, BPM Group, <http://www.spanyi.com> (14/05/2013)

Champlin tried to identify the existing models, and he also developed his own Generic Process Maturity Model, which is shown on picture 6.



Picture 6 Generic maturity model¹³

Champlin's model consists of 6 process maturity levels, and he precisely specifies the process management technique necessary to move to a higher category, such as basic managerial control, process defining, process measuring, etc. Moreover, B. Champlin describes each level by philosophy and culture that are dominant in an organization. The ultimate, desired point is presented by continuous improvement and cooperative optimization.

4.2. BPO (Business Process Orientation) process maturity model

BPO measure instruments and maturity model can be useful tools that help estimate the organization's current position on its way to process orientation, and develop a strategy for building a process integrated company. The trends indicate that the next step in organization design will be a shallow process-oriented structure. Despite that, a conventional control method and ingrained paradigms will not be able to manage these structures. Their implementation is not a short-term or ad hoc process, but it demands the organization to mature gradually so as to be able to increase freedom degrees and decentralize decision making, while it still keeps the control over process. Development and operationalization of process orientation estimation models can significantly contribute to the shift of process approach through the offer of theoretical frames for better understanding of business process reengineering efforts and business process management. Organization's business orientation can be characterized on different levels. There are numerous motives for achieving a higher process orientation degree. For instance, it enables a better focus on consumers and the knowledge about how consumers evaluate product value, or a better cooperation between organization members. Process orientation also provides an opportunity to influence the processing time and product quality with the purpose of producing a more attractive product for a consumer, in a faster and more quality way. Generally, it can be said there are three different approaches to usage, or the presence of process orientation:

1. process approach usage. Process approach can be used as methodology for improving an individual process, which results in insignificant impact on culture, organization, its roles and responsibility areas. Process approach can be used for quality insurance or for culture change towards an increased orientation on consumers within the organization, which has impact on roles and responsibility areas but in a limited manner. The process organization level is also limited.

¹³ http://www.cam-i.org/docs/CMA_A5_2007_CAMI_CMA_Business_Transformation_10232007.pdf (14/05/2013)

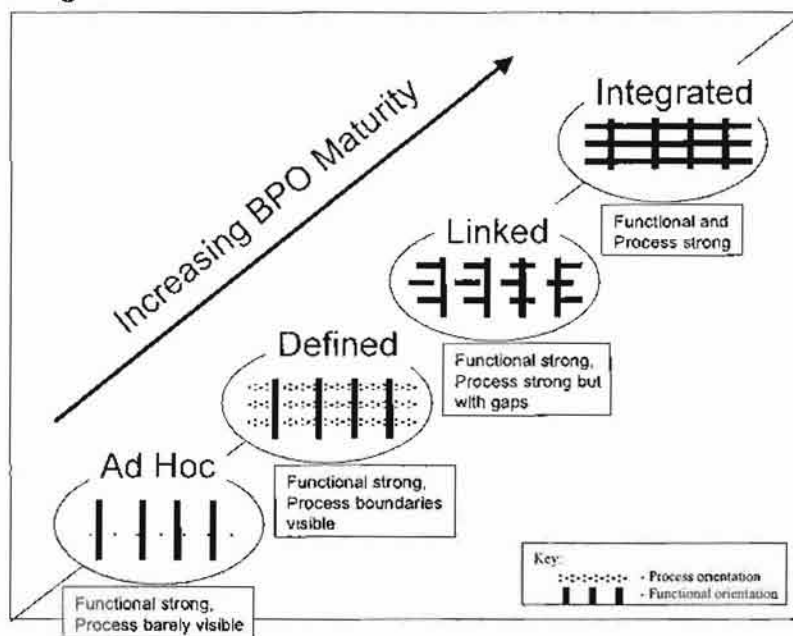
2. establishment of process organization or structure for process management. The management gives an important place to organization processes which results in a moderate, and sometimes even big impact on structure, roles and responsibility areas. Process orientation level can be significant.
3. establishment of process organization structure. Organization is managed through processes. This pattern results in Pure process structure and a complete process orientation.¹⁴
4. It is visible from this classification that the processes are increasingly seen as assets which require investment and development as they mature.

