

# Agility Based on Stakeholder Interaction – Blending Organizational Learning with Interactive BPM

Christian Stary<sup>1</sup>, Werner Schmidt<sup>2</sup>, and Albert Fleischmann<sup>3</sup>

<sup>1</sup> University of Linz, Freistädterstraße 315, A-4040 Linz, Austria  
Christian.Stary@jku.at

<sup>2</sup> University of Applied Sciences Ingolstadt, Esplanade 10, D-85049 Ingolstadt, Germany  
Werner.Schmidt@haw-ingolstadt.de

<sup>3</sup> Metasonic AG, Münchner Str. 29, D-85276 Pfaffenhofen, Germany  
Albert.Fleischmann@metasonic.de

**Abstract.** Highly dynamic adaptation of interactive work procedures not only requires structuring mechanisms, but also engaging stakeholders. As it touches business operation, not only user interface designs are challenged, but rather underlying business logic and data management issues. An inclusive perspective and interactive development support can be provided by Subject-oriented Business Process Management (S-BPM). It enables stakeholder involvement throughout an entire engineering cycle based on interaction specifications of all involved stakeholders. In this paper we propose to use S-BPM representations for both, capturing the business processes that are modified (i.e. content), and the process of modifying them along Organizational Learning (OL) cycles (i.e. adaptation). Since validated S-BPM models can be executed automatically from each stakeholder perspective, such an integrated BPM-OL approach allows structuring and implementing agility in operation under direct control of stakeholders.

**Keywords:** Agility, Organizational Learning Framework, Organizational Memory, Subject-oriented Business Process Management.

## 1 Introduction

Being forced to structural flexibility (agility) either by product or service management, customer or partner demands, organizations enter the stage of learning, both on the level of individuals and beyond [cf. 3]. Stakeholders play an important role for triggering and performing learning processes [cf. 7]. Ideally, they could drive change processes on both, the level of individual and organizational learning [cf. 2]. Subject-oriented Business Process Management (S-BPM) [cf. 4] relies on stakeholders and their capabilities constructing behavior specifications. Empirical results indicate positive effects on organizational velocity [cf. 5].

Various stakeholders can profit from a seamless support of modeling and execution [cf. 1], concerning user-interface design, business-logic, and business objects: employees assigned to functional roles in business processes, organization developers

while negotiating and mediating, and IT specialists when working with stakeholders. Either starting with process analysis and proceeding with modeling, validation, and execution, S-BPM models reflecting organizational change need to be guided by a reference model on a higher level to ensure valid semantic representations and mutual understanding. However, expressing modeling-relevant information in terms of intuitive representation is crucial for effective BPM, otherwise modeling problems well known from other BPM developments, such as BPMN [cf. 6], might occur.

In section 2 a reference model for effective change management stemming from OL is reviewed. In addition, S-BPM with respect to modeling activities is recaptured, revealing basic requirements for understanding the use of the S-BPM modeling approach. Both inputs are required for informed model construction and respective learning designs on lower and higher level OL. As S-BPM allows for seamless round trip engineering due to its aligned representational and execution capabilities, the stakeholder-driven Organizational Learning models can form an effective frame of reference for agile BPM. In section 3 an S-BPM implementation of the OL approach is exemplified, providing respective S-BPM representations. Further studies to blending OL with BPM are sketched in the conclusion of the paper.

## 2 Foundations

In the following we describe how stakeholders can trigger learning processes to reconfigure business operation. We also review Subject-Oriented Business Process Management with respect to modeling and execution as a baseline.

### 2.1 Organizational Learning Framework

For intertwining individual knowledge creation and collective learning processes in [9] an experiential learning cycle has been detailed (see figure 1) where individual knowledge creation serves as input to organizational learning processes. Change on the collective layer is triggered through designing processes, and followed by access, experience, and assessment on the individual level, before being shared in work communities:

- *Design*: Stakeholders express their specific view onto information structures or business processes, according to their individual experiences.
- *Implement*: The resulting information or models can be embedded into actual task situations. Interactive artefacts could enable hands-on-experience for task accomplishment (archetyping).
- *Observe*: Stakeholders observe, in particular when interactive artefacts are used, possible effects the executed tasks have on the situation and the organization.
- *Assess*: If the results fit individual expectations or meet individual demands for change, the concerned items serve as input for the learning process on the collective level. If further process refinements or modifications are required the cycle starts again.

