

IT Management during Acquisition of ERP-systems – Experiences from Goal Dialogues at two Companies

Karin Axelsson, Research group VITS, Department of Computer and Information Science, Linköping University, SE-581 83 Linköping, Sweden, email address: karax@ida.liu.se

Anders Avdic, Research group VITS, Department of Business Administration (ESA), Örebro University, SE-701 82 Örebro, Sweden, email address: aac@esa.oru.se

Abstract

Large IT-projects may put a lot of pressure on organisations. There always exist different key participants with diverging goals, expectations, and apprehensions about the acquisition and implementation of a new IT-system. IT-management implies strategic alignment between IT-investments and the organisation's present and future direction, which obviously is a very wide field. This paper describes a research project focused upon how diverging goals among key participants can be identified, visualised and evaluated before and during an IT-project, in order to make the project successful.

1. Introduction

Information technology (IT) is often viewed as a great enabler for organisations. Thanks to IT-innovations it is possible to make improvements, be more effective and produce with higher quality (e.g. Davenport 1993, Hammer and Champy 1993). On the other hand large IT-projects, e.g. acquisition of an enterprise resource planning (ERP) system, may put a lot of pressure on organisations. New IT-systems must be able to co-exist with old systems. Thus, it is obvious that legacy systems disable many new IT-innovations (Keen 1997). This may lead to a complex situation for organisations. Keen (1991) argues that IT has added complexity in most organisations, not reduced it. A study made by IVF Industrial Research and Development Corporation show a number of problems and challenges that organisations meet when implementing IT-systems (Kökeritz et al 2000). Results from this study reveal problems with handling IT issues strategically over time. Some of these problems are (ibid.):

- Information related to a specific product has a long life-cycle
- Technology has a short life-cycle
- Large IT-projects imply a long implementation time
- Development is forced by trends in technology, methods, and IT-systems
- Maintenance of legacy system is expensive
- IT-systems are made organisational dependent through adjustments
- It is difficult to map organisational needs
- Rapid organisational changes imply new demands on IT-systems

- Increased integration within and between processes (activities and information)
- Management lack understanding of how to align IT strategies to business strategies

All these problems are aspects that impact on IT management in organisations. IT management implies strategic alignment between IT-investments and the organisation's present and future direction. How can organisations meet these challenges in a successful way? Lockett (1996) argues that in order to increase both level and chance of success of IT-innovations with substantial business benefits, cross-functional project teams involving both IT and all relevant areas of the business are important. To bridge the gap between IT and business the right mix of skills must be ensured (ibid.).

This paper describes a research project focused upon a particular aspect of IT management, i.e. how diverging goals among key participants can be identified, visualised and evaluated before and during an IT-project, in order to make the project successful. There always exist different participants who have diverging goals, expectations, and apprehensions about the acquisition and implementation of a new IT-system. There can be diverging apprehensions about:

- *problems* that the new IT-system will solve and problems that the IT-system may cause
- *goals and visions* about the future organisation and use of IT-systems
- what *effects* the new IT-system will give in the organisation

The point of departure for this research project has been the belief that bringing these apprehensions closer to each other would establish a foundation for successful IT implementation. Working with commonly agreed diagrams and graphs of key participants' goals and problems is considered as a critical factor for successful handling of large IT-projects.

The aim of this paper is to describe this research project and its outcomes. The project had the purpose to develop a method that could solve some of the problems within the IT management area. The evolving method, described in this paper, is focused upon how to identify, visualise and evaluate diverging goals and apprehensions during an IT-project. As a basis for this method development, we have studied different groups of key participants and their experienced goals and problems in two case studies.

2. IT Management

As stated above, IT management is a wide concept embracing many aspects. Magoulas and Pessi (1998) define the concept as "the judicious organisation of technological means to accomplish individual and social needs". They state that an important aspect of strategic IT management is to continually develop and renew good IT architectures while at the same time eliminating undesirable islands or tangled nets of information as well as rigid and restrictive structures (ibid.).

Earl (1996) uses the term information management in the meaning of how to manage IT, including questions such as the mission and organisation of the IS function, control and accounting for IT, and design of the management process required across all the IT activities of an organisation. This implies that responsibilities, relationships, and roles are emphasised.

Earl notices that information management issues never seem to die since both technology and organisation are constantly changing. It is organisational issues in strategic management of IT that matters most. In the same time these issues are often poorly addressed. (ibid.)

Ward et al (1990) mean that poor IT management among other things results in lack of understanding and agreements between users, managers, and IT-experts, which lead to conflicts, bad solutions, and inappropriate use of resources. It is problems like these we address in this paper. When focusing on goal dialogues we wish to establish a sound basis for decision-making within IT-projects. Human and organisational issues are important but often neglected, as stated above.

