Evaluation of Maturity Models for Business Process Management
Maturity Models for Small and Medium-sized Enterprises

Johannes Britsch[1], Rebecca Bulander[2] and Frank Morelli[2]

[1]*University of Mannheim, Institute for SME Research, L9, 1-2, 68161 Mannheim, Germany*
[2]*Pforzheim University of Applied Sciences, Tiefenbronner str. 65, 75175 Pforzheim, Germany*

Abstract: This paper contains an appraisal of selected maturity models for BPM. Business process maturity models in general offer precise process definitions, repeatable process operations, the integration and interaction with linked processes, as well as the measurability and controlling of the process flows. Maturity models provide small and medium-sized enterprises (SMEs) with clear structures for organizational changes. The intention of the analysis is to support SMEs by choosing an appropriate framework that helps to design "to-be" business processes based on a continuous and comprehensive assessment concept. However, due to their size and limited resources, SMEs also have special requirements regarding maturity models. The paper describes the evaluation results of well-known maturity models for SMEs and the advantages and disadvantages of the models relating to a concrete scenario in the area of Anything Relationship Management.

1 INTRODUCTION

For effective and efficient management, it is essential to gain transparency about existing processes in order to avoid negative developments and to explore potentials for optimization. Today, small and medium-sized enterprises (SMEs) can find a wide range of models to assess and improve business processes. The open question is: which ones suit them best?

Business processes are a powerful means to put enterprise strategies into practice. In contradiction to a widespread view, especially among SMEs, business process management (BPM) does not only deal with rigid process standardization, but pursues the goal of improving agility, innovation, and specialization. The structured BPM approach comprises methods, policies, metrics, management practices, and software tools to manage and optimize activities of a firm. Important hereby is that BPM should be applied continuously – instead of the typical misconception that BPM stands for a one-time project.

Using BPM continuously as a vehicle, there are many ways to improve processes. However, before deciding arbitrarily to optimize an existing process, it is necessary to gain an integral perspective about the "as-is" state. For a company this means having defined processes, performance indicators, and the willingness for continuous improvement. Surprisingly, although BPM is part of a tradition that is now several decades old (Harmon, 2010, p. 37), even in large-scale enterprises a systematic and ongoing assessment of BPM activities cannot be found very often (Knuppertz et al., 2010, p. 10).

This paper contains an appraisal of selected maturity models for BPM. The intention of the analysis is to support SMEs by choosing an appropriate framework that helps to design "to-be" business processes based on a continuous and comprehensive assessment concept. Business process maturity models in general offer precise process definitions, repeatable process operations, the integration and interaction with linked processes, as well as the measurability and controlling of the process flows (McCormack and Lockamy, 2004, p. 2).

Maturity models thus provide SMEs with clear structures for organizational changes. However, due to their size and limited resources, SMEs also have special requirements regarding maturity models. Hence, relevant evaluation criteria and to which extent different maturity models fulfill those criteria will be thoroughly discussed. Using the hypothetical scenario of an SME introducing the new relationship management platform concept "Anything Relationship Management" (xRM) (Britsch and Kölmel,

2011, p. 3), the paper describes the advantages and disadvantages of the respective maturity models.

2 THE SPECTRUM OF CHOICES

SMEs that measure operational performance only by financial key figures often recognize too late when changes occur (Hammer, 2010, p. 7). Key performance indicators, derived from business processes that link cross-functional or inter-company value-based activities, reflect alteration by contrast. BPM proves to be a consistent system of leadership, organization, and controlling, driven by customer-needs to fulfill the strategic and operative goals of a company (Schmelzer and Sesselmann, 2010, p. 316 f.).

Supported by IT-based approaches, BPM offers the opportunity to gain process performance information in real-time. For predictions, incoming information can be combined with further data to perceive interdependencies as well as potential threats and opportunities. As a consequence, BPM results in a management practice which encompasses all activities of identification, definition, diagnosis, design, execution, monitoring, and measurement.

