“Developing and tailoring business process management methods using the situational method engineering approach”

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DEVELOPING AND TAILORING BUSINESS PROCESS MANAGEMENT METHODS USING THE SITUATIONAL METHOD ENGINEERING APPROACH

Abstract

Effective business process management is one of the key tasks of every organization if it wants to compete successfully on the market and satisfy the needs of its customers. Although there are many established best practices, techniques, and more or less complex methods in business process management, no approach can fulfill a typical organization's needs and wants. The key to success lies in developing new or adapting existing approaches for business process management to suit the unique characteristics of individual organizations and projects. This demands a solid methodological framework and a clearly defined work process. The aim of the paper is to apply situational method engineering concepts within the realm of business process management, thereby tackling the challenge mentioned above. As a result, a situational method engineering framework is defined to construct and customize business process management methods. The study proposes the conceptual foundations of the framework and a set of processes for constructing holistic and tailored methods that cover various aspects of business process management (analysis, modeling, management, etc.). The basis of the framework is represented by general method components at a higher level of abstraction, which are assembled into holistic methods via interfaces and are transformed into versions adapted to specific situations using tailoring rules. The practical applicability of the proposed framework is validated through its implementation in a project at a large manufacturing company, where it is used to develop both a general and customized business process management method.

Keywords method components, method database, meta-modeling, business process management approaches

JEL Classification M10, M15

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INTRODUCTION

Business process management (BPM) is a vast and sometimes poorly understood field at the intersection of computer science, information systems engineering, management, and industrial engineering (Reijers, 2021). BPM encompasses strategy, objectives, policies, methodologies, techniques, and tools for continuous improvement and holistic business process management. Its complexity dictates that appropriate and holistic management of its individual elements requires an effective methodological approach, i.e., BPM methodology. The BPM discipline includes many approaches, strategies, guidelines, techniques, and tools for managing and improving business processes, which often completely overwhelm organizations. No established approach (methodology) can fulfill all needs and wants; therefore, any approach requires major or minor tailoring to an individual organization or project (Zelt et al., 2019).

According to Harmon (2016), nearly half of all organizations involved in BPM employ their own methodology, while only 32% follow a stan-

dardized methodological approach. The problem with developing new individual methodologies is their construction and tailoring approach, as it is rarely based on a single and comprehensive set of concepts and a consistent work process. These methodologies are mostly built ad-hoc, as simple mappings of one of the generally established BPM methodologies published in the professional literature, without considering the specifics of the individual organizations or projects for which the methodologies are intended. The result is often an inadequate and deficient approach that does not meet the needs of organizations and project groups, mainly demonstrated by the fact that the developed methodologies are not used in practice.

1. THEORETICAL BASIS

There are many definitions of BPM in literature that differ to various degrees. For example, Jeston and Nelis (2022) define BPM as achieving the organization's objectives through improvement, management and control of key business processes. Harmon (2019) defines BPM as a discipline of management focusing on improving the effectiveness of an organization by managing its business processes. However, the Association of Business Process Management Professionals defines BPM as a discipline of management that integrates the organization's strategy and objectives with customer expectations and needs by focusing on the overall business process (Benedict et al., 2019).

Harmon (2019) defines a methodology as an extensive and specific set of instructions for implementing a specific task; in the context of BPM, it involves the re-engineering or enhancement of an organization's crucial business processes. According to Sweet (2014), a BPM methodology is an approach comprising principles and specific procedures that offer guidance on handling various scenarios within the realm of BPM. Methodologies can be general-purpose methodologies intended to solve a wide range of problems, or specialized methodologies intended for individual processes (Harmon, 2019).

Today, organizations that primarily focus on improving individual business processes generally use a version of the PDCA approach (Plan, Do, Check, Act), in which planning, implementation, verification, and action are repeated cyclically. When it comes to BPM, this approach typically encompasses the following phases: establishing an overview of areas in need of improvement, gathering stakeholder requirements, determining priorities, developing a model of the current process, developing a model of the redesigned process, and finally, implementing the redesigned process (Jeston & Nelis, 2022). This methodology is relatively simple but not supported by more detailed procedures, roles, products, and tools. Organizations that want to go a step further use more advanced approaches such as Six Sigma and its upgrade, Lean Six Sigma. Another problem of the PDCA approach is the lack of emphasis on the organization's strategy and process architecture (Benedict et al., 2019; de Morais et al., 2014). The solution, as envisaged by de Morais et al. (2014), lies in improving the PDCA approach by establishing a strategic phase that ensures mutual coordination of the organization's strategy with projects in the field of BPM. Weske (2019) and Harmon (2019) also advocate a similar approach, i.e., dividing the BPM methodology into activities that concern strategic aspects of BPM at the level of organization and activities that concern the individual business process enhancement.

At the beginning of the 21st century, the focus of organizations shifted from individual business processes to the development of extensive process architectures and the introduction of holistic, corporate BPM systems. This led to holistic, top-down BPM methodologies, with some of the more important freely available ones being Rummler-Brache (Rummler & Brache, 2012), BPTrends Associates Methodology (Harmon, 2019) and 7FE BPM (Jeston & Nelis, 2022). The fundamental problem faced by top-down methodologies is that they are complex and all-encompassing; their implementation in the organization requires a lot of knowledge, effort, and tailoring, as well as a change in the culture itself. Since this often represents an insurmountable obstacle, organizations increasingly resort to partial solutions, as evidenced by BPM research, as the focus shifts again from ensuring the business performance of the

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organization as a whole to the optimization of individual aspects (e.g., process modeling, workflow management) (Klun & Trkman, 2018).