In order to transfer the individually elicited knowledge to the organizational level several activities facilitate interaction, collective exploration, and reflection:

- *Annotating information and process models.* Basically, all created evidence for change needs to be documented by its proposer(s). It can then become available in some kind of Organizational Memory (OM) accessible for all stakeholders. The OM is the core of a support system, as it is used to store not only originally proposed structures, but also updates and versions. Each stakeholder can then express individual concerns and formulate individual inputs in a context-sensitive way, namely through annotating information. Annotations comprise comments, associations, and supplements to the created change request.
- *Deploying and sharing representations (models).* In order to share created evidence with other stakeholders, all generated information needs to be kept. Stakeholders should be able to share their findings with others. In this way individual perspectives on a process proposal can be taken by others.

Organizational Learning can be considered as a swinging pendulum between individuals and affected stakeholders, providing inputs for change and reflecting created information (structures) collectively before putting it to operation. First, individuals take the role of content providers, before stepping into the role of receptors or respondents, reflecting content and inputs on the individual or collective layer, respectively.

A step or cycle is complete, once a modified information model, content or process descriptions have been negotiated as a commonly agreed basis for organizational development, and can become effective on the collective level. Stakeholders then take the role of receptors embodying information.

Figure 1 shows the fundamental structure, activities, knowledge management system (KMS) components, and relationships. Individual stakeholders provide inputs or start discussions, leading to information they consider being of relevance to be documented. Once created, content can be refined by other stakeholders, modified or supplemented through sharing different inputs until proceeding on the collective level.

Information and process models are initially generated on an individual level. At some point, either immediately after creating or re-modeling, or after archotyping the input provider makes his/her model public. Then, others could step in and provide annotations to reflect the model collectively. Once a version is recognized by the involved stakeholders to become operational (i.e. put to production), the build time has been completed, and a novel way of running the business at hand is ready to be deployed. Build time has come to an end, run time can start. This step is indicated by 'transfer' transition to the Organizational Memory (OM). At that time additional implementation steps, such as additional validation with respect to stakeholder involvement, might be performed. After completing detailed implementation, the business operation actually changes, however still in an unembodied way, as new work practices need to be experienced in actual work settings realtime to become fully embodied. Hence, the roles stakeholders take in that context are still experimenter and explorer. The roles indicate the resonance space created now for all involved stakeholders to embody novel work processes or information structures that

are stored in the Organizational Memory. Once they have embodied novel work practices (indicated in the figure by the transition ‘Embodiment’) they enter the individual ‘Creating and Reflecting’ cycle on the individual level. Even in case stakeholder experience difficulties in following novel work practices they should be able to act in a constructive way in the next learning step. In this way, the framework in figure 1 addresses explicitly the interplay between individual and collective learning. Both aspects are considered essential for interactive organizational change. The model enables considering each of them from dedicated perspectives, and their interfaces along the Organizational Learning life cycle.

