Enterprise Modelling in Distributed Teams – Lessons Learned from Information Demand Modelling

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Abstract. Traditionally, enterprise modelling has one of its application areas in the context of improving business practice and management. In such improvement situations an important dimension is optimized information flow in organisations, i.e. to be able to provide the information required to complete organisational tasks. In order to systematically capture and analyse information demand in enterprises, a method for information demand analysis has been developed. The subject of this paper is the use of this method in distributed teams of modellers. This requires transfer of method knowledge to the modellers, coordination of its application, systematic evaluation of lessons learned, and collection of change proposals for the method. The aim is to report on the process of method knowledge transfer and usage including the lessons learned and implications on the used method.

Keywords: Enterprise modelling, information demand modelling, method knowledge transfer, method development, practice of modelling

1 Introduction

Enterprise modelling, enterprise architecture, and business process management are three areas that for a long time have been part of a tradition where the mission is to improve business practice and management [1]. There are close relations between these areas and the information systems field in the aim to improve organisations [2]. This improvement process often involves activities such as understanding and evaluating the current situation of a business and then developing and implementing new ways of working [3]. In this context, business process management and enterprise modelling often are used and applied as techniques to perform a business diagnosis, often referred to as modelling and analysing the AS-IS situation, and to develop and implement improvements, often referred to as the TO-BE situation [3, 8]. An important aspect of business diagnosis is the information flow within organisations, i.e. to analyse whether all organisational roles receive the information required for performing their work tasks and fulfilling their responsibilities.

One of the prerequisites for efficient business diagnosis and enterprise modelling projects is the use of a well-defined method [5], which guides the modelling procedure, defines the notation to be used for capturing modelling results, helps to identify important concepts and viewpoints, and supports identifying relevant stakeholders [6.7]. This paper addresses method use in distributed teams and in particular it focuses on experiences from the transfer of method knowledge. The experiences presented originate from the use of a method for information demand analysis (IDA), i.e. a method for analysing the information demand of organisational roles as a part of the information flow analysis [4]. This method was used in distributed teams of modellers, which required transfer of method knowledge to the modellers, coordination of its application, systematic evaluation of lessons learned, and collection of change proposals for the method. The aim of this paper is to report on the process of method knowledge transfer and usage including the lessons learned and method implications. The contributions of this paper are (1) an industrial case illustrating method use in distributed teams, (2) lessons learned from the process of transferring method knowledge, and (3) implications for the method as such regarding alignment between different models-on-plastic and electronic models.

The remaining part of the paper is structured as follows: Section 2 introduces the process and industrial cases of information demand modelling in distributed teams. Section 3 describes and discusses the lessons learned and method implications derived. Section 4 summarizes our work and describes future activities.

2 Information Demand Modelling in Distributed Teams

This section describes the context of information demand modelling in distributed teams forming the basis for lessons learned and experiences presented in this paper. This context includes an industrial case (section 2.2) and the process coordinating the modelling work (section 2.1).

2.1 Process of Modelling in Distributed Teams

The context for using the IDA method was the infoFLOW-2 project, which aims at improving information flow in small and medium-sized enterprises (SME) and has a runtime from 2010 - 2012. One of the main intentions of the project is to investigate, whether information demand-centric thinking can have advantages compared to process-centric thinking. When solving organizational problems, infoFLOW-2 starts from understanding and modelling the information demands in an organization, instead of modelling the work processes. The project includes two partners from automotive supplier industries, a system integrator specialized on IT-solutions for SME, a public-private partnership in information logistics research, a research institute and a university, responsible for the project management. Additional enterprises are involved on a case basis.

In the preceding project, infoFLOW-1 (2006-2009), the method for information demand analysis was developed. The method is documented in an English and a

Swedish handbook. Both handbooks aim at supporting method use by describing each phase of the method with preconditions, steps to be performed, way of working, expected results and aids, if relevant. Since many participants in the infoFLOW-2 project are native Swedish speakers, the Swedish version was considered an important element to ease method application.

