

Improving the Application of Process Models

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Abstract. Nowadays companies invest a lot of resources in the elaborate design of computer-based process models. Due to their inherent complexity, those models are not necessarily suitable for the purpose of communication towards and training of employees who are supposed to apply them. Hence, innovative and creative methods are needed in order to bring those abstract models to life and consequently intensify the adoption among the staff.

Keywords: Business Process Management, Process Modeling, Communication, Employee training

1 Initial Situation and Objective

The benefits reaped by business process management (BPM) are well understood and a lot of companies try hard to document their working procedures with the help of computer-based process models [1, 2]. Still, those models should be more than a pure documentary tool. Their versatile benefits unfold when employees actually apply the process models and draw relevant information for their daily work from them. Typically, domain experts are not familiar with understanding and interpreting process models and, hence, are not willing to apply them [3, 4].

In order to overcome these hurdles, the company considered in this case searched for new ways of communicating existing processes to employees. This case study, conducted in cooperation with the FOM Hochschule für Oekonomie & Management, is a summary of the attempts. It deals with the design and implementation of innovative training methods that help to impart knowledge about processes to employees. Two of these approaches are presented in this paper.

The company considered is a medium-sized auditing, tax and management consultancy which employs approximately 250 employees at ten locations in Germany. The prevalent business processes are highly knowledge-intensive, thus, usually complex and unpredictable, and require a precise interaction between a variety of departments and functions involved. In addition, those working procedures have a substantial impact on the quality perceived by the customers. This in turn significantly affects customer satisfaction and thus also the economic success of the company as a whole.

Due to their importance, the enterprise converted those processes into comprehensive, IT-based process models. These were created using the modeling language

BPMN 2.0. Basically, those models serve the purpose of training and instruction. Furthermore, they form the basis for analyses / improvements and external certifications. In addition, a process oriented job control which is supported by a dedicated IT-system is founded on those models [5]. Those many-sided areas of application assume that the process models depict a comprehensive and complete picture of all the affected activities, resources and coherencies. Therefore, the process models are relatively complex: Providing content-related high quality services, such as technical or business consulting, the respective sub-processes as well as each single activity have to be coordinated effectively and required information needs to be provided completely and in time. Thereby, requirements of an operation at different sites have to be considered, both at the customer's and the company's own premises, concerning various areas and locations.

In the company portrayed in this paper the staff turnover is relatively high, which is common in this specific industry. Additionally, in increasingly competitive markets professional service firms are highly recommended to continuously scrutinize and improve the efficiency of their job execution. Consequently, new employees need to be trained quickly and regularly in order to incorporate them adequately. New staff members need to quickly capture and process a huge amount of information. In order to facilitate this, the department of *Knowledge Management* searched for suitable training methods that help to convey knowledge about business processes.

These methods should be an alternative to extensive texts or ordinary process models which in the past have not proven to be sufficient training tools: The more extensive and accurate the descriptions and process flow charts, the less they were used. At the same time it is well-known that efficient communication of processes is a key success factor for establishing process thinking within an organization [6, 7].

The requirements for an ideal new method or a combination of several methods are summarized in the following figure:

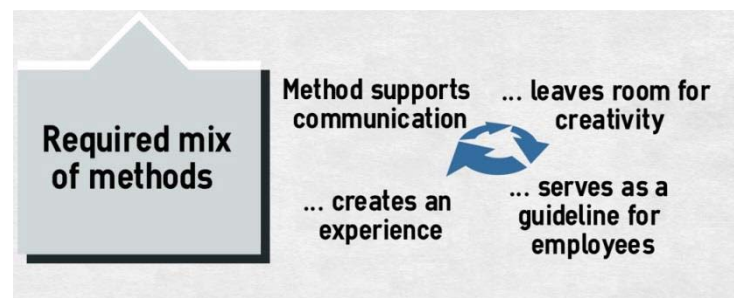


Fig. 1. Framework: Requirements for an ideal mix of methods (Source: own illustration)

While process models and process descriptions are very much geared towards perfection and completeness, 'imperfection' was the very first requirement directed at the new training method. What seems paradoxical has proven to be useful: An obvious incompleteness and description gaps within process models promote creativity of the

beholder and motivate to think about changes, additions and variations [8]. Accordingly, completeness is not necessarily advantageous for the success of training.

In addition, the new training method should help to combine the logical, abstract process models with emotional, symbolic elements so as to facilitate the learning success. Since new employees in this specific enterprise typically have a rather low affinity towards IT-tools, it would also be advisable to use non-IT-based procedures.

