Evolutionary Process Engineering: User Guide and Case Study for Adequate Process Support

Michael Seitz
PRODATO Integration Technology GmbH
Erlangen, Germany
michael.seitz@prodato.de

Stefan Jablonski
University of Bayreuth
Chair of Applied Computer Science IV
Bayreuth, Germany
stefan.jablonski@uni-bayreuth.de

***Abstract*— Evolutionary Process Engineering describes the development of business processes over time with the objective of increasing quality and performance, in order to meet – among other things – accreditation requirements. Maturity models like the Business Process Maturity Model support quality management and are perceived as convenient measurement for this evolution. In this paper, we follow up the investigation of how much technical support for process execution is adequate in dependency of specific maturity stages and which implementation (e.g., system-controlled approach like Workflow Management System or human-controlled approach like Checklist) complies best with the respective quality requirements. A user guide is introduced that assists practitioners stepwise with the application of the maturity model in order to design adequate process support. The user guide is demonstrated and evaluated within the scope of a case study about the introduction of a university degree program. By this means, also exceptional cases such as deviations from the development path recommended by the maturity model are discussed. It becomes apparent that the process quality can be enhanced without implementing the highest available degree of technical support for the whole process.**

Keywords – Process Evolution; Process Support; Quality Management; Business Process Maturity

I. INTRODUCTION

Business Process Management highly benefits from the development of the "computerization" described in [6] that enables entire technical integration and automation across enterprise boundaries. However, the spectrum of possibilities to support process execution is broad and it became evident that modern technology does not necessarily contribute to process improvement. Technical process support should rather be aligned with the currently demanded maturity (i.e., what is the required competency, capability or level of sophistication of the process implementation [4]). Maturity models (e.g., Business Process Maturity Model, BPMM [14]) therefore provide orientation and describe well-established development paths. In our previous work we already pointed out implications of quality requirements on the degree of process support [13]. We investigated the spectrum of technical support for process execution, in particular to what extent information systems are involved, e.g., for information, monitoring, guidance or control purposes. Therefore, a maturity model extended by a dimension for process support was introduced. Its maturity stages describe which process support is needed to implement and prove the quality requirements efficiently. Admittedly, there are some difficulties arising from the practical application of maturity models in general: They indeed specify exactly what is necessary to reach their maturity levels but often lack in recommendations for concrete actions how to do so [9]. Furthermore, they are not provided with workarounds if the development by default does not seem to be appropriate for a special use case. Therefore, in this paper, a user guide is introduced and evaluated that is of assistance to practitioners with the application of the maturity model in order to identify adequate process support step by step. Besides the determination of a suitable degree of support it is also exemplified when it is not worth to achieve the suggested maturity. The user guide finally depicts how to identify a suitable implementation approach. Existing approaches and field reports about the evaluation and introduction of an information system as process support like [10], [3] and [11] are mainly focused on the domain of Workflow Management Systems, while in this paper, the whole spectrum of process support, also including human-controlled approaches, is considered.

The paper is structured as follows: In Section II the conceptual approach is described. In Section III the approach is applied to an example process and the results of the case study are presented. In Section IV the findings are summarized and further research activities are discussed.

II. APPROACH

The approach is based on a maturity model that has been developed in [13] to determine the most suitable degree of process support considering both the expected process quality and the requirements to the underlying process model. The objective of the approach is to support the application of this maturity model by guiding the user through the evaluation and decision process. The user guide is composed of phases, activities and results and additionally provides users with appropriate methods and tools. With the application of the user guide, a concrete enactment approach providing appropriate process support can be identified.

Firstly, process support is defined and the main enactment approaches are introduced (Section A). Secondly, the maturity model as well as its three characteristic

 ISBN: 978-1-61208-278-3

dimensions (process quality, process model and process support) are summarized (Section B). Thirdly, each step of the user guide is explained (Section C). Finally, supporting methods and tools are presented (Section D).

