

# Participatory Design and Cyclic Improvement of Business Processes with Workflow Management Systems

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## 1 Introduction

We have a lot of results about participatory design and also an extensive discussion about how to conduct a continuous improvement of business processes with the help of workflow management systems. However, the synthesis of both perspectives is lacking. In the following we make some suggestions on how to overcome this gap. The necessity of participation in the course of business process improvement is widely acknowledged, but with different intentions. The management has recognized that they need to explore the knowledge and experience of their staff. Employees and their representatives try to prevent negative consequences of rationalization and expect their working conditions to be improved. Caused by these diverging interests we have a variety of modes and ways of how participation is practiced. Therefore we try to describe a framework explaining which mode of participation is sensible or crucial for which phase in the course of continuous business process improvement.

Our method is to contrast the literature on Participatory Design (CACM 93) with the publications on business process reengineering (e.g. Hammer et al. 94), workflow management (e.g. Swenson et al. 95) and continuous improvement with evolutionary life cycles (James 89). Furthermore we have made three case studies investi-

gating how companies organize projects to introduce workflow management systems and how they involve their employees. During the case studies we took the role of consultants who had to summarize the different modes and experience and to support the information transfer.

## 2 A Framework

From the perspective of evolutionary life cycles we can construct a workflow life cycle which starts with the gathering of data. In the next step the data is used to model, analyze and improve the business process. Then a workflow management system is selected and configured to support the improved version of the business process. Afterwards the system is used and experience is made which helps to investigate the weak points. With this investigation the cyclic process of continuous improvement starts again. Similarly the participatory design (and introduction) of software systems differentiates between phases of requirements engineering, software development (firstly, of prototypes) and testing. During the phase of prototyping the users try to fix their expectations with the aim of being prepared for the testing. While testing the system, the users develop new requirements and the cycle starts again. Fig. 1 combines these two perspectives.

The boxes of fig. 1 represent the different phases. Boxes with shadows contain more details (see figs. 2 and 3). Every phase shown in figs. 1, 2, and 3 can be combined with a set of documents. We can differentiate between three types of documents: documents which represent information about how participation is organized and the whole project is managed, such as how decisions are made, how the exchange of information is organized, who is involved with which rights, duties and responsibilities, what happens when conflicts occur and which resources are available. The second type of document represents the methods and results which are related to each phase, for example, the method of how data and requirements are gathered, the method of modeling and the models of the business process, the documentation of the selected workflow management system, the method and content of the education and training of the staff, the list of weak points and – most important – the agreements which are the outcome of participation. The third type of documents is related to the effects of the business process improvement and to the interests of the affected employees. Therefore it contains information about ergonomical aspects (such as workload and possibilities for free decisions and flexibility), privacy aspects, cognitive requirements, time needed

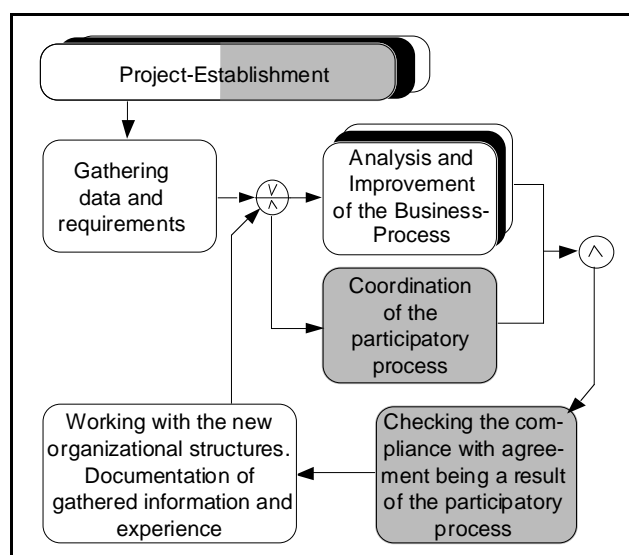


Figure 1: The life cycle of participatory business improvement

per task, costs, communicative and social relations, etc. This documentation of the potential effects is an important basis for the decision making of the participants.

