Continuous business process improvement
based on PmCompetisoft integrating the BPMM

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Abstract. Business processes represent the way in which organizations carry
out their business, specifying the sequence of activities to be performed, by
whom and at what time, in order to provide results of value to clients. A
software development process is a business process that is carried out by an
organization in order to develop and maintain a software product. For many
years the improvement of such processes has been studied under the premise
that a better development process allows better products to be built, and several
maturity models have been developed, such as CMM, CMMI, ISO/IEC 15504,
ISO 9000:2000 and recently COMPETISOFT. The Business Process Maturity
Model (BPMM) OMG standard is based on the CMM and CMMI, and aims to
provide the same guidelines for business process improvement. In this paper we
present an adaptation of the software process improvement process
PmCOMPETISOFT, into which BPMM is integrated.

Keywords: Business Process Management (BPM), Business Process Maturity
Model (BPMM), business process measures, improvement. POSITION PAPER

1 Introduction

The aim of Business Process Management (BPM) [1][2] is to help an organization
to manage its business process by following its lifecycle [3], from its definition,
modeling, validation, simulation, execution, measuring to its evaluation. This last
phase gains importance in the context of the improvement efforts organizations
undertake to improve their business processes, analyzing data collected from business
process execution to identify improvement opportunities using techniques such as
Process Mining [4] and tools such as ProM [5]. But as it also happens in the field of
software development, when no improvement process is followed, the improvement
efforts may or may not be successful, depending mostly on the people that carry them
out. We aim to support the continuous business process improvement through the
definition of the MINERVA framework (Model drIveN & sErvice oRiented

framework for the continuous business process improVement & relAted tools) which integrates the Service Oriented Computing (SOC) [6] and the Model Driven Development (MDD) [7] paradigms into business process, to support the automatic generation of services from business process and to separate the business process definition from its technical implementation. It is composed of three dimensions: conceptual [8], methodological [9] and tool support [10] defining concepts, methodologies and tools to support the definitions in the framework. The methodological dimension includes the Business Process Improvement Process (BPIP) an adaptation from PmCOMPETISOFT [11], a software process improvement process to guide improvement efforts in organizations developed as part of the COMPETISOFT [12] project. We have integrated into PmCOMPETISOFT the Business Process Maturity Model (BPMM) [13] OMG standard, which is based on the Capability Maturity Model (CMM) [14] and Capability Maturity Model Integration (CMMI) [15], to provide the same guidelines for business process.

The remainder of this paper is organized as follows: in Section 2 we describe the Business Process Maturity Model (BPMM), and in Section 3 we present the PmCOMPETISOFT improvement process. The Business Process Improvement Process (BPIP) proposal is presented in Section 4, and our conclusions and future work are set out in Section 5.

2 Business Process Maturity Model (BPMM)

The Business Process Maturity Model (BPMM) [13] OMG standard is based on the principles and practices of CMM and CMMI models for software process improvement, developed by the co-authors of these models. It aims to provide a reference framework to organize steps for the continuous improvement of processes at five maturity levels which establishes the basis for the improvement effort. Key practices are implemented at each maturity level, thus making progress between levels possible, taking small steps from the lower levels to that at the top. In accordance with the CMM and CMMI models, five maturity levels are defined in BPMM, which are presented in Table 1.

Table 1. Five maturity levels definition in BPMM taken from [13]

Maturity Level	Focus	Output
5 Innovating	Implement continuous proactive improvements to achieve business goals	Planned innovations, change management, capable processes
4 Predictable	Manage process and results quantitatively and exploit benefits of standardization	Stable processes, reuse/ knowledge management, predictable results
3 Standardized	Develop standard process measures, and training for product & service offerings	Productivity growth, effective automation, economy of scale
2 Managed	Build disciplined work unit management to stabilize work and control commitments	Repeatable practices, reduced rework, satisfied commitments
1 Initial	Motivate people to overcome problems and just "get the job done"	Productivity growth, effective automation, economy of scale

Process maturity is the extent to which processes are explicitly defined, managed, measured, controlled and are effective. Process capability refers to the range of expected results that can be achieved by following a process, providing the basis for predicting their most likely outcomes. Process capability indicators are maturity levels and Process Areas defined by the BPMM. While the process achieves their realization, it matures over time, leading to a more mature organization which can manage its process and predict its future outcomes, improving them on the basis of consistent data measures, collection and analysis.