The problems of holistic methodologies are not new, as they represented challenges at the turn of the 21st century in information systems development. In response to the complex approaches of the time (e.g., Rational Unified Process), many agile methodologies (Scrum, Extreme programming, etc.) were created, prioritizing agile principles instead of adhering to a predefined process. Agile approaches have become increasingly established in BPM in the last ten years, as indicated by numerous publications in the scientific and professional literature (Meziani & Magalhães, 2009; Thiemich & Puhlmann, 2013; Martins & Zacarias, 2017; Zacarias et al., 2017; von Rosing et al., 2015; Badakhshan et al., 2020). Agile BPM methodologies should provide projects with the early realization of benefits, efficient introduction of BPM knowledge in organizations, reduction of financial risk, shorter iterations between process releases, and enable planning, modeling, and implementation activities of business processes to be carried out simultaneously. The problem with agile approaches is that they often overlook the broader context of the organization's business and focus primarily on quick wins.

Therefore, there are many methodological approaches to BPM today, some of which are more general, while others detail specific activities, techniques, tools, and products. Classic approaches prioritize adhering to a predefined process, the result of which are specific products (documents, models, rules, roles, activities, etc.). In contrast, agile approaches focus more on cooperation with customers, genuine interactions, and real-time responses to changes.

The theoretical basis of the framework for constructing BPM methodologies is based on the concepts of the method engineering discipline (Brinkkemper, 1996), which covers planning, construction, and tailoring of methods, and techniques and tools for developing software solutions.

A special branch of this discipline is situational method engineering, which covers tailoring existing methods to the specific circumstances faced by organizations as well as to specific projects. Method engineering aims to construct methods for developing information systems and software solutions (Franch et al., 2018; van Steenbergen et al., 2019; Dehghani & Ramsin, 2023). However, over time, its concepts and procedures began to be used in BPM for modeling architectures and optimizing business processes (Gonzalez-Lopez et al., 2022; Ogbuachi et al., 2021). The discipline of method engineering uses the terms method and methodology as synonyms, with most authors preferring the term method. This paper will use the term method instead of the term methodology, although the latter is more established in BPM.

Method engineering defines a method as a set of parts called method fragments, which represent standardized compositions and are defined as consistent and well-defined parts of information system development methods (Brinkkemper, 1996). Method fragments are categorized based on their perspective, level of abstraction, and level of detail (Brinkkemper et al., 1999). The perspective dimension divides method fragments into product and process fragments, with product fragments describing models, documents, diagrams, and other products and process fragments describing method phases, activities, and tasks. The process and product fragments can be integrated into a single method fragment, called a method chunk, which ensures a close connection between the process part and the resulting products (Ralyté & Rolland, 2001b). A method is represented as a set of loosely connected method chunks at different levels of detail, with the method itself defined as a top-level method chunk.

The generic process for situational method engineering is divided into two key steps (Ralyté et al., 2003): determination of method engineering objectives, which defines the type of method required, and the construction of the method itself. The determination of the objectives depends on the current situation, which may require constructing a completely new method or tailoring an existing method. The defined objectives thus represent guidance for selecting a suitable strategy method construction. In addition to the generally established assembly strategy based on reusing fragments of existing methods, a tailoring approach can also be used. The main reason for

the shift from assembly to tailoring is the realization that assembling method segments into a new method is a complex task that requires a lot of effort, resources, and time, which can significantly increase the cost and duration of the project (Karlsson & Ågerfalk, 2004). The assembly strategy is particularly problematic from this point of view when it comes to complex methods with many fragments (Saeki, 1998).

The solution lies in constructing a method database for general methods or their fragments, which can then be used to construct specific methods tailored to individual projects (Henderson-Sellers et al., 2014). The development of a method database involves the re-engineering of existing methods and their specific fragments, encompassing the following essential stages (Ralyté & Rolland, 2001a): reconstruction or definition of the original method process model, identification of the method fragment, and definition of the method fragment. The method fragments stored in the method database represent the foundation for constructing one or more general methods that then serve as a starting point for tailoring to the project's specific properties, representing the last step in method engineering (Karlsson & Wistrand, 2006). Once the methods are in production, they must be continuously evaluated and, if necessary, upgraded to maintain their long-term optimal performance (Sandkuhl & Seigerroth, 2019).

2. AIM

The aim of the paper is to employ situational method engineering concepts in the context of BPM by introducing a comprehensive framework for developing BPM methodologies. The framework enables organizations to develop their own methodological approach for managing business processes tailored to their specific characteristics and the environment in which they operate. Constructing a framework requires a solid conceptual foundation that will support the framework. The foundation represents the static aspect of the framework, defining all key concepts and their mutual relationships, as well as the rules and constraints established within the framework. For this purpose, the meta-modeling technique is used, as it allows a graphical presentation of key components of the framework and their connections, using a standardized notation, the UML (Unified Modeling Language) class diagram.

3. RESULTS

Method components form the basis of the BPM method engineering framework presented in the study. The concept of a method component upgrades the method fragment in the sense of simpler construction of individual fragments since the components are defined at a higher level of abstraction and a more intuitive assembly of compositions into an overall unit (method) using interfaces (Karlsson & Wistrand, 2006). A method component thus represents an independent part of the method, which defines the procedure (set of activities) for transforming one or more products (inputs) into some final product (output) while simultaneously justifying the meaning of such transformation (Wistrand & Karlsson, 2004). A method component is generally described using two conceptual views: internal and external (Wistrand & Karlsson, 2004). The former presents the internal structure of the method component, which is based on a set of building blocks such as activities, products, roles, etc. At the same time, the latter provides an overview of how individual method components are connected via interfaces into an overall unit – the methodology. This study upgrades the basic concept of the method component in several directions for the needs of building BPM methods: by including additional elements of the method component within the internal view, by expanding the external view by establishing relationships between the method components and the process part of the method (phases, iterations, and milestones), and by defining mechanisms for tailoring method components to the characteristics of individual organizations and development projects.

The external view describes the connections between the organization and its projects in the field of BPM using the concepts of the general and tailored BPM method and the general and tailored method components (Figure 1). BPM method is any BPM method of the organization, general or tailored. The meta-model implies that an organization defines a single general BPM method, using its tailored versions on individual projects.

