Towards Tool-Supported Situational Roadmap Development for Business Process Improvement

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Abstract. In times of high market transparency and rapidly changing customer requirements, business process improvement (BPI) is becoming ever more important for companies to reach strategic objectives and stay competitive. However, existing BPI approaches such as Six Sigma or Total Quality Management are increasingly perceived as overly complex and over-dimensioned by employees. Therefore, we propose "tool-supported situational roadmap development for BPI" as an instrument for arriving at enterprise-adapted and easy-to-use approaches that can be applied straight away. In this way, employees with limited knowledge in the BPI discipline are enabled to design BPI approaches to match their particular needs. This paper presents a first concept of our solution.

Keywords: Business process improvement, modeling, metamodeling platform.

1 Introduction

Growing market transparency due to technologies such as social media or internet portals for product comparison (cf. [1]) leads to rapidly changing customer requirements and forces companies to continuously analyze their consumers' needs (cf. [2-3]). In that respect, business process improvement (BPI) [4] becomes decisive for companies to adapt their business processes (cf. [5-6], [40]) in order to match consumers' requirements and to remain competitive (cf. [7-8]). Several methods have been established for improving business processes over the years, such as Six Sigma, Lean Management or Total Quality Management (TQM) to mention just a few (cf. [9-10]). However, studies reveal that employees increasingly perceive existing methods as overly complex and over-dimensioned for projects with a limited scope (cf. [11-12]). Moreover, some methods have methodological flaws that hamper their application [13].

For that purpose, the construction of enterprise-adapted BPI roadmaps that are easy-to-use and suited for application in different project settings is ever more sought after (cf. [11], [14-15]). Roadmaps represent an established concept in knowledge management for both capturing knowledge and deriving problem solutions in a structured way (cf. [16]). In our case, a BPI roadmap is a logical arrangement of proven BPI techniques (e.g., Cause-and-Effect-Diagram, FMEA, etc.) (e.g., [17]) that

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supports the creation of results (cf. [18]) at all stages of a BPI project to arrive at suggestions for improvement (cf. [14]). Whereas proprietary sorts of BPI roadmaps can be found in the relevant literature (e.g., [15], [19-20]), a standardized and tool-supported approach for an easy construction and immediate instantiation of enterprise-adapted BPI roadmaps is missing. Against this background, the goal-oriented construction of enterprise-specific methods is a topic that is strongly rooted in the Method Engineering discipline [21]. Thereby, situational method engineering builds on the idea of combining different method chunks [22] to arrive at a method for a specific project constellation (cf. [23-24]). In this study, we refer to the idea of situational method engineering and pursue the following research question: *How can a tool-supported approach for situational roadmap development for BPI be designed?* Hence, we strive for a solution that allows the construction of situational BPI roadmaps that give methodological guidance on the transformation of implicit process knowledge (cf. [25]) into improvement suggestions.

The paper is structured as follows: In the next section, we introduce a first concept for a tool-based approach for situational roadmap development for BPI. Afterwards, the significance of the research is outlined. The paper concludes with an outlook.

2 An Approach for Situational Roadmap Development for BPI

The study follows the Design Science Research (DSR) approach (cf. [26-27]). The motivation for this research (cf. [27]) emerged from the conducting of several BPI projects with industry partners, who strived for the introduction of enterprise-adapted and easy-to-use BPI approaches. For that purpose, we introduce "tool-supported situational BPI roadmap development" as a means to establish BPI roadmaps on a graphical level, which are adapted to users' needs. More, the resulting tool will also allow to directly instantiate and use the developed BPI roadmaps and capture the project results (e.g., customer requirements, etc.) in the form of conceptual models (e.g., [28]).

The requirements (cf. [27]) of our solution concern (I) the nature of the BPI roadmaps to be created as well as (II) the tool-based approach itself. Considering the former aspect, we build on the requirements for engineering methods in general (cf. [29], [24]), which were classified by *Greiffenberg* [30] for instance. Thus our tool-based approach has to assure that the *completeness*, the *consistency* as well as the *applicability for the intended purpose* of the emerging situational BPI roadmaps are guaranteed (cf. [30-31]). In our context, *completeness* refers to the ability of the tool-based approach to construct BPI roadmaps that consider the method elements "procedure model", "BPI techniques" and "result documents" (cf. [18], [31]). Accordingly, each activity of the created BPI roadmap must be supported by a BPI technique that produces the aspired results for that activity (e.g., the activity "analyze problem causes" may be supported by the BPI technique "Cause-and-Effect-Diagram" [32] leading to a list of "problem causes"). *Consistency* requires the assurance that the procedure model of the resulting BPI roadmap follows a logical structure, e.g., project goals are defined before the process performance is measured,

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and no result documents are created redundantly (cf. [31]). *Applicability for the intended purpose* concerns the ability to design BPI roadmaps that meet users' particular demands and skills (cf. [31]). To guarantee the abovementioned quality aspects for the resulting BPI roadmap, we also define requirements for the design of the tool-based approach itself. These requirements stem from the experiences we made in a long-term cooperation project with a financial service provider in the field of BPI. At first, the (1) opportunity to define the activities to be performed in a BPI project on base of a pre-defined "BPI project activity database" is pursued. In this way, the BPI roadmap can be designed to meet the intended purpose, while the logical arrangement of the activities can be checked with the aid of rules (e.g., rules defining logical interdependencies [33]). Second, (2) the ability to individually select the BPI techniques to be used on base of a set of criteria/properties (e.g., ease-of-learning, flexibility, required input, etc. [34-35]) should be given. An overview of corresponding criteria can be found in [34-36] amongst others. Further, a collection of BPI techniques that are potential candidates for the roadmap is shown in [17] or [37]. More, (3) the functionality to integrate the selected BPI techniques on a graphical level to support all aspired BPI activities should be given. Hence, functional interdependencies exist between BPI techniques that describe value-adding opportunities for their combination [33], [44]. Thus, rules can be implemented to propose the user valuable combinations of BPI techniques. Finally, the (4) ability to directly instantiate the developed BPI roadmap via the tool is required.