Maturity models reflect the ability of an organization for sustainable and forceful action in the related domain. The maturity model concept is based on the tradition of other management approaches to measure the quality of an organizational subject (product or service). Within BPM, maturity model-based assessments can serve as a way to focus on certain process management improvement efforts.

The framework of the model comprises structured elements that shape the comprehensive perspective of BPM. Based on transparent, objectified criteria, a maturity profile of the "as-is" state of a firm is defined. Quantitative as well as qualitative business process characteristics are covered. This insight is expected to lead to decisions that improve the current situation in the sense of designing "to-be" business processes.

In science as well as in practice, an impressive number of BPM maturity models have emerged. This variety offers choices for SMEs, but at the same time it creates a challenge to select the most suitable model. The set can be sorted into two types of maturity models (see Zwicker et al., p. 382 and the quoted sources): models with a holistic orientation for BPM and models focusing on facets of BPM (e.g. Rosemann et al., 2006).

Typically, BPM maturity models are designed from a comprehensive perspective whereas domain specifics or particular application contexts are hardly considered; recommendations for BPM improvement are scarce (Zwicker et al., p. 383). Many maturity models differ between several levels which are based on each other. Thus, a continuous maturity model application increases the probability to use BPM successfully as a core management approach.

3 RESEARCH METHODOLOGY

To evaluate the existing maturity models for BPM we at first conducted an extensive literature review. Therefore, we reviewed a total of over 70 scientific papers, 20 books, and 30 other publications, also out of professional practice.

For the selection of the maturity models we defined the following criteria: the model has to be related to BPM; the description of the model has to be open to the public, and it must be widely spread. The latter of the afore-mentioned criteria was validated by several research studies about the dissemination of maturity models in business, e.g. Knuppertz et al., 2010.

In a next step the selected maturity models were described (see chapter 4). To evaluate the selected maturity models evaluation criteria were defined. These criteria were deduced by the needs of SMEs and also by former studies e.g. Dombrowski, et al., 2011 and Schmelzer et al., 2010. In order to quantify the peculiarity of each criterion, we used the Likert scale categorization. Each criterion was rated on a scale from one to five (see also chapter 5) according to discussions among the authors and their resulting joint judgments based on the literature review.

4 AN OVERVIEW OF SELECTED MATURITY MODELS

Over the years the Capability Maturity Model Integration (**CMMI**; Ahern et al., 2004; Chrissis et al., 2006; Hofmann et al., 2007) established its status as the de facto standard for business process organization. The model is applied in different industries and shows a high degree of popularity in the US, India, China, and in big German companies like Bosch or Siemens. Due to the high acceptance level, many other business maturity models refer to CMMI.

The CMMI model distinguishes between a continuous and a staged representation: The continuous representation allows focusing on certain process

areas as summary components which are important depending on the business objectives. As a result, an organization can be awarded a capability level achievement and/or target profile. There are six capability levels, numbered 0 through 5.

More typical for the CMMI approach is the staged representation to assess the overall maturity across an organization. As a scale the assessment uses a maturity level rating (1 - 5). A certain level is reached when the requirements of this level as well as all the ones of the lower levels are met. It is determined by using an appraisal, based on the Standard CMMI Appraisal Method for Process Improvement (SCAMPI). Within an appraisal, strengths and weaknesses of the processes are identified, comparisons to CMMI best practices are performed, and the transfer of requirements is evaluated. The idea is to identify areas where improvement can be made, and to provide an implementation roadmap.

CMMI can be described as a map to systematically design operating principles and methods within an organization. Good practices may be used for analysis and improvement of the "as-is" situation. However, the CMMI model focuses more on *what* processes should be implemented, and less on *how* they can be implemented.

The original development of **EDEN** took place between 2006 and 2008 and was based on individual models from European companies from different industries. It was performed by a practitioner-dominated task force whose goal is the ongoing advancement and improvement of the model.