A. Process Support

There are many different types of processes, e.g., administrative or skill-intensive ones, making various demands on process support, e.g., through information, monitoring, guidance or control. For this reason the comprehension of process support used in this paper is determined. Therefore, the spectrum of process usage and the main enactment approaches covering this spectrum are introduced.

Following the concept of process usage developed in [8], approaches for process support can be classified according to the degree of IT assignment (enactment dimension) and the degree of freedom (execution dimension). While external enactment at the one end of the spectrum implies planning and driving the process without using any information system (e.g., paper-based), internal enactment at the other end means that the process is defined and executed more or less under the control of an information system (e.g., a business process management software suite). The degree of freedom ranges between flexible and rigid execution. Process support is classified in terms of whether it allows process participants to decide on their own which execution step they want to perform next (flexible execution) or if it does not permit them to deviate from the pre-defined path (rigid execution).

Within the scope of process support described above four representative enactment approaches are classified (see Figure 1.):

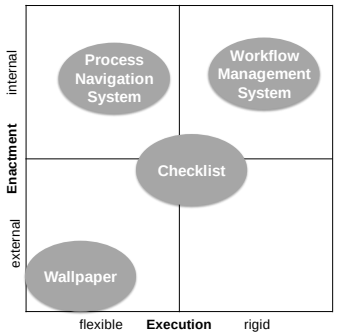

Figure 1. Approaches for Process Support [8]

- Wallpaper: The process model is used as it is, e.g., printed out as wallpaper, outlined on a flip chart or published online as process graphic in wiki. Even if the model is provided electronically the process itself happens completely "offline" (external enactment). Participants are in charge of the way the process is actually performed (flexible execution).
- Checklist: The checklist contains a serialized list of process steps to be performed as well as expected results. After a task has been finished the responsible person signs the respective list entry. This approach is versatile and can be applied both paper-based and electronically (external and internal enactment). Depending on organization and implementation the checklist contents and the order of the entries are binding or not (rigid and flexible execution).
- Workflow Management System (WfMS): WfMS in the traditional sense strictly execute the process as it has been modeled (rigid execution) and thereby interact with human users and other information systems via defined interfaces (internal enactment).
- Process Navigation System (PNS) [5]: In contrast to WfMS the PNS approach grants the participants to decide on their own how to perform the process (flexible execution). It suggests possible execution steps and points to constraints. The PNS therefore is rather perceived as a decision support system (internal enactment).

B. Maturity Model

Maturity models constitute helpful instruments for organizations to increase the capability of specific areas, such as the management of business, processes and IT [4]. They are able to determine the as-is situation (descriptively, e.g., "how much" process support is currently implemented?), to identify improvement measures (prescriptively, e.g., what would do well to provide more suitable process support?) and to benchmark performance across processes and organizations (comparably, e.g., in what way process support of process X differs from the one of process Y?). They contain a series of maturity levels that represent a development path. Each maturity level (ML) is defined through characteristics and their respective values [1].

The model presented here aims to determine and to evaluate the degree of process support and to reveal necessary adjustments. A ML results from the measure of the process quality, the scope and detail of the process model and the degree of process support. The process quality (e.g., according to BPMM) can be applied to process results and accordingly the way they are created. While a low maturity just demands to achieve the results (for example a document) anyhow, a higher maturity requires creating them properly (e.g., accurate format and structure) and in time, or furthermore measuring their performance (e.g., processing time or consumption of resources) systematically. The maturity of the process model differentiates which perspectives (e.g., organization or behavior, see [7] for details) are specified and if those can be interpreted and executed by information systems, e.g., a workflow system, or not. The maturity of the process support finally depends on how the process model is enacted, or, to be more precise, to what extent the process is executed beyond the control of an information system. In contrast to conventional maturity models such as the Business Process Maturity Model (BPMM) that generally aim at a continuous increase of maturity [9], the approach presented in this paper is not intended to strive towards the highest level (e.g., to automate as much as possible) but rather to establish the most reasonable one, e.g., by creating a widely accepted process support that accurately ensures and also proves the quality

 ISBN: 978-1-61208-278-3

that is demanded by the customer. This means to aim at fitting both process model and process support to the current quality and performance requirements.

