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All Aboard: ERP Implementation as Participatory Design

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ABSTRACT

Following a previous description of Enterprise Resource Planning (ERP) implementations as participatory design (Pries-Heje & Dittrich, 2009), this paper explores the case of a medium-sized, family-owned manufacturing company and its endeavors with changing their current ERP system. The case was selected on the premise of it being perceived a success by the involved stakeholders. Through a series of interviews and analysis of secondary material, the case covers the period between 1995 and 2010. As the results show, several instances of user involvement and participation can be found throughout the case. According to the respondents, this is seen as one of the central elements of the success. This is discussed in relation to previous findings and a call for future research into ERP implementation is presented.

Keywords

ERP, Implementation, Participatory design, Process design, User involvement, User-centered design

INTRODUCTION

Following the wide-spread adoption of integrated information systems in the 1970-1980's, the Enterprise Resource Planning systems were introduced into the marketplace in the early 1990's. According to its propagators, these systems would solve the entire need for information systems (total systems), and allow organizations to better manage their business (Singla, 2009).

Following the early developments of Management Information Systems (MIS), the critique was substantial and harsh, and several cases of failed implementations resulted in a general view of ERP systems as highly complex and cumbersome in both implementation and use (Barker & Frolick, 2003; Davenport, 1998).

During the late 1990's and early 2000's, the major ERP vendors started to direct their attention to the SME-segment, creating highly standardized and more closed solutions to cater to the needs of smaller customers than what they were originally targeting. These ERP packages were more closed-ended than its predecessors, with the intent of simplifying the implementation process (Koh & Simpson, 2005).

In 2008 the level of success when it comes to ERP implementations is still very low. According to professional analysts, 80% of all ERP related projects can be considered failures in regards to time, budget and scope (Gartner, 2008). Research has directed substantial interest and resources into understanding the critical success factors (CSF) of ERP implementations, yet there has been a difficulty with finding clear contingencies from cases where the implementation of a new information system is so intimately accompanied by a major revision and change in the business processes.

Pries-Heje & Dittrich (2009) offer a novel approach towards understanding the process of ERP implementation. They choose to see the implementation as a design process, where the intricate interplay between the users and the technical experts of the vendor and consulting firm can help our understanding of the process. Through taking the perspective of participatory design (Suchman, 1993), the authors focus on the CSF reported as "user involvement" (Nah et al, 2004; Whyte & Fortune, 2002; Robey et al, 2002) and investigate this in more detail.

Using the focus of Pries-Heje & Dittrich as a starting point, we have selected a case where the stakeholders involved in the implementation regarded it as a success. In addition to this, the case differs from that of Pries-Heje & Dittrich through being that of a family-owned medium-sized company that decided to change from a previous ERP system to a new one, whereas they were not in a green-field state when it comes to integrated information systems.

The purpose of this paper is to explore a successful ERP implementation as a process of participatory design. We do this through presenting the case and a brief discussion. In addition to this, we suggest issues for future research on ERP (in the field of participatory design).

PREVIOUS RESEARCH

ERP implementation

There have been published numerous descriptions of the perils and risks of implementing an ERP system. The risks involve both exceeding budget and time set out for the project, as well as having to hold production or invoicing due to system-related difficulties (Davenport, 1998).

With the system being integrated into most aspects of the business, if it does not function as expected, business will suffer. Frightening stories of massive failures created a surge in studies that focused on critical success factors (CSF) of ERP implementation. Building on previous work in CSFs (Holland & Light, 1999) and combining this with previous findings from general IS implementation projects (Parr & Shanks, 2000), several authors started to lay out a fundamental structure of CSFs of ERP implementations. However, there was substantial critique of this research for lacking empirical evidence (Finney & Corbett, 2007) and having a much too normative outset (Sambamurthy & Zmud, 1999).

CSF literature highlights a number of factors influencing the success of ERP implementations. The most common include Top Management support realized through ample budgets and a willingness to expand the budget (Aladwani, 2001; Al-Mashari et al, 2003; Mandal & Gunasekaran, 2003) and user involvement (Pinto & Slevin, 1987; Procaccino et al, 2002; Skok & Legge, 2002). The latter of these is of particular interest for this paper.