4.3. BPO maturity model and its phases

Development and operationalization of process orientation estimation models can significantly contribute to the shift of process approach through the offer of theoretical frames for better understanding of business process reengineering efforts and business process management. Organization's business orientation can be characterized on different levels. There are numerous motives for achieving a higher process orientation degree. For instance, it enables a better focus on consumers and the knowledge about how consumers evaluate product value, or a better cooperation between organization members. Patterns and phases of process orientation evolution:

Ad hoc processes: Processes are unstructured and badly defined. Process measures are not present, while workplaces and organization structures are based on traditional functions. **Defined processes:** Main processes are defined and documented in process folders. Changes in these processes have to go through formal procedures. Workplaces and organization structures include the process aspect, but in their basis they are still of functional nature. **Connected processes:** Managers introduce a process management with strategic surroundings and results. Widely defined process workplaces and structures are present out of the traditional functions.

Integrated processes: organization structures and workplaces are based on processes, whereas traditional functions start being equal or subordinate to processes. Process measures and process managerial systems are deeply present in the organization.¹⁵



Picture 7 BPO maturity model and its phases¹⁶

¹⁴ Hernaus T. (2006), Transformacija klasične organizacije u organizaciju orijentiranu na poslovne procese, magistarski rad, Ekonomski fakultet sveučilišta u Zagrebu, pages 136-137, <http://web.efzg.hr/dok/OIM/thernaus/HERNAUS%20%20Transformacija%20klasicne%20organizacije%20u%20organizaciju%20orijentiranu%20na%20poslovne%20processe.pdf>

¹⁵ Hernaus, T., (ak.god 2012./2013.), Promjena poslovnih procesa, Sveučilište u Zagrebu, Ekonomski fakultet, available at: <http://web.efzg.hr/dok/OIM/thernaus/TEMA%206.%20Promjena%20poslovnih%20processa.pdf> (accessed on 15/05/2013)

¹⁶ McCormack, K. (2000), Benchmarking using the BPO Maturity Model

4.4. System maturity model - CMM (Capability Maturity Model)

System maturity model or Capability Maturity Model – CMM, is normally used for the purpose of keeping track and estimating the stages of development cycles in big and complex projects. Originally, the maturity model appeared in the mid eighties of the last century, and its purpose was to improve programme support development process. Its typical application is also in computerization processes such as various e-Government projects. However, further development provided the approach with a more universal shape and its application became possible in hardware industry, service industries, and nowadays, it is possible to apply it in any industry as well.¹⁷

4.4.1. CMM advantages

The main CMM advantage is reflected in the fact that its model is compatible with other renowned standards and quality management models, such as ISO standard, Six Sigma, Agil and Lean. The largest number of parallels has been drawn between CMM and ISO 9000 standard series, hence the generally accepted conclusion is that the standards have big similarities and they mutually upgrade. Another CMM model advantage is that it can be applied to a project, business unit or the whole organization, so the organization itself can choose to which limit it wants to improve its business. CMM methodology still has the largest application in IT industry. More than 75% of organizations that have been estimated to work by a CMM maturity level are situated in the United States of America, India, China and Japan, and the number of companies that manage their business according to CMM and that do business on the highest level, is the fastest growing in India. Also, the tendency of further expansion has been recognized in the countries of Far East, and Europe as well, especially in Scandinavian countries, Germany and Ireland.¹⁸

4.4.2. CMM drawbacks

Very few KPA addresses have evolved the results of attached artefacts engineering (use case model, model design, original code) which grasps the real project objective. Also, the emphasis is not on the process design planning, process assessment or process implementation, or any other indicators that should be crucial for a project's success. CMM is overrated for control, inspection and traditional methods of quality insurance policy. Although manual control inspection can sometimes detect 60% of mistakes, it can rarely detect architecturally significant drawbacks which manage the projects with the help of most conventional software types. Secondly, most of CMM implementation leads an organization into producing more documents, more control points, more artefacts, more traceability and more plans. Further, abundant documentation, more detailed information and longer meetings lead to progress. These details face us with primary techniques for programme economy improvement and they decrease the complexity of human resources quantities. In reality, a wide-spread belief is that 'more artefacts and more precise artefacts correlation to a higher progress' is not a CMM's mistake, however CMM does not motivate organizations to act differently, to be better. Another problem is a precise measurement of organization's current maturity level. CMM takes an activity-based approach to maturity measurement:

- If you conduct the basic set of project activities, you are on level 2.
- If you conduct the prescribed set of activities as an organization, you are on level 3, etc.

