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Soft Systems Methodology in IT Project Management: Implementing CRM in SMEs.

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ABSTRACT

This paper reports on some of the outcomes from a two-year Knowledge Transfer Programme (KTP) which included the development of an implementation process for the installation of customer relationship management (CRM) applications in small to medium-sized enterprises (SMEs) in the UK mail order sector. Soft systems methodology (SSM) was used to help appreciate the organizational structures and processes of an independent software vendor (ISV) and to facilitate the development of a structured and formalized implementation process. Importantly this action research based project considered whether any elements of SSM could be incorporated into a new implementation process. The paper starts by introducing SSM and its relevance to managing organizational change before detailing the KTP Associate's experiences of using SSM to appreciate the situation of the ISV and developing a structured and formalized implementation process. The selection of appropriate elements of SSM for inclusion in the implementation process is discussed in the context of an initial CRM installation. The implementation methodology was subsequently modified and used for a second CRM installation before being adopted by the ISV.

Keywords

SSM, Project Management, Software Implementation, CRM, Knowledge Transfer.

INTRODUCTION

At the core of the research reported in this paper is the use of soft systems methodology (SSM), originally developed by Checkland (1981) and enhanced with Scholes (Checkland and Scholes, 1990) and Holwell (Checkland and Holwell, 1998), to develop an implementation process for the installation of customer relationship management (CRM) applications in small to medium-sized enterprises (SMEs) in the UK mail order sector. This action research based project was undertaken by a Knowledge Transfer Programme associate (the Associate) working in an independent software vendor (ISV) with the support of University academics.

SSM has been developed over a thirty year period of action research and can, in its most recent form, be represented as an inquiry/learning cycle, Figure 1.

Central to the use of SSM is the notion that the investigation of complex organizational situations (perceived real-world problem-situations) can be organized in a systemic way. This essentially iterative approach includes sense making of the perceived real-world problem-situation (through rich picture diagrams and analysis one, two and three), which leads to the selection of relevant issues to be developed into conceptual models (supported by root definitions and CATWOE). These conceptual models are used to question (by a structured debate) the real-world problem-situation in order to find accommodations which will enable action to be taken to improve the problem-situation. SSM has been widely used and commended in a variety of large organizations (Checkland and Scholes, 1990; Moyes, 1993) and in the area of information systems in particular (Mason and Mitroff, 1973, Wood-Harper, 1985; Ormerod, 1993; Checkland and Holwell, 1998). Vidgen (1997:23) acknowledges that any information system development has the potential to affect many stakeholders, often cutting across the hierarchical intra-organizational structure. Importantly, not all the stakeholders will necessarily share

common interests and have common beliefs. He argues that it is reasonable, from a theoretical viewpoint at least, to combine stakeholder analysis and soft systems thinking for the purpose of investigating information system requirements in problem contexts perceived to be complex. However, with the exception of Taylor and DaCosta (1999), there is a distinct lack of empirical studies considering the use of SSM in SMEs and information systems. This is in spite of the acknowledged importance of information and communication technologies (ICT) in economic development and wealth and job creation in SMEs (DTI, 2004; OECD, 2004). Within the European Union there are over 18 million small to SMEs generating 67 percent of employment and 59 percent of total GDP. Typically over 98 percent of all the enterprises are below 250 employees - the upper threshold for SMEs.

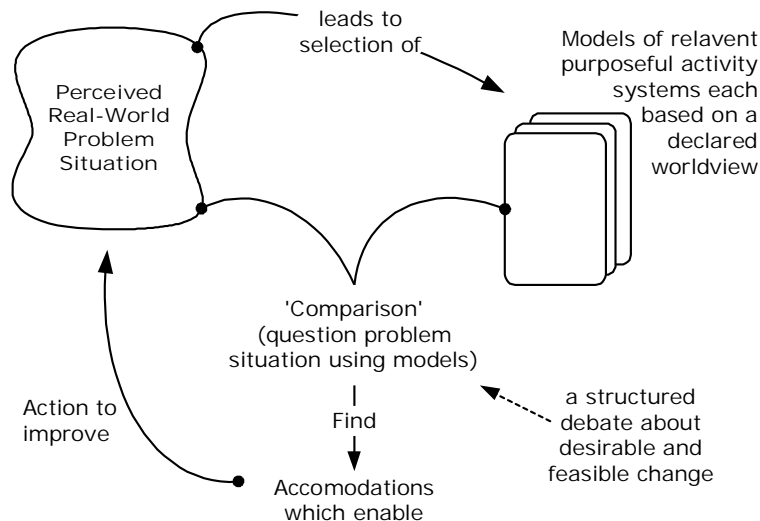


Figure 1. SSM as an inquiry/learning cycle (Checkland and Scholes, 1999)

