

Situational Method Engineering in Practice: A Case Study in a Small Enterprise

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Abstract. In this paper we report on our experience in the application of the assembly-based situational method engineering approach in practice. In particular, we demonstrate the construction of a situation-specific method for a small size company operating in the domain of e-commerce. The aim of this work was to help the company to specify its business model and activities in order to gain in common understanding and to provide means for further business evolution and innovation.

1 Introduction to the Case Study

Today's enterprises are becoming more and more dependent on their business networks, the variability of products/services they offer, the adaptability to their customers needs, the ways of realizing their business activities and the information systems supporting them. According to Johannesson [3], essential instruments to deal with the increasing complexity of business and information systems environments are models that allow to represent different aspects of an organization including its collaborations and value exchange, data, processes and future goals. However, formalized and structured business and information systems documentation is typically missing in small and medium size enterprises due to the lack of appropriate resources, time and knowledge to produce models and other structured documentation. In this paper, we report on the elaboration and application of a situation-specific method created for a very small company established in France and operating in the domain of e-commerce. The aim of this work was to provide the company with a methodological support allowing the specification of its business situation and activities and the exploration of their potential evolution and related innovations. This objective emerged during a brainstorming session with the company's employees (who are also its co-creators, managers and coworkers) about their daily activities and potential evolution of their business. This session clearly demonstrated that the understanding and opinions of different persons concerning this subject are divergent; one of the reasons being the lack of documentation related to the company's business activities and supporting applications. In the next section we illustrate the application of the assembly-based method engineering approach in order to construct an enterprise-specific method fitting its particular requirements and situation. Section 3 provides a few examples of models obtained during the method

application, while in section 4 we discuss advantages and difficulties identified during this case study.

2 Situation-Specific Method Design

The discipline of Situational Method Engineering (SME) [2] promotes situation-specific method construction *on the fly* by reusing existing method components. The aim of such method construction is to fit the situation and method requirements of a particular organization or a project. In our study, we followed the assembly-based SME approach [4][6], which uses the notion of *method chunk* as the main building bloc. A method chunk is defined as an autonomous and coherent part of a method, which combines method product and process perspectives in the same component (as opposed to a method fragment which separates them into product fragments and process fragments [2]). The assembly-based SME process consists of three main steps: method requirements specification, method chunks selection and assembly of selected method chunks (see Fig. 1).

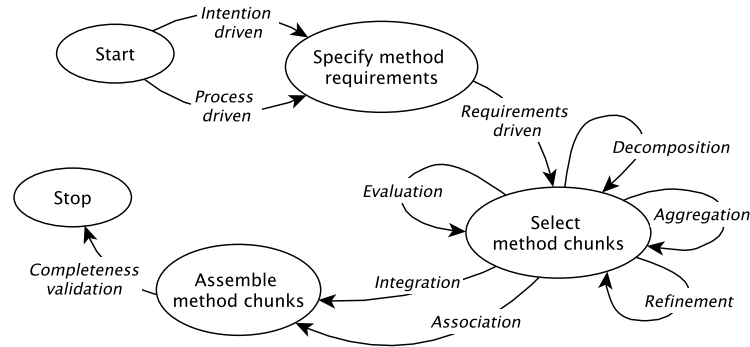


Fig. 1. Process model for assembly-based situational method engineering (from [6]).

2.1 Method Requirements Specification

As shown in Fig. 1, there are two strategies for specifying situation-specific method requirements: *intention-driven* and *process-driven*. The intention-driven strategy is especially suitable for an existing method adaptation by adding new intentions and/or strategies, while the process-driven strategy is relevant in the case of a brand new method construction. The aim of our study was to construct a project-specific method dedicated to specify the company’s business situation with a set of models and to identify potential business innovations. Construction of a new method was necessary because the company did not use any particular method and we could not identify any existing method fully satisfying the situation of our project. This strategy requires: first (1) the assessment of the enterprise/project situation, then (2) the identification of a set of engineering

intentions that are required to be fulfilled by the new method, and finally (3) the identification of potential strategies to achieve the intentions and ordering of these intention and strategies by using the Map formalism [7]. The result of this step is a generic process model, named *requirements map*, represented as a graph where nodes are process intentions and arcs represent different strategies to achieve them. In our case, we have evaluated the situation of the company with a set of criteria, some of them are shown in Table 1.