The industry independent EDEN model distinguishes an organizational layer and a process layer. The focus on the organizational layer is to identify how process management has been put into practice. The purpose of the second layer is to assess the differences in maturity for single processes. The measurement is based on nine dimensions (e.g. strategy, organization, IT) and consists of 170 different criteria. However, compared to CMMI, it is less detailed (Schnägelberger, 2009, p. 12). Complementary modules can be added for taking industry-specific and further aspects (e.g. SOX- or FDA-requirements) into account. It is possible to combine EDEN with CMMI and other business process maturity models.

Besides the assessment of the "as-is" situation, a mid-term and a long-term "to-be" value are recorded for each criterion from the perspective of the company. The measurement of the criteria in detail is performed with a questionnaire using a scale of 10 items. The transformation of the result leads to a grading within 6 maturity levels for each dimension.

EDEN furthermore intends to determine fitting strategies for action. Therefore, a categorization into two dimensions, progress (e.g. "new" vs. "implemented") and proceeding (bottom-up vs. top-down), takes place. Together they encompass a positioning matrix containing four areas (marsh, field, meadow, and garden). The guidance to be created then shows the path from the starting point (typically marsh) to the garden of EDEN. However, the model does not comprise concrete procedures for implementation.

EDEN offers a certificate for the application of the standard modules. Besides the large catalogue of criteria, EDEN has a simplified schema for self-assessment. Here only the "as-is" status is recorded and the range of possible answers is reduced.

The acronym **SPICE** stands for "Software Process Improvement and Capability Determination" and represents the **ISO/IEC 15504** standard for assessing business processes with a focus on software development. The currently valid international standard comprises five parts: part 2 has a normative character; the other ones can be characterized as appendices and provide examples and explanations.

SPICE focuses on the improvement of processes within an organization as well as the capability of suppliers for process interaction. Neither mandatory processes nor concrete assessment criteria are defined. Yet, Part 5 of the international standard shows concrete process reference models (PRMs) and process assessment models (PAMs).In the meantime, industry-specific SPICE models also have emerged (e.g. Automotive SPICE for the automotive industry, MediSPICE for medical engineering).

The international standard comprises primary requirements for PRMs on how to describe processes. Process attributes (e.g. process performance, definition, and measurement) have to be characterized by correlated primary management activities and serve for the assessment of each process. PAMs are specified with criteria for methodological evaluation.

The capability dimension has six levels that reflect performance competence. Process grading is based on a combination of the reference model and the assessment model: the process dimension of the reference model is used for identification, selection, and categorization of the concrete business processes to be assessed. In total nine process attributes are assigned to the capability levels ensuring that the results are developed systematically and with a high quality. The capability dimension of the assessment model is used to determine the efficiency of the chosen processes. In contrast to CMMI it is not easy to fulfill the requirements for the first capability level.

Basis for the evaluation is not only the existence

of a process activity, but the appropriacy of performing the task. The respective scale has four items (not achieved, partially achieved, largely achieved, and fully achieved). To reach a certain capability level it is necessary to obtain the grade "largely achieved" and for all process attributes of the levels below the grade "fully achieved." During the assessment it is obligatory to prove that the requirements of a certain step are met. The evidence can be shown by the results of process activities or by interview statements of the executors. Capacity levels are determined for each process separately. The resulting degrees of maturity describe a strengths-weaknesses profile for potential improvements. The descriptions of the next higher capacity level show opportunities for process optimization.

The process and enterprise maturity model (**PEMM**) was created by Michael Hammer in cooperation with the Phoenix Consortium and published in 2006. The intention of the model is to check if the prerequisites for changes in business process management are fulfilled. It also offers opportunities for removing deficiencies and for measuring progress.