2 Implementation

Starting from the requirements presented above, several suitable methods were identified and elaborated during an intensive brainstorming. The idea of a process card game is one of those methods and will be presented in detail in the following.

This process card game is based on traditional card games – well-known for example for comparisons of different cars, airplanes and ships. Cards are the primary device with which the game is played. Those cards typically show pictures of the objects. Usually each card has a number and letter on top (e.g. 1A, 1B, 1C, 1D). Further attributes such as ‘speed’, ‘power’, ‘price’, ‘weight’ and so on are given. Each player (2-4) receives an equal number of cards. The player is only allowed to play the top card of his own card deck, chooses an attribute and reveals the associated characteristic value. The player with the best value wins and gets the top card of the other player. The idea is to win all the cards.

Based on this game, the single process steps of a process (e.g. “Send the audit report”) were portrayed on the cards. An image was assigned to each step. In addition, each process step was given selected attributes and the according characteristic value (e.g.: handling time 0.25 hours). By doing this, a card game consisting of the individual process steps of the considered business process emerged.

The cards offer the advantage that the relevant process characteristics can be displayed and made visible immediately. They even constitute the central element of each card. Compared to IT-based process models, this is an essential difference. In these IT-based process models the visualization of the process flows often forms the core. Even though a variety of process attributes can be attached to those models, this important information is often not visible immediately.

In the following, possible process attributes are listed. For the sake of clarity, no more than six features should be displayed on the cards. The features ought to be carefully selected – depending on the objective of the training and the target group. For example one should refrain from showing the attributes “predecessor” and “successor” on the cards if the participants are asked to reconstruct the sequence of the process at the end of the training.

Potentially meaningful process attributes are:

- Necessity of the process step (mandatory vs. optional)
- Roles: Who is responsible? Who accomplishes the tasks? Customers, suppliers etc.

- Characteristics: Planning, execution, control, rework, feedback, mental activities, physical activities etc.
- Qualifications and / or competencies required
- Development perspectives for those involved
- Input / Output
- Scope / Objectives
- Customer expectations regarding output (quality of results)
- Required resources, tools, specifications
- Predecessors, successors, parallel activities
- Frequency of repetitions of each process cycle
- Duration (processing time, transition time)
- Required control activities
- Cost
- Contribution to value creation
- Impact on quality
- Risk (e.g. risk of shortage)
- Degree of IT support, IT tools used
- Workload: time pressure, quantities
- Predictability / leeway in decision-making / structuring
- Transparency
- Communication & interaction
- Spatial arrangement
- Potential conflicts
- Outsourcing potential etc.

In the illustrated practical example (focus: training of new employees) the following six process attributes were selected:

- **Necessity of the process step:** Mandatory vs. optional. This aspect is important for new employees since they need to know in which cases a process step may be omitted (e.g. because of economic reasons).
- **Interactive partners:** Quantity of functions that are asked to work together within this process step. This does not include the upstream and downstream process steps. New employees learn which colleagues and departments to involve in their activities and decisions. On the other hand, they realize in which situations and sequences their support is needed in turn. Furthermore, this process attribute indicates in how far the specific process step is dependent on other functions („degree of dependence“). In doing so, employees become aware of several reasons responsible for delays in the process flow.
- **Description / Characteristics of the process step:** Proportions and degree (share, percentage) of service / production / review / rework within the process step. While the service and production part of a process usually directly adds value, non-value-adding parts like control and rework activities should ideally be reduced to a minimum. New employees should learn the characteristics of the different process

steps. It is not unusual that one step exhibits all the presented characteristics (e.g. consists of 70% service, 20% review and 10% rework).

- **Average duration / processing time measured in hours:** New employees get an idea in how far the single process step contributes to the overall processing time of the process.
- **Impact on the overall process quality:** Here, the quality of results is divided into contentual quality, formal quality and timeliness. Thus, it is possible to objectify the impact of the process steps on each of the aforementioned building blocks of quality (ranging from 0 = no impact, 5 = high impact). New employees, willing and motivated to increase the quality of their work, get an idea of where to start. This also helps setting the right priorities in their daily work (“Which activities need special attention?”).
- **Risk of shortage / bottleneck (ranging from 0 = no risk, 5 = very high risk):** The higher the risk, the higher the chances that this process step might cause delays within the whole process. New staff members must be sensitized for these risks so that they are able to consider them within their own planning.

