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# A Model for Business Process Management Maturity

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## Abstract

*Over the last ten years Business Process Management (BPM) has advanced to one of the most sustainable management approaches. BPM now covers organisational, cultural and IT-related methodologies and solutions leading to a wide variety of BPM adoptions. This paper proposes a BPM Maturity (BPMM) model, which provides a framework for the detailed evaluation of BPM capabilities and achievements. This BPMM model has been applied in two case studies, which confirmed its understandability, relevance and applicability. Future work in this area seeks the establishment of a global standard for the measurement of BPM maturity, the development of a tool-based assessment kit, and the application of this model in international case studies.*

## Keywords

Business Process Management, Maturity Management, CMM, Case Study

## INTRODUCTION

Business Process Management (BPM) consolidates objectives and methodologies, which have been proposed in a number of approaches including Business Process Reengineering, Business Process Innovation, Business Process Modelling and Business Process Automation/Workflow Management. The comprehensive nature of BPM triggered a wide variety of modes of implementing BPM. This popularity and significance of BPM leads to the question of how advanced different organisations are in their BPM development. The notion of ‘maturity’ has been proposed in other management approaches as a way to evaluate “the state of being complete, perfect, or ready” and the “fullness or perfection of growth or development” (Oxford University Press 2004).

This paper is structured as follows. The next section provides an overview of the related literature on BPM and maturity models. The third section introduces the proposed BPMM model and discusses its dimensions. The final section provides a summary and an outlook on future research. Insights from two case studies, in which the model has been tested and applied within organisations, are available on request.

## RELATED WORK

### Business Process Management

A number of factors are either crucial for the success of BPM or can complicate or impede its implementation. Among others, commonly mentioned critical success factors are organisational and cultural change, aligning the BPM approach with corporate goals and strategy, focus on customer and their requirements, process measurement and improvement, the need for a structured approach to BPM, top management commitment, benchmarking, and process-aware information systems, infrastructure and realignment (Armistead & Machin, 1997; Elzinga et al., 1995; Harrington, 1995; Lee & Dale, 1998; Zairi, 1997; Zucchi & Edwards, 1999). The structured approaches to BPM presented above also substantiate the need for a methodology, which is explicitly mentioned by Zairi (1997). Beside the critical success factors, a number of barriers are mentioned which mainly focus on organisational and cultural problems. Commonly mentioned barriers include resistance to change, lack of understanding of BPM principles, lack of consistency of the organisation-wide BPM approach, and developing a process-oriented organisation (Armistead & Machin, 1997; Jarrar et al., 2000; Lee & Dale, 1998; Pritchard & Armistead, 1999; Rainer & Hall, 2002). Throughout this work BPM is defined as a holistic organisational management practice, which is focussed on the identification, definition, analysis, continuous improvement, execution, measurement, monitoring and analysis of intra- and inter-organisational business processes. BPM requires top management understanding and involvement, process-aware information systems, well-defined accountability and a culture receptive to business processes. It is based on a process architecture, which captures the interrelationships between the key business processes and the enabling support processes and their alignment with the strategies, goals and policies of an organisation.