PEMM does not dictate what processes have to look like in the sense of benchmarks and/or good practices. It is driven by a pragmatic vision to help companies plan and implement process-based transformations. PEMM can be used universally, minimizes additional effort, and may be applied even by untrained employees. The client list shows global presence with some focus on American enterprises.

The framework comprises two categories which are interrelated: Process enablers (design, performers, owner, infrastructure, and metrics) act as determinants how well individual processes work. Enterprise capabilities (leadership, culture, expertise, and governance) apply to the organization itself. The idea behind this segmentation is that organizations need to offer supportive environments in order to develop high-performance processes. The combination of the two categories is expected to provide an effective way to plan and evaluate process-based transformations. For this reason process enablers and enterprise capabilities are broken down into four levels of process enabler strength (P1 - P4) and four levels of enterprise capability (E1 - E4). For both of them, the scale for assessment consists of three items (largely true, somewhat true, or largely untrue) that can be visualized through traffic-light colors.

In the PEMM assessment, the weakest link of the chain determines the maturity level: A certain level can only be reached when all components show appropriacy (a "somewhat true" somewhere is not accepted). Besides, as an example, when the recep-

tiveness of an organization can be characterized by E-2 capabilities, it is ready to advance its processes to the P-2 level. Overall, PEMM represents a framework with a stepwise structure that indicates a path for becoming a process-based organization.

The Object Management Group (OMG), a consortium for modeling (programs, systems, business processes) and model-based standards, published the Business Process Maturity Model (**BPMM**) in 2008 (still current version 1.0). Some team members were co-authors of CMMI which explains the high similarity between the two models. In contrast to CMMI, BPMM concentrates more on transactional-oriented business processes, better characterized as workflows across organizational boundaries. Nevertheless, BPMM can be mapped to CMMI.

BPMM distinguishes between five different maturity levels. To operationalize the focus, each level (except for level 1) is combined with categories and process areas. The categories (organizational process management, organizational business management, domain work management, domain work performance, and organizational support) represent a structure for the in total 30 process areas. Process areas embody labeled sets of goals with a high-level purpose. The goals specify the scope, boundaries, and intent of each process area, and provide criteria by which conformance to BPMM is evaluated.

Each process area contains the same set of five institutionalization practices (describe the process, plan the work, provide knowledge and skills, control performance and results, objectively assure conformance) and further specific ones. In order to support organizations in their process performance improvement efforts, (sub)practices, and illustrative examples are described.

BPMM is intended to be used for guiding business process improvement programs, assessing risk for developing and deploying enterprise applications, evaluating the capability of suppliers, and benchmarking. All process areas comprise integrated best practices that indicate what should be done, but not how to put it into practice. On basis of appraisals, BPMM offers an evolutionary staged approach for continuous process improvement. There are several options in form of four appraisal types (starter, progress, supplier, and confirmatory). They differ in the level of assurance that the practices of the framework have been implemented appropriately.

5 EVALUATION OF MATURITY MODELS

The intended goal was to define suitable evaluation

criteria and to present a first assessment of maturity models to initiate a corresponding discussion within the scientific community. Thus, this section contains a description of eleven selection criteria for maturity models important for SMEs in our point of view. For the following literature based evaluation these criteria will be applied to the selected models.

5.1 Selection Criteria

The maturity model must be **universally usable (1)**, because the companies of our SME target group belong to different industries and a segmentation of the maturity models would cause too much effort. Since the focus of our paper is on maturity models for BPM, they should contain **differentiated possibilities to evaluate single processes but also cluster of processes (2)**. A very important criterion for SMEs is that the maturity model can be **deployed on its own without external consulting assistance (3)**. This implies that there is an encompassing description of the model available. Another crucial criterion for SMEs is that the **complexity of the maturity model (4)** is tailored to the need of SMEs; that means a comprehensive and understandable description and straightforwardness of the model. For a broad categorization in different maturity stages the maturity model should include **quantitative but also qualitative criteria (5)**.

