

ENTERPRISE MODELING PRACTICE IN A TURNAROUND PROJECT

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Abstract: *The paper describes enterprise modeling in a combined process change and ICT initiative in a small Norwegian Home Builder company. The paper contributes to understanding of modeling practice by reporting modeling experiences and recommendations and by relating modeling to a series of change activities. At an overarching level change took place in three stages: (1) Change maturation, (2) Change decision and (3) Process change, where the last stage constituted four steps of modeling supported process change: (1) Increased business understanding by providing a generic model, (2) Identification of TO-BE by process modeling, (3) Process categorization by sorting models into risk zones and (4) Implementation of prioritized change consistent with model artifacts. Readiness is identified as a precondition both for change and for doing modeling at all. The paper also investigates the importance of employee involvement and anchoring in senior management and the role of the project leader.*

Keywords: Process change, ICT, Enterprise modeling, Readiness, Employee involvement

1. INTRODUCTION

The term enterprise modeling is used in several ways both by practitioners and in the literature. An enterprise model can be a simple representation of the real world or an abstract picture existing in someone's mind. Anything that represents some enterprise aspect can be considered an enterprise model. It does not have to be more sophisticated than a sketch of the plant lay-out drawn on a flip-chart (Szegheo, 2000). Rumbaugh (1993) describes enterprise modeling as the process of understanding a social organization by constructing models. It is a key tool in understanding business processes as a prerequisite for improvement, used as a tool in conversation, communication and understanding in business change programs (Andersen, 2000; White & Miers, 2008). Enterprise modeling supports the strategic alignment task, as well as the management of planning evolution and change of business systems and practices (Loucopoulus & Kavakli, 1995).

Whereas much research has been devoted to the development of enterprise modeling tools, methods and methodologies, less is known about practice, for example on modeling benefits (Eikebrokk, Iden, Olsen & Opdahl, 2008; Indulska, Green, Recker & Rosemann, 2009). Delen and Benjamin (2003) analyzed major obstacles to a broader use of enterprise modeling and provided a methodical approach and a software implementation that addressed these obstacles. Persson and Stirna (2001) focused on why enterprise modeling is used in an explorative study into current practice. Within a sub-field of enterprise modeling, process modeling, Sedera, Gable, Rosemann and Smyth (2004) provided a success model for business process modeling based on a multiple case study, driven by little empirical research on important factors of effective process modeling and post-hoc evaluation of modeling success. Their study evaluated multiple independent and dependent variables derived from literature on the success of process modeling projects. Critical success factors were defined as those key areas where 'things must go right' in order for the process modeling project to proceed effectively and conclude successfully. Sedera et al (2004) included Stakeholder Participation, Information Resources, Management Support, Project Management and Modeler Expertise as project-specific success factors in their revised model.

Eikebrokk, Iden, Olsen and Opdahl (2006) conducted a study giving insight into Norwegian model-supported process-change practice. They introduced a process modeling practice model and found that the combination of technological, social and organizational factors explain the outcome of model-based process change projects. Recker, Indulska, Rosemann and Green (2006) identified critical issues related to the practice of modeling with Business Process Modeling Notation (BPMN) in contemporary process management initiatives. Recker et al. (2010) highlighted the need for consideration of representational issues and contextual factors in decisions relating to BPMN adoption in organizations. Kock, Verville, Danesh-Pajou and DeLuca (2009) studied business process redesign projects in eighteen organizations and found that a focus on communications flows is important for success. They emphasized that business process redesign has been intensely studied since the 1990s, but that little attention is paid to the relationship between business process choices and redesign success.

To increase knowledge of enterprise modeling practice, we conducted a multiple case study focusing on enterprise modeling practice in Norwegian companies. More than thirty informants were interviewed, and a variety of material in the form of model prints, reports and historical material from eight different cases were collected. Outcomes of the study have been, among others, a research model of enterprise modeling practice (Karlsen & Opdahl, 2012b) and insight into modeling benefits (Karlsen & Opdahl, 2012a). Our research so far has aimed at comparing and finding commonalities across various cases to validate and elaborate the Enterprise Modeling Practice model. In this paper we use our data to investigate a single case in particular. The focus is a change process where enterprise modeling was used to improve a small Home Builder facing a crisis. This Home Builder is building homes, on their own as well as others' sites. The company has 33 employees and is located on the west-coast of Norway. The most recent economic figures show that the company has evolved from risking bankruptcy to becoming a viable market actor. Our main objective is to detail the picture of modeling practice in the Home Builder during this turnaround by investigating modeling use from a longitudinal perspective (Eisenhardt and Graebner, 2007). We also want to extract lessons learned and recommendations on modeling practice, since individual voices are in danger of being lost when comparing cases (King, 2004). Finally, since there is a need for exploration and publication of success stories (Indulska et al, 2009) we will discuss our findings subject to some factors which literature regards as important to project success.

In section 2 we present related work. Thereafter, in section 3, our research approach is presented. In section 4 we present the Home Builder Case. In section 5 we present our research findings, before we discuss our findings in light of theory in section 6. Finally, in section 7 conclusions are drawn and suggestions are made for further research.