## **Business Process Management Maturity Models**

Most recently, a number of models to measure the maturity of Business Process Management have been proposed. The basis for the majority of these maturity models has been the Capability Maturity Model developed by the Software Engineering Institute at Carnegie Mellon University. This model was originally developed to assess the maturity of software development processes and is based on the concept of immature and mature software organisations. The basis for applying the model is confirmed by Paulk et al. (1993: 5) where it is indicated that improved maturity results “in an increase in the process capability of the organisation”. The CMM introduces the concept of five maturity levels defined by special requirements that are cumulative. CMM-based maturity models have been extended to include IT Infrastructure Management, Enterprise Architecture Management and Knowledge Management to name a few. BPM is another potential area for such a maturity model. Among others, Harmon (2004) developed a BPMM model based on the Capability Maturity Model (see also Harmon 2003). Smith and Fingar (2004) argue that a CMM-based maturity model which postulates well-organised and repeatable processes cannot capture the need for business process innovation. A shortcoming of these BPM models has been the simplifying focus on only one dimension for measuring BPM maturity and the lack of actual applications of these models. Pritchard and Armistead (1999) provide an attempt to divide organisations in groups depending on their grade and progression of BPM implementation. Maull et al. (2003), whilst trying to define maturity of BPR programs, encountered problems that they could not use objective measures. They tried to define maturity using two dimensions, an objective measure (time, team size, etc.) and a “weighting for readiness to change” (Maull et al., 2003), but this approach turned out to be too complex to measure. Therefore, they chose a phenomenological approach assessing the organisation’s perception of their maturity, using objective measures as a guideline. Another example of how to define maturity (or in their case “process condition”) is provided by DeToro and McCabe (1997), who used two dimensions (effectiveness and efficiency) to rate a process’ condition. The proposed BPMM model extends concepts introduced in earlier maturity models such as the CMM but goes further to address the specific requirements and complexities identified within business process management (BPM) as it is applied as a holistic and contemporary management practice within organisations. In a similar way, Fisher (2004) combines five “levers of change” with five states of maturity.

## **A HOLISTIC MODEL FOR BUSINESS PROCESS MANAGEMENT MATURITY**

The purpose of the model presented in this paper is the evaluation and assessment of an organisation’s BPM maturity. The proposed BPMM model has the following value propositions.

- (i) As a diagnostics tool, it allows the identification of current strengths and shortcomings in different factors such as IT/IS, culture or accountability, i.e. it quantifies as-is maturity. It can also be used to evaluate and compare the BPM capabilities of different organisational entities and support organisational learning.
- (ii) The model and the findings derived from its application can be used to identify and direct BPM-related activities, i.e. it can be used to define intended to-be maturity. It enables organisations to focus on less mature areas and to develop a structured improvement plan for progressing to the determined to-be situation.
- (iii) The model facilitates informed decisions about prioritising areas for BPM management development. It provides a framework for understanding the benefits of investing in proposed changes and the impacts of those changes on realisation of the organisation’s strategic objectives.
- (iv) The model can be applied over time and supports the measurement of progress in BPM capabilities.
- (v) Finally, the application of the model in a number of organisations allows benchmarking studies.

It has to be stressed that the proposed model measures BPM maturity, and not the maturity of business processes. The identified factors of Business Process Management within the model can be seen as the independent variables. The underlying assumption is that an increased maturity in these will have a positive impact on the actual business process performance, i.e. the dependent variable. The focus is on measuring these independent factors rather than the actual process performance for two reasons. First, it provides insights into how process performance can be improved rather than reporting on outcomes. Second, a number of models and solutions are already available for the measurement of process performance. However, the model can be easily linked to tools such as IDS Process Performance Measurement, which are focused on capturing metrics such as processing time and costs of a business process execution. It also has to be emphasised that maturity is not necessarily to be maximised. In other words, an organisation does not have to aim for a stage 5 BPM maturity, but rather a stage that is most appropriate to achieving its goals and objectives.

The comparison of low and high maturity in Figure 1 helps to understand the comprehensiveness and range of BPM maturity. The idea of comparing low and high maturity derives from the work from Paulk et al. (1993), who presented such a comparison to facilitate the understanding of the concept of process maturity. The concept of maturity stages is similar to CMM. The five BPM maturity stages are defined as: (1) Initial State, (2) Defined,

(3) Repeatable, (4) Managed, and (5) Optimised. In defining these maturity stages it has been assumed that each includes, as a pre-requisite, the requirements of lower stages.

Low Maturity		High Maturity
Un-coordinated, isolated projects		Co-ordinated BPM Activities
Low BPM Skills		High BPM Expertise
Key Personnel		Organisational Wide Coverage
Reactive		Proactive
Manual		(Meaningful) Automation
Internally Focused		Extended Organisation
Low Resourcing		Efficient Resourcing
Naive		Comprehensive Understanding
Static		Innovative

Figure 1: Comparison of low and high maturity and the five maturity stages.