The whole cyclic process starts with the project's establishment. As figure 2 shows, this guarantees early information about visions, ideas, concepts and plans. This kind of information is very decisive because it provides the context for further effects of a concrete project and makes the interdependencies with other projects comprehensible. In the course of establishing the project, the critical success factors should be identified and the conditions of the project have to be negotiated (see Kensing et. al. 96). We suggest that the negotiation should be used to make the potential benefits and disadvantages for the involved parties comprehensible. Thus, diverging interests can become apparent and the project's organization can be specified in a way which avoids this divergence evolving into serious conflicts.

Furthermore, the project's establishment also contains the determination of the project organization, like initial planning of the project and the preparation of the participation process. The project organization can be refined, if necessary, before a particular phase starts. The planning and preparation includes the initial specification of most of the documents as described above. One should find agreements concerning the crucial aspects of participation, for example: how to solve conflicts and who takes part. The main purpose of participation is to balance diverging interests. If such divergence did not exist, participation would not be necessary. Therefore it is important to identify the interests involved as early and continuously as possible to avoid conflicts which might cause extensive costs if they are detected too late. Other measures to avoid conflicts can also be taken into account: The size and structure of the teams or committees should be chosen in a way which allows them peer-to-peer negotiation and social sensitivity; furthermore, mediators or moderators can be introduced to support a group to solve conflicts (Okamura et. al., 94). Conflicts which cannot be solved are mostly passed on to a higher level in the hierarchical structure of an organization (Wicke 92, p. 207). Usually, groups tend to avoid this manner of delegating a decision. This tendency can be facilitated by personal relationships between the members of a group. The more voluntarily people take part in the participatory process, the more willing they are to find a consensus

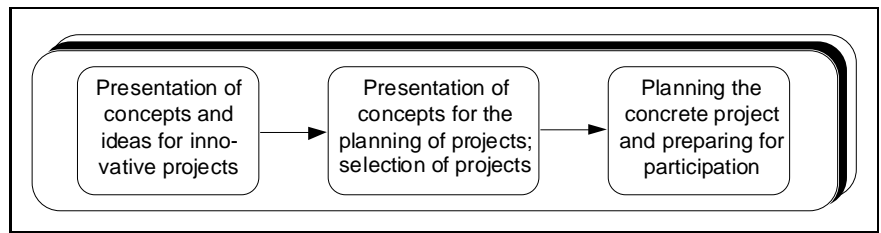


Figure 2: Details of project-establishment

(Mambrey et.al. 86, p. 72). Apparently, the organization of participation has to be adaptable during the phases of business process improvement (see figure 3), but the balance of interests should not be restricted by this flexibility.

After the project's establishment, the gathering of information starts and is followed by the phase of analyzing and improving the business process. These phases are distinguished as shown in figure 3. The organization of participation during analysis and improvement is adaptable as expressed by the parallel box named