2. THEORY

2.1 Enterprise modeling use

Persson et al. (2001) found that enterprise modeling can be used for two main types of objectives: (1) developing the business, e.g. developing business vision, strategies, redesigning the way the business operates, developing the support information systems, or (2) ensuring the quality of the business, e.g. sharing the knowledge about the business, its vision, the way it operates, or ensuring the acceptance of business decisions by committing the stakeholders to the decisions made. Hence, enterprise modeling offers many uses. At a more general level enterprise modeling can be used as a tool for communication, conversation and understanding, and more specifically as a tool to develop the business or to ensure business quality. In Karlsen et al. (2012a) we present our finding of five different types of enterprise modeling initiatives termed *Strategy*, *Industry*, *Dataflow*, *Work* and *Support*. Describing each initiative in terms of process change main focus, modeling objectives and ICT-initiatives, gives insight into the use of modeling. In *Strategy* enterprise modeling is used to reach a change strategy in a long term business change initiative with a mixed focus on improving work practice through physical intervention and improving information flows using information and communication technology (ICT). In *Dataflow* enterprise modeling is used to reveal AS-IS as input to a requirements specification in an effort to

improve information flows. In *Work* vendor supplied models are utilized to unveil differences between a wearable voice-directed warehouse application system and the organization in an effort to improve work practice by technology. In *Support* enterprise modeling is used to fill a quality system with process descriptions based on a specific guideline, focusing on developing a business support environment where it is expected that shared common models of work practice in the long-run will improve business. In *Industry* enterprise modeling is used to uncover the build-up of market leaders' ICT solutions to develop a joint industry-specific ICT solution and to produce input for a preliminary report to communicate the necessary alignment between this joint solution and specific actors' needs. We found enterprise modeling described as a tool or technique to increase the efficiency in the interaction between various project participants, as well as used as a tool or technique for employee training, and also to shape a common understanding of the business (Karlsen et al, 2012a).

Indulska et al (2009) found that academics, practitioners and vendors rank modeling benefits differently. Building on Shang and Seddon's (2002) benefits classification framework, they mapped benefits from each top ten list of the vendors, practitioners and academics to one of the five benefit dimensions: Strategic, Organizational, Managerial, Operational and IT infrastructure. They found that practitioners and vendors agreed that process improvement is the top process modeling benefit. Similarities also existed in the perception of an improved and consistent understanding of business processes as a core benefit, being ranked as #2 and #3 respectively by vendors and practitioners. Academics, however, perceived model-driven process execution, which was not identified by practitioners at all, as the number one benefit derived from process modeling activities.

2.2 Steps in process change

Davenport and Short (1990) stated that business process and IT are natural partners and that organizations that have used IT to redesign boundary-crossing customer driven processes have benefited enormously. They observed most or all of the following steps being performed in companies succeeding with business process redesign: (1) Develop business vision and process objectives, (2) Identify processes to be redesigned, (3) Understand and measure existing processes, (4) Identify IT levers and (5) Design and prototype process (Davenport et al, 1990).

Kettinger, Teng and Guba (1997) investigated a large number of business process reengineering methods, techniques and tools and placed them within an empirically derived reference framework. They concluded that projects differ in magnitude of planned change, and that varying project characteristics call for differing methodological choices and different techniques. To assist project planners in business process reengineering, they empirically derived a planning framework outlining the stages and activities of a business process reengineering archetype: *Stage 1: Envision*. This stage typically involves a business process reengineering champion engendering the support of top management. A task force is authorized to target a business process for improvement based on business strategy and IT opportunities in the hope of improving the firms overall performance. *Stage 2: Initiate*. This stage encompasses the assignment of a reengineering project team, setting of performance goals, project planning and stakeholder/employee notification and buy-in. *Stage 3: Diagnose*. Diagnose is classified as the documentation of the current processes in terms of process attributes such as activities, resources, ICT and cost, where root causes for problems are surfaced and non-value-adding activities are identified. *Stage 4: Redesign*. In this stage a new process design is developed by devising process design alternatives through brainstorming and creativity techniques. *Stage 5: Reconstruct*. This stage relies on change management techniques to ensure smooth migration to new process responsibilities and human resource roles. *Stage 6: Evaluate*. This stage involves monitoring of a new process to determine if it meets its goal and is linked to a firm's total quality program. Kettinger et al. (1997) also found that at least 72 techniques were used to accomplish activities associated with business process reengineering projects, including techniques developed in other problem-solving contexts like activity-based costing and role play. They saw that the success of radical business process reengineering projects is dependent on effective change management, which puts a pressure on project planners to effectively integrate techniques for organizational design into their customized approaches.

2.3 Effective change management

Trkman (2010) emphasized that although business process management is a popular concept, it has not been properly theoretically grounded. In general the literature offers similar and rather general success factors for business process management, summarized as: top management support, project management, project champions, communication, inter-departmental cooperation and end-user training, where top management often is considered the most important (Trkman, 2010).