Implementation as a process of participatory design

Participatory design (PD) can be seen as a set of principles focusing on the emancipation of the worker into an active member of the development team. This approach was developed in Scandinavia during the 1970's and 80s, and had a strong link to Marxist ideologies and the ideas about the power attributed to being involved in the design of one owns work (Spinuzzi, 2005).

Suchman (1993:viii) defines PD as concerned with “a more human, creative and effective relationship between those involved in technology’s design and its use”. Following up on this, Kensing & Blomberg (1998) state that PD is concerned with three main issues: Politics of design, the Nature of participation and Methods and tools. Out of these three issues, this paper focuses on the Nature of participation, with a particular emphasis on the cooperation and knowledge integration between users and developers of technology.

A number of articles have addressed the issue of PD in relation to ERP implementations, such as the formerly mentioned Pries-Heje & Dittrich (2009), Wagner & Piccoli (2007), Taylor (1998), Afnes & Strandhagen (2000) and Fischer et al (2004). Central to the findings is that user involvement and the use of PD is a way of facilitating successful ERP implementation.

Vilpola (2008a, 2008b) takes a different approach towards the involvement of users in ERP implementation projects. She takes a User-Centered Design (UCD) approach by building a method on the 1999 ISO 13407 standard. In her own words (2008b:2), this is an attempt to “...focuses on the requirements of both users and the organization... improving the usability of the system by early user involvement and continuous iteration..:”

METHOD

In 2007, a dialogue was initiated between a group of researchers and a group of consultants. The idea was to build on previous experience and create a new course module for an existing ERP course. The consultants proposed a case of one of their customers, Hestra Inredningar AB (Hestra), as a starting point for a thorough study.

As researchers, the case immediately grabbed our attention. Apart from being willing to open up to a thorough study and being relatively close to the university (a two-hour drive), the company seemed to have taken a text-book approach towards their ERP implementation.

Reportedly, Hestra had spent a lot of resources on getting the power-users involved at an early stage. This had been achieved through a series of workshops where the objective was to create a process map of the processes to-be.

In February 2010, a group of three researchers conducted interviews on-site Hestra with a selection of co-workers that had been active in the implementation. A total of eleven respondents were interviewed in one full day.

The interviews were directed at the management team (CFO, Project Managers and CIO), the Sub-process owners (Market, Administration and Production) and regular users (Market, Administration and Production). The interviews each took about one hour and were semi-structured with open-ended questions. Further interviews were conducted via the phone, targeting one member of the company board, the CEO and three consultants that were involved in the project.

To complement the interviews, a collection of secondary material in the form of minutes from selected meetings, the requirements specification, user manuals and the process maps were used in constructing the case.

The interviews were all sound recorded and the interviewer took notes throughout the interview. In these notes, the interviewer took down the specific time in the interview where points of interest were found related to the objective of the study. These “little narratives” (Czarniawska, 1998) were then summarized during a separate session where the researchers met and decomposed the implementation project.

Following this, the case description was drafted by one of the researchers and then collated against the other researchers complementing the description with more observations and quotes from interviews they had conducted. The case description was then sent to representatives from Hestra and the consulting company for verification.

THE CASE OF HESTRA

Hestra Inredningar AB (Hestra) is a third generation family-owned shop-fitting company founded in 1900. They offer standard solutions as well as customer-specific arrangements with the help of in-house architects. Company headquarters is located in Hestra in southern Sweden, where all production, warehousing and administration is housed. Hestra also has local branches in Denmark, Finland and Norway. The company has 140 employees, and an annual turnover of €30 Million (2008).

The following description of Hestra’s endeavors covers the period from 1995 to 2010. The case is divided into phases derived from empirical data rather than from a process model for ERP implementations.

Background: 1995-2005

In 1997, Hestra found themselves in need of an ERP System. For support in this project, they hired a new CFO, who had previous experience from a similar project. The new CFO had a business degree and a strong interest in Information Technology and the integrating aspects of ERP systems.

The project resulted in an installation of Movex (from the vendor Lawson), which the CFO previously had implemented at his former employer. The installation went live in 1998.