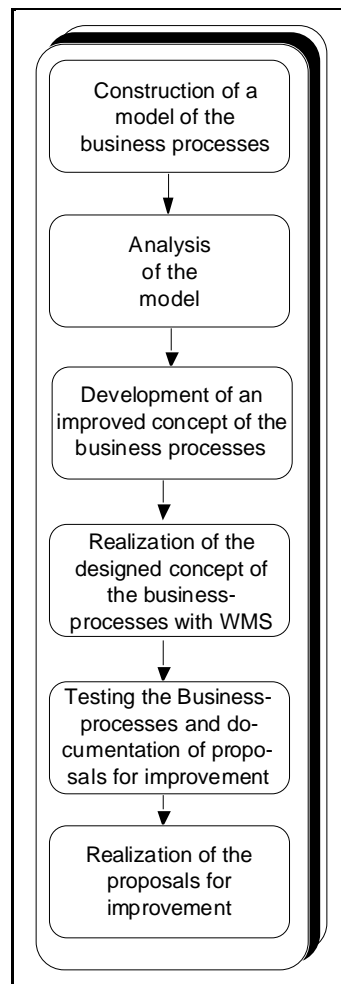


Figure 3: Details of analysis and improvement of business processes

coordination of the participatory process. That means that the participants should have the possibility to influence the participatory process and to negotiate the circumstances of participation (like resources, modes of participation etc.). Before the new organizational structures are applied and supported by a workflow management system, one must check whether all measures are in compliance with the agreements being a result of the participatory process. Therefore the documents described above have to be completed during the two parallel phases. The responsibility for this inspection and for the coordination of the participatory process should lie in the hands of a steering committee in which the members of all involved parties are represented. Participants who mainly have to carry out tasks as part of the business processes are not as responsible for the strategic decisions of a company as their representatives are. While "normal" employees can concern themselves mainly with their job conditions, the members of the steering committee have to focus on the success of the whole company. The members of this committee should represent the different interests being relevant for the whole project. The extent of responsibility participants have in the course of business process improvement should be tailored in accordance with their organizational position. To support a continuous process of improvement, the employees involved in the new or-

ganizational structures should document and visualize their gained experience to provide the basis for a new cycle. This new cycle can become necessary by the detection of weak points or by considering of information concerning the situation of a company.

### 3 Modes of participation

One can differentiate between a variety of methods of how participation can be organized. There are different ways through which the work council and (or) the staff can be informed, such as meetings of the whole workforce, newsletters from the company, presentations for selected representatives of the staff, company meets another company (where the planned measures have already been brought into reality) and direct talks with managers. In these cases, employees are more or less passive. Other methods provide more possibilities for employees to actively influence the business process improvement, such as consultation with representatives, hearings, opportunities to make proposals, workshops, usage of external know how to elaborate the proposals. The highest influence becomes possible if the work council has the right of co-determination. This right can be guaranteed by law, as is the case in Germany, if the decisions concern an electronically supported monitoring of employees or a far-reaching organizational change. These conditions are fulfilled if business processes are improved and workflow management systems are introduced. Therefore, unsolved conflicts can lead to awkward legal consequences; to avoid them, the management of a company mostly attempts to find a consensus with the work council.

It is sensible to analyze each of the phases described above under the question which modes of participation are appropriate and what is the content of the participation. In the most phases it is not sufficient to only inform the employees, for example, when the improved concept is under construction. They should have an opportunity to influence the business process as early as possible, if their positive attitude is a goal for the company. We assume that employees are only willing to support more than one cycle of improvement if they can realize their advantages.

The most crucial requirement is to make the staff knowledgeable – not only that they can conduct the newly organized processes, but also that they are able to take part in an active process of participation. Therefore additional effort is required to make the business processes and the concepts for improvement comprehensible by employing methods of visualization. To meet this challenge it is sensible to refer to concepts like storyboards (Wall et al. 94), working analysis wall (Blomberg et al. 93), the Pictive method (Muller 93) and to adapt them to the special conditions of business process modeling.

### 4 Conclusion

Participatory continuous improvement of business processes with workflow management systems requires very complex organizational structures. The organizing of participation and the changing of business processes can both be considered as organizational processes themselves which have to be coordinated. Furthermore, at least three different information spaces have to be integrated: documents representing the organizational structures, methods and results of the phases of business process improvement, and the documentation of the requirements which have to be fulfilled by the improvement. It is an important task of the project management to maintain the comprehensibility of these complex structures – especially for the work force. We suggest that software based methods of modeling and visualization (such as hypermedia tools) be employed to make all the relevant perspectives comprehensible. It is a challenge for future research to develop these kinds of tools which support the integration of the three different information spaces outlined above.

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