C. User Guide for Adequate Process Support

The user guide that will be introduced in this section constitutes an assessment method for the maturity model mentioned before. It contains three phases which in turn are divided into activities respectively. Each activity produces a specific result that is processed in subsequent activities. The creation of the results is supported by specific methods and tools. In the following the content of the user guide (see TABLE I.) is described in detail.

TABLE I. PROCEDURE MODEL

Phase	Activity	Result	Method / Tool
A. Preparation	1. Select Process	Scope	-
	2. Structure Process	Process Sections	-
B. Evaluation	1. Evaluate Process Sections (As-is)	As-is Maturity	Maturity Level Checklist
	2. Evaluate Process sections (Ref.)	Reference Maturity	Maturity Level Checklist (Quality)
	3. As-is/Reference Comparison	To-be Maturity, Need for action	Best Practices for Deviations
C. Decision	1. Consolidate To-be Maturity	Spectrum of Process Support	Maturity Portfolio
	2. Derive Implementation	Enactment Approach(es)	Maturity Portfolio

Phase A serves as preparation of the actual evaluation and leads to the subject matter. The first step (A1) is to select the process scope. The second step (A2) is to divide up the process into process sections so that the evaluation can be accomplished as clearly as possible in terms of quality. In the end it should be possible to assign one distinct quality ML for each process section. Since there is no generally admitted practice to break down a process, this activity has to be accomplished case-related, e.g., by separating creative, human controlled parts from administrative, well-structured system controlled parts.

Phase B comprises the evaluation of the process in two respects. On the one hand, the as-is maturity is evaluated (B1). The maturity characteristics (quality, model and support) are rated independently for each process section in the first instance. The ML checklist (see TABLE II.) contains the requirements for each characteristic and ML and thus is considered as criterion. On the other hand, the reference maturity is determined (B2) for each process section. Therefore, the maturity for both process model and process support is due to the to-be process quality (e.g., when a process should meet the quality requirements of ML3, the process model and the process support should also cope with ML3, not more or less). Again, the ML checklist can be consulted. Finally, the as-is maturity is reconciled with the reference maturity (B3) in order to determine the to-be maturity and to identify appropriate need for action. In general, the reference maturity should be adopted, unless there are justifiable reasons. Recommendations for how to proceed in case of deviations between as-is and reference maturity are given in Section II.D.2.

The previously determined to-be maturities are the basis for the decision that is made in phase C. At first, the to-be maturities are consolidated with the help of the maturity portfolio in order to identify the spectrum of process support (C1). Therefore, each process section is classified according to internal or external enactment and flexible or rigid execution using its to-be maturity. Since some MLs, from a quality point of view, can be construed as both rather flexible and rather rigid execution, it has to be decided for each process section which execution type is appropriate. At second, a suitable implementation is derived (C2). Each process section has to be assigned to an enactment approach that complies with the demanded maturity and execution type. Process sections within the same quadrant of the portfolio can be unified.

D. Methods and Tools

Below, some methods and tools are introduced that are intended to support the activities of the user guide.

1) Maturity Level Checklist

The ML checklist serves as measure for the maturity assessment (see activities B1 and B2 of the procedure model in TABLE I.) of process quality, process model and process support, which are the characteristics of the maturity model presented in Section II.B. A ML is considered as applicable if all requirements are fulfilled. In turn, a process section is awarded the highest applicable ML. Below, the maturity stages according to BPMM and their requirements (see checklist in TABLE II.) are described using the procurement of coffee beans as an example. The example process consists of the process steps need recognition and demand planning, supplier selection and ordering.

For ML1 the results have to be achieved, which means that coffee beans are available. It doesn't matter who is buying the beans and where. As for the process model it is completely satisfactory to describe what has to be purchased (data perspective), e.g., sort and package. Process support consists of publishing this information, e.g., by means of a bulletin board flyer near the coffee dispenser.