Markus and Benjamin (1997) concluded that many IT-enabled projects fail despite what is known about ensuring success. They did not have any magic solution on how to handle change, but provided some suggestions. First, success in IT-enabled transformation is more likely when those involved in initiating, designing, or building technology-enabled change accepts that IT is not a magic bullet. Change management involves listening, understanding, giving people an opportunity to learn, designing learning experiments, as well as dramatizing and visualizing ideas. The change management activity must be performed as an integral part of initiating, designing and building change enabled by technology. Markus et al. (1997) recommended that line managers and IT specialists who wish to achieve success with IT-enabled transformation must change their own minds so that they can alter their change management behavior; e.g. giving up the magic bullet theory associated with IT. Next they believed it is unwise to approach such a complex, dynamic and chaotic process as IT-enabled organizational transformation as a linear sequence of tasks with defined roles and handoffs. Instead everyone must be ready to do whatever it takes, since change is everyone's job. To implement this recommendation, Markus et al. (1997) suggested that the organizational members learn about and practice all the different roles that change agents may play. They pointed out that all individuals will be more effective contributors to change processes if they learn to shift tactics when conditions change and familiar practices do not work. In addition, they argued that behavioral flexibility is a critical success factor in chaotic change processes, sometimes using a tactic to shock people with evidence of the need for change and sometimes providing them with an attractive vision of the outcomes of change. Visioning change as everyone's job, Markus et al. (1997) proposed that at least two team members should be designated as change agents, e.g. one IT specialist and one non-specialist and that the assignment should rotate periodically so that all team members are able to think through and practice change management. After a shared change culture has started to form, the organization should formalize the role as part of everyone's job. Markus et al. (1997) concluded that successful change does not need magic, but takes good ideas, skills and plain hard work.

2.4 Readiness

The concept of readiness is well-known within the organizational literature and discussed by for example Beckhard and Harris (1987) and Armenakis, Harris and Mossholder (1993). Armenakis et al. (1993) emphasized that because of increasingly dynamic environments, organizations are continually confronted with the need to implement changes in strategy, structure, process, and culture. They saw many factors contributing to the effectiveness with which organizational changes are implemented, where one such factor is readiness for change. They defined readiness for change as the cognitive precursor to the behaviors of either resistance to, or support for, a change effort, and described it in terms of the organizational members': 1. beliefs, 2. attitudes, and 3. Intentions. Armenakis et al. (1993) saw the message for change as the primary mechanism for creating readiness among members of an organization. They suggested that framing a change project in terms of readiness seems more congruent with the image of proactive managers who play the roles of coaches and champions of change, rather than those whose role is to reactively monitor the workplace for signs of resistance. They asked how a change agent might intervene in the natural flow of social information processing occurring among organizational members to increase their readiness for change. They concluded that the three strategies of persuasive communication, active participation and management of external sources of information are appropriate. Armenakis et al. (1993) said that oral persuasive communication involves direct, explicit message transmission through meetings, speeches, and other forms of personal presentations, whereas written persuasive communication happens in the form of documents prepared by the organization (e.g., newsletters, annual reports, memos). As to the management of external sources, they explained that sources outside the organization can be used to bolster messages sent by the change

agent, for example in the form of a diagnostic report prepared by a consulting firm used to add credibility to a message sent by the change agent. They emphasized, with reference to Gist (1987) that generally, a message generated by more than one source, particularly if external to the organization, is given a greater air of believability and confirmation. Armenakis et al. (1993) suggested that active participation in formalized strategic planning activities can lead to self-discovery of discrepancies facing the organization.

3. RESEARCH METHOD

Our study was initiated to answer the overall research question: “*How is enterprise modeling used, and how can it be used to support ICT-enabled process change in Norwegian companies?*” The initial research goal was set to elaborate and validate an Enterprise Modeling Practice research model presented in Karlsen (2008). The present study examines further in depth one of the cases, the Home Builder, partly guided by our overall results. In addition to the data from the overall study, see Table 1 for details, we use financial figures and a one and a half hour long interview with the project leader as sources of evidence.

Table 1: Case information – Sources of evidence

Main organization	Number of employees	In-person interviews	Additional sources of evidence
A home builder company	33	The owner and top manager A combined IT-vendor and consultant	Board protocols Mail correspondence on modeling meetings Summary of the case history Financial numbers and bank letters Model artefacts Literature references motivating the approach followed Procedure descriptions PowerPoint from meetings Description of the stages followed in the building process

We revisited the Home Builder, a Strategy initiative, in order to capture the circumstances of, and conditions for the organizational change process. This is one of the rationales making single case appropriate (Yin, 2009). The revisit additionally introduced another single case rationale; that of the longitudinal case (Yin, 2009). We wanted to broaden our insights by focusing on the experiences of a project leader participating in a change project in a typical small company. The assumption was that this could broaden our description of enterprise modeling use by supplementing previous interviews, collected notes, board protocol minutes and other material with personal reflections. The project leader was our preferred interview object due to his intimate knowledge of the whole change process and his willingness to share these experiences. He was both member of the Board and consultant engaged to facilitate the turnaround process in the main organization. He acted both as project leader and facilitator of the modeling process.