The paper seeks to directly address this shortcoming in research by detailing the Associate's experiences of using SSM in the implementation of information systems in SMEs. Before proceeding with this account it is appropriate to discuss some of the key elements of SSM, namely sense making, articulation of relevant issues, comparison and taking action to improve. Firstly, sense making is the deliberate and organized process of determining the context for and details of the real-world problem-situation through rich picture diagram building and analysis one, two and three. In rich picture diagram building the investigator attempts to condense key aspects of the problem-situation graphically in order to facilitate discussion with other stakeholders and reach a shared understanding. The rationale for using rich picture diagrams relies on the fact that the complexity of multiple interacting relationships is best summarized by graphics rather than linear prose. Analysis one, two and three supports the documentation of the intervention, social and political factors surrounding the problem-situation. Staker (2003: 232) states that the emphasis of SSM is on assisting a group of stakeholders to learn about their mutual needs and the overlaps and conflicts between these. By resolving these conflicts and comparing harmonized needs with what exists in the real world, stakeholders are hopefully able to reach conclusions about what action to take to improve the situation.

Secondly, this discussion leads to the selection of relevant issues for developing into conceptual models. This structured activity deliberately acknowledges that stakeholders can have different worldviews, which can be equally valid. Conceptual model building starts with identification of issue based or primary task based human activity systems. Each of these systems can be logically modeled by agreeing a root definition, expressed as a system to do something (WHAT) by (HOW) in order to achieve (WHY), and the use of the CATWOE mnemonic. Where C is customer, A is actor, T is transformation, W is worldview, O is owner and E is environment. Finally the models need to be considered in terms of their effectiveness, efficiency and efficacy.

Thirdly, in the comparison phase it is important to recognize these conceptual models are not descriptions of the real-world but simply the logical activities required to enact a root definition. And furthermore that they are essentially disposable intellectual devices used to facilitate discussion rather than prescribe activities. In practical terms they help the stakeholders identify activities that might be expected to be present. Of course each of the activities can itself be modeled via an appropriate root definition. This essentially iterative process supports a structured debate about desirable and feasible change by questioning the problem-situation using these models. The purpose of this comparison is to seek accommodations which

are both systemically desirable and culturally feasible. An accommodation requires agreement, by the stakeholders, on a version of the problem-situation which different people with possibly different worldviews can live with.

Finally, the main purpose of SSM is achieved by taking action to improve the real-world problem-situation. Of course once these have been enacted this process can be repeated. It has been noted that in practice SSM is used in two ways, namely openly declared (mode A) and internalized by the actor (mode B). Partly because of its seemingly complex nature and precise language used SSM can be intimidating to the uninitiated. Experienced users tend towards the latter (mode B) with the client, participants, stakeholders or problem owner being unaware of the use of SSM and only being aware of the outcome or improvement. The next section briefly describes the research method used before detailing the Associate's experiences of using SSM.

RESEARCH METHOD

The case study as a research method is central to the design and presentation of this paper. There are a number of methodologies which come under case study methods most noticeably Yin (2003) and Stake (1995), which can be distinguished by their level of intervention. Stake takes a more involved approach, akin to action research, where the potential for the researcher to assist is greater and is less concerned by issues of validity (Easterby-Smith et al., 2002). Yin proposes three (technical) characteristics, namely that (i) there are many variables from (ii) multiple data sources from which the data collection and analysis benefit from a (iii) declared theoretical framework.

This action research based project was undertaken by the Associate, over an 18-month period finishing in early 2006, working in an ISV to develop an implementation process for the installation of CRM applications in SMEs in the mail order sector. The Associate was supported by academics at Lancaster University Management School who were familiar with using SSM in organizations and information systems in particular. The Associate worked both independently and within the implementation team of the ISV and reported to the Operations Director. The Associate maintained detailed journals of the fieldwork undertaken whilst using SSM to appreciate both the problem-situation of the ISV and the development of a structured and formalized implementation process. Action research is where the researcher explicitly recognizes that involvement will influence the outcome and furthermore that this is part of the learning process and facilitates data collection. The use of an Associate to assist in the transfer of knowledge and ideas from academia to industry is well proven. The nature of these action research based projects requires detailed documentation of activities and outcomes. The review of these documents forms the basis of the source material used for this paper.

The next section details the Associate's experiences of using SSM to appreciate both the problem-situation of the ISV and the development of a structured and formalized implementation process for use in SMEs.