Work in the infoFLOW-2 project, including modelling in distributed teams, was coordinated by infoFLOW-2 project meetings with all project members attending. During the meetings, upcoming cases for information demand modelling were briefly introduced and the decision was made, who should perform and how the case should be performed. During the first part of infoFLOW-2, the basic strategy was to transfer method knowledge by always involving at least one modeller in the case who was part of the method development team, i. e. the handbook was basically considered as accompanying material for the cases in the first infoFLOW-2 phase. The other modellers involved in the cases were supposed to learn the method by observing the experienced modeller and by stepwise getting more responsibility for the case.

Later in the project, we added cases where only the method handbook served as means to provide the method knowledge or where the modelling teams did no longer include one of the initial method developers. In total, we so far performed 4 cases with involvement of method developers, 4 cases without method developers but with modellers who were involved in at least one of the first 4 cases, and 3 cases completely based on handbook use only. These 3 cases were outside the infoFLOW-2 project and using the English handbook version.

For all cases and during all phases of infoFLOW-2, the project meetings served as central coordination unit, i. e. the modelling results, experiences when performing the modelling, and improvement or change requests for the method and the method handbook were discussed during the infoFLOW-2 meeting in the project team and documented in the minutes. The infoFLOW-2 project includes 4 industrial and 2 academic partners. On average the meetings had 10 participants (5 from industry, 5 from academia). Among these 10 were 5 who were involved in the method development and the main method engineer.

2.2 Industrial Case

The research work presented in this paper is motivated by a number of real-world cases, one of them was selected for brief presentation in this section: the SAPSA case.

The SAP Swedish User Association (SAPSA) is a non-profit association for organizations that use the enterprise system SAP. The main purpose with SAPSA is to provide an arena for exchange of knowledge and experiences and networking for SAP stakeholders. SAPSA also aims at taking care of the member's demands for development of SAP software and services and third part products certified by SAPSA. The members have unlimited access to SAPSA´s focus groups (groups with expertise within certain areas) and the annual SAPSA conference. The background for doing enterprise modelling and information demand modelling at SAPSA was an articulated need from SAPSA to elucidate their interaction with the focus groups, members, and other stakeholders. At the time of this case SAPSA experienced some difficulties in how

to increase the activity and exchange between SAPSA central, the focus groups, the members, and other stakeholders. The core area for the modelling session therefore addressed the central roles; SAPSA, Focus groups, User companies, SAP consultancies, SAP Sweden, and SAP International. The people that were present at the information demand modelling seminar were, from SAPSA: the CEO, the Event coordinator, the economy administrator, and the secretary from the SAPSA board. From the research project we participated with one researcher. One representative also participated from the industry. The industrial project representative is also the secretary in the SAPSA board.

The actual modelling seminar lasted for five hours including a scoping discussions (framing and setting the scene), the actual modelling, and validating discussions in the end of the seminar. The actual modelling session was divided into two phases. First we modelled the actual situation and how the different roles were interacting today (AS-IS), see fig. 1 below.

