

Where to Find the Creativity? A Case Study from the Public Sector using an Integrative Approach of an Enterprise Wiki and an Enterprise Modelling Environment

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Abstract: Reacting on an unstable environment in an agile manner is a creative driven act. The creative needs may be motivated by the amount of possible solutions, from which one solution might be selected, that fits the respective enterprise perfectly. However, enterprise model might be defined as an instrument that offers the development of solutions under the consideration of various aspects of the enterprise by a rather strategic or tactical located organisational unit. So it needs to be undertaken from a holistic perspective and hence, needs to omit various peculiarities faced by the operative business. Analogously, enterprise wikis are capable of collecting such peculiarities from the operative business, but as these inscriptions are often taken without any form, they might lose their focus with respect to the strategic direction of the enterprise. Therefore we introduce a bilateral approach that comes with the benefits of a holistic description by means of enterprise model and additional is able to capture valuable information from the operative business by means of the enterprise wiki. The approach will be evaluated with in an exploratory case study, which was undertaken with one of the biggest agencies of the public sector. Specifically such agency needs to repeatedly adapt towards new requirements, e.g. legal regulations. It will be shown how such requirement should be faced by a rather holistic enterprise model description and a self-adaptation through the collection and evaluation of experiences in an enterprise wiki.

1 Introduction

More intensive than in common enterprises, agencies of the public sector have to consider a variety of different legal regulations. Additionally, these legal regulations are so specific that sometimes only one agency is in charge of satisfying these legal regulations. Next to actions that mainly depend on accordingly and purposefully created software systems, actions that mainly depend on the human actor may vary in their level of interpretation and hence, require additional support and provision of information, respectively for the

consideration of legal regulations.

Additionally, the actual solution that satisfies the respective legal regulations may only become occurrent during the execution of such actions, respectively when the actual choice is required. This may be the case, if the respective modeller of such a solution is not capable of developing it accordingly and additionally, the actors from the operative business are not capable of modelling such solutions, so that the other co-workers are capable of understanding the solution.

Therefore, in this paper an integrative approach will be introduced that relies on both, the prior formalisation by means of enterprise model and the successively extension of the informative content by means of an enterprise wiki. Within this paper more particularly, a case study will be discussed that shows, how an integrative approach might support the enterprise in information gaining and the execution of its everyday business.

2 On the Integration of Enterprise Wikis and Enterprise Models

In the recent decades, enterprise wikis have gained a remarkable popularity [Lin13]. With their relatively easy-to-use functionalities, such as collaborative editing, enterprise wikis have established a vivid and proceeding manner for documenting. So with the use of natural language in enterprise wikis, it becomes possible to collaborate with a variety of different departments, teams or individuals from different levels of the enterprise [HDW10]. As shown in [FHS13], information provided by enterprise wikis is mainly unstructured as it is proposed by means of natural language and therefore is mainly suitable for highly human involved activities. These activities are, among others, the definition of terms and the documentation of guidelines and FAQs.

However, as structured information is required in order to enable the unambiguous interpretation, which is a prerequisite for the successful support with respect to information systems, enterprise wikis aren't sufficient for particular tasks such as e.g. modelling of executable processes. Thereby, an enterprise model is a depiction of a social system, respectively the enterprise, and its integration with the relevant and required software systems [Fra12]. Hence, enterprise modelling offers a well-structured depiction of a specific problem domain and provides an according structure for interpreting such a resulting model. However, enterprise modelling is not suitable for the participation by the operative business for specific reasons. *First*, the operative business usually doesn't offer the capabilities required by enterprise modelling. Although the operative business is considered with the execution of concrete actions, capturing these actions by means of concepts of a higher level of abstraction is rather more complicated. The other way round, enterprise modelling languages usually don't offer the possibility for depicting gained experiences of the operative business. *Second*, the consistent use of enterprise models requires maintenance effort. After a change of the enterprise that wasn't driven by an enterprise model, there is the need for adapting the enterprise model accordingly, in order to ensure the correctness of the enterprise model. *Third*, enterprise modelling languages restrict the possible frame of action due to their specific syntax. Therefore they can inhibit the development

of creative solution, as only solutions are possible that conform to the language's syntax. Moreover, information that may be important to the enterprise, can't be specified with respect to language, if the language doesn't account for such information. [BFT13]

As initially motivated both the use of an enterprise wiki as well as enterprise modelling, do come with certain benefits and outstands the other. However, in order to gain advantages from both, an integrative approach has been developed that enables synchronised perspectives based on the enterprise wiki and the respective enterprise models. Accordingly the structure that is proposed by an enterprise model is followed by the enterprise wiki. Thereby, the enterprise wiki enables the addition of information to concepts from the enterprise model by means of natural language.