ML2 additionally demands proper results in time, e.g., to avoid that coffee beans become short in supply or several people purchase independently of each other. Therefore, the process model is extended by the steps to be performed (functions), e.g., dial a number, a schedule (behavior) and responsibilities (organization), e.g., allocation of purchaser by calendar week. In point of process support, deviations from schedule are recognized, e.g., by the responsible person signing each order transaction on the schedule.

Consistent and stable results according to ML3 can only be established by using a reference process. To make sure that each process instance produces similar results, e.g., with respect to coffee flavor, procurement costs and time of delivery, the standard path (generally the behavior) has to be specified, e.g., which supply channels are to be used or how to accept and store deliveries. The specification of all

 ISBN: 978-1-61208-278-3

required perspectives is necessary to enforce that the execution is consistent with the reference process. Compliance can be supported by task assignment, tool suggestion and templates.

ML4 requires measurable results (e.g., reliability, adherence to delivery dates) and furthermore to take corrective action in case of an unexpected turn (e.g., replacement purchase or change of supplier). The process model therefore must incorporate KPIs that are collected and analyzed by the process support. In order to anticipate deviations process support must handle exceptions (if they are predefined) or at least allow for them (if they are not / cannot be predefined).

ML5 calls for continuously improved results (e.g., reduce dead stock or combine orders). In order to implement improvements, the process model must deal with changes (e.g., invocation of new electronic market place) either through altering the formal specification or – if the new procedure cannot be expressed – through extending or switching the modeling language. Process support is considered to identify necessary improvements through suggestion or execution of suitable process steps and moreover to make sure that these improvements are incorporated into the reference process.

TABLE II. MATURITY LEVEL CHECKLIST

	Process Quality	Process Model	Process Support
ML1	Initial: Results have to be achieved	Results are effectively represented textually or graphically (data perspective)	Information about expected results are provided
ML2	Managed: Proper results have to be achieved in time	Functional and behavioral perspective is specified (schedule) Organizational perspective is represented (resources)	Deviations from schedule are recognized and reported
ML3	Standardized: Consistent and stable results have to be achieved	Standard path is defined completely All required perspectives are specified (reference process)	Tasks are assigned Tools, applications and services are suggested or automatically invoked Templates are provided or automatically processed
ML4	Predictable: Results have to be measurable and corrigible	KPIs are defined	KPIs are measured and analyzed statistically Deviations are anticipated
ML5	Innovating: Results have to be improved continuously	Formal specification can be altered (automatically) Modeling language can be extended (manually)	Suitable process steps are suggested or executed automatically Improvements are incorporated into reference process

The maturity stages described above are presumed to be suitable for the majority of processes but they are not universally valid. This is due to because the gaps between MLs are sometimes too big for the resources of an organization to close and it is not always worth to implement all requirements of a ML [9]. For this reason the ML checklist should not be perceived as binding but rather as recommendation and orientation. Maturity models also often lack in workarounds if not each requirement as prescribed by the ML is achievable or actually reasonable. In the next section some best practice examples are given for scenarios that break ranks and do not mesh with the maturity grid.

2) Best Practices for Deviations

As support for activity B3 of the procedure model in TABLE I. some general recommendations for the handling of deviations between as-is and reference maturities are made in this section.

If the ML of the as-is process support is lower than the reference quality maturity, the as-is support should be enhanced, unless the quality can be achieved and proved all the same or there is no gain of efficiency. For example, to align the procurement of coffee beans to the taste of the consumers (continuous improvement according to ML5) it makes a difference if the process is designed for a countrywide restaurant chain or a company's kitchenette. While the restaurant chain would actually analyze customer behavior through performing a web-based opinion research and thus automatically align its sourcing strategy (ML5 process support), as for the kitchenette it would rather be sufficient to make a yearly survey through posting up a tally sheet next to the coffee dispenser (ML1 process support).