Nothing depicts the quantity of these activities as long as you deliver the intended results. If you can improve any of the items, then you are on level 3. The improvement of more dimensions leads to a higher level. In reality, none of the base activities allows results management as long as it is sufficient. We have to combine these two approaches in order to determine a precise maturity. In standard practice, we often see that organizations define their processes strictly by CMM traceability, so that they have a clear map for

http://www.google.hr/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CC8QFjAA&url=http%3A%2F%2Fwww.drkresearch.org%2FPublications%2FDownload%2FBPO_benchmarking_article.doc&ei=IVJeUpndIsj54ASSl4DQBQ&usq=AFOiCNHAMWB2VsV2rBNpCof94v9gA8GIAQ&bvm=bv.54176721,d.bGE (accessed on 10/09/2013)

¹⁷ ITSM Partner; Metodologija, prakse i standardi CMM, available at <http://www.itsm.hr/itil-itsm-metodologija/metodologija-cmm.php> (accessed on 15/05/2013)

¹⁸ Marković, Ž., CMMI- Capability Maturity Model Integration – Kvalitet, available at: <http://www.kvalitet.org.rs/standardi/cmmi> (accessed on 15/05/2013)

assessment. Managing the waterfall model requirements practically leads an organization along similar paths, it is based exclusively on traceability, and required specifications for elements designing, which is more important for design quality measurement than for meeting users' needs. Organizations care about real improvement – compared to just adopting a revision, they focus on reaching process levels that produce improved business results. A complete estimation frame should also measure a real improvement of project implementation, dimensions like estimated time of launching on the market, it should determine the final price and foresee the product quality. Software development standard (RUP or ISO 12207) which is broadly designed to help organizations decide how and what to produce, can set the grounds for precise estimations. Unfortunately, the practice in many organizations is that they apply CMM as a development standard and an estimation standard.¹⁹

5.4.3. CMMI - Capability Maturity Model Integration

Moreover, within the approach, certain areas have been developed to which the approach was adjusted, so today we differentiate:

1. products and services development – CMMI for Development (CMMI-DEV),
2. establishing, managing and providing services – CMMI for Services (CMMI-SVC),
3. products and services acquisition – CMMI for Acquisition (CMMI-ACQ).

CMMI is based on process improvement model within the organization so as to reach a certain process maturity level. There are 5 process maturity levels within the approach:

1. Initial – processes are unstable, unpredictable and badly controlled,
2. Managed – processes are defined, controlled and measurable on the level of organization project,
3. Defined – processes are defined and established on the level of entire organization,
4. Quantitatively managed – processes are measurable and controlled on the level of entire organization,
5. Optimizing – directed towards process improvement.²⁰

The goal of model development was to increase development quality, or the appropriate encouragement for the organization so that it transforms its own business processes from unregulated to mature processes that are being continuously improved. Keeping track of maturity stages is conducted for a process that consists of numerous process areas that can be on different maturity levels, therefore we distinguish between a phase and continuous maturity level.

- Phase model means that all process areas have to be at the same maturity level so that the process could move on to the next level.
- Continuous model- certain process areas can have different maturity levels, so the priorities can be set on reaching the maturity of particular process areas.

System Security Engineering Capability Maturity Model - SSE CMM, has played an important role in connecting security engineering concepts, following the example of system engineering. From the viewpoint of maturity models, the thing that connects system engineering maturity models and system security engineering, are the project and organizational practices of process maturity. The main idea of SSE CMM model, or the ISO/IEC 21827 Norm, is in fact the integration of security life cycle into a system life cycle, which largely facilitates certification and accreditation proceedings, or the information assurance – IA. SSE CMM model enables reaching of several important objectives of security engineering:

1. process improvement by using this tool for security practice evaluation and orientation towards improvements;
2. providing organization trust based on evaluation;
3. risk management based on measurement mechanisms and keeping track of organization capabilities;
4. estimation of security engineering service provider capabilities.