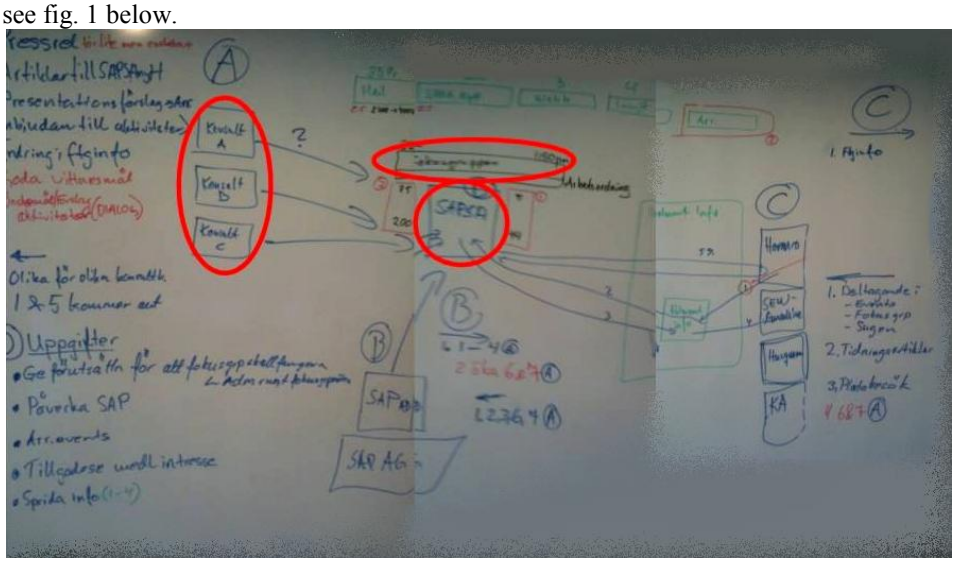

Figure 1: Example of model from the first modelling phase

During this stage we also had an evaluating discussion about the current practice concerning the interaction between the involved roles. This evaluation resulted in a couple of core problems in relation to the exchange and interaction between the specified roles. Based on these problems we started to design a future interaction schema that could solve these problems. One important solution was to employ a new role at SAPSA, a Focus Group Coordinator. After the modelling seminar at SAPSA the models were then transformed into electronic versions, see fig. 2 below.

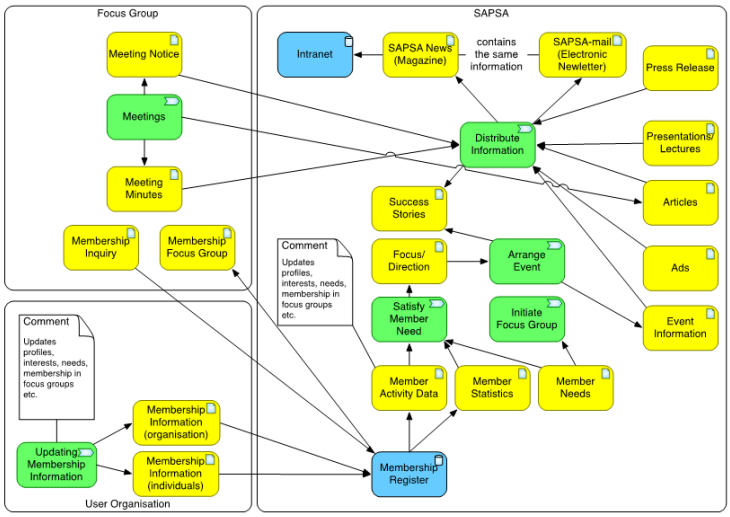

Figure 2: Information demand model of the SAPSA case

As in a couple of other cases, we observed that there are somewhat troubling differences between the models that were developed on site, usually on plastic sheets or on whiteboard, and the models when they are transformed into electronic versions. It seems that the notation rules that are specified in the method for information demand analysis are a bit tricky to translate into the models during the actual modelling sessions. It seems, as there is a need for structural planning of the roles in the models, which is hard to do initially when the model starts to evolve. In some sense you need to have the whole picture before this type of structuring is possible.

3 Lessons Learned and Method Implications

Lessons learned from distributed application of the information demand analysis method are presented in this section. Due to space limitations, we selected just two lessons for discussion: experiences from modelling in distributed teams (3.1), and the necessity to avoid gaps between the electronic and pre-electronic models (3.2).

3.1 Experiences from modelling in distributed teams

The most important lesson learned from the process and coordination of distributed modelling is that more tools and aids supporting the use of the method are required. Although we were in the very fortunate situation to have 6 modellers in the project team who were quite deeply involved in the method development, the transfer of this method to other modellers by joining the team and learning from the experienced ones had a number of problems. The experienced modellers all had the same IDA method steps and a joint perspective on how to perform the modelling in common, but they performed the

actual modelling slightly differently, i. e. they did not share the practices of IDA originating from their own backgrounds. Examples of these differences are

- how to perform the scoping (start from an organizational unit or start from a work process?),
- how to layout the models,
- how detailed to document terms and concepts (e. g. the responsibilities of roles), or
- how to schedule the modelling process (e. g. plan, interviews, modelling session and feedback workshop at the beginning of the process or one after the other)

These differences in practice basically are a consequence of the nature of methods, which are supposed to be support and a guideline for action, not a rigid and precise algorithm, since adaptation to situational requirements is considered an element of method success. However, when teaching a new method to modellers, these differences in practice often are perceived as deviations from the recommended method use or as inconsistencies in the method then as supportive practices. For relatively newly developed methods, like in our case the IDA method, variations in the practices should be made explicit by either offering alternative paths in the method descriptions or additional aids, like checklists or textual practice description, complementing the method handbook.