If the ML of the as-is process support is higher than the reference quality maturity, it should be checked if the process is adversely affected by the usage of the current execution support system. This may be the case if a certain process could achieve better results by granting the participants more flexibility instead of prescribing them each single step, e.g., by the WfMS. However, to come back to the kitchenette example (ML1 quality), it is also conceivable that – maybe due to corporate guidelines or just because the required software functions are implemented anyway – the coffee bean orders are processed by the central procurement system (up to ML5 process support) instead of keeping an account of them on a handwritten shopping list (ML1 process support).

Process execution support, especially in conjunction with the usage of information systems, is in need of an explicit representation of all relevant information. So if the ML of the as-is process model is lower than the reference process support maturity, the as-is process model must be enhanced.

According to modeling principles, as stated in [2], only those facts should be modeled that are relevant and economically reasonable for execution support. So if the ML of the as-is process model is higher than the reference process support maturity, it should be reviewed if the current design of the process model providing larger scale and greater detail as actually needed is reasonable. It may be reasonable, for instance, if other processes or information

systems share it or a higher ML is considered in future anyway. Otherwise, unessential contents should be removed or not be maintained any more.

3) Maturity Portfolio

Basically, all requirements of the ML checklist (see TABLE II.) can be fulfilled without using any information system and – as described in Section II.D.2 – each combination of maturity levels with respect to quality and process support is generally possible. However, observing the 80/20 principle, an increase in quality is accompanied by a certain enhancement of both the process support and the usage of information system. With the help of the maturity portfolio presented below it is possible to assign a given to-be maturity of process support to a searched approach for process support (compare activities C1 and C2 of the procedure model in TABLE I.). As mentioned earlier in Section II.A, the idea of classifying approaches for process support into flexible or strict execution and internal or external enactment goes back to spectrum of process usage developed in [8]. The integration of maturity levels was accomplished in [13]. The new portfolio view (see Figure 2.) arises through merging the maturity levels and the approaches for process support into the spectrum of process usage. It enables the assignment of a given ML to a certain approach for process support and vice versa.

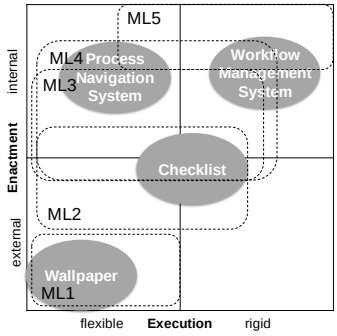

Figure 2. Maturity Portfolio

Enactment approaches that are identified in this way can be regarded as adequate process support, because they meet the requirements for process usage concerning execution and enactment requested by the respective maturity.

III. CASE STUDY: INTRODUCTION OF A UNIVERSITY DEGREE PROGRAM

In this section, the case study is presented in which the user guide approach is applied. The data for the case were attained through conducting interviews with the executing staff and studying the process and quality manual.

A. Preparation

The case study deals with the process of introducing a degree program at an example university. Breaking down the process results in the following process sections that are subject to the evaluation:

- P1 Form a degree program concept
- P2 Elaborate the degree program
- P3 Reach a decision on university level and request for state ministry agreement
- P4 Prepare introduction

B. Evaluation

The as-is process model consists of a textual and graphical reference process description of input and output documents (data), process steps on activity level (functions), responsibilities (organization) and sequence and conditions (behavior) using a formal modeling language that enables to define process models formally and clearly. Consequently, the as-is maturity of the process model is to be evaluated as ML3 for all process sections.