The last visit resulted in an interview in the form of a dialogue, focusing on three themes: (1) Personal experiences, (2) Recommendations and (3) Lessons learned. The interview gave insight into what the project leader saw as central aspects in the achievements on turning the company into a successful undertaking. The material was coded with tags or labels for assigning units of meaning to the descriptive or inferential information compiled during the study (Miles & Huberman, 1994). We also re-read all material to gain an overall impression of the change process. By combining the various sources of evidence we could summarize change in terms of steps and sub-steps. Experiences, recommendations and lessons-learned were then sorted in accordance to which step they related to. Finally, case findings were analyzed by comparison to the literature. Validity was strengthened by having the project leader review the case report at the completion of data analysis at the case site (Yin, 2009).

4. THE HISTORY OF THE HOME BUILDER

4.1 The problems emerge

With reference to signed board meeting protocols, extracts from meeting calendars, correspondence and notes the project leader describes the problematic situation as follows: In 2002 there was a board meeting where the board director signaled the need for correct information on project results and comparability of financial statements. It was emphasized in the Board meeting that there were formal requirements for project accounting. The formation shown could not be compared to the financial statements, and was made in such a way that it was impossible to calculate break even turn-over or otherwise determine what was good or poor project results. Project accounting thereby lost its significance. [Mail: The history, Project Leader]. In 2005 The Board made the decision to look into the organization. The background was the detection of a lack of overview on how to make a profit while at the same time registering interaction difficulties and conflicts. [Mail: The history, Project Leader]. Early in the year of 2006 the Board decided to review a submitted proposal on the making of clearer distinctions between the activity areas of the company. Currently one was lacking an overview of what made profit. The Board pointed this out. The objection was that it was cost-driving to spend time on this matter, and that it was unnecessary because the company made money. The board nevertheless made a decision that one should look into how one could obtain the relevant information. In the middle of 2006 the company tested a new system for order management, project accounting and financial management. There were still challenges in establishing best practices and a good culture for accuracy. One of the challenges was that carpenters got their material at the lumber warehouse without submitting this on the project. In the last month of 2006 the company's organization was again a theme. The arrangement which was put into operation had turned out to be very labor-intensive. It involved for example that all project invoices had to be registered twice. The Board was impatient and required project accounting presented in a reliable way together with reports from the various activity areas. [Mail: The history, Project Leader]. In the middle of 2007 the Board followed the case of the Enterprise Resource Planning system (ERP) and financial overview closely. The report from the Board meeting indicates that the company was then in the midst of a change of routines. Order processing seemed to work fine. When it came to the department accounting and project accounting, these systems were expected to be in normal operation by August or September the same year. At the end of 2007 the Board again discussed company organization. The outcome of this discussion was the splitting up of the company into two separate companies, where one should focus on building material and the other should focus on residential design. [Mail: The history, Project Leader].

4.2 The turning-point

In August of 2008 the Bank demanded both operational and liquidity budgets. The company had a line of credit which it had exploited nearly one hundred percent. A new Board meeting was arranged in the middle of the next month. The situation had turned even more serious with a deficit of nearly NOK 1.5 million. The next month the liquidity was low, but they expected that they could proceed within the existing framework through the rest of the year. The Board emphasized that the procedures which were developed had to be put into operation. Both investment and staffing stop were implemented. Ongoing monitoring and alert duty on revenue was imposed. The Board demanded to be immediately notified if sales figures gave indications that the prognosis of the year would be threatened and might not be reached. [Mail: The history, Project Leader].

In a Board meeting at the beginning of October 2009, the Board again discussed routines and interaction within the company. It was evident that there were large improvement opportunities. Later the same month the Board invited all employees to a meeting. NN, member of the board and with more than 30 years of experience as a “clean-up guy” in companies facing financial difficulties, was designated project leader and facilitator. The meeting started with a discussion on the strengths and weaknesses of the company. A short presentation was made by the project manager about Lean principles and the flow of goods, work flow and information flow. These subjects had caught the attention of the project manager during the last couple of years. He therefore wanted the Board to look into them as possible

focus areas of concern to turnaround the company. The employees were then placed in groups consisting of a sales person, a building manager and two or three carpenters. They were invited to discuss strengths and weaknesses and the reasons behind the problems. A representative from each group summarized the results. The common denominator in what was presented was that the main problem lay in the flow of information.

4.3 A period of process improvements

The company then entered a period focused on process improvements: to increase earnings through better flows and less errors, to reduce time usage in the factory and to improve interactions both internally and with suppliers. The Managing Director was given the responsibility for implementing the changes. In April of 2010 there was a new meeting with all the employees. Having visited the company several times and interviewed various employees, the project leader wanted to discuss the procedures as they had now been implemented. Again the focus was on the flow of goods, work flow and information flow [Source: Mail, The history, Project Leader]. During the course of process mapping and changing flows, the company's profit after tax increased more than tenfold from 2008 to 2010, from approximately NOK 400' in 2008 to approximately NOK 6000' in 2010.