ACCOUNT OF THE USE OF SSM

The following account details the Associate's experiences in the ISV before stating the key findings that have emerged from this case study. There were two distinct phases to the research reported in this paper. Firstly, using SSM to appreciate the situation of the ISV and secondly to develop a structured and formalized implementation process. This second phase also involved considering whether any elements of SSM could be incorporated into a new implementation process. In essence SSM was used to support the intervention and elements of it were included in the output.

Using SSM to appreciate the situation of the ISV

This initial phase of the research project took place over a four-month period. This involved 'off the record' conversations, and interviews to discuss the current implementation practice with respect to how individuals perceived the current process and the effect on their individual role and/or to the company as a whole. Observations were made; documentation/literature reviewed; and SSM workshops attended. The research covered all current employees of the ISV involved in sales and implementation and importantly senior managers from five existing customers.

Simple process diagrams were provided to prompt discussions around the current implementation practice. The data was captured by recording the interviews and asking the interviewees to 'walk through' the current implementation process and to express their individual opinions. At this stage the focus of the project was kept deliberately vague and wide ranging for as long as possible in order not to ignore the current situation by concentrating on the future. In order not to bias the data collected during this phase of sense making about the problem-situation the Associate tried not to influence the interviewees (employees and customers) and allowed them to think for themselves.