Another criterion which refers to the deployment of maturity models especially in SMEs is **the level of transparency and clarity of the evaluation scale for the user (6)**. A success factor of the usage of maturity models especially in SMEs is whether the model **offers concrete and understandable action items for improvement (7)** to reach the next maturity stage after an evaluation cycle within the model. Does the model **offer possibilities for adaptations to specific circumstances of organizations and processes (8)** and is it flexible to changes? Another criterion is the **wide spread usage of the maturity model (9)** and availability of best practice cases. If an SME decides to apply a maturity model and puts some effort into this subject, it is important to know if the model will be **further developed by a community (10)** and if there are new releases planned. The last criterion for the evaluation of maturity models comprises two side effects: is there any **compatibility** to other maturity models and is it possible to acquire any kind of **certificates (11)**?

5.2 Evaluation Results

The following table contains the results of the evaluation using a typical five-level Likert item (1 equals "strongly disagree," 5 equals "strongly agree").

Table 1: Evaluation results of preselected maturity models.

Evaluation criteria	CMMI	EDEN	SPICE	PEMM	BPMM
(1) Universal usage	3	5	2	5	4
(2) Differentiated evaluation model	5	5	5	5	2
(3) Usage without external assistance	1	5	2	5	1
(4) Manageable complexity	3	4	3	4	3
(5) Quantitative and qualitative criteria	3	5	3	5	3
(6) Understandable and clear evaluation scale	2	5	2	4	1
(7) Concrete action items	4	4	5	5	5
(8) Flexible adaptability	1	2	1	1	2
(9) Wide spread usage	5	3	3	4	2
(10) Further development	5	5	5	3	1
(11) Compatibility and certificates available	4	4	5	1	2
Total	**36**	**47**	**36**	**42**	**26**

The maximum score possible would have been 55 points. None of the selected models achieved this number. We want to point out some important aspects of the four models with the highest scoring.

The maturity models CMMI and SPICE in joint third place offer high compatibility (criterion 11: 4 and 5 points), but come together with a complex evaluation scheme (criteria 4 and 6: 2 to 3 points). Another minus point that has to be mentioned is the high costs to implement the models which are not acceptable for SMEs (criterion 3: 1 and 2 points).

The PEMM model offers easy practical usage, an online-assessment and an understandable evaluation scheme (criteria 3, 4, and 5: 4 and 5 points). Unfortunately, the model does not offer adaption possibilities to different scenarios in companies (criterion 8: 1 point); over the last couple of years there has been no further development of the maturity model (criterion 10: 3 points). Therefore, there is only limited relevance for SMEs.

The maturity model EDEN reached the highest score in the evaluation. The model offers a high practical relevance and will be continuously developed (criteria 3, 4, 5, 6, 10 and 11: 4 and 5 points). Since on the website there are no best practice cases available, the usage for SMEs has to be evaluated.

None of the evaluated models matched all criteria for SMEs. Major areas of improvement in all maturity models are seen in the flexibility of the model, the transparency of the evaluation scheme and the high complexity of the models.

6 DISCUSSION

In order to illustrate the evaluation results, the properties of the five examined maturity models are discussed along a practical example in the following sections. The example chosen is the hypothetical introduction of "Anything Relationship Management" (xRM) at an SME in the retail sector. xRM was selected as a challenging "stress test" for the maturity models because it covers three main aspects many modern management concepts have in common: its relative newness when quickly becoming popular ("fashionability"), its strong IT component, and its holistic approach involving the whole organization.

For more than two decades, IT supported relationship management has been one of the top priorities for many large enterprises and SMEs. The trend began with improving customer relations (CRM) and continued with adapted concepts like Supplier Relationship Management (SRM) and Employee Relationship Management (ERM). In the last years, xRM has emerged as a new approach which covers the management of all stakeholder relations. xRM is described as a combination of both a standardized enterprise software platform and a managerial concept to improve processes between all kinds of organizational entities (Britsch and Kölmel, 2011, p. 3).