Our recommendation is to develop a training course for the method to be transferred (in our case the IDA method) and to include a detailed example for all steps of the method in the handbook. The training course will help to make the material and aids more detailed, the example will ease understandability of the handbook and help to identity gaps.

3.2 How to avoid gaps between pre electronic and electronic models?

Based on practical experiences from the case presented in section 3, we have recognised what we on a conceptual level would describe as model gaps. These model gaps are closely related to the work procedure that is prescribed in the IDA-method. The normal work procedure in IDA, and many other modelling methods, is that the modelling is performed in two steps. In the first step we do the modelling on big plastic sheets or papers with post-it notes and white-board pens. The reason for this is to be able to do the modelling in an interactive manner together with different stakeholders. The goal is to get the stakeholders to be active in the actual modelling activities in different ways. In the second step the models on the plastic sheet is transformed into digital models in a modelling tool. As a result of this transformation process we have recognised that the differences between the plastic model and the transformed digital model can be of quite some difference. For information demand modelling this transformation process involves a restructuring of the models in terms of role-clustering of tasks and the needed information based on different rules. This clustering process could in this case be regarded as an analysis activity, which probably is not so easy to do during the actual modelling session. This structuring planning of clustered roles in the models is hard to do initially when the model starts to evolve. In some sense you need to have the whole

picture (whole models) before this type of structuring is possible. This creates what we have chosen to call conceptual model gaps.

These model gaps are typical examples of alignment deficiencies between different work steps in the method. When we have these types of deficiencies in our models we will have to put down specific efforts into analysing the models as such rather than the specific case, which rather should be the priority. It is therefore important to really address notation issues when we are developing methods for a certain purposes. The notation should therefore be simple enough so that we can devote our modelling efforts to case analysis and not model analysis, i.e. the notation and the notation rules in a method should not require analysing activities in order to produce the model.

In order to identify and implement the implications for the information demand modelling method used in our cases, we have now initiated a method development activity where these alignment issues in the method are treated. Our suggestion for solution, which we already piloted in a number of cases, is to refine the procedural description of how both the initial draft of the model, as produced during seminars and the documentation of those into electronic models are constructed, which is supposed to ensure traceability between the different versions of the model.

More concrete, we started improvement work of the method with the following objectives:

- A more precise correspondence between the "paper-based" symbols used for models-on-plastic and the notation used in the electronic version. For all elements in the notation, a corresponding paper symbol has to be selected and labelled accordingly, e.g. colour, shape and print on the paper symbol have to be defined. This will at least ease the work of translating models-on-plastic to electronic ones.
- A checklist for supporting consistency and completeness of the models-on-plastic. In the modelling team, one member will have the task to assure at the end of the modelling session that the number of quality issues is as low as possible. Aspects to check include relations between model elements or additional textual descriptions of important concepts
- Guidelines for layout of models-on-plastic. Might be useful. However, this aspect has to be investigated carefully because standardizing the layout might hinder the user participation, which would be an unwanted effect.

4 Conclusions and Future Work

Illustrated by an industrial case, this paper presented experiences and lessons learned from transferring method knowledge and performing information demand modelling in distributed teams. These lessons learned mostly concern the practice of demand modelling and of transferring method knowledge. An important lesson learned is that method knowledge transfer "by heads" (i.e. by including persons experienced in the use of the method in a modelling team) does not substitute a good method handbook, since even these "heads" need some sort of normative ground to base their practice on.

Furthermore, a number of implications for the method as such can be derived from the experiences:

- Traceability between models-on-plastic and electronic models has to be improved, e.g. by correspondence between paper-based symbols and method notation, in order to avoid alignment deficiencies between different work steps
- the layout of the information demand models as part of the secondary notation has to be further explored and developed, in order to ease the visualization and an understanding of role – information dependencies.
- more tools and aids supporting the use of the method are required, which make variations in the practice of different modellers explicit by either offering alternative paths in the method descriptions or additional aids, like checklists or textual practice description, complementing the method handbook

Implementation of the above changes and evaluating their effects in the practice of modelling constitutes the future work in this area.

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