The first process section is to form a degree program concept. After determining the degree program type and the coordinator the degree program description is created by the faculty. Upon approval by the school council the capacity plan is prepared by the QM (Quality Management) department. Both documents are reviewed by the executive board of the university. In case the degree program concept is followed up, an external evaluation under participation of the QM department is accomplished and the capacity plan is refined. Finally, the concept is forwarded to the department of academic administration. Particular attention is paid to the content of the resulting documents. The concept must be convincing in form and content to satisfy the decision makers. Therefore, miscellaneous checklists and statistics data are provided to ensure consistent and stable results. On the contrary, the real development process (deadlines or applied tools, for instance) is disregarded. Consequently, from a quality management perspective, purely the achievement of results is required (ML1). However, with respect to the output documents (data perspective), ML3 quality is worthwhile (to-be). Currently, process support is limited to information about expected results (ML1). Even though ML3 process support is recommended for achieving ML3 quality, there is no need for action here, because the compliance with the reference process can be established anyway and also be proved through dated receipt stamps and signatures on the respective documents.

The second process section deals with the elaboration of the degree program and is organized as a collaborative project. It takes about 8-10 weeks and is scheduled backwards from the school council meeting. Within the first 4-6 weeks, the degree program documentation is elaborated by the school, the chairs, corresponding committees, the dean and the coordinator. Four weeks before the meeting, the documents are delivered to the department of academic administration for the purpose of a preliminary check. There are three weeks left to work in change requests. One week before the meeting, the final documents have to be submitted. In prior to that, the detailed resource plan is elaborated by various departments. Furthermore, the dean informs the student parliament about the new degree program. From a quality perspective, beside proper results there are also due dates to be adhered (ML2). Again, the process is focused on the output documents and therefore should comply with ML3 likewise. In order to observe deadlines, process support should be enhanced to ML2.

 ISBN: 978-1-61208-278-3

Waiving ML3 process support including task assignment is not detrimental to the success, because the process is rather collaborative than coordinative and the quality of the results is assured nevertheless.

The third process section is concerned with the approval of the degree program by various authorities one after another, at first on university level and then on state ministry level. In each case the degree program documents are presented. In the event of rejection, the coordinator or the school is provided with editorial remarks for revision. In the event of acceptance, the next authority decides on the degree program. Firstly, the school comes to a decision. Secondly, the presidential committee is passed. Preferably before the resolution of the senate, the statement of the university council is obtained. At least one week before the meeting of the senate, the documents are brought before the senate. In case of acceptance the documents are forwarded to the state ministry. The degree program is then either approved or approved conditionally or declined. Finally, all stakeholders are informed and the degree program rules are published. Currently, ML2 quality is reached. The participants meet due dates and communication channels. However, the process prescribes a strict order and each application for a degree program should be handled equally. In order to head for a more standardized procedure, the process section should be raised to ML3. Therefore, the current process support should also be enhanced (ML3) as recommended by the maturity model, because not only the output documents but also organization and behavior have to comply with the reference model.

In the last process section the introduction of the degree program is prepared. Various activities are initiated simultaneously but independently of each other: design and distribution of flyers, information of the student advisory service and other departments, appointment of responsible persons, long-term course planning, preparation of examination procedures and other degree program details. Responsibilities are clearly defined. ML1 quality seems to be sufficient here, because due dates are negligible. Consequently, also ML1 process support is reasonable, because the tasks are well-defined and there is not much of coordination effort.

In TABLE III. the evaluation results are summarized.

TABLE III. EVALUATION MATRIX

Process Section	Process Quality	Process Model	Process Support
	As-is → To-be	*As-is/Ref. → To-be*	*As-is/Ref. → To-be*
P1	ML1 → ML3	ML3/ML3 → ML3	ML1/ML3 → ML1
P2	ML2 → ML3	ML3/ML3 → ML3	ML1/ML3 → ML2
P3	ML2 → ML3	ML3/ML3 → ML3	ML1/ML3 → ML3
P4	ML1 → ML1	ML3/ML1 → ML3	ML1/ML1 → ML1

C. Decision

The process sections P1, P2 and P4 mainly focus on the respective results. Their time limits are either disregarded or perceived as directives. Furthermore, the actual arrangement and design of the degree program is in need of a certain creative scope that cannot be pre-defined. The quality is in the coordinator's and the faculty's interest. Consequently, a flexible, human controlled execution support seems to be more reasonable than prescribing each single step according to a rigid process model. However, within the deciding steps of process section P3 equal treatment for each degree program request has to be ensured. In order to standardize the organization and the behavior and to establish favorable terms for reaching the desired quality a rigid execution support is advisable. Consolidating the to-be maturity levels of the process support accordingly results in two categories: P1, P2 and P4 are mapped to external flexible process support, while P3 is mapped to internal rigid process support (Figure 3.). The assignment of the process sections to the recommended enactment approaches is visualized in Figure 4. and will be explained below.