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The general BPM method (Harmon, 2019; Jeston & Nelis, 2022) provides a holistic approach to business process management and represents the basis for deriving methods tailored to projects. It consists of a set of interconnected general method components (Wistrand & Karlsson, 2004) and covers all the most frequently occurring activities of an organization in BPM, meaning that it contains a spectrum of activities, products, roles, and tools that is as complete as possible. On the other hand, tailored BPM method is tailored to the characteristics of an individual BPM project. It depends on the general BPM method of the organization and the context of the project in which it will be applied.

Method components in the framework exist in both general and tailored forms. In the context of a specific domain within BPM, an organization establishes a singular comprehensive method component. This component can then be instantiated in various customized versions for specific projects. The general method component functions autonomously within a broader method, overseeing a well-defined sub-process as a component of a comprehensive methodological strategy (Wistrand & Karlsson, 2004). Conversely, a tailored method component operates independently within a tailored approach, targeting a distinct concluded sub-process integrated within a specific BPM project. These customized method components are intricately linked to the phases of the BPM project.

BPM project consists of organizational efforts to improve business process planning, management, or implementation (Harmon, 2019). The project is implemented within the framework of an organization, encompassing multiple distinct phases. Several tailored method components can be used in each phase. In some cases, a single tailored method component can cover several phases (depending on each phase's complexity level). The primary purpose of the phases is to decompose a BPM project into manageable and connected time frames with well-defined milestones (Jeston & Nelis, 2022).

A method component combines the BPM method's product and process aspects, so its elements describe all essential methodological concepts (Wistrand & Karlsson, 2004). Figure 2 shows the elements forming an individual method component, whereas Figure 3 shows the internal view meta-model of method components, which defines their interdependencies.

The activity corresponds to a procedure or task performed within a method component (alignment with strategy, business process modeling, ac-

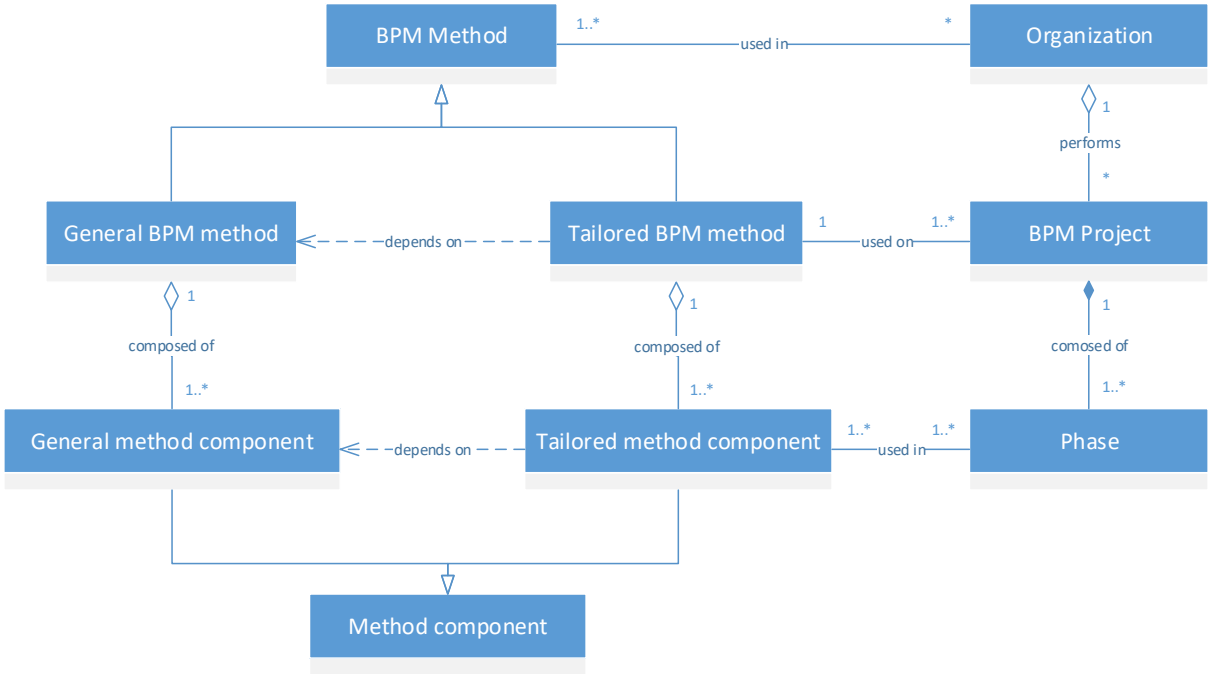

Figure 1. External view meta-model

tivity analysis, establishing a performance measurement system, etc.). Larger activities can be specialized in more detailed activities, which facilitates the management of the project's complexity and its results (products) in accordance with the divide-and-conquer paradigm. Activities at the same levels are combined into a holistic sub-process at a certain level of abstraction, and the connections are established through input and output products (Wistrand & Karlsson, 2004).

Any output generated during an activity within an individual method component (including specifications, models, etc.) or any data introduced into a method component as input is encompassed within the concept of a product (Henderson-Sellers & Gonzalez-Perez, 2010). Products are thus divided into input, internal, and output products (Wistrand & Karlsson, 2004). Input products provide required or auxiliary data or inputs to the initial activities of a method component; internal products represent intermediate solutions and are essential only within an individual method component; and external products represent the final result of a method component, i.e., the basic objective, for which a method component was defined.

The implementation of activities depends on the presence of all essential roles, each utilizing a range of tools, techniques, and skills in the development of products (Cockburn, 2002). Some techniques address a single role (requirement capture, business process modeling, activity analysis, etc.), while others require the involvement of a wider group of people (project retrospective, planning session, etc.). The main tasks of tools are to facilitate the work of project team members to improve product quality and to increase productivity. Effective utilization of tools and techniques is contingent upon the skills of team members, which stem from their inherent talents, educational background, and accumulated experience.

Method components are interconnected in a method with interfaces (Figure 4), which are defined as the general objective of a method together with its input (conditions) and output products (results) (Wistrand & Karlsson, 2004). Each method component always has at least one interface but can have more if the input conditions differ or if there is a possibility of different results. Input products can be required or optional; each method component must have at least one output product.