3. Research Design

In this section we describe the research project and the studied organisations.

3.1 The Research Project

The main parts of the research project have been carried out between May and December 2000 as case studies at two Swedish companies (JOAB and ESAB, shortly presented in section 3.2 below), with focus on acquisition and implementation of an ERP-system. Main activities have been interviews with persons who had different relations to the ERP-system, graphical analysis, and feedback seminars.

During the case studies 16 interviews were conducted by two researchers, eight interviews at each company. At JOAB the managing director, financial manager, marketing manager, administrative manager, production manager, branch workshop manager and two employees were interviewed. At ESAB the implementation project manager, logistics manager, transport manager, finance manager, a project member and two representatives from the IT-system supplier were interviewed. The interviewed persons were identified as key persons in relation to the acquisition and implementation project. These persons have also been gatekeepers in order for the researchers to get access to the organisations.

Since the study was explorative the interviews consisted of open questions. Questions were asked about problems, goals, and expectations in relation to the informants work tasks and the acquisition, implementation, and usage of the ERP-system. Examples of questions are:

- What are your work tasks?
- What are the goals of these tasks?
- What are your apprehensions of the organisational goals?
- Which problems in the organisation do you think the ERP-system address?
- What causes do these problems have?
- How do you think it should be instead?
- Why do you want an ERP-system?
- Which factors do you consider most crucial in order to succeed with the implementation project?

- How will the ERP-system affect your work situation?
- If you were to decide, how should the implementation be organised?

The interviews have been taped and transcribed. Problems and goals have been structured in graphs, during the transcription (for examples of graphs, see section 4). The aim of the analysis has been to find patterns and categories of interest in order to find common and diverging goal and problem apprehensions. After the first graph construction, the graphs have been reviewed, revised, and verified by the informants.

In one of the companies a feed back seminar was arranged. At this seminar the graphs were presented to all the informants. During the seminar, the researchers registered discussions and reflections especially about diverging goal and problem apprehensions. Notes from the seminar were later used to complete the documentation from the verified interviews. In the other company, a similar seminar was planned but suspended due to unforeseen circumstances.

3.2 Studied Organisations

We have conducted case studies at two industries in Sweden:

- ESAB, a multinational company which is the world's largest manufacturer and supplier of welding and cutting equipment with 7 600 employees. At ESAB a decision has been taken that aims to implement common business processes at ESAB Europe in order to accomplish a high degree of customer service and substantial cost cutting at the same time. This organisational change also demands a new ERP-system that should be used by all European factories belonging to ESAB.
- JOAB, a family-owned, market-leading manufacturer of truck bodies. The company develops, manufactures and sells hook lifts, bucket loaders, etc. and has 100 employees. Since the company is growing there is a need to structure information processing and decrease personal dependence in relation to information flow. An ERP-system will be implemented in order to support JOAB's customer focus and allow a flexible production.

4. Empirical Findings

Our empirical findings are discussed according to goals, problems, and key participants. Finally, we report some identified similarities and differences in the two case studies.

4.1 Goals

The informants have expressed different kinds of goals, varying from official and unofficial goals to expectations and preferences. By official goals we mean goals that are explicitly decided in e.g. a board meeting. By unofficial we mean other kinds of goals.

Goals have been analysed and arranged in hierarchical graphs with superior goals at the top and subordinate goals below. When ordered in the mentioned way, the goals at the bottom represent the means to accomplish goals above. An example of a goal hierarchy is showed in Figure 1.

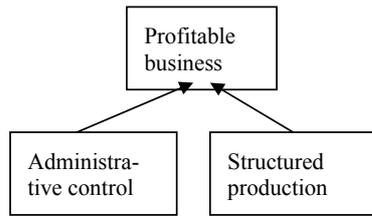


Figure 1 Example of a graphical illustration of a goal hierarchy (i.e. a goal diagram)

Since the case studies were qualitative, focusing on exemplifying rather than generalising, the frequencies of specific goals discussed at the two companies are of somewhat limited interest. Still as an example though, there could be interesting to notice that there were some goals that the two companies had in common in relation to the acquisition and implementation of the ERP-systems. These common goals were related to the aim of centralising, controlling and making business more effective.

Since there has been a focus on implementation of an ERP-system, a crucial goal for all the informants has been “successful implementation of ERP-system” or some similar formulation. When placed in the middle of a graph this crucial goal makes the graph look like an hourglass. This *hourglass model* clearly indicates the two main areas of questions and discussion, namely conditions (below the middle) and effects (above the middle).