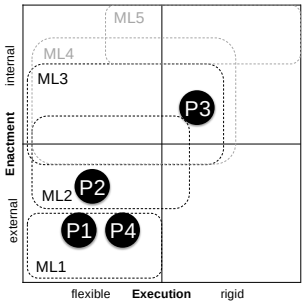

Figure 3.
Spectrum of process support

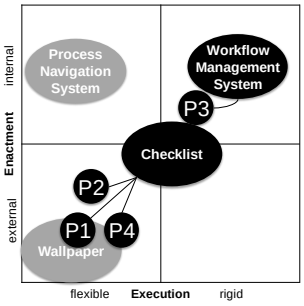

Figure 4.
Enactment Approaches

Regarding external, flexible process support, two enactment approaches come into consideration: the wallpaper and the checklist. The checklist seems to be more appropriate, because the wallpaper is not able to provide ML2 runtime support as demanded by P2. Even though for P1 and P4 mainly the results count it is important that actually all essential activities are performed and their resulting documents contain all required information. Therefore, the checklist approach could be designed as follows: On the one hand, there is a paper-based checklist on process level with a list of process steps to be performed. It is maintained by the coordinator and is intended to support him in keeping track of the project. In case of deviations, corrective action is taken manually, e.g., by phone or e-mail. On the other hand, there are checklists on document level, either paper-based or electronically, depending on the availability of the respective data. Each document header is provided with a bullet point list of the required content parts. The list entries are signed by the respective authors and thereby serve both as orientation for the persons in charge and as proof of conformity to the reference process (ML3 quality for data perspective).

Concerning internal, rigid process support, again two approaches are possible: the Checklist and the WfMS. Here, the WfMS seems to be more appropriate than the checklist, because the approval workflow, the task assignment, the data logistics and the collaborative access to documents can be clearly defined and actively controlled by WfMS standard functions. This approach is especially recommended when – as in the case of the example university – an already existing

communication and collaboration platform providing basic workflow functions can be used. The workflow that has to be implemented is initiated by the coordinator when the documents have to be brought before the school council (end of P2). It ends with the agreement of the state ministry and the publication of the degree program rules (end of P3).

IV. CONCLUSION AND FUTURE WORK

In this paper, a user guide was introduced that is intended to lead practitioners through the procedure of identifying adequate process support. It was showed how to determine the as-is situation, in particular how much support is currently provided and which quality level can be reached. Furthermore, it was pointed out how to identify appropriate need for action for both standard and exceptional cases of process evolution. On the one hand, best practice maturity stages were introduced that are meant to be a guideline in most instances. On the other hand, also exceptional cases were discussed that are not in line with the common process evolution. Moreover, it was presented how to reach a decision on the question which enactment approach is most suitable for the demanded quality and execution type. Finally, the application of the user guide was presented by using the example of the degree program introduction. The case study revealed that the highest degree of process support is by no means the most reasonable one and that the process quality can rather be enhanced through providing an adequate degree of process support at the right place.

Our future research is concerned with the question how the approach can be further improved in order to provide an even more specific assessment of quality requirements and their impact on process model and process support. One starting point would be to initially evaluate each process perspective (data, organization, behavior, etc.) independently from each other. Another starting point is to differentiate process support by execution support (e.g., guidance) and documentation support (e.g., log generation). Generally, we aim for a more comprehensive evaluation of the conceptual approach in different domains and branches. Moreover, our activities head for the further specification and development of the conceptual approach presented in [12] that is intended for the technical support of process evolution, in particular for the acceleration of transitions between maturity levels through attaining process models during execution.