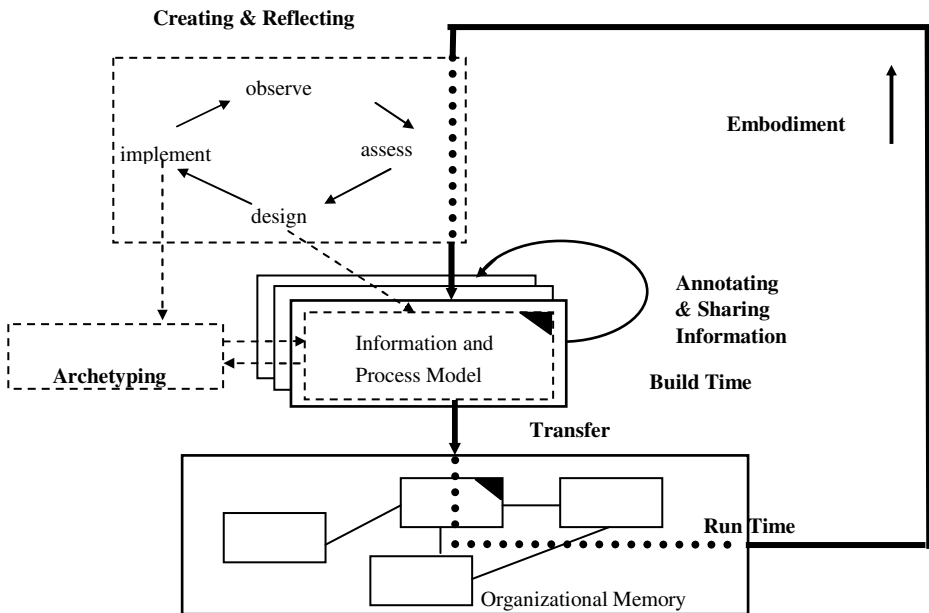


Fig. 1. The operational frame of reference and resulting KMS components for change support as given in [9]

## 2.2 Subject-Oriented Business Process Modeling and Execution

Subject-oriented business process models aim to bridge the gap between describing, documenting, and processing collaborative work processes. When expressing their understanding of work behavior stakeholder only have to understand interaction as the process of exchanging messages between actors and systems - which they are capable once they collaborate and use mail, in particular e-mail. Models play a crucial role in S-BPM. They are generated or processed, respectively, along a chain of various activities:

- *eliciting* and representing knowledge about work and its organization
- *analyzing* process descriptions with respect to specificity, accuracy, completeness

- *validating* models whether they could be executed in a stringent way
- *executing* models allowing hands-on experience of specifications
- *embodying* processes in organizational and technological settings of organizations
- *monitoring* with respect to expected achievements
- *simulating* in order to explore alternative or novel ways of task accomplishment

These bundles of activities represent fundamental phases of business process development. Once in each phase of development all stakeholders can participate due to their modeling capabilities, the transparency and traceability of organizational development processes can be ensured or even increased. A key enabler to this respect is the capability of support tools to execute validated process models (cf. [www.metasonic.de](http://www.metasonic.de)).

We now briefly review the creation of subject-oriented representations. It starts with the identification of process-specific roles involved in the process, the subjects, and the messages exchanged between them. When sending messages, the required data is transmitted from the sender to the receiver. Thus, with a message indicating the intention to go on a business trip, e.g., ‘request’, sent by an employee to the supervisor, among other things the start and end date are transmitted. The behavior of communication partners, such as the supervising manager is complementary. For instance, messages sent by the employee are received by the manager, and vice versa. The manager therefore waits first in a receiving state for a business trip request from the employee. For each work procedure or business case, the

1. subjects involved in the process,
2. interactions taking place between them
3. messages they send or receive during each interaction, and
4. behavior of the individual subjects

are described as they represent the essential elements of a subject-oriented model. The description of a subject determines the order in which it sends and receives messages, and performs internal functions. Its behavior thus defines the order in which the subject processes which activities: sending or receiving, or services that are defined on the corresponding objects. Services are used to assign a specific meaning to the individual steps captured by a subject behavior model. They are triggered synchronously, i.e., a subject does not enter the corresponding next state, unless the used service has been also completely processed.

Figure 2 exemplifies a model on the left side. The screen on the right side shows a snapshot of the screen displayed when the model on the left side is executed as a workflow using the Metasonic Suite ([www.metasonic.de](http://www.metasonic.de)). Once all ingredients have been added, the model can be validated and executed without further transformations. In the figure the current state is the receiving state as also highlighted in the model – an employee receives an answer to his/her request. The corresponding inbox can also be visually displayed in terms of user interface widgets as known from model-based development [cf. 8]. It requires the assignment of user-interface elements in the course of instantiating subject specifications.