Table 1. Characterization of the enterprise situation

Criteria	Evaluation
Size of the company	Very small enterprise (7 employees) with an aim to grow.
Maturity	Founded in 2010 with one specialized e-commerce web store. In 2011 the company grows to 9 web stores. The objective for 2012 – 20 web stores.
Market	Niche market based on the "market to demand" model.
Need for innovation and evolution	High: the company has to permanently look for new niche products to increase their offer – to create new web stores.
Need for strategic watch	High: the company has to watch technology and business innovations to stay competitive in the market.
Management of growth	By project: The creation of each new web store is managed as a project.
Impact of a new project	High
IS/business documentation	No formal or semi-formal documentation available concerning business activities, information system and applications.
Skills in modeling	High interest and enthusiasm but no experience in modeling and describing business activities.

The characterization in Table 1 demonstrates that, in order to stay competitive in the market, this company has to constantly increase its offerings and to innovate its business strategy. However, it does not have any well-structured documentation concerning its business model, activities and data. In a few years, this company will not be a start-up anymore and having an appropriate documentation will therefore be key for the evolution of the enterprise. Therefore, we have identified two main objectives that should be satisfied by the new method: (1) to document the enterprise business situation and (2) to discover potential business evolution options based on the analysis of the produced models. In particular, it was decided to use three modeling perspectives: business, business process and information (data) in both method phases with potentially different strategies to manipulate these models. During the first phase of the method application, these models should serve to specify the As-Is situation, while in the second phase they should allow to discover and evaluated the potential To-Be sit-

uations. The requirements map for the new method construction is illustrated in Fig. 2. It says that the method will be based on two main intentions (*Document enterprise business situation* and *Discover business evolutions*) and identifies the types of approaches/techniques that should be used to achieve these intentions in terms of generic strategies (e.g. business modeling techniques, process modeling techniques, etc.). In the next step, we use this requirements map to select appropriate method chunks, i.e. modeling and exploration techniques.

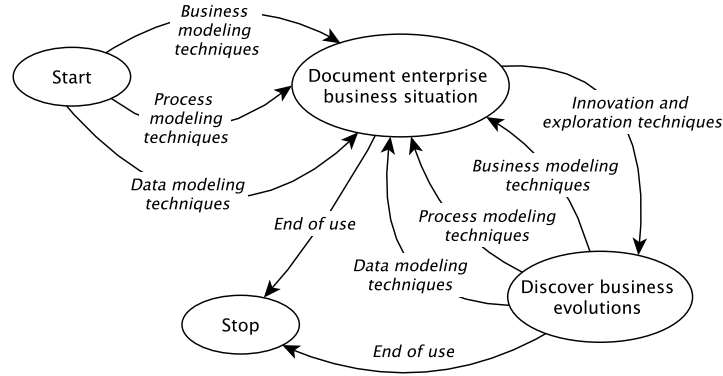


Fig. 2. Requirements map for the new method construction.

2.2 Method Chunks Selection

Once the method requirements have been specified, the selection of the method chunks matching these requirements can start. The *Requirements-driven strategy* (see Fig. 1) helps to formulate method chunks selection queries by giving values to the attributes used to specify method chunks descriptors and interfaces (e.g. type of engineering activity, situation or source information/product, intention to achieve, etc). For example,

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Select method chunks where
Engineering activity = "Design" AND Technique = "Process modeling"
AND Situation = ("Business activity expertise"
OR "Business activity description")
AND Intention = (Verb = "Construct" AND Target = "Process model").
  
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The detailed method chunk metamodel can be found in [4]. At least one method chunk has to be selected for each requirements map section (i.e. <source intention, target intention, strategy>). *Evaluation*, *Decomposition*, *Aggregation* and *Refinement* strategies (see Fig. 1) can be used to refine the candidate chunk selection by refining the selection query and analyzing more in depth if the chunk matches the requirements. In our case, we did not have a fully operational repository and the selection of method chunks was mainly based on the literature review and the author's (plying the method engineer role in the project)

personal method knowledge. For example, for business model construction and innovation, we have selected two method chunks: e3value [1] and Business Model Canvas (BMC) [5]. These two business modeling techniques allow capturing complementary business model perspectives. While e3value focuses on the collaborations with business partners and value exchanges, BMC puts forward the business value propositions and describes how an organization creates, delivers and captures value. Business model patterns (BM patterns) proposed in [5] facilitate business model evolution and can be used together with BMC for discovering how an enterprise business model could evolve – modeling possible To-Be situations. Furthermore, in [5] the authors propose a set of design approaches such as Customer insights, Ideation, Visual thinking, Storytelling, etc. that are considered as creativity and innovation techniques and can be combined with business model canvas for creating new business models. In particular, we have selected and tested the techniques named *Empathy map*, *What-if questions*, *Scenarios* and *Brainstorming*. The *Empathy map* technique helps to identify different categories of enterprise customers, to better understand their environment, behavior, concerns and aspirations, and to design better value propositions and more appropriate customer relationships. The *What-if questions* help team members to break free of constraints imposed by current models, while *Scenarios* allow the imagining of new ways of realizing business activities. We recommend completing the application of these techniques with concluding *Brainstorming* sessions. Table 2 lists the method chunks selected for each requirements map strategy.