However, studies have shown that often already simple implementation projects of CRM systems face substantial problems which lead to failure (see e.g. Foss et al., 2008, p. 70 f.). Thus, especially in the SME context, potentially more complex xRM introductions need to be clearly structured. SMEs have to evaluate their stakeholder status, strategy, and roadmap before they invest in xRM software platforms. They might work on customer processes at first, and then, building upon this foundation, on employee processes, supplier processes and so on. Consequently, the use of a fitting maturity model is essential for a successful xRM introduction.

If our retail SME selected **BPMM**, it would have different options on how comprehensively processes are appraised, and would be flexible concerning time and money spent on these efforts. On the downside, BPMM comes with a 482 page documentation and a complex evaluation system. For a holistic xRM project, BPMM deficits in process organization and the negligence of IT process support would lead to difficulties. Furthermore, it remains unclear if the OMG will continue the development of BPMM.

As for **SPICE**, the SME would have a model which offers ISO certification and allows the creation of a strengths-weaknesses profile to prioritize

fields of action. Self-assessment would be possible. But since our example is in the retail sector, SPICE does not fit – it is designed for process improvement within technology companies. The different process dimensions of the model do not cover all stakeholder groups involved in the xRM concept. Still, for future SPICE versions, expansions are planned.

By using **CMMI**, the SME would stick to the de facto standard, which could have positive marketing effects. Because the model is popular and freely available for download, employees could already be or easily become familiar with it. For xRM, the SME could build on the customer oriented model version CMMI for Services (CMMI-SVC, Version 1.3). Yet, the model is not fully suitable for the retail sector and the stakeholder approach of xRM. While CMMI (like SPICE) is costly and needs external advisors, concrete process implementation instructions are not provided. For our SME with few resources applying CMMI does not guarantee increasing performance.

With **PEMM**, the SME would have an xRM-friendly, universal phase model for single projects as well as for the whole firm. Its simplicity, intuitive plausibility, and the small degree of formalization offer a high attractiveness for SMEs. Also, PEMM pays high attention to involving employees which is crucial for relationship management introductions. On the other side, the model is already several years old and has reached its limits e.g. at depicting new types of "many-to-many" xRM interactions in social media. Besides, it does not offer any certifications and cannot be integrated with other models.

In case our SME chose **EDEN**, it could use the simplified self-assessment option for a convenient evaluation. This could be the foundation for fast-track benchmarking of xRM stakeholder processes. A further benefit of EDEN lies in its compatibility with other models: retail sector-specific questions could be included through complementary modules. However, EDEN lacks in detailed "procedures" and "good practices." Also, like with all selected models, the flexibility of using EDEN itself (e.g. changing or dropping criteria) is low, which may be inconvenient especially for small companies.

Due to these shortcomings, none of the models fits perfectly for SMEs. For further considerations it therefore makes sense to initiate a BPM maturity "consolidation" – a collaboration of several universities with firms and related institutions offers the chance to reinforce a well-known and accepted standard including good practices. In this way, the advantages of the different maturity models could be integrated under the perspective of SME requirements. Based on this model, we see big potentials in

deriving topic centered sub-models, like a version for xRM introductions. Today, similar attempts can be observed using available maturity models (e.g. "CRM CMMI," Sohrabi et al., 2010). The idea of categorizing the amount of IT support offers further opportunities: corresponding reflections lead to automated data collection where business processes are supported e.g. by ERP systems (see e.g. Thomé, de Hesselle, p. 546 ff.). Last but not least a tool-based solution for an integrated maturity model would increase efficiency in practice (see e.g. Hefke, 2008).