In a meeting with the bank in the middle of 2010 the bank now saw a financially sound company [Source: Mail, The history, Project Leader]. In September the same year, the administration, the Managing Directors, sales personnel, building managers and the project leader had a weekend meeting at a hotel to review the latest process descriptions. The review this weekend aimed at concluding on future actions. The meeting ended in what the project leader described as their way to build homes on someone else's land. During 2011 the profit increased even further and was reported as especially high at the end of the year. It is evident from interview statements that the project participants relate a large part of the improved earnings to the modeling process aimed at improving their business process: *"The reason is better information flow, which in turn leads to better goods flow. In addition we are experiencing less scrap due to fewer errors and better workflow due to better information flow: A win-win for all!"* [Interview I, Project leader]

5. RESEARCH FINDINGS

5.1 Identifying the modeling process

Based on the history of what happened, we can summarize the change process in three main stages: (1) Change maturation, (2) Change decision and (3) Process change. The change maturation stage lasted for several years, leading to a moment in time where the risk of bankruptcy was evident. The change decision on the other hand was instantaneous when the board acted by deciding to have a meeting with all employees, simply asking what they as a company were good at and what they did not do so well. The last stage then took the form of a year-long endeavor where profit increased. Figure 1 compares Profit margin in industry to Profit margin in the Home Builder Case. Figure 2 compares Return on Equity.

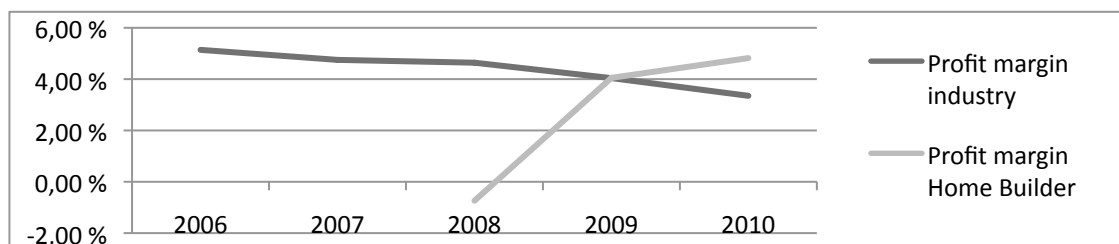


Figure 1: Profit margin in industry compared to profit margin in Home Builder

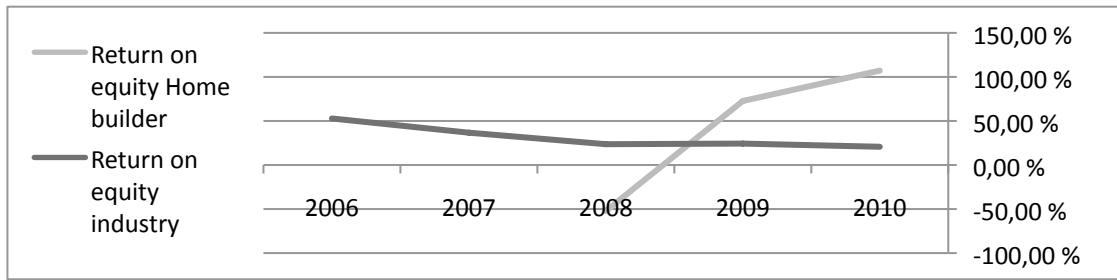


Figure 2: Return on equity in industry compared to Return on Equity in Home Builder

From the figures we see that while competitors kept struggling, the Home Builder improved and became a viable market actor, coinciding with putting planned changes into operation.

By combining various sources of evidence, process change can additionally be described in terms of four modeling supported steps:

- (1) **Increased business understanding by providing a generic model:** Initially enterprise modeling was used to establish a high level and generic model of the enterprise, using an adapted version of a model found in Miller and Berger (2001).
- (2) **Identification of TO-BE by process modeling:** Thereafter followed a process whereby modeling activities were organized as workshops with oral participation. The models were drawn by the facilitator while participants of the main organization provided oral inputs to the modeling process. The models were initially produced with the help of Microsoft Office in the form of “home-made” figures and textual descriptions; later transformed into BPMN. For example, the home production process was divided into five milestones with associated summary descriptions. The first milestone contained three sales phase descriptions. The second milestone featured a description of the production preparation. The third milestone focused on preparing the site ground. The fourth milestone contained four early construction phase descriptions, while the last milestone contained four interior design specifications. Figure 3 contains excerpts from a description where the home building process is presented and reviewed at a customer meeting.