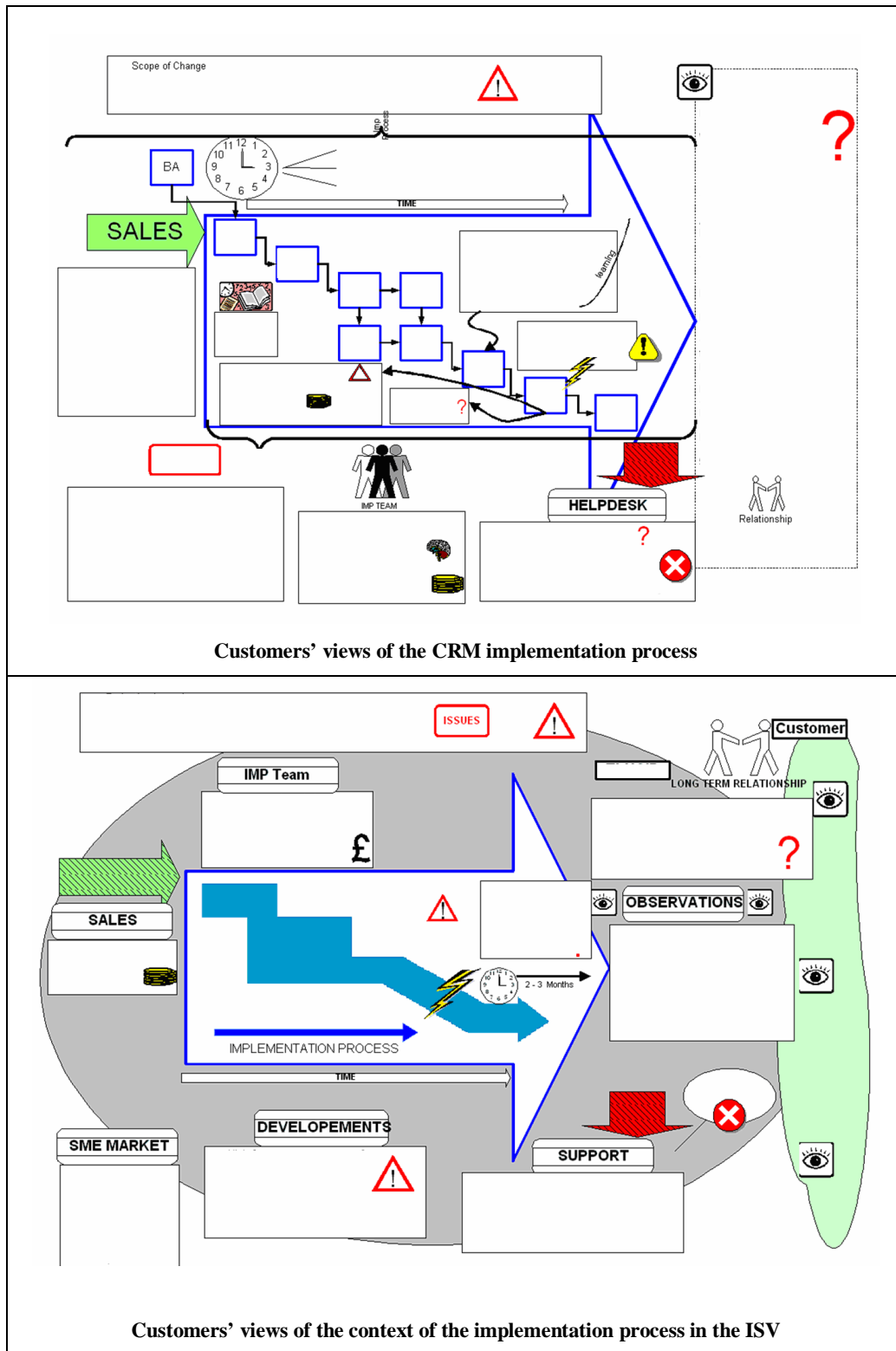


Figure 2. Modified rich picture diagrams (customer perspectives)

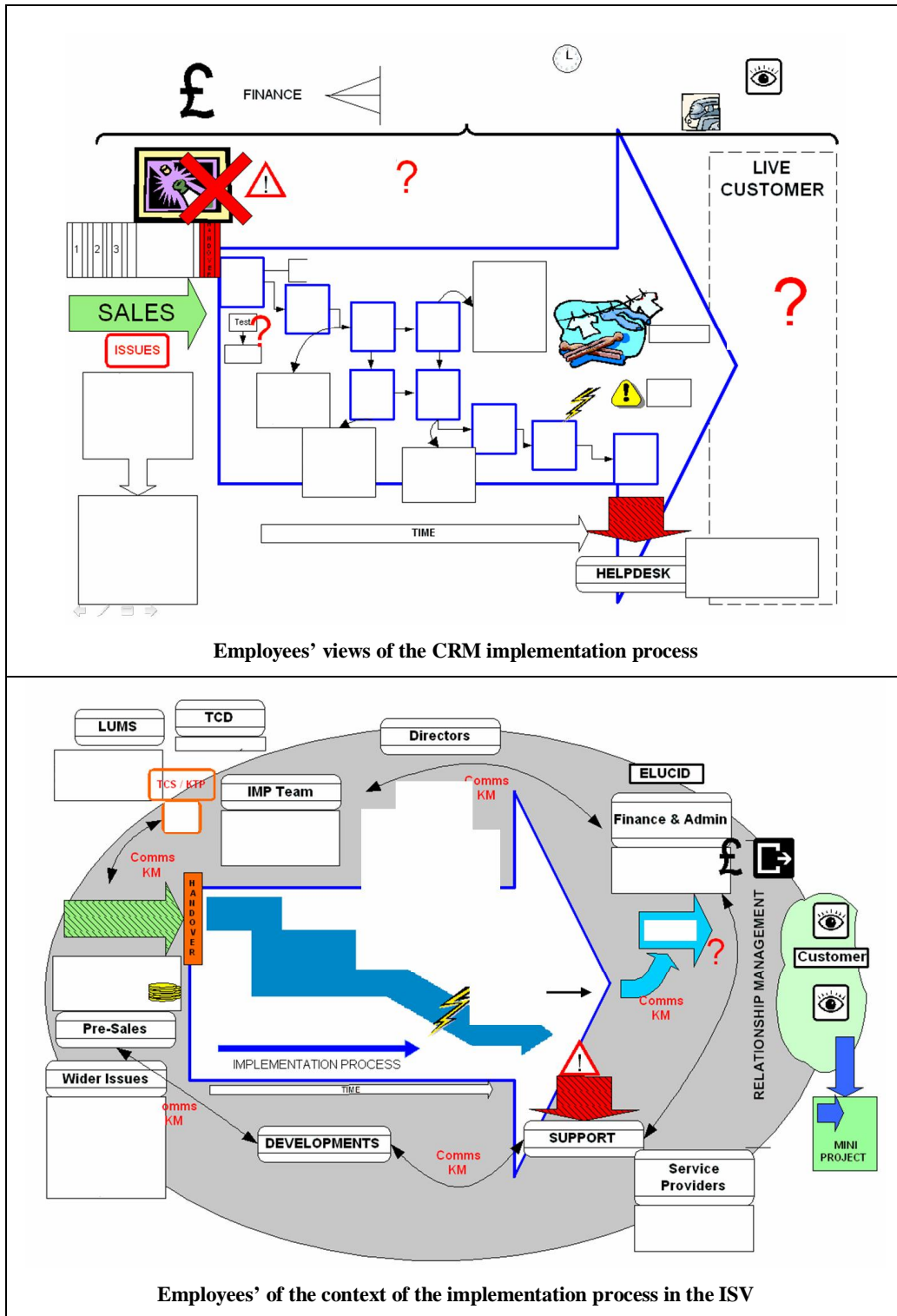


Figure 3. Modified rich picture diagrams (employees)