An exemplary card from the game is shown in figure 2.

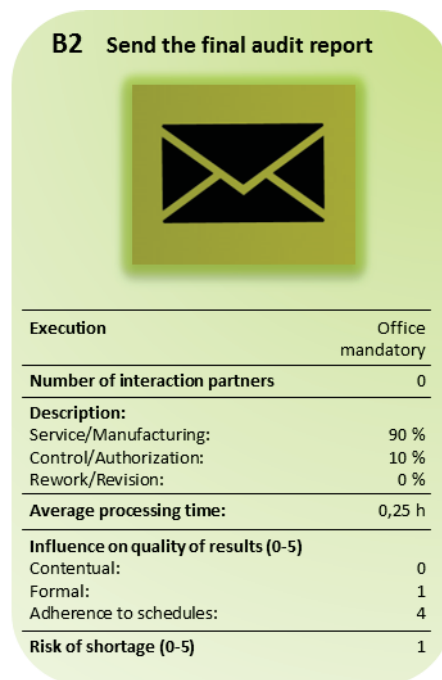


Fig. 2. Example – Card portraying the process step “Send the final audit report” (Source: own illustration)

3 Application of the Method

The process card game is used as a part of the initial training for new employees. This training is a five-day course. Not only will the attendees get subject-specific input, but also important business processes are presented and explained. The IT-based process flow charts are shown initially as an introduction and in order to give a first, rough overview. At the end of a training day or at the beginning of the following one, the card game comes into action. Participants play in groups consisting of two to four people. They compare the values of the different attributes. The respective “better” value wins. This might also end in heated discussions, e.g. “*Is a higher value at ‘risk of shortage’ really the winning value?*” It is indeed intended that the participants reflect on the process and discuss the different steps alongside the values. Thus, they playfully deepen their knowledge of the process. Having played some moves, open questions about the different process steps, the characteristics and values are clarified with the help of the trainer. Finally, the attendees are then asked to model the complete process with the cards. The individual process steps are placed consecutively in the correct order. This is based on the “Swim lane”-method in which each department has its own “lane”. The process steps performed by a certain department are hereby shown in the respective lane (see fig. 3).

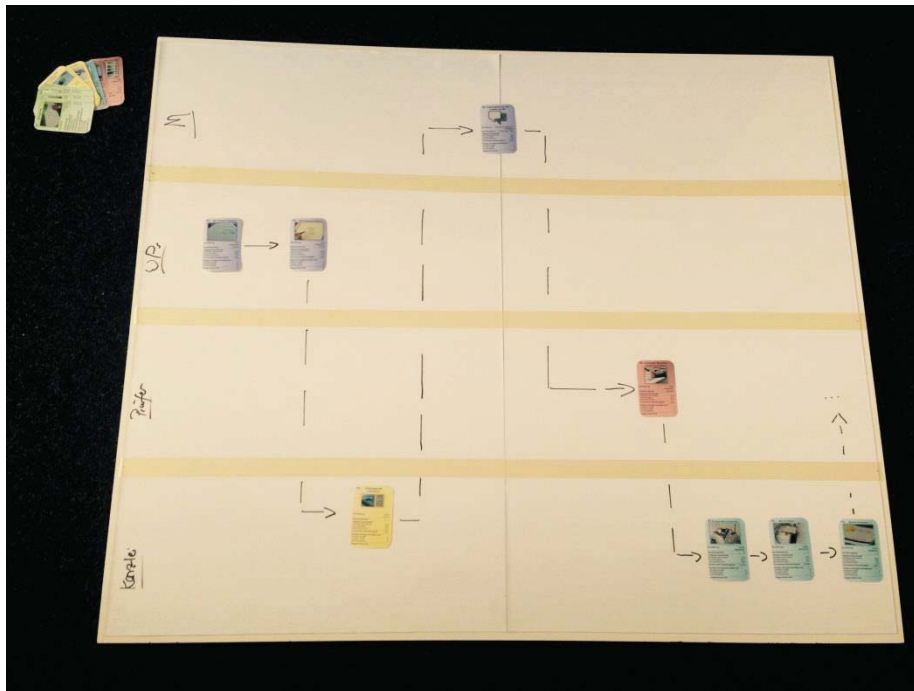


Fig. 3. Modeling a process with the help of the card game (Source: own illustration)

It becomes obvious that the card game can also be used for process modeling on a very abstract level. The amount of time the attendees take to model the process and also the accuracy of the results indicate how well the participants have understood the whole process. This might be an important feedback and insight for the trainer.