Figure 5 shows the meta-model for tailoring general method components to individual projects in BPM. A tailored method is created for each BPM project, based on the organization's general BPM method and depending on the specific context in which the project is implemented. The context of a project is defined by a set of context factors specific to an individual project (Bekkers et al., 2008). Evaluation of individual factors represents the input for preparing a holistic assessment of the expected project situation.

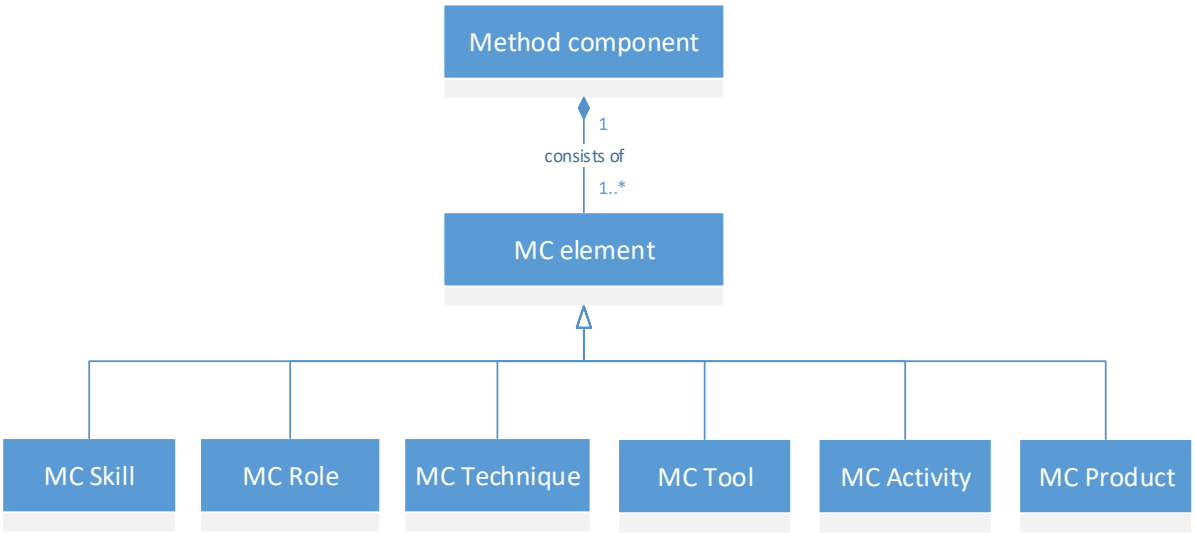

Figure 2. A set of method component elements

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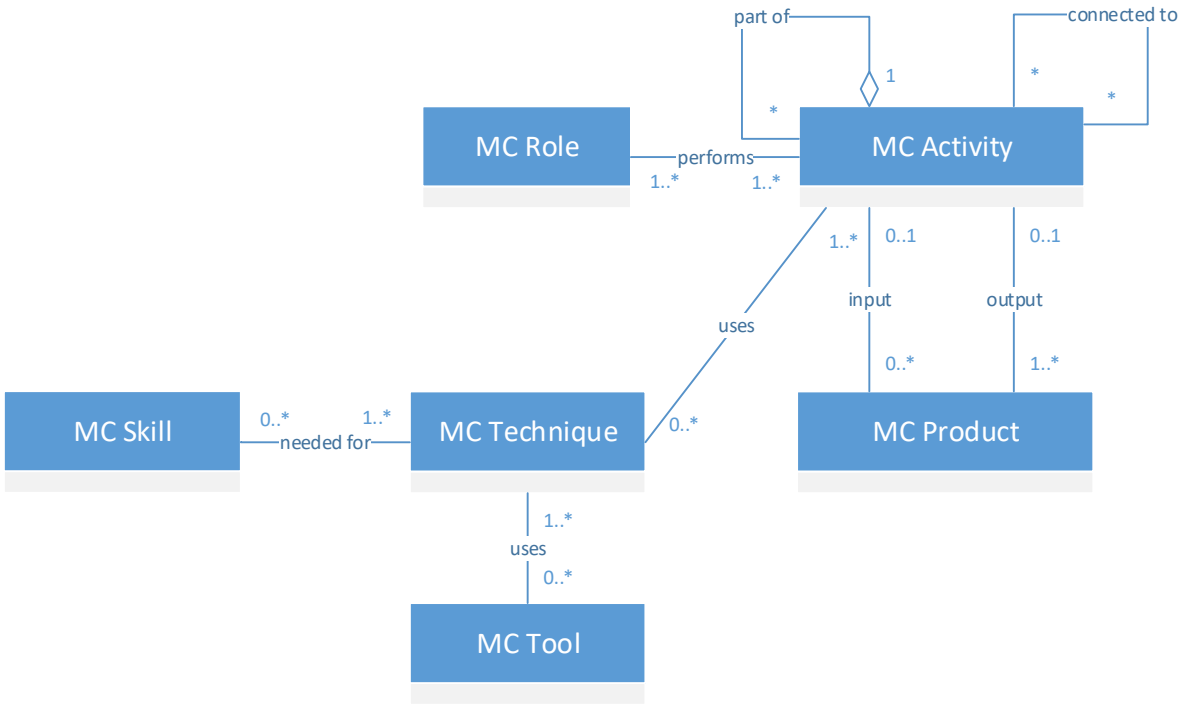

Figure 3. Internal view meta-model of method components

A tailored method consists of interconnected tailored method components based on the general method components and the chosen configuration (Karlsson & Ågerfalk, 2011). Tailored method components contain tailored method elements that depend on the general method component elements and configuration details. A configuration always refers to a particular context, which usually includes several configurations of general method components included in a BPM method (Karlsson & Ågerfalk, 2011). An individual configuration includes details that interconnect elements of general method components with context factors.