The data captured from the research was collated into written documentation resulting in an extensive log of qualitative information. The Associate's first task was to 'express' the problem-situation as rich picture diagrams. Pictures can be considered as a whole and help to encourage holistic rather than reductionist thinking about a situation. Rich picture diagrams were drawn on flip charts. Multiple pictures expressed issues focusing not just on the implementation process but also on the

ISV as an organization. Four pictures were taken to the final review of the problem-situation. The rich picture diagrams show which personnel and departments were involved, their purpose, and their needs and concerns. They show human activities, processes, cross-organizational boundaries and how these interests align. The rich picture diagrams were presented to the management team of the ISV to highlight issues and opportunities in the problem-situation, as seen from employee and customer perspectives. The Associate used these pictures as a method of presenting and communicating the current problem-situation of the ISV, their main stakeholders and the issues around not only the implementation of their CRM application, but also issues regarding communication within the company itself. The Associate made sure participants were aware that this was not a representation of how the Associate personally saw the problem-situation but of how their employees and customer saw it. Any additional comments or issues raised were noted on the rich picture diagrams, if these were agreed then it was updated. The management team's responses helped to further understand the social and cultural issues regarding the problem-situation, Figures 2 and 3. To ensure confidentiality text and individual names have not been included.

The senior management team agreed that the rich picture diagrams had highlighted areas of concern with respect to the project management practice within the implementation team, and also with the internal processes and communication within ISV. Importantly this agreement supported the next phase of the project to develop a structured and formalized implementation process detailed in the next section.

Using SSM in the development of a structured and formalized implementation process

This phase of the action research based project used SSM to assist in conducting a review of the ISV current implementation process in order to 'take action to improve' it. This action was agreed through reaching 'accommodations' through a process of sense making, model building and discussion. An SSM workshop was held involving key stakeholders from the ISV, University academics and the Associate. This workshop was used to review the problem-situation expressed in the rich picture diagrams, to identify the key stakeholder needs and the many candidate problems highlighted from the research. The main area of concern for both the Associate and the key stakeholders was regarding the communication, knowledge management and project management issues surrounding the implementation of the ISV product to new customers. Following this review it was decided to focus on a primary task model of the long-term functions of the implementation process at the ISV. Key stakeholder involvement in this workshop achieved additional support for the project and a recognition that the process of engagement into the inquiring/learning cycle increased the motivation to implement change at the ISV.

Following the SSM workshop the root definition based on this primary task was developed: 'a system to manage the implementation process for the ISV's products and services with a new customer in order to contribute towards a sustainable business model'.

The associated CATWOE for the root definition was:

Customer	=	Client
Actor	=	Implementation team
Transformation	=	Need for ISV product/service
Worldview	=	ISV product/service benefits customer
Owner	=	ISV (Operations Director)
Environment	=	Multi-channel business solutions

Each system has a transformation at the heart of the process in which something, an input, is changed or transformed, into some new form of itself, an output. The transformation in this system is the implementation of the ISV product at a customer. A conceptual model of purposeful activity was developed from the root definition and performance measures were identified (efficacy, efficiency and effectiveness), Figure 4.

A full project team meeting was held, with all key stakeholders in attendance, during which a summary of the rich picture diagrams and 'primary task' conceptual model were presented. Participants were asked to consider in particular the changes that may be required with respect to structure/procedure/attitude. The use of SSM in managing and overcoming multiple interpretations is well documented by other previously cited studies. This aspect of SSM proved particularly useful in this study as there was no common view within the company regarding the issues surrounding implementation. SSM concerns the process of learning and enquiring through the iterative process of constructing conceptual models. It is from these models that the learning process may be undertaken as the impetus for change may come as a result of an activity that is identified through any of the conceptual models. This meeting was the critical point for the success of the project. All stakeholders agreed that the model did represent a logical approach and the focus of the meeting changed direction to concentrate on what actions were required to bring about improvements and changes in the existing implementation methodology, *Original version*. All the stakeholders agreed that an improvement in the internal information systems process in conjunction with an

improved implementation methodology, *Version 1*, would be the initial desired and feasible changes. The Associate monitored the use of *Version 1* of the methodology in three CRM installations. After four months another review took place and the SSM learning cycle was repeated. The implementation methodology was subsequently modified, *Version 2* (Figure 5), and used by the Associate for another CRM installation before being adopted by the ISV. Table 1 lists all of the stages of the three implementation methodologies used by the ISV to support the installation of CRM application in SMEs.