4 Critical Reflection & Evaluation of the “Process Card Game”

After the training of new staff members had been running for several cycles, the participants were invited to a pen-and-pencil interview. Among other aspects, they were asked to reflect on the application of the process card game. In addition, this survey was supplemented by a personal interview in order to uncover the causes of the results. Furthermore, the observations of the trainer are included in the evaluation as well.

The goal was to determine the success in application. The chosen method is successful if it meets many of the previously defined requirements formulated and summarized within the initial framework (see fig. 1). Based on this framework, an ideal method combines the following attributes: It promotes creativity, supports communication, and combines abstract artifacts with symbols and vivid descriptions in order to reduce complexity. This led to the following specific requirements: Training new employees requires a method that stimulates creativity among the participants, is neat and instructive which helps to understand the process, creates an experience, promotes discussions and encourages participation, and considers different levels of expertise. However, it is unlikely that one method meets all requirements completely. The evaluation results in relation to the method “Process card game” are shown in figure 4.

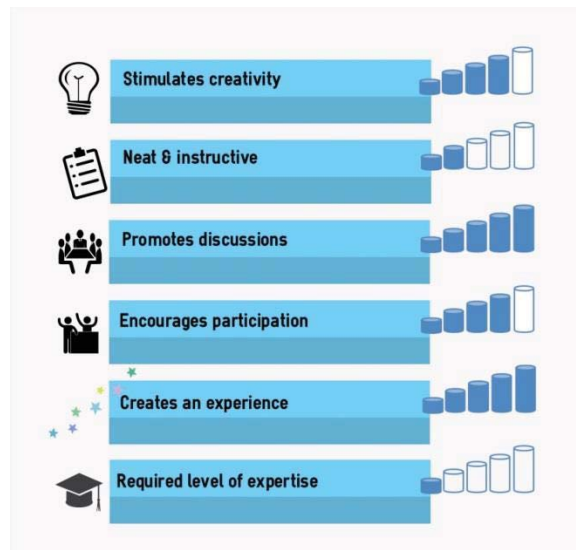


Fig. 4. Evaluation results for the method “Process card game” (Source: own illustration)

As displayed in figure 4, the card game was particularly assessed as a method that stimulates discussions and creates an experience. This is predominantly due to the playful contest the attendees were part of. Competition is part of the game and this made it a contest: Comparing the different values, discussing about why the “enemy’s” value is higher than one’s own, winning and losing – those very emotional moments stay in memory. Playing cards against each other creates a very loosening atmosphere which is a welcome change during a week full of teacher-centered training. Moreover, playing cards is connected to childhood memories. This additionally promotes the event quality experienced. The criteria “Stimulates creativity” and “Encourages participation” were rated relatively high with four out of five points each. This is attributable to the fact that it is a very interactive game. Furthermore, the final modeling of the process demanded a high degree of creativity and provoked discussions among the attendees.

The card game neither constitutes a complete process model nor a complete process documentation. This also explains the low results with respect to the criterion “Is the method neat and instructive?” It can always only be seen as a supplement to existing (often IT-based) process models and additional methods that help to communicate the process.

With reference to statements of the attendees, the required previous knowledge and level of expertise is relatively low. This applies both to the application of the method itself (card game) as well as to the required knowledge about the process. Even though the process was previously explained theoretically, the exact relationships between the different steps, roles and activities become only apparent during the game itself.

Taking everything into account, the evaluation results confirm the expectations that have been directed at this method ahead. This new method improves the communication of processes, the imparting of knowledge and, hence, the application of the implemented process models.

5 Magnetic Whiteboard – A Complementary Method for a Neat Representation of Processes

5.1 Description

As described above, the process card game is particularly suitable for the training of new employees. Yet it is less appropriate for the permanent, simple visualization of an entire business process at the workplace of each employee. This visualization is needed, however, to connect processes to actual business work and in turn to encourage the employees to think about process improvement and process alterations. This requires some sort of prior experience [9]. Hence, target group of this second method are new employees (equipped with knowledge from the initial training) as well as all the other - already experienced - employees working in the different departments. Consequently, the required previous knowledge can assumed to be higher compared to the previously described method.

A supplementary method was elaborated. Again, the main requirement was to support communication and to promote creativity at an appropriate level. Simple, tangible instruments should also be used here. Ideally, these instruments allow portraying the process as a whole, but additionally leave room for variations which arise from discussions. For these reasons, relatively complex IT-based process flow charts were ruled out.