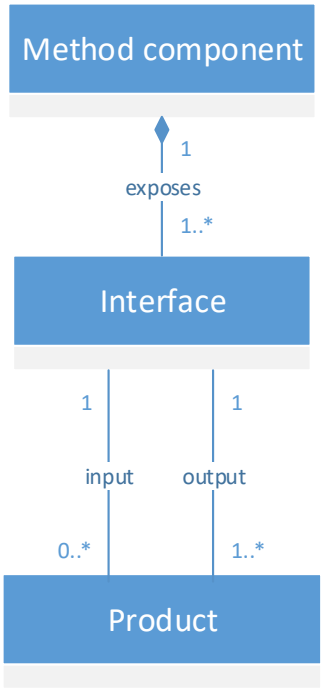

Figure 4. Meta-model of method component interface

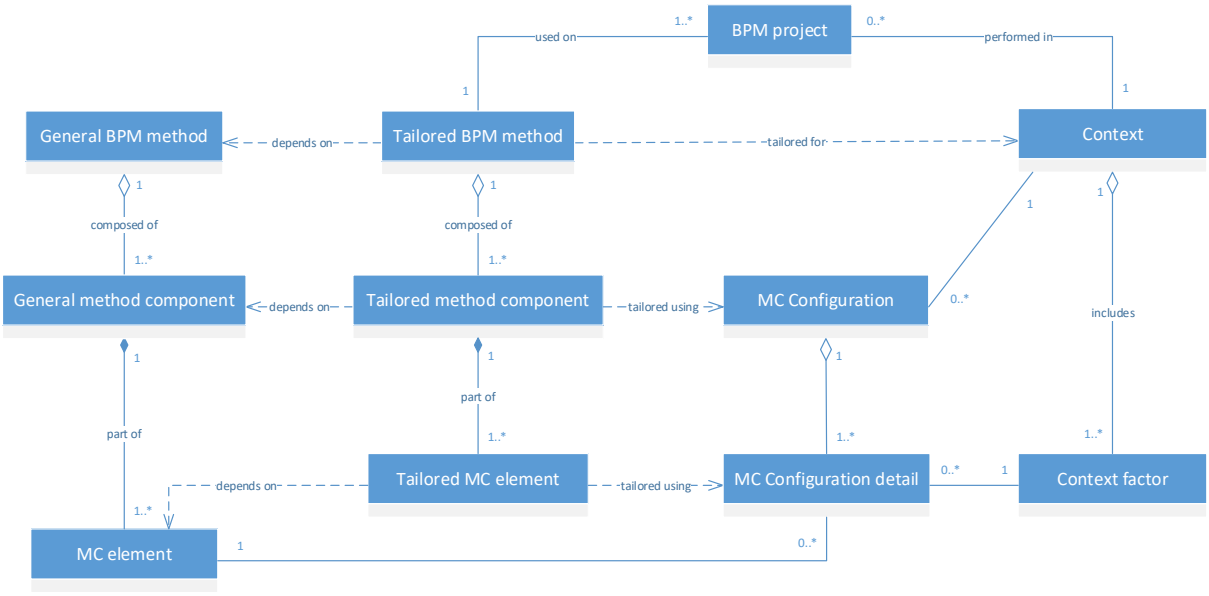

Figure 5. Meta-model of tailoring method components

The proposed method engineering framework outlines three processes for developing holistic and tailored BPM methods. Constructing a general method component constructs a new component that covers a chosen BPM field (Figure 6). The process starts with defining the purpose and objectives of a general method component and identifying its key inputs and outputs (general interface) (Ralyté et al., 2003; Wistrand & Karlsson, 2004). This is followed by reviewing existing publicly available BPM methods and identifying their parts (phases, activities, products, etc.) that best meet the set objectives. If there are any uncertainties, inconsistencies, or ambiguities in source methods, they must be resolved before the start of construction of a general method component (Ralyté & Rolland, 2001a). The main objective of identifying a method component is to define a new general method component as a subset of the elements of a single method or assembly of elements of different source methods (Ralyté et al., 2003). The activity of defining a method component provides for the verification of the method component elements and their mutual relationships, the final definition of the interface, the characterization of the method component, and its description following the defined internal view meta-models of the method component and the interface. The construction process ends with an evaluation of the work done (McBride & Henderson-Sellers, 2011).

The initial set of general method components is primarily created based on established good practices, acquired experience of BPM experts in the organization or external consultants and documented methods used on past projects of the organization. The method component database is then supplemented through constructing the organization's general BPM method and methods tailored to projects (Brinkkemper, 1996). Considering the wide field covered by the BPM discipline, it cannot be expected that the initial set of general method components could cover all aspects of the issues under consideration (Zelt et al., 2019).

The general method construction process establishes and maintains an organization's general BPM method that contains activities and products for the most frequently recurring projects (Aerfalk & Fitzgerald, 2006). Each project that deviates from the organization's established BPM practices requires the addition of existing or the development of completely new segments of the general method, which, according to the previously presented meta-models, results in a supplemented set of general method components. These must include a consistent set of interfaces, ensuring that their assembly into a holistic method takes place efficiently and without complications (Wistrand & Karlsson, 2004).

Figure 7 shows the construction process of an organization's general BPM method. The first ac-

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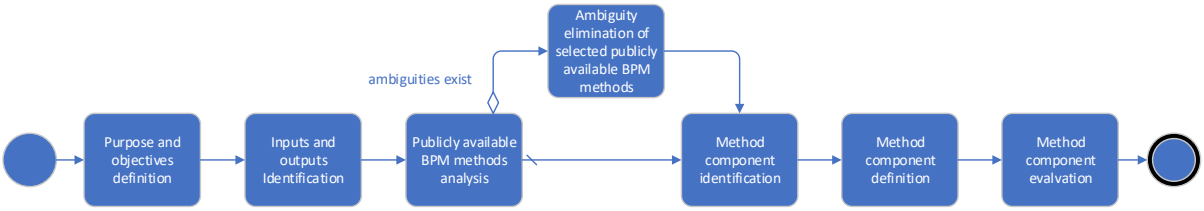

Figure 6. Construction of a general method component

tivity, the preparation of an organization's BPM strategy, analyses the existing position of an organization from the perspective of BPM, determines strategic objectives for the future, and defines tactics to achieve the objectives (Jeston & Nelis, 2022). The scope of a general BPM method is determined based on the current situation and adopted strategic objectives, which requires selecting key general method components that will represent the backbone of a newly constructed general BPM method (Henderson-Sellers & Ralyté, 2010). If the existing general method components do not meet the set objectives, either new general components are created, or existing ones are transformed (in the domain of the process of construction of a general method component) (Karlsson & Ågerfalk, 2011; Karlsson & Wistrand, 2006). The process of constructing a general BPM method continues with the activity of assembling the components of a method (Ralyté et al., 2003), in which relationships between general method components are established based on defined interfaces, which ultimately leads to a unified general BPM method at the level of an organization. The last activity evaluates the newly created general method (McBride & Henderson-Sellers, 2011).