The following years the system was fine-tuned and the technological base renewed, yet the system was not upgraded. Hestra realized that Movex lacked support for three critical business processes, namely the handling of customer specific products, block orders and product configuration. Meanwhile, more and more employees were experiencing frustration due to the lack of system integration, which often resulted in additional manual handling.

One such example was the packing process, where the warehouse personnel had to write down the wrapping material quantities by hand on the picking list, which was later handed over to the finance department for manual update of the invoice. The shortcomings in being able to track what exactly was happening in the business often resulted in quarrels and disputes between departments. Bearing all this in mind, something had to be done.

A meeting with the Board: November 2005

During the fall of 2005, the CFO approached the board of directors with a claim for an upgrade of the Movex system, due to its shortcomings in handling important business processes. The board, however, encouraged the CFO to broaden his perspective and evaluate alternative vendors and solutions. This “raising of the bar” caught the CFO quite off guard at first, given his previous experience with the Movex and his initial plan being to upgrade it rather than changing it. It also involved a major re-allocation of resources in expanding the scope of the pre-study from simply defining the necessary functionality to actually overhauling the entire business process.

Mapping the Processes: December 2005 – March 2006

Hestra early identified the need to perform a thorough mapping of the company's as-is and to-be processes. Requiring structural help in this work, the company called on consultants from a local consulting firm (SYSteam) and had an initial workshop in December 2005. Prior to this workshop, 13 sub-process owners (SPOs) from the business had been appointed and formed the project group. Hestra chose SPOs close to the business, who would actually use the system, and who had the inclination to continuously improve the system. Several respondents claim that the appointment and empowerment of these SPOs strongly contributed to the success of the project.

To the CFO, the decision to invite the SPOs came naturally: "The people who know the business must be a part of the project". He was also well prepared for the amount of work the project would require, and that the level of ERP knowledge needed to be improved among the employees.

Additionally, the CFO took the project manager role for Finance (PM FIN) while the current warehouse manager was appointed project manager for Logistics (PM LOG). In order to secure necessary resources for the project without affecting daily work, a temporary warehouse manager was appointed.

Using post-it notes, each SPO described their own process. This resulted in a holistic view of all business processes within the company started to emerge. Despite this being seen as a rather primitive approach, it was a mind-opening experience for the group.

It quickly became apparent to the project group that process modeling would take a team-effort. To further enhance the teamwork, teambuilding exercises such as joint cooking-classes were carried out with the consultant as a natural member of the team.

Through a series of six workshops where each process was discussed individually *and* as part of the whole, the SPOs were encouraged to use post-it notes to comment on other sub-processes as well. "Everyone was allowed to comment on the other departments and say 'you are too bad at this'", the PM LOG explains. Consequently, focus was put on optimizing hand-offs between processes and enhancing end-to-end information flow. Slowly a process map of a new, more streamlined, Hestra started to emerge.

The SPOs experience of this phase was highly positive. One respondent notes: "It all began so positively! We were asked to design the processes the way we wanted them to be. I always thought that we would never get this through, yet afterwards we were struck by how much we actually got through."

Inviting the Vendors: August 2006

In early fall of 2006, a selection of processes were transformed to a requirement specification by a consultant with a previous track-record at Hestra.

The specification was sent to three vendors, Microsoft Axapta, Lawson Movex and Jeeves, with an invitation to demonstrate how their systems could support a selection of the key-processes. Each vendor was given two days with the whole project group to present their solution. Hestra found great support in the consultants during this period, since they were able to question the vendors in areas where they themselves lacked competence. All SPOs evaluated the different vendors using pros and cons.

As a result of the evaluation, Axapta fell short, but Movex and Jeeves were both found to be feasible alternatives. None of the systems fully supported the three key issues; customer-specific products, block orders and product configuration in their standard form, and there was some variations in how the issues were supported in the two remaining systems.

Forming a decision: September - December 2006

Following the evaluation of vendors, a series of project meetings were held discussing the different solutions. At first, the project team was in disagreement regarding which system to choose due to a variation of needs in different sub-processes. However, emphasizing the need to solve the three fundamental issues with the old system at the lowest possible cost, informal discussions between the different departments started to occur in between meetings. This facilitated an understanding that a compromise between some of the sub-processes was necessary.