3 PmCOMPETISOFT improvement process

PmCOMPETISOFT [11] is a process for driving process improvement in Very Small Enterprises (VSEs) developed as part of the COMPETISOFT [12] Ibero-American project which includes a Process Reference Model, an Evaluation Model and an Improvement Model, which were developed by considering existing standards and references such as CMMI, ISO/IEC 15504 or ISO 9000:2000. PmCOMPETISOFT integrates the Improvement Model, and is an explicit process to provide a step-by-step guide to carry out process improvement efforts. A global view of the general methodological framework of COMPETISOFT taken from [11] is shown in Fig. 1.
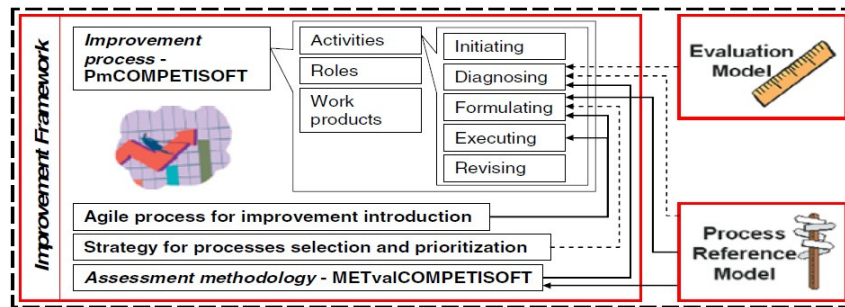

Fig. 1. COMPETISOFT general methodological framework taken from [11]

As Fig. 1 shows, the PmCOMPETISOFT improvement process defines activities, roles and work products to guide the improvement effort in the organization. The "Initiating the cycle" activity aims to create an improvement proposal that is aligned with the organization's strategic plan in order to guide the organization through the activities in the cycle. In "Diagnosing the process" a process assessment is carried out to discover the general state of the organization's processes, defining a prioritization for them. The prioritization is used to plan in which iteration each improvement will be carried out. The COMPETISOFT Process Reference and Evaluation models are used for the diagnosis of the process, but any other model could also be used.

In the "Formulating improvements" activity the current iteration of the improvement plan is designed and planned, defining how to incorporate the improvements into the process. "Executing improvements" is the activity in which the improvements for the current iteration are actually managed and executed, according to the established plans. The improvements introduced into the selected processes are analyzed, and the results, the performance and evaluation of the iteration are

registered. Finally, the "Revising the cycle" activity aims to perform a post-mortem analysis of the improvement cycle, in data such as the processes that have been improved in the cycle, and any other relevant information are registered.

4 Business Process Improvement Process (BPIP)

The Business Process Improvement Process (BPIP) proposal is included in the methodological dimension of MINERVA, to guide the business process improvement and its relationship with the business process lifecycle [3]. It integrates the Business Process Service Oriented Methodology (BPSOM) [9] to guide service oriented development from business processes. The general proposal is illustrated in Fig. 1.
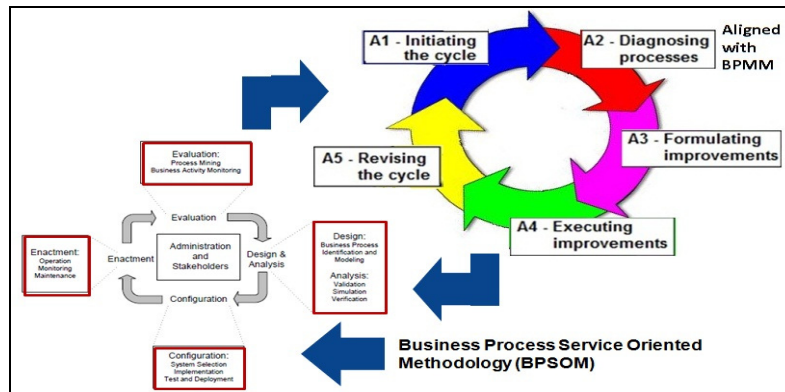