The solution is a magnetic whiteboard in conjunction with magnetic process symbols which is installed close to the workplace of the employees. Each whiteboard shows the relevant business process (or parts of it) for the respective group of employees. The process symbols are based on current modeling languages (e.g. BPMN 2.0), however, are simplified and less diverse. Lacking expertise in process modeling, most non BPM-experts welcome this simplification since it helps to understand complex relations and procedures. “Swim lane”-techniques are used as the basic form to represent the processes. Here, the different lanes are arranged horizontally showing each department involved in parallel. Each lane is labelled so that employees can identify which process steps are to be performed by their department and where there are linkages to other parties involved. Additionally, the charts show the sequence of events; which are parallel, up- and downstream activities (see fig. 5).

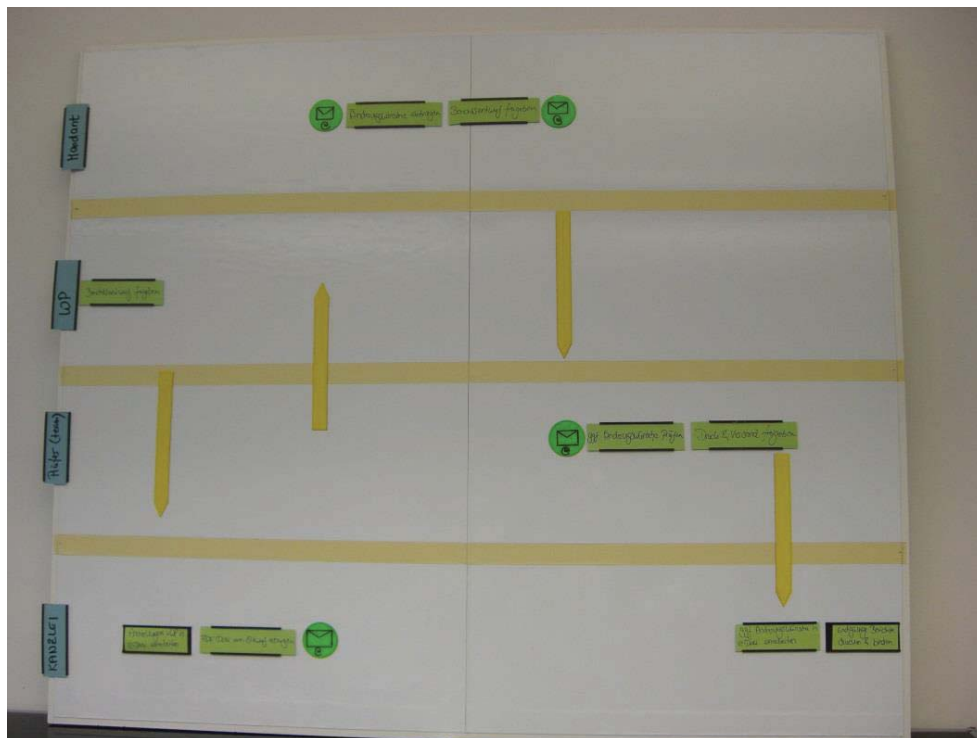


Fig. 5. Magnetic process whiteboard (Source: own illustration)

The magnetic process symbols enable employees to easily alter the process. They are tangible, comfortably to hold in the hand and there is enough space to add details with a dry marker. Furthermore, new symbols may be added and symbols no longer required may be removed. It is not necessary to wipe texts or marks from the whiteboard or write on the board since everything is presented through the magnetic symbols. This reduces the inhibition level to actually alter and modify the process: Due to the company's corporate culture it is not usual to declare the work results of others as "incorrect", wipe out and correct it. But the flexibility the whiteboard offers provokes to overcome this restraint. Creativity is encouraged and process modifications may be straightforwardly visualized. This approach generates plenty ideas of potential improvement. If necessary, the original condition is quickly restored. Therefore, employees take "before and after pictures" so as not to lose any alterations. A small digital camera is attached next to the whiteboard for this purpose. Employees are asked to upload their pictures (voluntarily) to a central folder the department of *Process Management* has access to. Hence, those pictures and suggestions are also an interesting indicator and important instrument for business analysts. If necessary, they can then identify the respective employees using the file name and discuss open questions about the process model with them.