Table 2. Selection of method chunks according to the method requirements

Method Re- quirements	Selected Method Chunks
Business modeling techniques	e3value [1], Business model canvas (BMC) [5].
Process modeling techniques	BPMN was selected for modeling enterprise activities in terms of process models. In particular, we recommended using guidelines provided in [8].
Data modeling techniques	Any type of class/entity diagram fits very well for producing conceptual domain models. We have used simplified class diagrams based on two types of relationships: existential dependency and specialization.
Model consistency check	We did not find any method chunk allowing to check consistency between the three types of models (business, process and data). We have defined a set of consistency validation rules to satisfy this method requirement.
Innovation and exploration techniques	Business modeling patterns (BM patterns) [5]. Techniques extracted from [5]: Empathy map, What-if questions, Scenarios, Brainstorming.
End of use	The application of the method stops when the enterprise decides to stop the use of the documentation obtained by applying this method.

2.3 Method Chunks Assembly

As shown Fig. 1, the assembly-based SME approach identifies two strategies, named *association* and *integration*, to assemble selected method chunks into a new method. The integration strategy has to be applied if selected method chunks have similar engineering goals, their process and/or product models overlap (i.e. contain same or similar elements) and they are used to produce the same deliverable (e.g. the same model). Otherwise, the association strategy is used to position the method chunks in the new method and provide guidelines for their execution. In our case, the method chunks representing two business modeling techniques – e3value and BMC – have the same engineering goal – to construct a business model, but they produce different and complementary business models. Therefore, the association strategy is sufficient to indicate that these two method chunks can be applied in parallel without any particular ordering. In contrast, BMC and BM patterns are overlapping method chunks because they use the same canvas model. However, the integration of these two method chunks already exists because they are extracted from the same approach [5]. Besides, in our method these two method chunks are used for different purposes: BMC for business model description and BM patterns for business model innovation. Other selected method chunks deal with complementary engineering goals and simple association is sufficient to combine them into the desired method. Fig. 3 illustrates the process model of the assembled method.

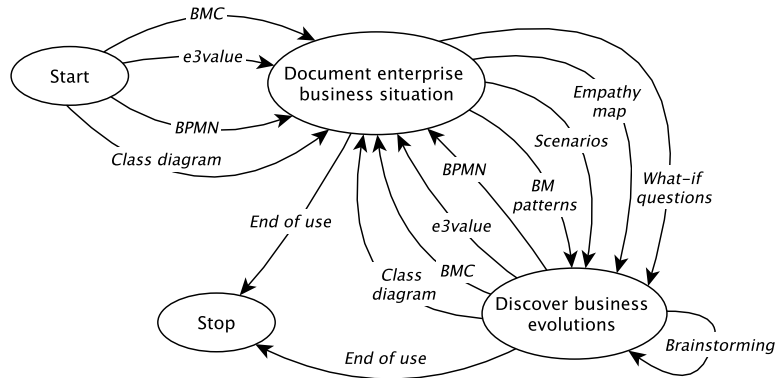


Fig. 3. Process model of the constructed method.

3 Examples of Method Application

Several collaboration and modeling sessions have been organized together with the employees of the company in order to specify the initial business documentation. In particular, we have developed e3value and BMC models to represent the company’s business model. Enterprise activities were formalized with business process models by using BPMN and the data models with class diagrams. This

project permitted the production of semi-formal documentation of enterprise business and unified employees' awareness of their company business structure and activities. For illustration purpose a few models are shown in Fig. 4.

In order to test the second phase of our method we have experimented the Empathy map technique followed by a brainstorming session. Participants were divided in two groups and explored two different user profiles. Then, the brainstorming on these two profiles permitted the identification of new ways to improve customers loyalty and even to transform them into purchasing advisors.