The process of tailoring a general method (Figure 8) constructs a new BPM method tailored to the context of the concrete project. The project categorization activity defines the most essential features of a project, such as business criticality, complexity, variability of requirements, organizational level, time frame, etc. (Bekkers et al., 2008). Based on identified project characteristics, the scope of a method is first determined, which must cover all activities and results planned in a project. This is followed by a selection of required general method components, where it is possible to determine that all or only some basic components (due to the limited scope of a project) must be included in the tailored method (Henderson-Sellers & Ralyté, 2010). The key activity of the process is tailoring selected general method components to the project characteristics.

Suppose it is possible to include the project in one of the situations that were already addressed in the past. In that case, tailoring can use existing configurations, which carry out tailoring of selected general method components in accordance with the defined details (Karlsson & Ågerfalk, 2004). However, suppose it is a new situation that has not been faced before. In that case, a suitable configuration is first created for each selected general method component, defining all required activities, products, and other elements (Karlsson & Ågerfalk, 2004). Then, all these new configurations are applied in the same way as in the first example, resulting in new project-specific tailored method components. The process of constructing a tailored BPM method continues with the activity of assembling tailored method components (Ralyté et al., 2003). It concludes with the evaluation of a newly created method (McBride & Henderson-Sellers, 2011).

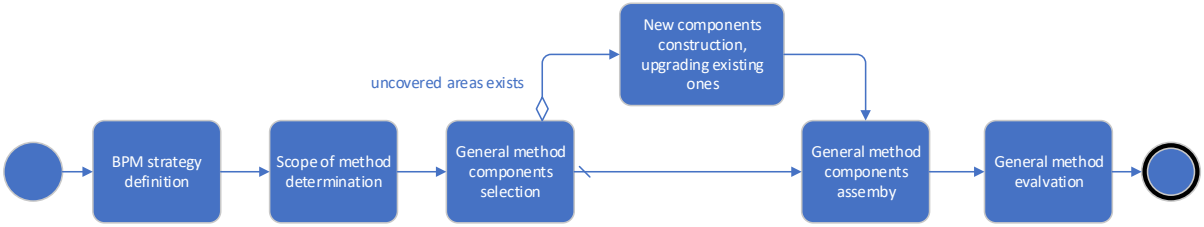

Figure 7. Construction of a general BPM method

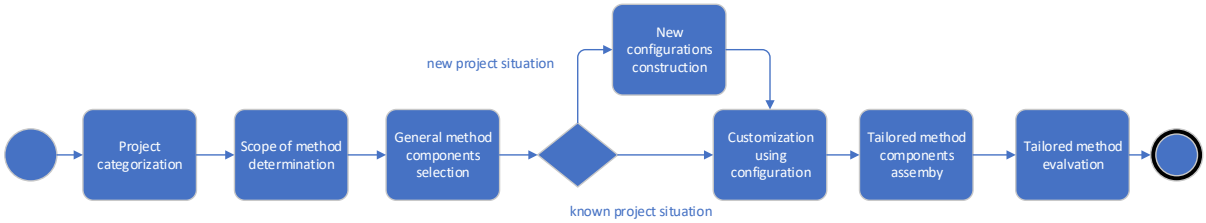

Figure 8. Construction of tailored BPM method

A tailored BPM method is finally situated in the planned time frames of the project in which it will be used, considering the constraints of available resources (financial, human, informational, etc.). Every project is time-limited, divided into phases and milestones, with progress dependent on the appropriate realization of defined objectives and results (Krutchen, 2001). The external view meta-model shows the dependency between project phases and tailored method components (Figure 1). However, it can generally be characterized as a many-to-many relationship (at least one or more tailored method components are used in one phase, or the same method component can be used in several project phases). It all depends on the project's scope, the division into a larger or smaller number of phases, and the complexity of tailored method components used.

The BPM method engineering framework presented in the study was used to construct a general and tailored BPM method in a large manufacturing company. Before the start of the project, a company assessment was conducted according to the CMM model (Capability Maturity Model) (Harmon, 2019), the result of which was placement on the second level (in the company, requirements are generally managed, processes are planned and controlled, but the processes are not defined in detail by standards, procedures, methods, and tools). The classic (functional) company lacks defined mechanisms for effective control, management, and improvement of its business processes. The project has two objectives: to establish a common method for managing the company's business processes and redesigning the production process.

The objective of establishing a common BPM method at the company's level was to provide a solid foundation on which the company would build its efforts for improving BPM in the future (situation analysis, prioritization, project management, etc.). The management decided that the company must move from the second to at least the third level of the CMM model in the foreseeable future, as it recognized the importance of proper business process management in the organization, as well as in connection with its partners within the supply chains. The implementation of the transition to the third level, which dictates the definition of all critical processes within the company, is usually a long-term process that requires a lot of time, resources, and effort from the company. However, because the company at that time was addressing a very concrete problem within the production department, specifically poor control over machine operation, the second objective of the project was to redesign the production process and prepare specifications for the introduction of a production management information system – MES (Manufacturing Execution System).