Different to former approaches, e.g. [GKL⁺09], we propose an integration that orientates towards patterns of enterprise modelling. Within the domain of business process modelling, the respective patterns were introduced in [Aal03]. As the integration is done by means of patterns, the enterprise wiki content is more coherently collected with respect to the form of the enterprise model. For example, it makes sense to subsume several activities, which are executed in a sequential order by one specific actor, in one wiki page and provide this page as a set of instructions. The conception of the proposed integrative approach is provided by means of Figure 1 [BFT13].

3 Benefits from the Integration of Enterprise Wikis with Enterprise Modelling and the Execution of Business Processes

Enterprise models mainly incorporate a specific holistic and managerial perspective, as they are usually not specified by those that are in charge for using them. Thereby, for the actual execution, an enterprise model must not specifically fit the requirements of an actor. For example, for the execution of a business process that was specified by means of a business process model, the information needs may go beyond the information provided by the business process model. Hence, additional and varying information needs will be requested by the multitude of different actors that are different to each other with respect to their individual knowledge, experiences and beliefs. However, an enterprise wiki is a suitable manner for offering different documentations regarding various activities and other aspects depicted by an enterprise model. Nevertheless, it must be still ensured that the strategic direction, which was specified by the strategic management and spread through an enterprise model, will be followed accordingly by the respective enterprise. Therefore, the captured information in the enterprise wiki, which should be collected by the operative business, needs to be integrated and accordingly directed with the respective provided enterprise model from the strategy.

Ultimately, an enterprise model will include two slightly distinguishable types of information, both information that guides the respective actor for executing purposeful actions and information that is needed by the respective information systems. However, an enterprise wiki, as the contributors are mainly human, should only refer to those parts of an enterprise model that require the interaction with human actors. The upcoming Figure