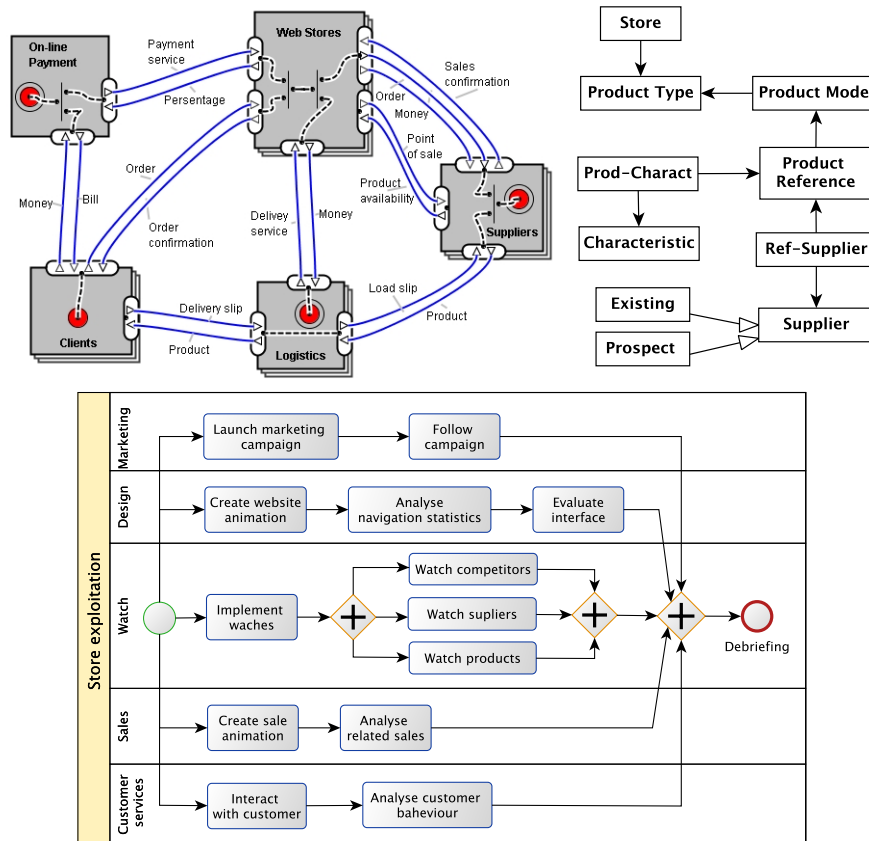


Fig. 4. Examples of models: business (e3value), data and business process.

4 Discussion and Conclusion

During this study, we have frequently observed that the employees of the company (who are also its co-creators and business partners) were not necessarily speaking the same language and therefore not always having the same understanding of things. Each of them was having his/her own interpretation of enterprise business model, activities and his/her own roles and responsibilities.

This work has assisted the company to clarify and unify their understanding and to produce a semi-formal documentation of its business structure, processes and domain concepts. In addition, this study has motivated the managers of the company to think about some improvements, innovations and changes to be implemented in a near future.

Various discussions and collaborative sessions with the company employees demonstrated that the method was well adapted to the project situation and requirements. Overall, they understood models that we have developed and techniques to produce them, and found them quite intuitive. They are determined to use them as a support for enterprise evolution management in the coming years.

This case study demonstrates that not only big companies need methods and modeling techniques to describe their business, activities, information systems and enterprise architecture in order to manage their complexity and evolution. Small and medium size enterprises can also benefit from model-based documentation to establish a common understanding and agreement on enterprise activities and to facilitate future development strategies. However, a small company can be easily lost in the jungle of modeling approaches and techniques proposed in the literature and different Internet sources. It needs help in selecting and combining appropriate method chunks, and it needs training in applying them in practice, at least at the beginning of the documentation process.

References

1. Gordijn, J., Akkermans, H.: E3-value: Design and Evaluation of e-Business Models. *IEEE Intelligent Systems* 16(4), 11-17 (2001)
2. Henderson-Sellers, B. and Ralyt, J.: Situational Method Engineering: State-of-the-Art Review. *Journal of Universal Computer Science*, Vol. 16(3), 424-478 (2010)
3. Johannesson, P.: The Role of Business Models in Enterprise Modelling. In: Krogsie, J., Opdahl, A.L., Brinkkemper, S. (eds), *Conceptual Modelling in Information Systems Engineering*, pp. 123-140, Springer (2007)
4. Mirbel, I. and Ralyté J.: Situational Method Engineering: Combining Assembly-Based and Roadmap-Driven Approaches. *Requirements Engineering* 11(1), 5878 (2006)
5. Osterwalders, A., Pigneur, Y.: *Business Model Generation: A Handbook for Visionaries, Game Changers and Challengers*. John Wiley & Sons, Inc. (2010)
6. Ralyté, J., Deneckère, R., Rolland, C.: Towards a Generic Model for Situational Method Engineering. In: *Proceedings of CAiSE 2003*, pp. 95-110, LNCS vol. 2681, Springer (2003)
7. Rolland, C., Prakash, N., Benjamen, A.: A Multi-Model View of Process Modelling. *Requirements Engineering*, 4(4), 169-187 (1999)
8. Silver, B.: *BMPN Method & Style*. Cody-Cassidy Press (2009)