The first task, after learning about the key objectives and constraints of the project, was to build a general company-level BPM method. The 7FE BPM method, freely available and described in detail in professional literature (Jeston & Nelis, 2022), was used to determine the general method components. The 7FE BPM method proved to be the best in terms of structure in a previously conducted comparative analysis of general BPM methods (Lahajnar & Rožanec, 2016), meaning that it is procedurally holistic, has a high quality description, many available examples of use, and includes an extensive set of BPM techniques. The method also covers most of the substantive sections of the BPM discipline relatively well. It ensures a quick establishment of the initial set of general method components: company strategy, process architecture, initiation, understanding, innovation, development, implementation, and sustainable execution. All general method components have been precisely defined with all key elements required by its internal model (activities, products, roles,

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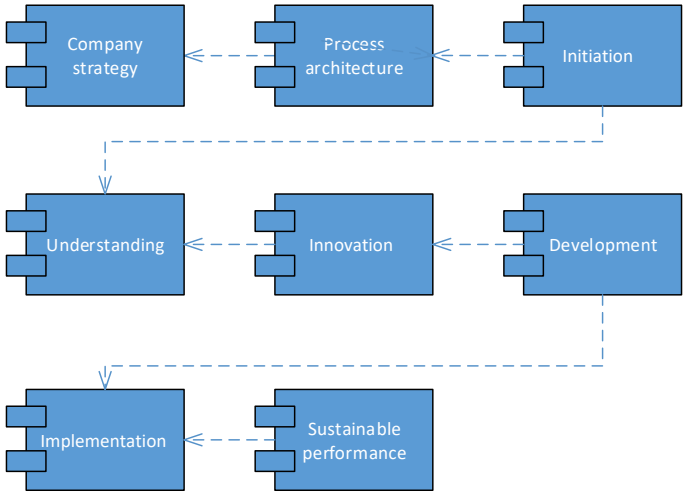

Figure 9. A general BPM method as a set of interdependent general method components

techniques, tools, and skills). After the evaluation, the dependencies between general method components were established, resulting in creating a general company-level BPM method, shown as a UML component diagram in Figure 9.

The definition of the general BPM method was followed by constructing a method tailored to the production process redesign project. The project had precisely set objectives (analysis and redesign of the production process in two departments and preparation of fundamental specifications for the MES software solution), a short implementation deadline, and constraints regarding available financial and human resources. Based on the risk analysis, a decision was made to construct a relatively light methodology with limited activities and products, which will quickly lead the project team to the set objectives. Out of all defined general method components, only a limited set was defined, which still satisfactorily covered the scope of the project and its objectives considering the given constraints. The tailored method included the following general components: initiation (determining the place to start the project, reaching agreement on the objectives and vision of the selected projects), understanding (analyzing the organization's existing processes), innovation (identifying new process options, process redesign or improvement) and development (creating all components – establishment of infrastructure for process implementation).

The mutual dependencies of the tailored method components included in the project are shown in the UML component diagram in Figure 10. The diagram shows that the whole process starts with the activities of the initiation method component. Its results represent the inputs to the understanding method component, which the innovation method component then depends upon. The procedure concludes with the activities of the development method component, the result of which is the redesign plan for the production business process and specification (functional and technical) of the MES system.

The selected general method components were further subjected to a detailed analysis, thereby removing all the activities whose implementation did not decisively contribute to the project's final success. For each tailored method component, a process diagram was created using BPMN (Business Process Modeling and Notation), which specified in detail the order of execution of the activities included in the component, as well as all

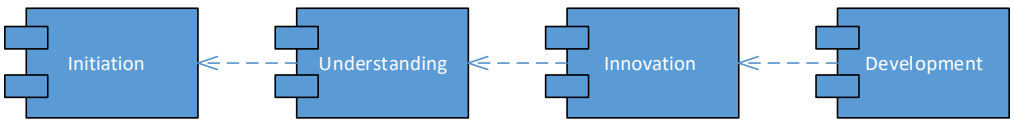

Figure 10. A tailored BPM method as a set of interdependent tailored method components

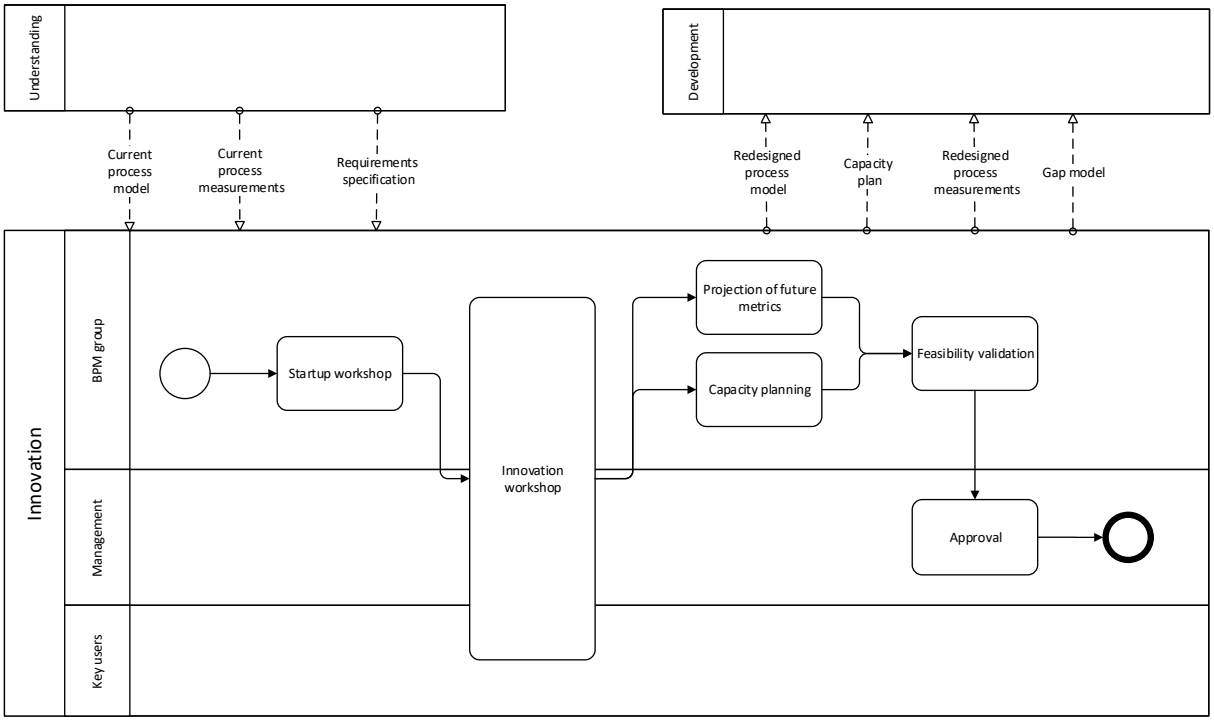

Figure 11. A process of the innovation tailored method component

other key building blocks and their interconnections (e.g., for the innovation method component shown in Figure 11).