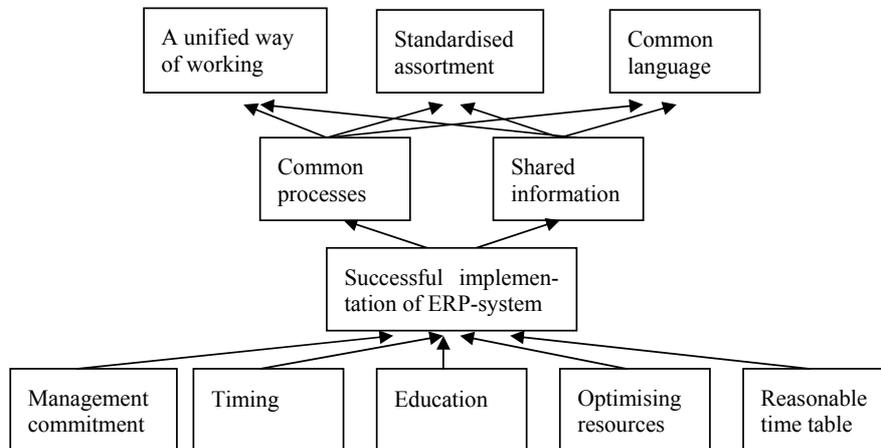


Figure 2 Simplified example of an “hourglass” graph

The interviews were focused on ERP-system aspects and, thus, comments from the informants covered IT-related issues. Some of the informants did also mention *non-IT-related conditions*. Organisational change was one condition mentioned at JOAB. Another condition was keeping good relations with customers, since this was an important business policy. These non-IT-aspects were also illustrated in the goal diagram. (See Figure 3)

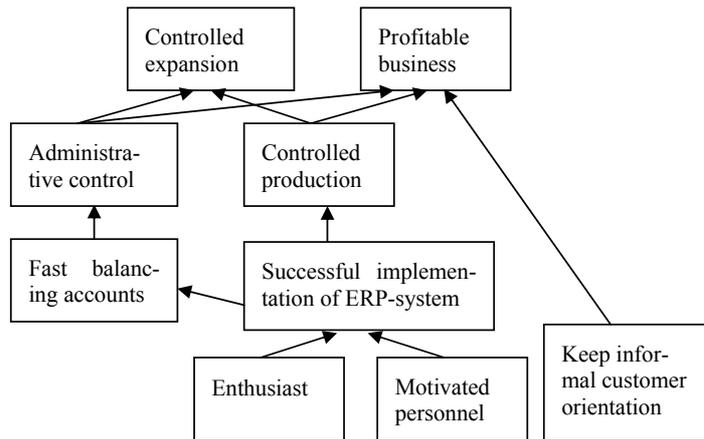


Figure 3 Simplified example of a goal diagram with IT-related and non-IT-related conditions

4.2 Problems

The questions about problems aimed at identifying and comparing apprehensions about problems in the organisation and expected problems in relations to the ERP-system. Another aim was to verify apprehensions about goals. From our perspective problems are related to goal since there has to be a goal to experience a problem. If there are no goals there are no problems. The problems have been documented and graphically illustrated in problem diagrams, similar to the goal diagrams (see Figure 4). A problem diagram shows negative effects at the bottom and their causes above. This implies that if one wants to avoid negative effects, measures have to be taken according to the basic causes (at the top of the graph). With respects to Figure 4 the problem “information bottlenecks” matches a goal like “information available to relevant persons”. The way to avoid this effect is to share vital information and implement relevant administrative resources (according to the graph). In our study this information was used to verify and complete the informants apprehension of goals.

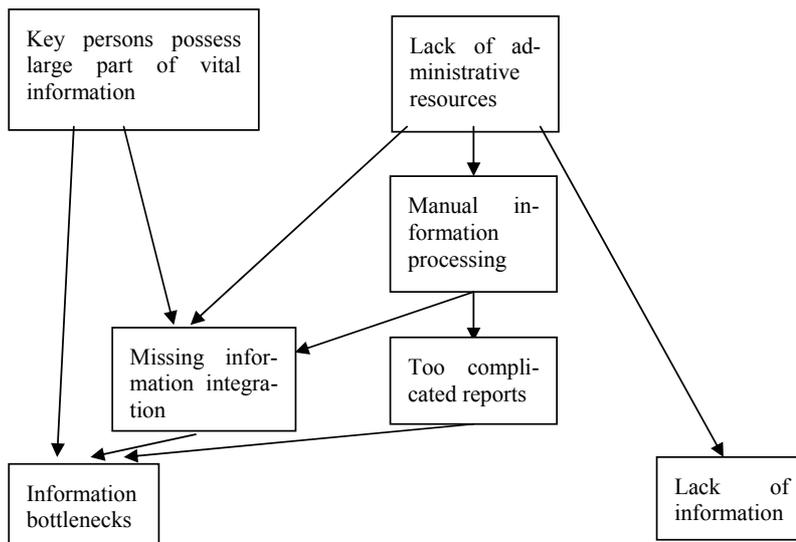


Figure 4 Simplified example of a problem diagram (present problems)