However, the discussions within the departments – provoked by the magnetic whiteboard – are even more important. As a starting point, employees receive a whiteboard showing the target state of the process model. Based on this model, the department members discuss and simulate options for change. When there are no ongoing discussions, the current status quo should always be represented. It is not unlikely that the status quo within the department ("How things are done here") differs from a centrally prescribed ideal state of process. A deviation from the target process is not forbidden or unwanted – it may have reasonable causes and positive effects. By displaying the actual process, business analysts and BPM-experts notice quickly how the process actually takes place on site. This may be an important starting point for further discussions with the staff. Moreover, as already mentioned, digital photos offer the opportunity for further evaluation. Thus, local optimization can be harnessed for the whole company.

5.2 Critical Reflection on the Method

The method "Magnetic whiteboard" had to undergo an evaluation as well (pen-and-pencil-interview as well as personal interviews; supplemented by the observation of business analysts).

The interviewees particularly acknowledged the support of discussions about process related topics (5 out of 5 points). The aspects clarity („Method is neat and instructive“) and promoting participation also scored high (with 4 points each). The results indicate that this method creates an experience and encourages creativity at a moderate level – with both of these characteristics in the middle of the field (3 out of 5 points). Taking into account the evaluation of the "Process card game", it becomes obvious that the "Whiteboard" is a useful supplement as it addresses and considers the

weak points of the card game exactly. The results of the overall evaluation are summarized in the following figure:

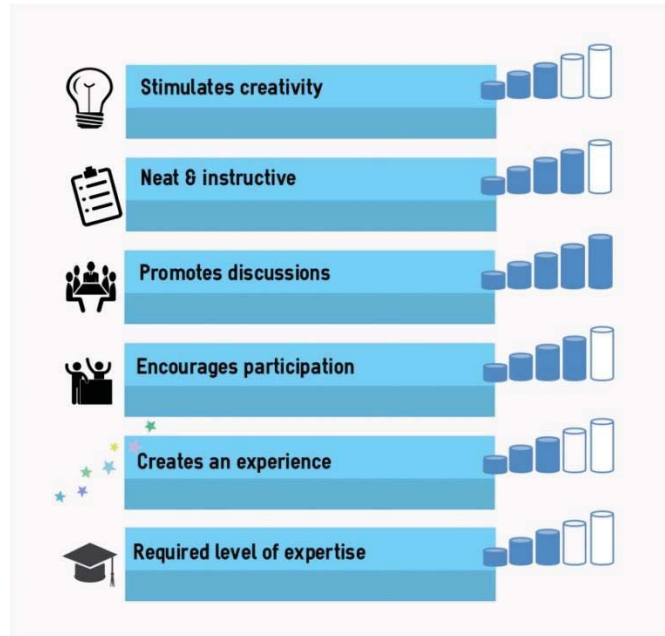


Fig. 6. Evaluation results for the method “Magnetic Whiteboard” (Source: own illustration)

All in all, the magnetic whiteboard is an effective instrument especially for small and medium-sized enterprises that do not want to invest in costly digital screens on walls or in table form but still want to pursue a professional management of their processes. For them, the described method is a cost-efficient instrument for a neat and supportive representation of their business processes.

6 Summary and General Lessons

Process models have to walk a tightrope: On the one hand, they have to serve different areas of application (process analysis, process improvements attempts, documentary purposes, form the basis for certifications, trainings, communication etc.). This again favors an inherent complexity of those models. On the other hand, it is important to consider the perspective of employees who are not familiar with process thinking and who in turn might be overwhelmed by this complexity. The benefits reaped by business process management implementations might be negatively affected if employees do not apply the available models to the desired extent.

Since high complexity often interferes with comprehensibility, we argue that those complex process models should not necessarily be the only tool for communication. Bearing in mind these critical remarks, we provide the following conclusion: New and innovative approaches are needed to balance the trade-off between the claim of com-

pleteness on the one hand and the desire for intelligibility on the other. Hence, the implementation of business process management should not be completed with the creation of detailed process models. The trick is to use these models as a foundation for new methods which are better adapted to “arouse” the process, turn it into something tangible and, hence, serve as a supportive communication tool.

The methods presented in this paper indicate ways to handle the challenges presented above. They encourage non-BPM experts to discuss processes intensively and really develop an understanding. All in all, our new methods close a gap between business analysts (experts in process modelling) and specialty departments (experts in their field of knowledge, but often lacking a deeper understanding of process management methods). However, one important finding is that computer-based models (e.g. based on BPMN 2.0) form an essential basis for the newly introduced methods, which therefore can be characterized as an enhancement rather than a substitute.

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