The final result of the process is a BPM method tailored to a concrete project. It included all the necessary elements for successful application: the sequence of activities that will be carried out within the project, the roles that will carry out the activities, the products that will enter the work process or be part its result, the techniques and tools that project team members will use, and, last but not least, the skills necessary for the successful implementation of the activity. In the end, the tailored BPM method was placed within the set time frames of the project and provided with available resources, which led to the creation of a detailed project plan with narrower and wider milestones.

4. DISCUSSION

The BPM method engineering framework provides the theoretical basis and practical procedures for constructing general BPM methods at the organizational level, as well as methods adapted to individual projects. When compared to established general approaches in BPM, like Six Sigma (Pyzdek & Keller, 2018), BPTrends Associates Methodology (Harmon, 2019), and 7FE BPM (Jeston & Nelis, 2022), the framework itself lacks the inclusion of procedures, recommendations, techniques, good practices, or other topics related to BPM content. Primarily, it serves as a tool that enables BPM experts to capture existing knowledge and transform it into compelling and consistent work methods suited to specific circumstances. The main weakness of general BPM approaches is the lack of customization options, as they mainly focus on generalized descriptions of individual steps and techniques used while overlooking the customization issue. For example, the 7FE BPM method only briefly mentions that certain steps can be omitted if necessary (Jeston & Nelis, 2022), and the BPTrends Associates Methodology includes two separate approaches, considering only two different project types (Harmon, 2019).

The context-specific concept of configuration stands out as a key element within the BPM method engineering framework, facilitating customization. The framework does not deal with the content (contextual factors), as this aspect has already been adequately discussed in existing literature (Bekkers et al., 2008; Bucher & Winter, 2009; vom Brocke et al., 2016). However, such research

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primarily provides general recommendations on utilizing the identified context without providing specific tools and a defined process. The BPM method engineering framework addresses this limitation by precisely outlining the customization process and defining the database structure containing context factors and configurations within the tailored method components.

The framework can also be compared with several other approaches that introduce the concepts of situational method engineering to the BPM field. In comparison to the methodological framework, which serves as a catalog of use cases for process improvement (Vanwersch et al., 2016) and primarily focuses on generating ideas for undertaking renovations, the BPM method engineering framework is primarily concerned with effectively connecting the chosen ideas into a practical BPM method. The same challenge is also addressed by the framework for quantifiable process improvement (Ogbuachi et al., 2021), which outlines the method fragment using a concept called Reduced Fragment Descriptor (RFD). The method's composition relies on linking input and output elements from various RFDs (similar to the previously described concept of method component interface). However, the content of the RFDs is provided only descriptively, resulting in various possible interpretations of the procedures themselves and potential inconsistencies. To circumvent this, the BPM method engineering framework includes a meta-model of the method component, defining all essential elements and their interrelationships.

Parallels can also be drawn with the CAMAS method for evaluating, classifying, and selecting BPM methods based on identified factors within three defined dimensions (vom Brocke et al., 2021). The CAMAS method enables the creation of a repository of BPM methods, subsequently chosen and applied in different BPM projects based on the identified situations. The primary distinction between the two approaches lies in the fact that the CAMAS method does not anticipate constructing new or adapting existing BPM methods along with their components – this is the central task of the framework described in the paper.

Compared to other approaches, this BPM method engineering framework addresses the issue more comprehensively. In terms of implementation details, it draws upon numerous best practices, knowledge, and studies within the field of BPM. The observed limitations of the framework during its practical application primarily pertain to the absence of adequate software support; instead, all data (definitions of individual method components, interfaces, tailored method, etc.) were managed using templates in a normal spreadsheet (Excel). The creation of the process model of the tailored method was also done manually using a graphic tool (Visio), which certainly did not contribute to the greater efficiency of the project team. The solution lies in developing a web application that will provide information technology support for all processes and databases defined by the framework. This development is projected to take place soon.

CONCLUSION

The purpose of this study was to define the general framework for BPM methods construction. This type of framework enables organizations to develop their own methodological approach for managing business processes, tailored to their specific characteristics, the environment in which they operate, and the aspects of individual projects. A case study of the framework usage has shown that it can be successfully used both for the construction of a general BPM method at the level of the organization and for its tailoring to the specific project circumstances.

With the first successful project, new ground in the field of BPM method engineering has been broken. In the future, it will be necessary to check the framework's applicability on more diverse projects (simple and complex) in organizations of different sizes and at different maturity levels. However, this will only be possible with adequate information technology support, which will guide analysts through all activities of the method engineering process and provide them with an adequate repository of pre-prepared general method components. This study has so far mainly focused on the technological aspect of

the framework, its processes, and databases. In the future, more emphasis will be placed on the semantics itself, i.e., constructing an extensive repository of general method components for all areas of the complex BPM field.

AUTHOR CONTRIBUTIONS

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Formal analysis: Sebastian Lahajnar, Alenka Rožanec.
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Software: Sebastian Lahajnar.
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Visualization: Sebastian Lahajnar, Alenka Rožanec.
Writing – original draft: Sebastian Lahajnar, Alenka Rožanec.
Writing – review & editing: Sebastian Lahajnar, Alenka Rožanec.

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