7 CONCLUSIONS

The overview has shown that the selected maturity models cover a broad scope for business process management. This drove us to the main question of this article, which of them shows the highest attractiveness for SMEs. The models PEMM and EDEN scored highest in our evaluation. Yet, none of models could fulfill the needs of SMEs completely. This is why we propose the development of a business process maturity model which is specifically addressing the requirements of SMEs, as reflected in our 11 appraisal criteria. In a second phase, this new model has to be allied in practice and the fit for purpose has to be evaluated.

ACKNOWLEDGEMENTS

REFERENCES

Ahern, D., Clouse, A., Turner, R., 2004. CMMI distilled: A Practical Introduction to Integrated Process Improvement. *Addison-Wesley*, Boston.

Britsch, J., Kölmel, B., 2011. From CRM to xRM: Managerial Trends and Future Challenges on the Way to Anything Relationship Management. In: Cunningham, P., Cunningham, M. (editors), *eChallenges e-2011 Conference Proceedings*.

Chrissis, M., Konrad, M., Shrum, S., 2006. CMMI Guidelines for Process Integration and Product Improvement. *Addison-Wesley*, Boston.

Dombrowski, U., Brinkop, M., 2011. Der Prozesssicherheitsgrad zur Prozessbewertung. In: ZWF, Edition 106 (2011), pp. 400 - 406.

Foss, B., Stone, M., Ekinci, Y., 2008. What makes for CRM system success – or failure? *In: Database Marketing & Customer Strategy Management*. Vol. 15, No. 2, pp. 68-78.

Hammer, M., 2010. What is Business Process Management? In: vom Brocke, J., Rosemann, M. (editors), *Handbook on Business Process Management* 1. Springer, Berlin and Heidelberg.

Harmon, P., 2010. The Scope and Evolution of Business Process Management. In: vom Brocke, J., Rosemann, M. (editors), *Handbook on Business Process Management* 1. Springer, Berlin and Heidelberg.

Hefke, M., 2008. Ontologiebasierte Werkzeuge zur Unterstützung von Organisationen bei der Einführung und Durchführung von Wissensmanagement. Dissertation, *Karlsruhe Institute of Technology* (KIT).

Hofmann, H., Yedlin, D., Mishler, J., Kushner, S., 2007. CMMI for Outsourcing: Guidelines for Software, Systems, and IT Acquisition. *Addison-Wesley*, Boston.

Knuppertz, T., Schnägelberger, S., Clauberg, K., 2010. Umfrage: Status Quo Prozessmanagement 2009/2010. BPM&O GmbH, Köln.

McCormack, K., Lockamy III, A., 2004. The Development of a Supply Chain Management Process Maturity Model Using the Concepts of Business Process Orientation, http://www.supplychainredesign.com/publications/scm-2004.pdf (01.23.2012).

Rosemann, M., de Bruin, T., Power, B., 2006. BPM Maturity. In: Jeston, J., Nelis, J. (editors), *Business Process Management Practical Guidelines to Successful Implementations*. 2nd edition, Butterworth.

Schmelzer, H., Sesselmann, W., 2010. Geschäftsprozessmanagement in der Praxis. 7thedition, Carl Hanser, Munich.

Schnägelberger, S., 2009. EDEN – Reifegradmodell. Prozessorientierung in Unternehmen. White Paper, http://www.bpm-maturitymodel.com/eden/export/sites/default/de/Downloads/BPM_Maturity_Model_EDEN_White_Paper.pdf (11.12.2012).

Sohrabi, B., Haghighi, M., Khanlari, A., 2010. Customer relationship management maturity model (CRM3): A model for stepwise implementation. *In: International Journal of Human Sciences*. Vol. 7, No. 1, pp. 1-20.

Thomé, R., de Hesselle, B., 2011. Betriebliche Prozessreifgradmodelle. *In: Das Wirtschaftsstudium (WISU)*. Vol. 40, No. 4, pp. 544-550.

Zwicker, J., Fettke, P., Loos, P., 2010, Business Process Maturity in Public Administrations. *In: Handbook on Business Process Management* 2. Springer, Berlin and Heidelberg.