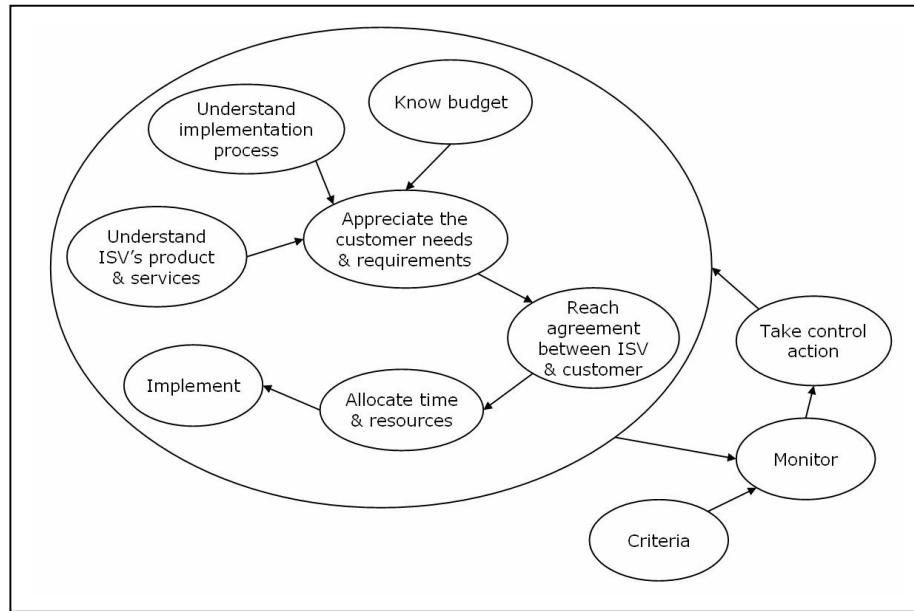


Figure 4. Primary task conceptual model

Stage		Original version	Version 1	Version 2
1.	Kick off	No	Yes	Yes
2.a.	Install	Yes	Yes	Yes
2.b.	Business process overview	No	No	Yes
3.	ISV overview	Yes	Yes	Yes
4.a.	Conference room pilot	Yes	No	No
4.b.	Business process analysis	No	Yes	Yes
5.	System Set-up	Yes	Yes	Yes
6.	Customization & enhancements	Yes	Yes	Yes
7.	Pilot training	Yes	Yes	Yes
8.	User training	Yes	Yes	Yes
9.	Go live	Yes	Yes	Yes
10.a.	Support	Yes	Yes	Yes
10.b.	Review	No	Yes	Yes