¹⁹ Fertalj, K., FER, Usporedba koncepata i metoda koje se koriste u područjima upravljanja informacijskim sustavima i upravljanja informacijskom sigurnošću, available at: <http://www.zpr.fer.hr/zpr/Portals/0/Predmeti/UIS/Koncepti%20i%20metode%20upravljanja%20IS.pdf> (accessed on 15/05/2013)

²⁰ Marković, Ž., CMMI- Capability Maturity Model Integration – Kvalitet, available at: <http://www.kvalitet.org.rs/standardi/cmmi> (accessed on 15/05/2013)

In so doing, certification is a method of checking and confirming the compliance of a gadget or system with the specified demands (for instance norms or determined security policy), and, in the area of information system security, it usually presents a step before accreditation. Accreditation is normally a procedure of approving the organization's work or

1. products and services development – CMMI for Development (CMMI-DEV),
2. establishing, managing and providing services – CMMI for Services (CMMI-SVC),
3. products and services acquisition – CMMI for Acquisition (CMMI-ACQ).

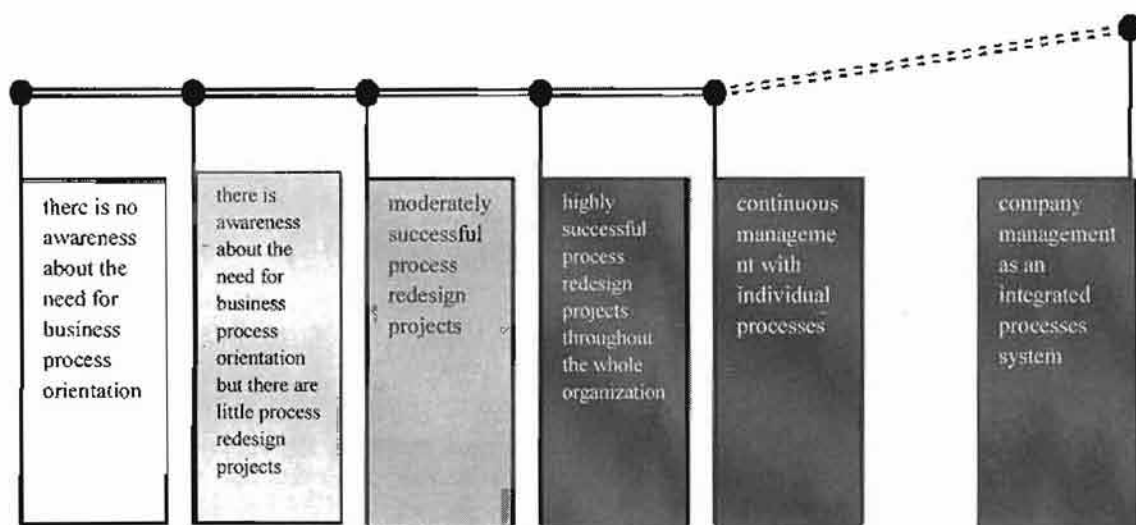
All three above mentioned approach areas have 16 Process Areas in common, and depending on the approach type, the number of Process Areas moves from 20-25. Process Areas are also classified according to the category they belong to (project management, process management, support, engineering). Each process area consists of individual objectives and practices, which are thoroughly described and have to be met, so that the Process Area could be considered achieved. Objectives and practices are divided into:

1. generic objectives and practices – objectives and practices set that are the same for all Process Areas,
2. specific objectives and practices – each process area has its own individual objectives and practices set.

The same as in applying other standards and approaches, CMMI prescribes specific objectives and practices that have to be fulfilled with the purpose of reaching a maturity level. The organization alone chooses the method by which it will achieve these objectives and practices.

4.5. Rummler-Brache process maturity method

In the early nineties of the last century, the movement of process improvement or business process reengineering produced several maturity models as well. One of the showcase models is the one developed by Rummler-Brache group. The model is based on 6 process maturity levels, while the biggest distinction has been made between the fifth level. This level continuously, but individually manages also the sixth level processes, and the sixth level represents a company management as an integrated process system.



Picture 8 Rummler-Brache- process maturity model²¹

4.6. QMMG process maturity model

The quality movement in the 1970s and 1980s resulted in many maturity models, and it can be said that it actually introduced these kinds of instruments into the business world through the front door. Crosby's Quality Management Maturity Grid – QMMG, is the most referential one from that area. His model recognizes the importance of support to the management, it includes the need for cross-functional

²¹ Spanyi, A. (2004), Towards Process Competence, BPM Group, <http://www.spanyi.com> (15/05/2013)

cooperation and it tries to quantify the successfulness based on the 'quality cost' which is measured by sales percentage.²² It consists of 5 levels (table 2):

- uncertainty,
- awakening,
- enlightenment,
- wisdom,
- certainty

QMMG is an organization's maturity matrix which was firstly published in the book 'Quality is Free' in 1979. QMMG uses a company or organization as a measure for the maturity level to which he led his processes and how well they are integrated into their own culture, taking into consideration services and products of quality management.