### General Criteria for Measuring BPM Maturity

In the scope of the proposed model, BPM Maturity is defined as a combination of coverage and proficiency, which is similar to the notion of effectiveness and efficiency in the model by DeToro and McCabe (1997). Coverage refers to the capability within the organisation and the degree to which BPM principles are implemented and practiced, whereas proficiency measures the quality and effectiveness of BPM in the organisation. In other words, coverage asks how far through the organisation BPM activities extend and proficiency asks how well BPM activities are conducted. Attaining a higher maturity stage requires improvement in both “coverage” and “proficiency”. A set of criteria derived from the key elements of BPM maturity presented above and the comparison of low and high maturity is used to characterise each stage consistently.

There are three criteria defined to measure the coverage of BPM within an organisation:

- (i) Number of processes included in BPM practices.
- (ii) Staff involvement / level of staff undertaking BPM actions.
- (iii) Links to other management tools (such as budgets, KPI, organisational charts, etc).

There are three criteria defined to measure the proficiency of BPM within an organisation:

- (i) Response to BPM issues.
- (ii) Frequency of conducting BPM projects, initiatives and maintenance and update procedures.
- (iii) Suitability of resources and practices.

For each criterion a five-point scale is defined, which corresponds with the five maturity stages. As a result, the combination of the six criteria and the five maturity stages defines a matrix, which lists for each criterion its special characteristic at a certain maturity stage (e. g. if staff accountable for the development of BPM practices is best described as “Executives and Key Personnel” this may represent a component of accountability maturity equivalent to Stage 2). Five maturity stages are separately defined for each of the five identified factors and are directly related to each of the assessment tools used when applying the model to ensure consistency across results. The quantifiable nature of the criteria developed enables consistency and comparability of model results across organisations and reduces the possible anomalies arising from individual interpretations.

### Business Process Management Maturity Dimensions

The generic concept of stage requirements is applied to four dimensions which form the framework for the BPMM assessment: factors, perspectives, organisational scope and time. The dimension of “factor” is considered to be the primary dimension of the model and forms the central focus of the model as it is this dimension that reflects the elements critical to the success of BPM within organisations. A factor is defined as a specific, measurable and independent element which reflects a fundamental and distinct characteristic of BPM. Based on an extensive literature review and the identification of critical success factors or barriers for the implementation of BPM, five factors have been identified which are perceived as covering and characterising BPM completely.

- (i) *Information Technology and Systems (IT/IS)*: The use of IT/IS resources (aka process-aware Information Systems) in the implementation and conduct of BPM practices.
- (ii) *Culture*: The acceptance, practice and promotion of BPM by personnel related to the organisation’s processes.

- (iii) *Accountability*: The assignment of responsibility for BPM practices to personnel related to the organisation's processes.
- (iv) *Methodology*: The adoption of formal, well-defined and repeatable methodologies for conducting BPM.
- (v) *Performance*: The measurement, assessment and actioning of BPM related performance, including individual processes and personnel related to the organisation's processes.

A perspective is defined as a high-level repeatable phase that applies to BPM in general as well as to individual business processes. In a functional sense, a perspective may represent an area of expertise or responsibility already existing within the organisation. The perspectives have been derived from established business process lifecycle models and are similar to the plan-do-check-act cycle or the DMAIC (define, measure, analyse, improve, control) methodology used in Six Sigma. The perspectives included in the model are: Align; Design; Execute; Control; and Improve. A perceived benefit of the model is its flexibility and the possibility of cascading implementation. Therefore, the organisational scope, defined as the entity to which the model is applied, is one dimension of the model. The entity can be an entire organisation or a sub-set of an organisation such as a geographical location, a division, a business unit or a subsidiary, or even a project or a process. Despite BPM being defined as a holistic organisation-wide approach, the organisational scope reflects the reality that organisations might not start the implementation of BPM principles with a corporate top-down approach but rather bottom up, at business units or with isolated projects. Furthermore, the application of the model across the organisation helps to gain a detailed view of the current situation. An organisation that is striving for a company-wide balanced BPM approach can compare and assess entities, identifying more mature entities for use as internal benchmarks and guiding examples, whilst enabling a focus on less mature entities by systematically supporting their improvement. Within the model, time refers to the point in time at which the model is applied. An organisation's maturity is assessed, whereupon a desired maturity stage and an improvement plan can be determined. After completing the initial assessment, the model can be re-applied to compare the maturity over time and identify the results achieved. The combination of factors, perspectives and organisational scope combined with time lead to a multi-dimensional BPMM model. Factors and perspectives build a five-by-five-grid, resulting in 25 assessment fields or cubes. A "cube" is a factor/perspective combination, and can be defined as the smallest measurable entity within the model. The assessment of 25 cubes enables organisations to identify and understand their current stage of BPM maturity (i.e. their as-is position). The dimension of scope enables the application and comparison of the model across both time and entity. All dimensions are orthogonal. The BPMM model is depicted in Figure 2.