Table 1. Comparison of ISV's implementation methodologies

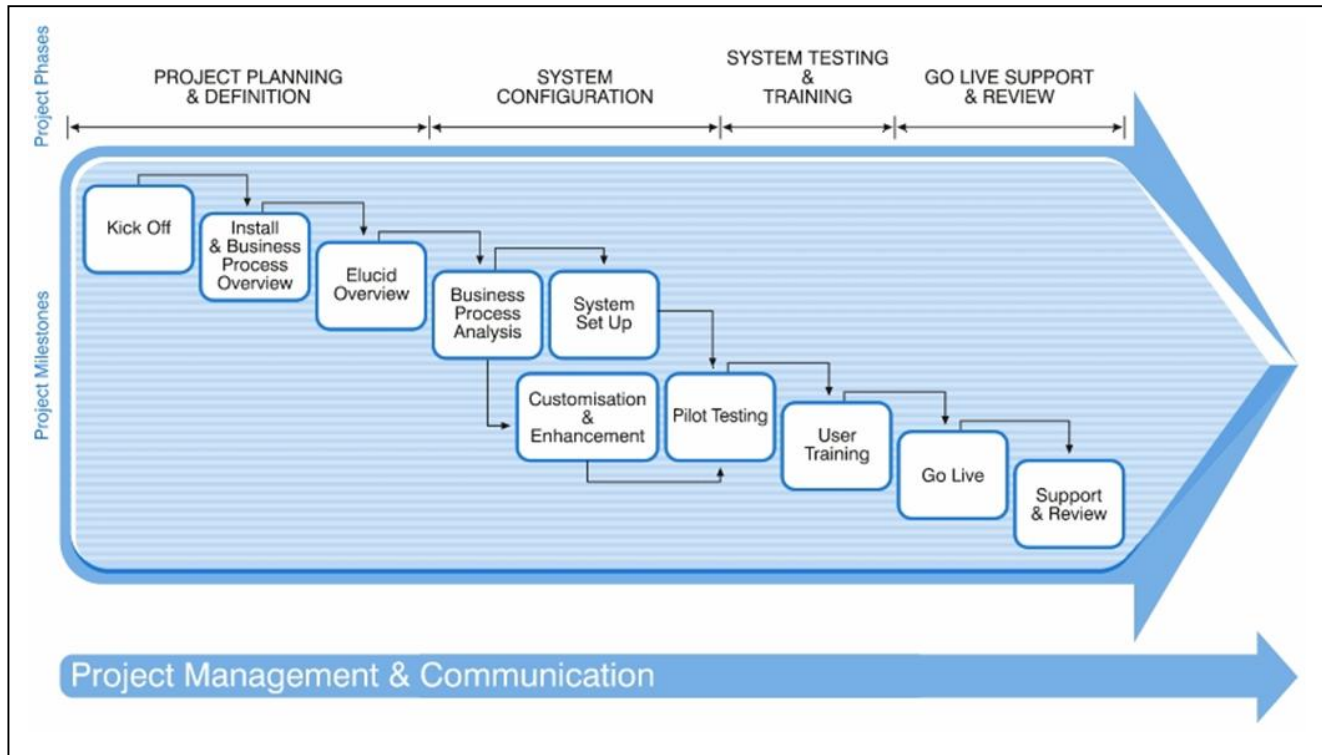


Figure 5. Implementation Methodology, Version 2

Elements of SSM could be incorporated into a new implementation methodology

The use of SSM to help appreciate the organizational structures and processes of the ISV and to facilitate the development of a structured and formalized implementation process provided the Associate a unique opportunity to consider which elements could be incorporated into the implementation methodology. The Associate reviewed each element of the methodology in order to select the elements of SSM that would be incorporated. After consultation with the implementation team and operations director it was decided to provide opportunities for SSM rather than to declare its explicit use per se. This important decision allowed the tailoring of the ISV's implementation methodology. Three such opportunities were imbedded into Version 1, namely 1. Kick off, 4.b. Business process analysis and 10.b. Review. After a review of three installations using version 1 a further opportunity was included to version 2, namely 2.b. Business process overview. Each of these new elements provided the implementation team with deliberate opportunities to apply the SSM knowledge and experience, Table 2.

In order to increase the learning about Version 2 of the implementation methodology the Associate deliberately took on the role of project manager for the ISV on a large CRM application for a new client. This involved working with other members of the project teams, both ISV and client personnel.

KEY FINDINGS

The key findings of this study can usefully be divided into three themes, namely: the strength of SSM in appreciating complex organizational situations; the difficulty of incorporating elements of SSM in a formal implementation process; the importance of project staff being knowledgeable and experienced in using SSM. Each of these is considered separately below.

Stage		Description of stage and SSM element
1.	Kick off	Meeting of all members of ISV and client implementation teams. SSM Sense making activities
2.b.	Business process overview	Observing processes and identification of problems and opportunities. SSM Sense making activities
4.b.	Business process analysis	Agree system requirements with all team members. SSM Building relevant conceptual models SSM Comparison to agree accommodations SSM Taking action to improve
10.b.	Review	Agree lessons learnt and changes to methodology. SSM Used as learning cycle

Table 2. Elements of SSM incorporated into implementation methodology

The strength of SSM in appreciating complex organizational situations

The study confirmed the strength of SSM in the appreciation of complex organizational situations, where there is an intention to 'take action to improve'. The Associate used SSM both explicitly (mode A) and implicitly (mode B) to help appreciate the organizational structures and processes of the ISV and to facilitate the development of a structured and formalized implementation process. Rich picture diagrams played a particularly important role in establishing the boundaries of the project and the context for it. The use of informal flipchart based diagrams incorporating multiple internal and external stakeholder views helped to depersonalize issues in the problem-situation. These rich picture diagrams went through several iterations before finally being converted into computer generated images, Figures 2 and 3. The action of tabling a rich picture diagram had an inclusive effect as people at all levels gathered around and engaged in debates about the relative importance or omission of various issues. They also helped to justify the time taken by the Associate in collecting the information which was incorporated into the rich picture diagrams. The Associate acted as facilitator and scribe at these meetings.