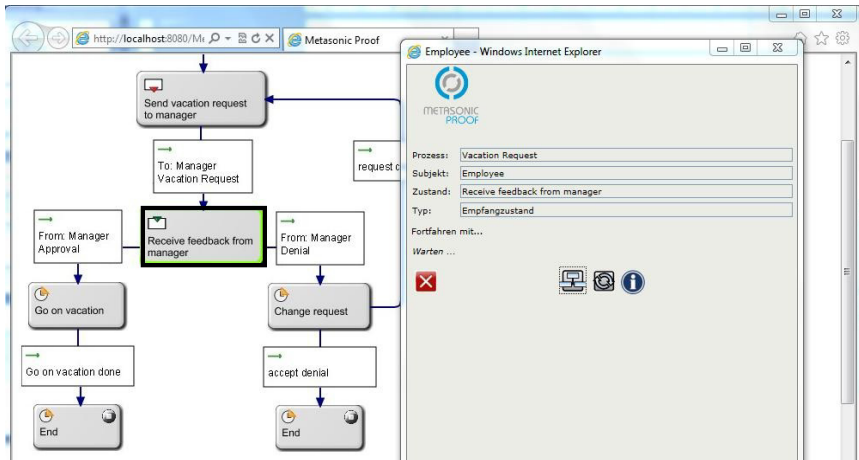


Fig. 2. Model Representation and Execution

Once those subject models have been completed that are involved in a work process, an organization-wide representation has been created. Its execution allows from each subject (i.e. stakeholder) perspective to experience the entire process interactively.

### 3 (Re-)Structuring Operations ‘On-the-Fly’

We demonstrate how the framework given in section 2.1 can be implemented in a seamless BPM environment. Figure 3 gives the principal interaction structure of the OL process with input provider, stakeholder and organizational memory (OM) as

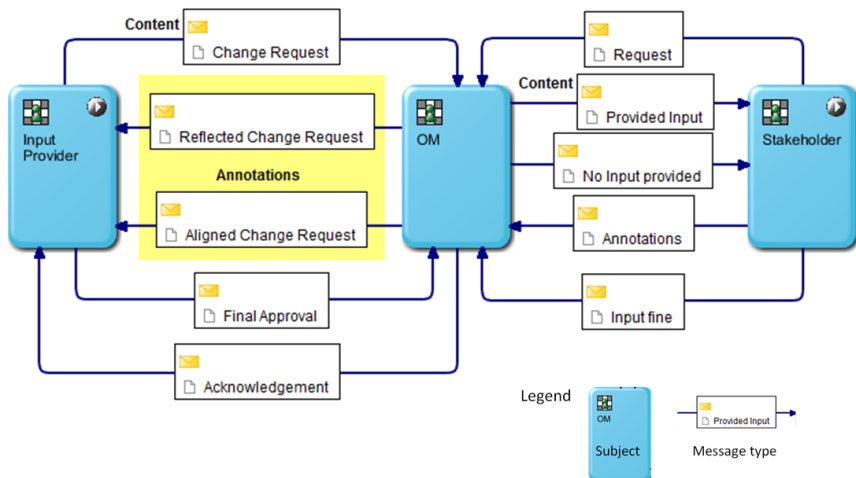


Fig. 3. Subjects involved in Organizational Learning

subjects and several types of messages they exchange. As subjects represent roles, at run time one person can act in different roles, such as an input provider and stakeholder commenting proposals for change provided by others.

For technical systems, such as the organizational memory, it is also decided at the time of implementation, which technology is going to be used at run time. In S-BPM the organizational implementation is distinguished from the technical, in order to capture both implementation aspects [4].

According to the OL life cycle (Figure 1) initially a stakeholder familiar with a work procedure (in the role of input provider) triggers change (Figure 4). He prepares some content to be considered as a new work pattern, for example a process model, such as the behavior of an employee applying for a business trip, or some other input triggering change. The content is sent to the OM as a request for change and then, the input provider waits for feedback, which may subsequently lead to changes until content has been approved by the other stakeholders. Finally the input provider embodies the new work procedure in his daily operation and acts according to it until a new learning cycle is initiated by him or other stakeholders and leads to another change of work practice.

Processing travel expense reimbursements for sales persons can serve as an example. The responsible stakeholder, e.g., an accountant, receives electronic forms containing data like name and organizational unit of the sales person, travel details, money spent etc. In order to book the reimbursement the accountant needs to retrieve the relevant cost center id of the organizational unit from a list. As this takes him 2 minutes for every single instance his idea is to let the sales people fill in the right id into the form. This would only take them some seconds because they usually know their cost center id. So the accountant provides a new version of the form including a field for the cost center id.