REFERENCES

[1] J. Becker, R. Knackstedt, and J. Pöppelbuß, "Developing Maturity Models for IT Management – A Procedure Model and its Application", in Business & Information Systems Engineering, vol. 1, 2009, pp. 213-222.

[2] J. Becker, M. Rosemann, and R. Schütte, „Grundsätze ordnungsmäßiger Modellierung", in Wirtschaftsinformatik, vol. 37, 1995, pp. 435-445.

[3] J. Becker, C. v. Uthmann, M. zur Mühlen, and M. Rosemann, „Identifying the Workflow Potential of Business Processes", Proc. Hawaii International Conference on System Sciences (HICSS 32), Jan. 1999.

[4] T. de Bruin, M. Rosemann, R. Freeze, and U. Kulkarni, "Understanding the Main Phases of Developing a Maturity Assessment Model", Proc. Australasian Conference on Information Systems (ACIS 16), Sydney, Nov. 2005.

[5] M. Faerber, S. Meerkamm, and S. Jablonski,"The Processnavigator – Flexible Process Execution for Product Development Projects", Proc. International Conference on Engineering Design (ICED 17), Stanford, Aug. 2009, pp. 99-110.

[6] E. Fleisch, „Von der Vernetzung von Unternehmen zur Vernetzung von Dingen", in „Roadmap to E-Business. Wie Unternehmen das Internet erfolgreich nutzen", C. Belz, T. Tomczak and M. Schlögel, Eds. Landsberg/Lech: Verl. Moderne Industrie, 2002, pp. 124-135.

[7] S. Jablonski, "MOBILE: A Modular Workflow Model and Architecture", Proc. International Working Conference on Dynamic Modeling and Information Systems (04), Noordwijkerhout, 1994.

[8] S. Jablonski, "Do We Really Know How to Support Processes? Considerations and Reconstruction. Graph Transformations and Model-Driven Engineering", in "Graph Transformations and Model-Driven Engineering. Essays Dedicated to Manfred Nagl on the Occasion of his 65th Birthday", G. Engels, C. Lewerentz, W. Schäfer, A. Schürr and B. Westfechtel, Eds. Lecture Notes in Computer Science. Berlin/Heidelberg: Springer, 2010, pp. 393-410.

[9] N. Kamprath, „Einsatz von Reifegradmodellen im Prozessmanagement", in HMD – Praxis der Wirtschaftsinformatik, vol. 282, S. Reinheimer and R. Winter, Eds. Heidelberg: dpunkt, Dec. 2011, pp. 93-102.

[10] P. Kueng, „A Process Model for Deployment of Workflow Systems", in Institute Report 95.02, University of Linz, 1995.

[11] M. Mühlen, „Workflow- und Prozessmodellierung bei einem Energieversorgungsunternehmen", in Prozessmanagement, J. Becker, M. Kugeler and M. Rosemann, Eds. Berlin/Heidelberg: Springer, 2005, pp. 511-531.

[12] S. Schönig, M. Seitz, C. Piesche, M. Zeising, and S. Jablonski, „Process Observation as Support for Evolutionary Process Engineering", in International Journal On Advances in Systems and Measurements, vol. 5, Dec. 2012, pp. 188-202.

[13] M. Seitz and S. Jablonski, „Evolutionäres Prozess-Engineering: Zum angemessenen Grad an Prozessunterstützung", in HMD - Praxis der Wirtschaftsinformatik, vol. 287, D. Ingenhoff and A. Meier, Eds. Heidelberg: dpunkt, Oct. 2012, pp. 93-102.

[14] Business Process Maturity Model (BPMM), Version 1.0, 2008. Last access: Mar. 2013. Available: http://www.omg.org/spec/BPMM/1.0/.

 ISBN: 978-1-61208-278-3