The rich picture diagrams instigated discussions resulting in agreement in the 'primary task' based model, which was expressed as 'a system to manage the implementation process for the ISV's products and services with a new customer in order to contribute towards a sustainable business model'. This supported a move away from the real-world problem-situation towards a more abstract discussion of the 'ideal' or 'typical' activities which made up the conceptual model. Staker (2003:232) states that the emphasis of SSM is on assisting a group of stakeholders to learn about their mutual needs and the overlaps and conflicts between these. By resolving these conflicts and comparing harmonized needs with what exists in the real world, stakeholders are hopefully able to reach conclusions about what actions to take to improve the situation. This process had to be carefully managed by the Associate so as not to be seen as blaming existing participants. This was largely achieved and resulted in comparison of the conceptual model with the real-world problem-situation and agreement (through reaching accommodations) on action to improve. The inherently informal nature of building rich picture diagrams is distinctive from other techniques for eliciting requirements, such as Joint Application Development (JAD) sessions (Wood and Silver, 1995). The comparison of SSM rich picture diagram building and other approaches designed to achieve similar outcomes is an area worthy of further research.

The difficulty of incorporating elements of SSM in a formal implementation process

SSM is essentially a set of activities which together constitutes an inquiry/learning system. Can such a system be used in discrete individual elements and yet still maintain the integrity of the original methodology? Practically this may not be an issue as each element made a contribution to the understanding of the problem-situation and enabled agreement of action to improve it. However some of the emergent properties of SSM were lost by this decomposition. For example the hierarchical layered nature of systems thinking supports the deliberate moving between layers by turning a given activity in a conceptual model into the 'what' and then modeled. This enables the logical movement, consistency checking and alignment between many levels of thinking. Put simply this degree of subtlety is lost. Perhaps the most important contribution in a formal implementation process is providing the opportunity for SSM practitioners to use their skills. Whilst the study has shown that

elements of SSM can be incorporated into a formal implementation process the sum of the elements selected does not equal the sophistication of the whole (SSM).

The importance of project staff being knowledgeable and experienced in using SSM

Given the previous two findings, namely the confirmation of the strength of SSM and the loss of some of its potency when individual elements are incorporated into another methodology, it is not surprising that the people involved in the inquiry are the focus for the next finding. For the benefits of SSM to be fully realized it was found to be important that the project personnel were familiar with the principles of SSM and had experience of using it. The Associate deliberately became the project manager on a large CRM application for a new client and was able to contrast her experience with other members of the project team. Whilst the project was deemed a success by the Operations Director of ISV and client the final post implementation review helped to identify some of the gaps surrounding the experiences of using the methodology. It was concluded that the Associate's superior knowledge and experience of using SSM enabled a higher level of appreciation of the problem-situation and more extensive use of the opportunities for using systems ideas in the implementation. Interestingly the Associate also used these skills to develop a time/cost process to support the financial monitoring of Version 2 of the implementation methodology. The final recommendation of this phase of the programme was that all ISV project staff should be trained in and given experience of using SSM. It was concluded that it would not be feasible or indeed desirable to train the client's staff in the use of SSM.

CONCLUSION

This study indicates that whilst individual elements of SSM can be incorporated into an implementation process its real value was in providing project staff with a robust framework for conducting structured inquiries. This would be further enhanced by project staff being trained in and given experience of using SSM. It is important to recognize that the Associate and supervising academics had no vested interest or financial incentives in recommending that the ISV project staff were trained in the use of SSM. In fact this recommendation has, at least to-date, not been implemented by the ISV. However ISV project staff are trained in the use of Version 2 of the methodology and this does include some discussion on selected elements of SSM. Rich picture diagrams proved particularly useful in engaging staff with no knowledge or interest in SSM in a structured and constructive way.

This paper contributes to our understanding of SSM by showing that its use can be appropriate in the implementation process of CRM applications in SMEs in the mail order sector, both in terms of supporting project staff and embedded within an implementation process. SSM can also improve the quality of such implementations and support the iterative improvement of the implementation process. Historically SSM has been predominantly used within large organizations, and typically by consultants. This study highlights that it is relevant to small firms as well as large and reinforces its use by actors external to the organization undergoing the change. The research therefore makes an important contribution to IT project implementation by recommending the incorporation of SSM in implementation methodologies and the training of IT project staff in using SSM - even for SME ISV and SME clients. It is perhaps this research finding which makes a distinctive contribution to nearly thirty years of SSM research, namely that SSM can prove useful even when only certain elements are used and incorporated into other methodologies. However it is acknowledged by the authors that some of the 'strengths' of SSM are lost but that this can be mitigated when such hybrid methodologies are used by SSM trained project staff.

Further research is recommended in two areas, firstly the use of Version 2 of the methodology in other organizations and comparison with the research reported in this paper. Secondly, that other techniques for eliciting requirements, such as Joint Application Development (JAD), could be usefully compared with the rich picture building element of SSM.

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