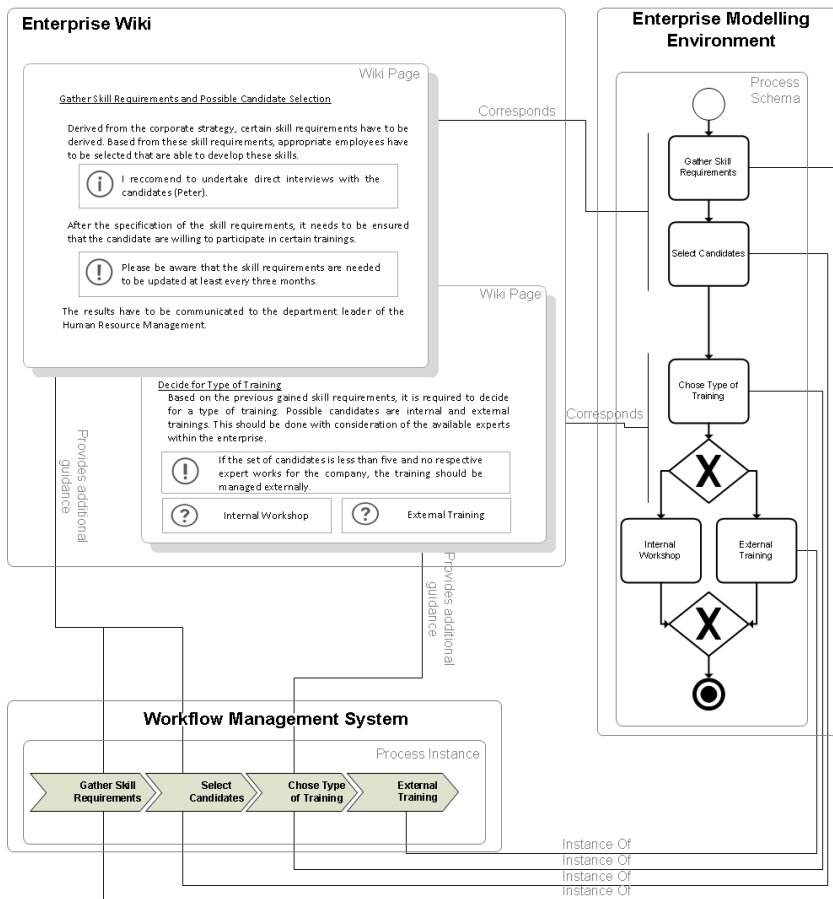


Figure 1: Structural Framework for using Enterprise Wikis in correspondence to an Enterprise Modelling Environment and Workflow Management System [BFT13]

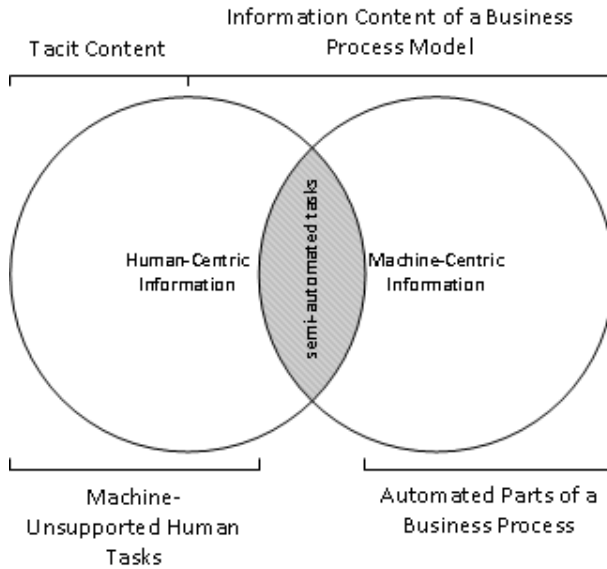


Figure 2: Information Affiliation of Business Process Models

2 divides the respective information constituting the enterprise models and the enterprise wikis by means of the human-relevant and machine-relevant information parts. As it may be inferred from the figure itself, information regarding the execution of a business process can be distinguished by three different types. The first type of information is considered with those tasks that can be completely automated and therefore the information is completely satisfied by means of the process model and additionally models about the associated information systems. The second type of information defines human-dependent activities, for which a support through information systems is still available. Hence, the model consists of information for a partly automation of tasks. Finally, the third type is information that mainly focusses on the respective actor and which refers to activities that are completely executed by human beings. However, such information can't be completely captured by means of a business process model, as this information is sometimes tacit and depends on the experience of the actor. Therefore, additional information needs have to be satisfied that require a certain discourse and phases of learning. To close this gap, we refer to the previously introduced approach that integrates enterprise wikis and enterprise modelling environments (cf. section 2).

Within this paper, three different benefits will be derived from the earlier proposed integrative approach with respect to the described information needs. First, the enterprise model provided from the superordinated represents a form for purposefully and accordingly structuring an enterprise wiki. For example, any documentation about an activity that isn't considered by the enterprise's strategy, neither implicit nor explicit, is unnecessary. With respect to business process models, the operative business should be able to provide information regarding the executed business process and their respective activities,

but not beyond. The directed structure of the enterprise wikis enables then the identification of the respective information and prohibits the existence of unused and unnecessary information islands within the enterprise. So, the first benefit is the

B 1 *Sophisticated derivation of the purposeful structure of the enterprise wiki from the enterprise model.*

Enterprise models, especially business process models, are used to provide a facility for the execution of the operative business based on the holistic enterprise planning [FS95]. However, as the strategic planning usually only reaches a certain aggregate level, due to the required effort for planning every detail [GM71], the essential derivation of operative actions of the operative business depends on the actual individuals of the enterprise. Hence, there is information that go beyond business process models. This information contains experiences from employees that spent a certain time at receiving business process models and executing them. Thereby, to provide this information to future generations might be a certain asset to the company. Additionally, the exchange of this information contributes to the master the faced unstable environment, as a immediate contribution and utilisation of this information becomes possible. This information may be based on tacit knowledge [KPV03] and at the utmost be provided by means of natural language. Therefore it is necessary to provide a secondary platform, next to an enterprise model environment, that is able to capture such information in its unstructured form; the enterprise wiki. So, the second benefit is:

B 2 *Synchronised perspectives provided by the enterprise wiki and the enterprise model environment*

Ultimately, as the additional information content needs to be integrated with the respective information systems, in order to enable its sophisticated use during the execution of the business processes of an enterprise. As these information systems are based on the respective enterprise models, an integration based on the concepts provided by the model, becomes possible. For example, a certain wiki content, which is associated with a sequence of activities of a business process, could be provided during the execution of these activities with support of the information systems. Furthermore, the direct association enables the quick and immediate identification of the relevant wiki content that is related to the current problem the employee faces, for which he either can utilize the available information or contribute to it. Hence, the ultimate benefit is the

B 3 *Runtime support regarding the execution of the operative business with an integration of the enterprise wiki with the respective information systems through the enterprise models.*

As a final consequence the initial enterprise model will be enriched, after several iteration, with information from the operative business. As this information is directly associated with parts of the enterprise model, the wiki content may support the refinement of the enterprise model, in order to establish best-practices by means of the enterprise model. If

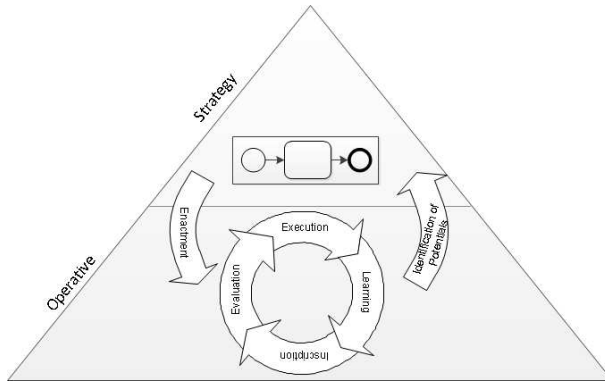


Figure 3: Procedural Framework for using Enterprise Wikis in correspondence to an Enterprise Modelling Environment and Workflow Management System

for example the higher level of abstraction provided by a business process model enables two different options that both satisfy the requirements of the respective and current activity, one may be less costly. After this potential identification the strategy can decide to specify the business process model in more detail and embody the less-costly option. The described process is illustrated by Figure 3.

4 Case Study

The undertaken case study was developed with a partner in practice, which is one of the biggest agencies of the public sector in Germany. In an exploratory manner initially the problem of the agency were identified [Oat06, pp. 143-144] and following, the contribution towards a solution of these problems by means of the earlier described benefits were evaluated. One of the major problems was that the given time for the creation of enterprise models, which should be used as a basis for defining the different actions of the different actors, often is insufficient. However, as it turned out, a complete specification of these actions by means of enterprise model was insufficient, as provided amount of information either was insufficient or varied between the various actors. Additionally, although the different actions had a specification of the required achievements and requirements, still their execution slightly varied and some processes were only formalisable to a certain degree. The specific requirements that should be targeted with the introduction and implementation of the proposed integrative approach, are discussed in Table 1.

The proposed approach was implemented in a two-step proceeding. First, the usual and more strategic orientated enterprise modelling facility was extended by means of a possible manner for introducing and extending the corresponding enterprise wiki content. So that based on a specific enterprise model, e.g. a business process model, the corresponding enterprise wiki pages were generated. In a second step, these enterprise wiki pages were then provided to the operative business with an association to the particular business