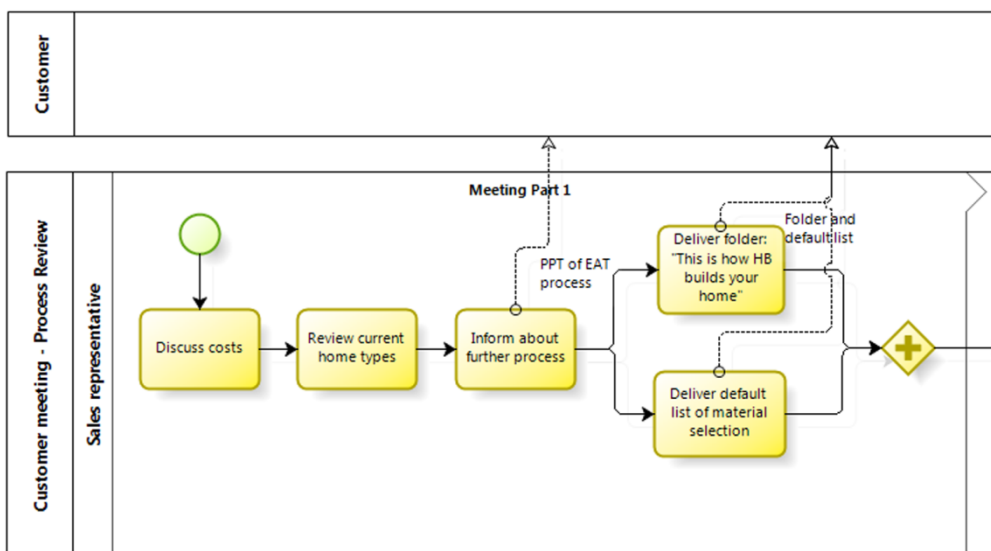


Figure 3: Excerpt from a customer meeting description

- (3) **Process categorization by sorting models into risk zones:** Having described the processes TO-BE, largely ignoring AS-IS, the processes were then categorized into “a green, yellow and red zone, where red signals show that we do not tolerate deviation whereas in the green zone more guidance

on how to do things is provided” [Last interview, facilitator].

- (4) **Implementation of prioritized changes consistent with model artifacts:** Having categorized the processes, the management of the main organization was instructed to implement the changes. The facilitator describes these activities as follows: *“they adjusted the way they worked...and checked out that the processes had different weights in accordance to risk. We had to be certain that things were done concerning the processes at the critical risk level”*

The project leader [I. interview, Project manager] stated that his expertise did not free the main organization and its employees from their role as providers of insights into business processes so that a more complete, integrated picture of the enterprise could be painted by his hand. To emphasize this aspect we use the term “facilitator” when quoting him in the following.

5.2 The facilitator’s experiences and recommendations

Increased business understanding by providing a generic model: The reason for starting the modeling effort by providing a high level and generic model of the enterprise was: *“to make various employees understand how various enterprise views are inter-linked and how the business processes could be described by introducing the concepts of information flow, work flow and the flow of goods”*. [Last interview, facilitator]. This approach is seen as an important success factor, because it led to what the facilitator describes as a Eureka experience. The visualization of the enterprise through the generic, high level model made people understand how things flowed *“in the form of goods from the suppliers and on to the construction site”* etc. The tools were important *“to visualize, because again, the flow of goods and work is visual, the information flow is not!”* [Last interview, facilitator]. Besides increasing the competence of the employees on how processes interact in the organization, the facilitator also links the use of the general model as a means to create readiness; to understand why things had to be done and what had to be done.

Identification of TO-BE by process modeling: The facilitator describes modeling practice as a large learning experience for him as well; a process whereby he collected material from various textbooks and from a Lean course he had recently attended. From this he got a “toolbox” of new ideas and approaches on how to accomplish the mission of changing the business.

The facilitator describes the approach used, as follows: *“We started to have workshops. The frequency varied. We discussed the processes: How is it done and how should it be done. We then wrote it down in points. We began monitoring: what happens from the initial stage of planning a house and until producing it, from start to finish? What is going on? Soon it was realized that it was not particularly useful to discuss how they did things, for it turned out that it was done in so many and different ways, so it was just as good to go right on: how is it best to do it? And then we started writing that down.”* [Last interview, facilitator].

Pertaining to the use of text versus graphical notation *“I feel you should use both. At the early stages of a process using, for instance, BPMN within a group becomes somewhat hopeless in my opinion. It is easier to write a few bullet points on the board to create an understanding of the flow. Entering into the details however, and in the process of accurately describing how to execute things, then BPMN in my opinion is more applicable in terms of visualizing. But just as one is standing center stage, then in my opinion it is better to use words.”* [Last interview, facilitator].

Process categorization by sorting models into risk zones: The criteria used to place different processes in the red or the green zone, are explained as follows: *“It is the consequence of the process, i.e. the risk’s probability and impact...It is for example: if you do not get the ordered window for a house, you will not get the house weather proof and if you then are about to build the wall..”* [Last interview, facilitator]. Interviewer: *“So it demands knowledge on construction practice?”* Facilitator: *“Yes, it does!”* The facilitator describes the importance of making this categorization: *“for in such situations there are many, many actions that shall be executed. And if you map all these actions and*

describe them in the highest detail, people get totally lost. That is one aspect. The second aspect is that one needs to obtain an understanding that if I do that wrong, then I will detect it and I can fix it by myself". But if I do not execute this process properly, terrible consequences will be the outcome" [Last interview, facilitator].

Implementation of prioritized changes consistent with model artifacts: Improvements were then implemented according to an evaluation of which processes were most in need of change. A concrete implementation of process change was for example having the carpenters participating in what is called a triangle meeting before starting a building process, i.e. a meeting between the salesman, the building manager, the carpenter and the customer.