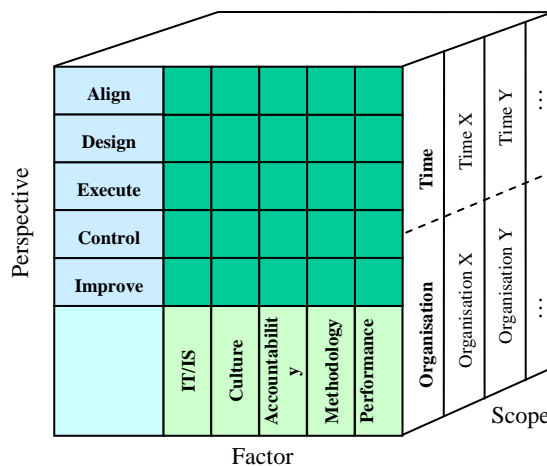


Figure 2: The BPMM Model

Similar to CMM, the BPMM model is designed to be both a self-assessment and a third party assessment tool. The self-assessment is done in the form of a survey. The questions are quantitative and based on a five-point scale. The scale corresponds to the generic stage requirement descriptions. Consequently, the answers can be related back to a maturity stage. All questions are clustered following the 25 cubes. The third party assessment is conducted in the form of a case study including the survey. In addition, this case study includes a number of semi-structured interviews with relevant stakeholders as well as studying relevant documents such as process models, job descriptions of process owners or process performance reports. The advantage of a third party assessment is seen to be twofold. First, the scope of the study is more comprehensive as it goes beyond the survey. The conduct of a case study allows triangulation between the data gained through the survey, from the interviews and the document studies and increases the reliability of the outcomes. Second, the research team gains experience with the model that can be used for improving it and contributing to the BPM body of knowledge. Assessment using the model reveals strengths and weaknesses, because one maturity stage is determined for each cube, but at this time does not result in a single BPM maturity stage being determined for

the organisation. This approach is similar to the continuous representation of the CMMI model (Ahern, Clouse, & Turner, 2004) whereby a method of mapping or metric needs to be identified to map the 25 cube maturities to one overall BPM maturity.

## CONCLUSION AND FUTURE WORK

To assess the relevance and practicality of the proposed model, it has been applied in two case studies. The results of these case studies have indicated that the structure of the BPMM model, its four dimensions and especially its factors have been evaluated as intuitive, perceived as complete and relevant. In both instances, the value of applying the model was in enabling the two organisations to baseline their current position with respect to process-orientation. In particular, the ability to be able to identify the specific areas (particularly by factor and entity) in which process-related strategies should be focused was felt to be extremely beneficial. In addition, benefits were seen in the independence of data collected by a party external to the organisation. The ability to re-apply the model over time is seen to benefit the organisations by allowing them to better understand the impact and relative success of such strategies when implemented. This research project has a number of current initiatives. As part of a global network of approximately 20 academics, we are comparing and consolidating our model with other current BPMM models. This will also include the identification of larger, US-based organisations, for future case studies. We will also automate parts of the measurement of BPMM. With respect to the ongoing research, the case study and survey process is being refined based on the feedback from both organisations. In particular, attention is being paid to the use of terminology, consistency of interpretation of questions and mapping responses to maturity stages, and the ability to broadly apply the tools.

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