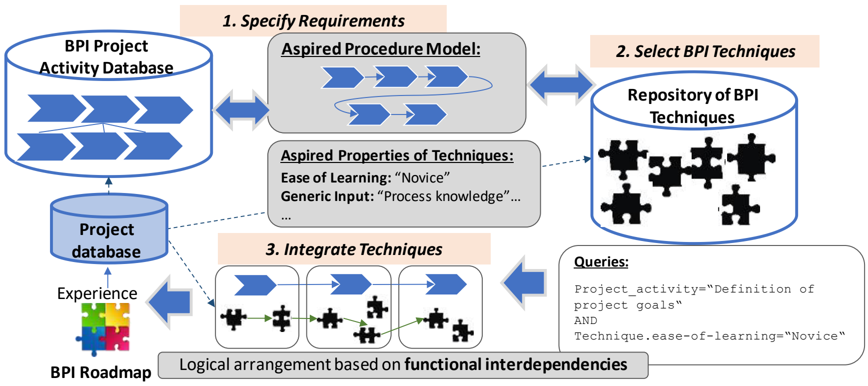

Figure 1. Tool-based situational BPI roadmap development (modified and adapted from [23])

The intended design of the approach for the "tool-based situational roadmap development for BPI" is depicted in Figure 1. It builds on the general steps of situational method engineering (cf. [23], [38]) and was adapted to the purpose at hand. Therefore, in a ***first step (specify requirements)*** an enterprise has to define the phases and activities (e.g., map process, measure process performance, etc.) (cf. [39-40]) to be performed for structuring a BPI project. These can be retrieved from a corresponding "BPI project activity database". Depending on the problem situation and user requirements, certain activities (e.g., "analysis of measurement data") may be more relevant than others (cf. [36]). Moreover, the properties and inherent characteristics of the BPI techniques are to be specified, e.g., user-friendliness, flexibility, etc. (e.g., [34], [41]). The specification of the activities and properties are

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the base for the automatic retrieval of BPI techniques from a "repository of BPI techniques" by help of queries ***(step 2 – select BPI techniques)***. Therefore, the BPI techniques in the repository are characterized by help of attributes and corresponding values. These attributes refer to the aforementioned selection criteria (e.g., [35], [42]). An algorithm (realized via the ADOxx script language ADOScript [43]) compares the user input with the attribute values to retrieve those BPI techniques that best meet users' demands. Then, the selected techniques – the user wishes to apply – are combined to form the adapted BPI roadmap in ***step 3 (integrate techniques)***. In this respect, the so-called functional interdependencies [44] are to be considered, i.e., the desired interplay between the BPI techniques is to be determined [33]. Thereby, the tool gives hints, which BPI techniques may be purposefully combined due to synergetic functional interdependencies (cf. [33], [44]). The experiences that emerge from the application of the BPI roadmap in real-life settings can be stored in a project database (see *step 3 – Figure 1*).

From a technical perspective, the tool-supported approach is to be realized by help of the freely available ADOxx metamodeling platform *(www.adoxx.org)* (cf. [43]). Thereby, the model types capturing the results from applying the BPI techniques are specified as metamodels and stored in the tool's repository. The GUI and algorithms supporting all steps as shown in Figure 1 are realized by way of the ADOxx "modeling" component as well as the ADOScript language (cf. [43]).

Based on above described concepts, the tool-based approach is currently undergoing implementation. The latest version of the running prototype comprises approx. 20 BPI techniques that were designed as conceptual model types along with their metamodels. Additional BPI techniques, however, are already conceptualized in form of metamodels waiting to be implemented. At the moment, the tool already allows for a manual selection of singular BPI techniques and their instantiation for a BPI project to document results and guide users in developing improvement suggestions. Next, the implementation of the tool-based approach is to be finalized. Following this, a thorough evaluation (cf. [27]) is pursued. We will demonstrate the applicability of the finalized prototype by using it in selected real-life BPI projects with our cooperation partners (cf. [45]). In addition, laboratory experiments (cf. [46]) with students are planned to gather reactions to the prototype's usability, e.g., with the aid of SUMI (software usability measurement inventory) studies (cf. [47]). The feedback will be used to revise the prototype before it is evaluated at companies from various branches (cf. [45]).

3 Significance of the Research & Outlook

This research-in-progress study contributes to the academic discussion of how to develop easy-to-use approaches for BPI that are adapted to employees' particular needs (cf. [35], [11]). For that purpose, an approach to systematically develop BPI roadmaps by way of a tool and directly instantiate/use them in BPI projects is created. Therefore, ideas of Method Engineering are transferred to the BPI field. Practitioners receive a software tool to establish enterprise-specific BPI roadmaps that meet their

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particular demands. Results are captured via conceptual models that can be easily shared, queried and analyzed. To sum up, a running research project – dealing with the situational development of roadmaps for BPI – is described in this paper. As the prototype is still being finalized, a comprising evaluation has not yet been effectuated. Furthermore, the requirements are derived from the relevant literature and our BPI projects, while completeness cannot be guaranteed. However, the results received so far are promising.

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