Quality Management Maturity Grid (Crosby)		Assessor:			Department	
Measurement Categories	Stage 1: <i>Uncertainty</i>	Stage 2: <i>Awakening</i>	Stage 3: <i>Enlightenment</i>	Stage 4: <i>Wisdom</i>	Stage 5: <i>Certainty</i>	
Management understanding and attitude	No comprehension of quality as a management tool. Tend to blame quality department for "quality problems".	Recognising that quality management may be of value but not willing to provide money or time to make it all happen.	While going through quality improvement programme learn more about quality management; becoming supportive and helpful.	Participating. Understand absolutes of quality management. Recognise their personal role in continuing emphasis.	Consider quality management as an essential part of company system.	
Quality organisation status	Quality is hidden in manufacturing or engineering departments. Inspection probably not part of organisation. Emphasis on appraisal and sorting.	A stronger quality leader is appointed but main emphasis is still on appraisal and moving the product. Still part of manufacturing or other.	Quality department reports to top management, all appraisal is incorporated and manager has role in management of company.	Quality manager is an officer of company, effective status reporting and preventive action. Involved with customer affairs and special assignments.	Quality manager on board of directors. Prevention is main concern. Quality is a thought leader.	
Problem handling	Problems are fought as they occur; no resolution; inadequate definition; lots of yelling and accusations.	Teams are set up to attack major problems. Long-range solutions are not solicited.	Corrective action communication established. Problems are faced openly and resolved in an orderly way.	Problems are identified early in their development. All functions are open to suggestion and improvement.	Except in the most unusual cases, problems are prevented.	
Cost of quality as % of sales	Reported: Unknown Actual: 20%	Reported: 3% Actual: 18%	Reported: 8% Actual: 12%	Reported: 6.5% Actual: 8%	Reported: 2.5% Actual: 2.5%	
Quality improvement actions	No organised activities. No understanding of such activities.	Trying obvious "motivational" short-range efforts.	Implementation of a multi-step programme (e.g. Crosby's 14-step) with thorough understanding and establishment of each step.	Continuing the multi-step programme and starting other pro-active / preventive product quality initiatives.	Quality improvement is a normal and continued activity.	
Summary of company quality posture	"We don't know why we have problems with quality".	"Is it absolutely necessary to always have problems with quality?"	"Through management commitment and quality improvement we are identifying and resolving our problems."	"Defect prevention is a routine part of our operation."	"We know why we do not have problems with quality."	

²² Hernaus T. (ak.god.2012./2013.), Promjena poslovnih procesa, Sveučilište u Zagrebu, Ekonomski fakultet, available at: <http://web.efzg.hr/dok/OIM/thernaus/TEMA%206.%20Promjena%20poslovnih%20processa.pdf> (accessed on 15/05/2013)