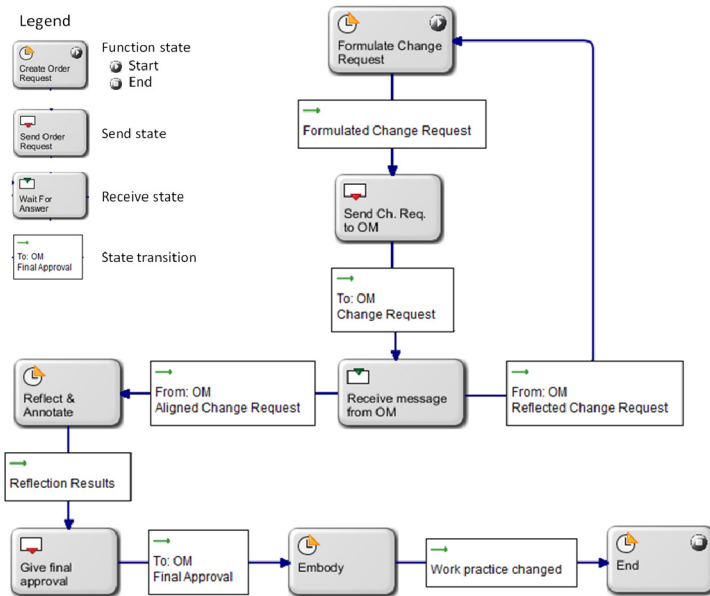
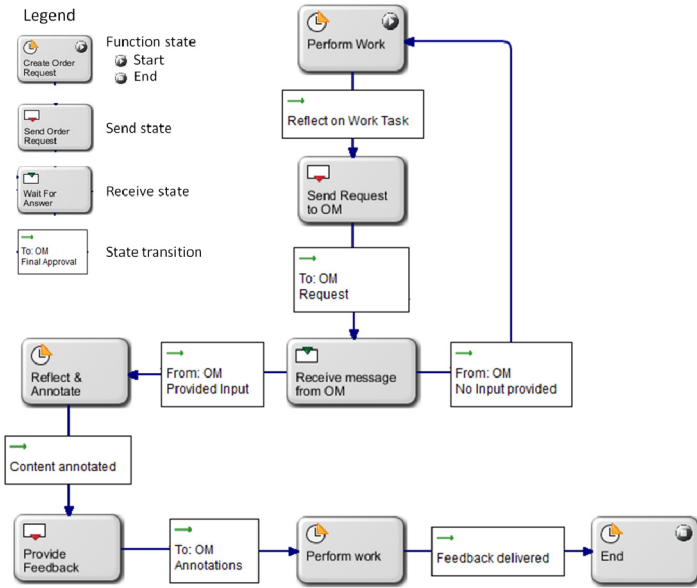
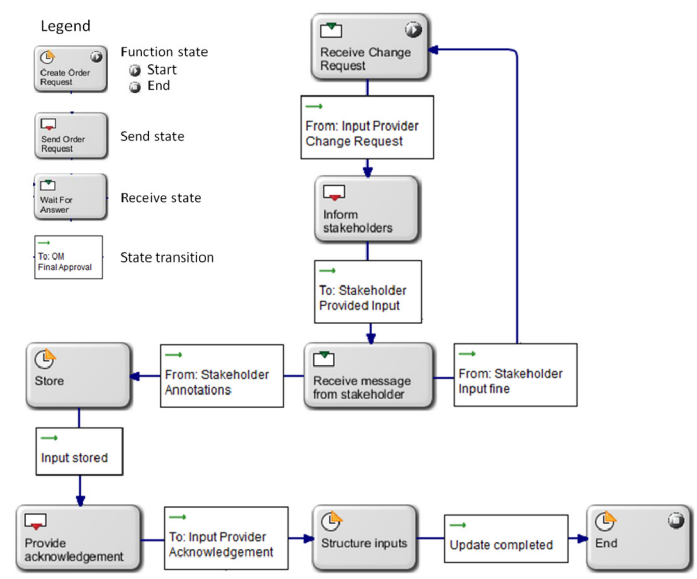


Fig. 4. Behavior of the subject 'input provider'



**Fig. 5.** Behavior of the subject ‘stakeholder’ responding to provided inputs



**Fig. 6.** Behavior of the subject Organizational Memory

Other stakeholders may, beside themselves suggesting changes to the OM, share the provided content, and make annotations (Figure 5). These annotations refer to the originally provided content, are sent to the Organizational Memory and through it become available to the input provider who may modify the change request.