Besides making concrete improvements on business processes, process descriptions were also placed on the wall in the lunch-room. The motive was to ensure that procedures were followed by providing the artifacts in a spot where they would be seen on a daily basis. The facilitator emphasizes that a display is not enough to ensure that things are conducted as decided. One also needs someone taking charge. They solved this issue by letting the leader take charge, but *"we still have potential for improvements. And we still experience discrepancies, but less frequent. In any case, one experiences important learning. I also think that many procedures have the tendency to remain in a book on a shelf, and we need to assure that at some point someone must verify that things are executed according to specification."* [Last interview, facilitator]. With reference to having published the models on the lunch room walls: *"It is helpful in my opinion, but it comes without guarantee."* [Last interview, facilitator].

As an alternative to having the artifacts at display in the lunchroom, the facilitator suggests that *"Thinking further, instead of using the lunch room wall, maybe we can better describe these processes through illustrations on a computer screen making it easier to look up a point of interest or discussion."* [Last interview, facilitator]. The facilitator also sees the necessity of having modeling competence. He emphasizes that he has *"given some thought to whether anyone can be involved in modeling. I honestly doubt this. It is a matter of ability to view things systematically. I regard myself as systematic. It is also partly a matter of creativity, meaning the ability to identify new ways of doing things. Discussing AS-IS and TO-BE with a group of people, then you both need the ability to understand their descriptions of how things are done, as well as the necessary ability and creativity to think differently."* [Last interview, facilitator]. Another important aspect of modeling practice is the type of business at hand: *"modeling is first and foremost suitable in organizations facing repetitive iterative tasks. This must be a recommendation in my opinion."* [Last interview, facilitator].

6. DISCUSSION

In earlier work we focused on analyzing how various cases combined the use of information technology with process change main focus and main objectives of modeling. We identified the Home Builder as a Strategy type of modeling initiative characterized by using modeling as a tool to reach a change strategy in a long term business change initiative, with a mixed focus on improving work practice via physical intervention and improving information flows via IT (Karlsen et al, 2012a). This gives some insights into enterprise modeling usage. However, it says little on the details of modeling practice to the extent that practitioners can gain specific ideas and inputs for their own modeling efforts. By focusing on the details of the Home Builder Case from a longitudinal perspective, another picture emerges where enterprise modeling is described in terms of four modeling supported steps: (1) Increased business understanding by providing a generic model, (2) Identification of TO-BE by process modeling, (3) Process categorization by sorting models into risk zones, (4) Implementation of prioritized changes consistent with model artifacts, where steps (2), (3) and (4) are iterated.

Previously we interviewed one of the managers saying that modeling *"support was not big until I understood the point. N.N. (the facilitator) worked extremely hard. I remember that I thought that this would become expensive, everything costs a lot of money, big bills all the time, and then suddenly we*

saved so much work that we rather could pay them and take time off ourselves. You understand what I mean? And as I see it now: spending some money on it, I do not see it as an expense but as a means to increase income. Because now I believe in it, and then it is much easier!" [1. Interview, Manager]. From this and similar statements it is evident that the facilitator made a major effort in selling the idea of mapping the business processes to be able to understand what to do and what to change. Visualization through a generic, high level enterprise model helped people understand how things flowed in the form of goods from the suppliers and on to the construction site, etc. The use of a generic model increased readiness further by improving the ability to understand why things had to be done and what had to be done. These actions fit well with Armenakis et al. (1993) suggesting readiness creation through arguing and discussing. Based on the board protocols we also see how the company's situation was deteriorating, leading to a maturity state where it is evident that something has to be done. This is another factor described by Armenakis et al. (1993) which shapes readiness via solid evidence. Having increased business understanding by providing a generic model, the three iterative stages of identifying future state, process categorization and implementation of prioritized changes were entered. Davenport et al. (1990) emphasized that the means by which processes are identified and prioritized is one of the key issues in process redesign. They also saw two major approaches to the issue, where they labeled the first the "exhaustive" approach and the second the "high-impact" approach. The exhaustive approach attempts to rigorously identify all processes within an organization and then prioritize them in order of redesign urgency. The high-impact approach attempts to identify only the most important processes or those most in conflict with the business vision and process objectives. Comparing these approaches to what was done in our case we see that the high-impact approach is chosen. This choice can be understood by the challenges the company was facing. They had to act as quickly as possible, and they did, by focusing on the aspects considered most grave. In fact, they focused on the information flow, which leads to better goods flow and experienced "*less scrap value due to better information flow: A win-win for all!*" [1. Interview, facilitator].