The CFO describes the following meetings as very exciting, since he could tell that people had been talking to each other in between the meetings. Consequently, in early December 2006 a last meeting was held, at which Jeeves was voted the winner by unanimous decision. This portrayed a radical change, since Movex was seen as the most likely choice during the initial evaluations. According to the CFO, this was mainly due to the fact that "Jeeves captured our hearts", and that the price for

this new system was about the same as of upgrading the existing Movex. This was later described as the result of the Jeeves consulting taking a business risk and actually designing a set of processes using the data from Hestra directly into Jeeves for the demo.

Verifying the ERP system: September - November 2007

Having worked close with the consultants up until this point, respondents at Hestra describe the initial period after having signed the contract as a “vacuum”. The new group of consultants isolated themselves at Hestra, configuring the system according to the process maps. However, during early fall of 2007, SPOs were invited by the consultants to verify their processes and provide feedback. Simultaneously, the whole project group had several meetings where the SPOs described and showed their actual process implemented in Jeeves. This allowed other SPOs to provide feedback as to how this supported (or rather disrupted) their processes.

PM LOG claims that these meetings helped visualize how far each sub-process had come, and if any process or department required additional resources to finish on time and ensure an efficient information flow through the whole company. “Either you took one step up the stairs, or it became visible that someone had not managed to do so”, he says. Unfortunately, this phase coincided with an unusual business peak with a lot of customer orders, which consequently resulted in insufficient resources for the production department to invest in the project and thus falling behind in the project. Additional resources were needed and approved to help production get back on track.

Several respondents describe this period as very stressful. The SPO of invoicing states: “We were supposed to handle our regular assignments as well, invoicing naturally could not stop. It was tight.” Another, more figurative, illustration of the stress the SPOs felt during this period is a fainting episode one of the SPOs suffered from. To alleviate this stress, the company assigned additional human resources to take on the regular tasks that the SPOs had, allowing them to focus solely on the project.

The SPOs were also responsible for the development of training materials and manuals for their respective process. Therefore, the meetings acted as incentives to learn the system as well as a forum for feedback on this material. Additionally, the SPOs consulted colleagues for fresh perspectives on the material and process flow in between the meetings.

During these meetings, it became clear that the Go-live date would have to be postponed from September until the beginning of December. The original Go-live date was set in order for the CFO to be able to close the books for the turn of the year, yet the decision to push the Go-live was still taken. The CFO noted: “The closing of books is after all secondary to a fully functioning production and logistics flow. I understood that we would have to manage, even though this involved a lot more work for us.”

This change was possible mainly due to the relative small importance of the final profit and loss statement to the owner structure. Furthermore, the scope of functionality at the Go-live was narrowed as a means of ensuring full functionality for key processes, postponing some of the non-crucial functionality to a later stage. An example of this is project invoicing that is planned to be implemented during fall 2010.

During November 2007, user training was conducted at each department by SPOs using the new manuals. Up until the Go-live in early December, no changes had been implemented in actual work process since the old system was still live. However, having trained all end-users, the Go-live with both the new system and the new process flow was experienced as smooth and a success. Or as a respondent from the Consulting side put it: “We never ‘went-live’, we simply stopped working in Movex.”

Post implementation: December 2007-February 2010

The post implementation phase has focused on three main areas. First, effort has been put into providing full Jeeves support for all processes stated in the process maps (for example, project invoicing). Second, the exit of the old Movex system has been initiated, since it is still used for accessing all historic data. Third, continuous improvements of the processes have been undertaken.

Project members have returned to operational tasks but continue to function as a Competence center for the processes and the system, useful in the continuous improvement and upgrade work.

Problems identified by the business have been dealt with in different ways. For example, the system did not allow payment of goods that had not been registered as finally delivered. Finance put this issue forward to the incoming goods department, resulting in consistency in finalizing the delivery at goods arrival. The previously reported quarrels between departments due to data inconsistency decreased dramatically due to the higher extent of information integration and possibility to track data

in the new system. Consequently, consistent mistakes in data entry in some departments have been possible to notice by other departments, allowing for corrective action. In some cases, the consultants have been asked to adjust reports and specific fields.