The Organizational Memory receives all inputs and informs other stakeholders about the input (Figure 6). It also stores incoming annotations and provides versioning for further iterations. In our example stakeholders like sales people and the owner of the process express their acceptance of the modified form which then can become effective in operation. In another case some of them could suggest further improvement by extending the electronic form by services to automatically retrieve personal and cost center data from databases once the short employee id is entered. This could lead to an iteration, e.g., collecting the stakeholder's opinions on whether to start with the additional field or go straight for the more sophisticated change with the IT services.

The behavior diagrams have been simplified to demonstrate the interaction flow being the distinct feature of the approach. After validation it finally enables the automated execution of the behavior diagrams.

Hence, the resulting learning and business operation occurs in a choreographic way. This is of dual importance: On one hand, actors and systems may interact in parallel, however, timely synchronized. On the other hand, organizational learning is an intervention on demand, rather than prescribed, which results in non-intrusive change processes with respect to the technically informed business.

## 4 Conclusion

Meeting the requirement of many organizations to reconfigure their business processes dynamically, we followed a blended BPM-OL approach. A procedural framework for individual and collective changes and the operational representation for executing business processes have been intertwined, utilizing the capabilities of Subject-oriented Business Process Management (S-BPM). It provides a stakeholder perspective for modeling processes and organizational development. Re-configuring running business processes is enabled in seamless round trips.

Field studies still need to be set up to validate the results empirically in the context of BPM projects, as the current tool support is undergoing major improvements (see [www.i2pm.net](http://www.i2pm.net) – Open S-BPM). Of particular importance is investigating existing role concepts, as known from BPM, e.g., process owner, and their impact on the roles identified for organizational learning, such as input provider. It is likely that mutual mappings need to be defined to perform change management on-the-fly effectively.

## References

1. Avital, M., Te'eni, D.: From Generative Fit to Generative Capacity: Exploring an Emerging Dimension of Information Systems Design and Task Performance. *Information Systems Journal* 19(4), 345–367 (2009)
2. Böhmman, T., Burr, W., Herrmann, T., Krcmar, H. (eds.): *Implementing International Services: A Tailorable Method for Market Assessment, Modularization, and Process Transfer*. Gabler, Wiesbaden (2011)

3. Chen, M.T.: The Impact of Organizational Agile, Organizational Learning and Innovation on Value Creation, Ph.D., Department of Business Administration, Shih Hsin University, Taipei (2012)
4. Fleischmann, A., Schmidt, W., Stary, C., Obermeier, B.E.: Subject-oriented Business Process Management. Springer, Heidelberg (2012) <http://link.springer.com/book/10.1007/978-3-642-32392-8/page/1>
5. Nakamura, S., Tan, T., Hirayama, T., Kawai, H., Komiyama, S., Hosaka, S., Nakamura, M., Yuki, K.: CGAA/EES at NEC Corporation, Powered by S-BPM: The Subject-Oriented BPM Development Technique Using Top-Down Approach. In: Schmidt, W. (ed.) S-BPM ONE 2011. CCIS, vol. 213, pp. 215–231. Springer, Heidelberg (2011), doi:10.1007/978-3-642-23471-2\_15
6. Recker, J.: Opportunities and Constraints: The Current Struggle with BPMN. Business Process Management Journal 16(1), 181–201 (2010)
7. Rouse, W.B. (ed.): Enterprise Transformation: Understanding and Enabling Fundamental Change. Wiley, Hoboken (2006)
8. Stary, C.: TADEUS: Seamless Development of Task-based and User-oriented Interfaces. IEEE Transactions on Systems, Man and Cybernetics, Part A: Systems and Humans 30(5), 509–525 (2000)
9. Stary, C., Fleischmann, A.: Evidence-based Interactive Management of Change. Knowledge Management & E-Learning: An International Journal (KM&EL) 3(2), 170–200 (2011) <http://www.kmel-journal.org/ojs/index.php/online-publication/article/view/31/83>