The change of processes, by physical intervention and design of the ERP system to support business improvement, was then followed up by making model artifacts available in the lunch room. The motive was to ensure that procedures were followed by placing the artifacts where they could be seen on a daily basis. But, the facilitator experienced that model presentation was not enough. Someone actually had to make sure that things were done properly. The facilitator saw the need for the company manager to take an active role in ensuring that things were followed up, i.e. he had to function as the additional change agent, besides the facilitator himself. This is in line with Markus et al. (1997) who recommended that at least two team members should be designated as change agents and that after a shared change culture has started to form, the organization should formalize the role as part of everyone's job. Interestingly, by comparing the process change sub-steps in this case with the steps observed by Davenport et al. (1990) in successful process redesign, we find a rather good match. In line with Davenport et al. (1990), we notice that the facilitator uses time on developing shared vision and process objectives by educating various employees on the need for process interaction and orchestration. Next, the processes to be redesigned are identified focusing on TO-BE, equal to the second step in Davenport et al. (1990). Thereafter process risks are categorized, which fits the step of understanding and measuring existing processes in Davenport et al. (1990). When it comes to the implementation step, where the ERP system is adjusted together with physical intervention in selected processes, this largely fits the observation by Davenport et al. (1990) of identifying IT levers and design and prototype processes. There is also a good match with the stages in the reengineering archetype presented by Kettinger et al. (1997). Regarding their first stage focusing on involving a business process reengineering champion to gain support of top management, we find this an activity performed in the Home Builder Case as well. As regards the second stage on encompassing the assignment of a reengineering project team, the setting of performance goals, project planning and stakeholder/employee notification and buy-in, we see that this is something the facilitator also engages in, but more on an iterative basis through the change process together with the three next stages described by Kettinger et al. (1997). The *Evaluate step*, which is not made explicit in the steps described by Davenport et al. (1990), is performed when the facilitator produced financial figures and compared them with similar companies in the same sector.

Due to the similarities between actions performed in the Home Builder and the steps envisaged by Davenport et al. (1990) and Kettinger et al. (1997), writers about whom the facilitator did not know, we regard the steps as relevant explanation factors for project success together with enterprise modeling. Other potential explanation factors are also observed, for example the roles of employees and executive management. It is acknowledged that how employees and management behave on a daily basis influences the project result. This is in line with literature highlighting top management support, inter-departmental cooperation and end-user training as important success factors (Trkman, 2010). It is also acknowledged that the implementation of the ERP-system is vital for implementing the necessary changes, in line with Davenport et al. (1990) seeing business process and information technology as natural partners. The role of strategic management is also seen as important, in line with Markus et al. (1997) emphasizing the need for several organizational member roles in change processes, and Kettinger et al. (1997) relating project success to effective change management. The project manager role as an important success factor (Sedera et al, 2004, Trkman, 2010) is evident in that he puts a lot of effort and prestige into the change process, focusing on creating readiness for change and getting employees and others to actively participate in the change process, by the use of modeling. In this context it is interesting to remember his broad experience as a clean-up guy in different projects compared to his more limited experience with modeling as described in 5.2. Such a comparison triggers a question of whether project management is more vital to project success than modeling practice and whether the project could also have succeeded without modeling efforts. Unfortunately, while these certainly are interesting aspects, the case study is not well-suited to evaluate the factors' relative importance (Leonard-Barton, 1990). We therefore call for further research investigating how factors can mask and challenge other factors' importance for project success. Since other projects may be the subject for different methodological choices and different techniques (Kettinger et al, 1997) it is obvious that the informant's recommendations must be evaluated in various contexts before wide-reaching conclusions can be drawn.

The main contribution of this paper is gained insight into modeling practice in a successful change initiative. Despite considerable investment in the business process management area, most reviews report as many as 60-80 percent of the initiatives as having been unsuccessful (Trkman, 2010). Maybe then, as Trkman (2010) says, it is no wonder that the industry is not convinced that a business process approach can bring significant benefits. Additionally, Indulska et al. (2009) emphasize that since little is known on modeling benefits, lack of insight also makes it difficult to convince executive management of its benefits. In these respects, findings from the turnaround project may motivate practitioners to explore similar methods and approaches in their practices. This is important, since we all depend on practitioners who test methods and techniques so that commonalities, differences and lessons-learned can be extracted to improve company operations on both case specific and more generic levels. As regards our overall research question on how modeling is used, the single case study from a longitudinal perspective has contributed depth to our picture by displaying some of the intricate nature and context of ICT-enabled process change within which modeling is practiced.

7. CONCLUSION

Our case study has described modeling practice as a series of four steps of modeling supported process change, where the first step used modeling to increase business understanding by providing a generic model, the second step used modeling to identify TO-BE, the third step facilitated process categorization by sorting models into risk zones and the fourth and last step dealt with the implementation of prioritized change consistent with model artifacts. We also have extracted lessons learned and recommendations on modeling practice, since individual voices are in danger of being lost when comparing cases (King, 2004). Finally, since there is a need for exploration and publication of success stories (Indulska et al, 2009) we have discussed our findings in the light of factors which literature propose as success factors of project change. In this regard, we identified readiness as a precondition both for change and for doing modeling at all. Our paper also investigated the importance of project

management, employee involvement and senior management anchoring and has concluded that the single case study was useful to broaden the picture of enterprise modeling practice.

Even though a single case study can broaden the picture of organizational changes, case study research also has limitations (Yin, 2009). We therefore call for supplements to our work, to examine whether the recommendations and experiences reported in this paper are relevant in other projects as well as to weigh the relative importance of various factors to project success. Whatever research approach is followed, we share with Indulska et al. (2009) a wish for further research on modeling experiences and with Trkman (2010) a wish for improved insight into success factors in real-life change projects.

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