During the first year after going live, consultants visited Hestra one full day each week. In 2009, this was decreased to once every second week. During 2010, every sub-process has been given a certain amount of time with the consultant to discuss the process and possible improvements. Having covered all sub-processes, a meeting is held to sum up and ensure that process-specific changes do not negatively affect other parts of the business. Following this, changes agreed upon will be implemented and the consultants will perform a second round of sub-process dedicated meetings.

Additionally, Hestra has recently started looking at solutions for expanding the scope of their ERP installation. Branching out into Norway, the company is now looking at a new installation and inter-company transaction support (ICT).

Summary

Figure 1 illustrates the main phases of the case and the stakeholders involved.



Figure 1. Overview of Project and Internal/External Stakeholders

DISCUSSION

We first discuss the case in relation to Pries-Heine & Dittrich (2009) and their focus on knowledge integration in PD. After this, we briefly touch upon the area of UCD (Vilpola, 2008a), followed by a general discussion and a call for future research.

Pries-Heine & Dittrich (2009) see knowledge integration (KI) occurrences in ERP implementation as an avenue for increasing our understanding of the PD process. In the Hestra case, we have found five examples of knowledge integration that were of paramount importance to the success.

The first is the KI between the consultants and the SPOs that occurred in the process mapping workshops. Here, the consultants brought a technique for process mapping and applied their previous knowledge, leading to an eye-opening experience for the SPOs. The process mapping led to a second KI between different SPOs, in terms of a new understanding of the entire business process, and a first step towards alleviating the previous sub-optimizations in Hestra.

The third KI occurred between SPOs and users, in the dialogue when creating the process maps and user manuals. This helped both institutionalizing the changes in system and processes, as well as giving the SPO a chance to invite more co-workers into the project.

The fourth KI occurred in the post implementation between consultants and users. The presence of consultants on site after implementation allowed users to add new functionality and to question the current system.

The fifth and last KI that was found in the case occurred between the users themselves. Having a thorough understanding of the functionality in Jeeves and the business process, users were able to see deviations from the processes and faulty data and either correct it immediately, or, if it was re-occurring errors initiate a dialogue with the user that caused the error.

As for the UCD (Vilpola, 2008a), we found differences regarding the iterations described. In the case of Hestra, these iterations were ever-present, and there was no real end-state. Instead, they continued into the post-implementation phase, which can point to a difficulty with the model.

A second aspect of this can be found in the shift between the process map as an artifact and the user manual as an artifact. Here, the best-intentions of the company did not prevent the process maps of becoming obsolete when the user-manuals were constructed. From this point, the company could be seen as shifting their point-of-interest from the process to the functionality after the Go-live.

In general, the case exhibits some interesting aspects that would need further attention in research.

For instance, the decision process that led up to the choice in system was a lot more messy than rational models would state. The existence and role of rumors of neighboring companies and the fact that the short-listed systems were more or less equal in “fitting the bill” made the decision point boil down to “they won our hearts...” as the CFO put it. This leads to the following question being regarded as relevant for future research: What are the characteristics of real-world decision processes in ERP life-cycles?

A second issue that would require further research is the shift of interest from process map to user manuals. As the case shows, this is not something that is experienced as a failure by the organization. Instead it is a means of utility, and they are pleased with the new way of working. This leads to the following question being regarded as relevant for future research: What purposes are relevant for process maps and manuals?

A third issue is related to the post-implementation process. Here, we would like to see more research taking into account the ever-going process of implementation. We do not see this as a “second-wave” of the implementation, but rather as a continuous improvement along the lines of Kaizen. This leads to the following question being regarded as relevant for future research: How is systems improvement work organized in relation to implementation projects and ERP life cycle management tasks?

A last issue would be a call for research into the criteria for success when it comes to ERP implementation projects. The case was considered highly successful despite the fact that they pushed the deadline 2 months and decreased the scope for Go-live. This indicates that keeping initial deadline and functional scope may not be relevant as means of measuring success in ERP implementation projects.

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