Mjerne kategorije	Faza 1: nesvjesnost	Faza 2: buđenje	Faza 3: prosvjetljenje	Faza 4: mudrost	Faza 5: sigurnost
Razumijevanje i potpora menadžmenta	kvaliteta se ne smatra menadžerskim alatom dok se odjel kvalitete optužuje se za probleme kvalitete	upravljanje kvalitetom se smatra vrijednim, ali se ne osigurava novac i vrijeme za njeno provođenje	provođenjem unaprjeđenja kvalitete više se uči o upravljanju kvalitetom; menadžment sve više pruža potporu	menadžment aktivno sudjeluje i u potpunosti razumije upravljanje kvalitetom; menadžer prepoznaje svoje uloge	upravljanje kvalitetom predstavlja osnovni dio poslovanja
Položaj kvalitete u organizaciji	kvaliteta je smještena u proizvodnu funkciju ili inženjering; ne postoji inspekcija	uvodi se pozicija menadžera kvalitete iako je kvaliteta još uvijek u sklopu proizvodnje	odjel kvalitete odgovara vrhovnom menadžmentu	menadžer kvalitete izvještava o efikasnosti poslovanja i o preventivnim akcijama	menadžer kvalitete je član Uprave; preventiva je najbitnija
Rješavanje problema	problemi se rješavaju kako se i pojavljuju; prisutno je međusobno optuživanje	formirani su timovi za rješavanje glavnih problema; ne razvijaju se dugoročna rješenja	kommunicira se o korektivnim akcijama; otvoreno se pristupa problemima i njihovom rješavanju	problemi se identificiraju rano u njihovom nastanku; sve funkcije mogu sugerirati i provesti unaprjeđenje	osim u iznimnim slučajevima, problemi su preventivno spriječeni
Trošak kvalitete kao % prihoda od prodaje	prijavljena: – stvarna: 20%	prijavljena: 3% stvarna: 18%	prijavljena: 8% stvarna: 12%	prijavljena: 6,5% stvarna: 8%	prijavljena: 2,5% stvarna: 2,5%
Aktivnosti unaprjeđenja kvalitete	nema organizirane aktivnosti i shvaćanje potrebe za istima	ostvarivanje kratkoročnih poboljšanja motivacije	implementacija programa kvalitete sa potpunim razumijevanjem i provođenjem svakog njegovog koraka	nastavak provođenja programa i osiguravanje njegovog opstanka	unaprjeđenje kvalitete je normalna i stalna aktivnost
Stav kompanije prema kvaliteti	„Ne zna se zašto su prisutni problemi sa kvalitetom.“	„Je li stvarno potrebno stalno imati probleme sa kvalitetom?“	„Kroz posvećenost menadžmenta i unaprjeđenje kvalitete identificiraju se i rješavaju problemi.“	„Sprječavanje skarta je rutinski dio poslovnih operacija.“	„Zna se zašto nema problema sa kvalitetom.“

Table 9 Quality Management Maturity Grid (QMMG)²³

4.7. BPM process maturity model

Another valuable model is the one developed by M. Rosemann and his BPM research group at Queensland University of Technology in Australia. The actions directed towards arranging business processes are not the same in all organizations, but they depend on the current arrangement situation and the improvement level which can be reached with the acceptable investment level. Real actions are easier to be designed if specific decisions are based on general models, which help to explain the dependency between the current situation and the actions that will lead to a desired situation of process arrangement. When making such decisions, the Business Process Maturity Model–BPMM can help, which is shown on the picture:



Picture 10 Business Process Maturity Model²⁴

²³ <http://www.qualityandproducts.com/2012/07/09/crosbys-quality-management-maturity-grid/> (17/05/2013)

²⁴ <http://blog.vsharing.com/aws/A973545.html> (15/05/2013)

The model speaks about five maturity levels. The lowest level, or shortly 'Presence', denotes the organization's state when business processes exist but they are not arranged or sufficiently documented. The highest, fifth level, is the organization's state in which all business activities are conducted through optimized and thoroughly defined business processes, which result in products or services of required quality and they are supported by modern ICT.²⁵

5. CONCLUSION

When selecting an adequate model for estimation of process maturity or competence level, there are numerous critical attributes. The chosen model has to understand that process competence is completely connected to successfulness. In the situation when the leaders do not understand in the same way organization business processes and when business processes are not regularly measured, it is almost impossible to manage them. Process defining and process measurement is important, but it is not sufficient for ensuring successfulness improvement. Estimation of the needs for process competences has to emphasize the level to which a company's business processes will be defined, measured, improved and managed. The chosen model has to explicitly recognize that process competence on organization level includes a balanced combination of improvement practice and management of large cross-functional business processes and the approach to business activities measurement in process times. As well, the model has to enable self-assessment by a cross-function team or organization's estimation by an external expert. Therefore, the model has to be sufficiently applicable for basic implementation on organizational and lower levels. Ideally, the chosen model has to be designed so as to enable a comparison of company's successfulness with industrial standards for most of the key business processes. No matter the selected model, it is evident that the path towards the highest maturity level is long, and that organizations have to take up a serious approach in order to become more process oriented, or to reach the highest process maturity degree.

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²⁵ V. Bosilj-Vukšić (2006), Upravljanje poslovnim procesima i metodologija modeliranja, available at: http://koris.hr/Data/Sites/1/resursi/bpm/BPM_metodika.pdf (accessed on 15/05/2013)