Fig. 2. General proposal for business process improvement of MINERVA

Before a business process improvement effort can be introduced, data about the model, execution, and capacity of the existing business processes is needed, which must be defined and collected from early stages of the business process lifecycle. Design and execution measures [16] [17] from business process models and Process Key Indicators (PKI) must be specified in the business process definition in order to clearly determine which measures it is necessary to collect and how.

4.1 Business process lifecycle execution

Starting with the business process lifecycle, the first phase of Design&Analysis aims to model and validate business processes from the organization, integrating design measures to validate their models. In the Configuration phase, business processes are implemented and deployed in the selected platform. The BPSOM methodology is used in order to move from the business process models defined to service oriented models with which to design and implement them with services. It also includes QVT [18] transformations for the automatic generation of SoaML [19] service models from BPMN [20] business process models. In the Enactment phase business processes are executed and execution log files are stored containing data defined to measure and further analyze the execution. In the Evaluation phase data is analyzed by using techniques such as Process Mining to identify improvement opportunities.

4.2 PmCOMPETISOFT execution

When an improvement opportunity is detected, we enter the business process improvement cycle guided by the PmCOMPETISOFT improvement process, to carry out the improvement effort. The improvement proposal is defined in the first activity of PmCompetisoft (the aforementioned "A1-Initiating the cycle"). In "A2-Diagnosing the process", we integrate the use of BPMM in order to assess the capacity of the process. By using the evaluation model to assess the process, and based on the reference model, it is possible to discover the extent to which the process satisfies each Process Area, defining the capacity of the process. More improvement opportunities are likely to be found which must be added to the improvement effort to be carried out. In the "A3-Formulating improvements" activity we establish how we are going to make the improvement, based on the analysis carried out in the business process lifecycle Evaluation phase and on the BPMM business process diagnosis.

The improvement opportunities corresponding to the current iteration are managed and executed in "A4-Executing improvements". In order to execute the improvements, the business process lifecycle has to be reentered in the appropriate phase. If the improvement requires changes that affect the business process model, it is reentered in the Design&Analysis phase. However, if the improvement refers to issues related to execution, such as implementation changes to the underlying services realizing processes, it is reentered in the Configuration phase. After executing the business process lifecycle from the corresponding phase, new data from the execution of the process is available, which is analyzed in the Evaluation phase and compared to the previous data which originated the detection of the improvement opportunities, in order to analyze whether the improvement opportunities have been satisfactorily implemented in the process. If so, the new process is accepted and established in the organization, and if not, new improvement opportunities can be found and a new improvement cycle can be carried out. The comparative analysis and results, along with the performance and evaluation of the current iteration are registered. Finally in "A5-Revising the cycle" the development of the improvement process is assessed.

5   Conclusions and future work

The Business Process Improvement Process (BPIP) defined in the context of the MINERVA framework aims to guide the business process improvement efforts in organizations providing a systematic manner in which to define and execute detected improvement opportunities. It is based on an adaptation of the PmCOMPETISOFT process which integrates the BPMM OMG standard to determine the capacity and maturity of business processes. The relationship between the PmCOMPETISOFT adaptation and the business process lifecycle upon which we based the framework activities has been presented, and a complete cycle from the definition of a business process to its implementation, execution, evaluation and improvement has been described. The implementation of business processes in the MINERVA framework is based on services guided by the BPSOM methodology, and includes the automatic generation of service models from business process models, separating the business process definition from its technical implementation. We believe that the definition of

BPIP will result in a useful guide for business process improvement in organizations, based on the improvement process defined and the realization of business processes by services with model driven and methodological support. Our future work is to completely detail the BPIP and to define a case study to test the proposal.

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