Table 1: Setting of the Case Study

No.	Requirement	Description	Satisfied By
R1	Various Information Sources	Within the given case study, the execution of business processes by the agency, requires the consideration of various information sources, by which further directives or legal regulations were provided.	B1
R2	Frequent, not formalisable business constraints	Most of the faced business constraints, e.g. legal regulations, can't be captured by means of a business process model or the costs for capturing those by means of a business process modelling language exceed the benefits.	B2 & B3
R3	High variety of business constraints	The agency has to consider various business constraints that are first worked off by the strategy and then distributed to the operative business. However, due to a variety of information sources the different actors have to filter the business constraint themselves, which can lead to misunderstandings.	B3
R4	Various directions for the operative business	Most of the directions given by the superior management are inscribed textually and the best-practice for satisfying these directives is then communicated orally within the operative business. However, it has to be ensured that the strategy guides the operative business accordingly.	B2 & B3
R5	Difficulties in formalising experiences and best-practices	Valuable information from the operative business is often lost, as there is no medium for capturing the information accordingly. Additionally the information management is difficult, as it has to be coherent to the current strategic direction.	B1 & B2
R6	High fluctuation of employees	A high fluctuation causes the problem in stabilising the according execution of the respective business processes. Information usually provided by co-workers is sometimes not available as they have to cope with other issues. So, there is the need for providing a platform where employees can exchange and consume others' experiences.	B2 & B3

process. The operative business was able to consume information from the enterprise wiki while executing the respective enterprise model. Additionally, after several executions the operative business was able to provide additional information based on the experiences that were gained during the executions. This information, while provided by a particular actor, was then evaluated by means of other actors with respect to the coherency of their own experiences. Hence, if positively evaluated the information was released and provided to others from the operative business during their execution of the enterprise model. After several iterations the gained information were used to identify possible potentials of redesigning the respective enterprise model. The implementations was undertaken according to the conceptualisation represented by Figure 3.

Regarding the different requirements *R1-6* presented by means of Table 1, the satisfaction of these requirements can be achieved through the benefits of *B1-3*, which were discussed in section 3. The satisfaction was evaluated with respect to the current state in argumentative manner with the respective stakeholders according to [Fra06]. The coping with the variety of information sources (*R1*) is satisfied by the provision of a specific structure for the enterprise wiki by the enterprise model. This structure may then be used to include content from the different information sources accordingly through the enterprise wiki. With respect to *B1*, the integration becomes possible although the information is specified by means of natural language. Requirement *R2* is satisfied through the possible specification of business constraint through natural language. So business constraints that are either not formalisable or their formalisation exceeds costs can be inscribed in the enterprise wiki, which is then accordingly aligned with the enterprise model, due to *B2*. Additionally, because of *B3*, the business constraint are properly provided during the use and execution of the respective business process models. Closely related is the high variation of business constraints *R3*. Due to the integration of the enterprise wiki with the respective information systems with reference to the enterprise model (*B3*), it can be ensured that business constraints that were inscribed in the enterprise wiki are accordingly provided. Furthermore, the various directions from the strategy (*R4*) can be immediately provided to the operative business, due to an inscription in the enterprise wiki (*B2*) and further the provision during the use of the respective information systems (*B3*). Hence, an intermediate step taken by a respective modeller between the strategy and the operative business can be omitted. Experience and knowledge that was taken by the operative business (*R5*) does need to be completely formalised by means of a modelling language, due to the possibility of an integration between the natural language text within the enterprise wiki and the actual enterprise models (*B1-2*). Thereby, the operative business can inscribe its experience and knowledge in the same manner they communicate it orally, respectively with the natural language. The problem with a high fluctuation of employees *R6* can be partly overcome with the possibility for inscribing knowledge and experience from former, maybe not available co-workers (*B2*) and the immediate provision of the respective information during the execution (*B3*).

5 Conclusion

In this paper it was shown how an integrative approach between enterprise models and enterprise wikis could improve the quality and utility of depicting the enterprise by enterprise models. More specifically, the improved support for the execution of business process models was evaluated. In conclusion, with the proposed approach, a framework was introduced that purposefully includes enterprise wikis in the act of enterprise modelling. Further, this framework provides a basis for collecting and providing knowledge regarding enterprise models. The approach decreases the effort for keeping process logic (specified by the process model) in sync with the natural language documentation (contained in the wiki) and enables the involvement of the operative business. Additionally, less effort is required for capturing the enterprise with enterprise models, as some aspects may be simply stated by means of natural language and later on refined. Also parts of an enterprise model that are subject to continuously changes can be captured with the enterprise wiki, which doesn't require a modelling expert. Ultimately, the operative business can be closely related to the process of enterprise modelling, as it is able to contribute by means of a more familiar language, the natural language.

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