At JOAB we identified particular problems concerning poor information availability, dependency of key persons and manual information processing. At ESAB there was a common understanding of what the basic problems were, namely several IT-systems leading to poor homogeneity. This caused in turn poor usage of resources and poor customer service.

There is a difference in problem apprehension depending on whether focus is on problems perceived in the *present* or in the *future*. If the implementation of the ERP-system is a way of implementing a major change in organisation (as was the case at ESAB), problems in the present are not as interesting as if the ERP-system in itself is a mean to overcome present problems (as was the case at JOAB). Since the implementation of the ERP-system was meant to decrease problems in the future, it was natural that estimated future problems in the organisations were not as many as perceived present problems. Still some problems were discussed in relation to the implementation as such. At JOAB there was some fear that key persons would be too occupied with the implementation and that the customer service would not be as effective as usual during the time of implementation. The need for careful planning was stressed in order to fulfil customer requirements during implementation.

Comment: In eller on?

4.3 Key Participants

The key participants can be categorised according to three dimensions; horizontally (x), vertically (y) and by time (z) (see Figure 5). The horizontal dimension (x) relates to different departments or units in the organisation, e.g. financial department, construction department or a branch. The vertical dimension (y) relates to different levels in the organisation, e.g. the managing director level, the middle management level or the employee level. The time related dimension (z) relates to the life-cycle of the acquisition and implementation of the ERP-system, e.g. different roles in the process of acquisition, implementation, and usage of the ERP-system. All the informants in the case studies can be categorised according to these

three dimensional model. One dimension not expressed in the model is the product life-cycle. Persons could be involved in different parts of the life-cycle, e.g. construction, marketing, production and supply. Partly this dimension is represented in the x-dimension.

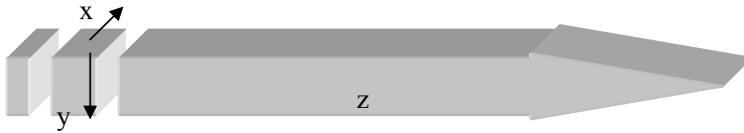


Figure 5 Three dimensions of key participants

The identified key participants in the study at JOAB represented different aspects of all three dimensions. In the x-dimension participants from different departments focused different aspects according to their department. In the y-dimension participants from the middle management level had a more unified view of the implementation than the employees had. Differences concerned especially the benefits of the ERP-system. An interesting aspect in this respect was that employees compared the investment in the ERP-systems with alternative production oriented investments. This questioning of the ERP-system could be due to poor information about why the IT-system was to be implemented. In the y-dimension implementation and usage was focused by the employees and one of the production managers who expressed concern about the importance and problems with registering and keeping correct information in the IT-system.

At ESAB the participant mix was somewhat different than at JOAB. Still different levels were represented. Participants from the middle management were somewhat more represented in relation to employees. On the other hand they represented different departments involved in the ERP-project. Representatives from the supplier were also interviewed which gave some interesting views on goal conflicts.

The discussion of key participants above deals only with the *role* of the participant. We have also noticed that individual characteristics are important when choosing persons in order to gather information about goals and problems. If a dialogue about similarities and differences concerning goals and problems takes place, the informant must be willing and able to participate in the dialogue. This includes that the informant must:

- agree with the value of such a dialogue
- have the time or be given the time, to participate
- have the ability to express his or her apprehensions

4.4 Similarities and Differences

In both companies apprehensions at the middle management level were quite similar in many ways. We believe that this is due to the fact that the ERP-project has been discussed among the managers for some time and, thus, a common apprehension has evolved. When talking to other groups of key participants, different perspectives were expressed. At the feedback seminar at JOAB this fact was much appreciated and led to a plan about engaging more people in the ERP-project. The purpose was to let more persons express their apprehensions through systematic collective interviews. At JOAB with 100 employees this would be possi-

ble but at ESAB with nearly 7 600 employees it would of course not be possible. Still there can be a substantial value to give many involved persons the possibility to express their apprehensions. At ESAB an employee with experience from a similar implementation project for example expressed some apprehensions that were quite different in relation to the managers.

In both companies customer service and reduction of costs have been expressed as important superior business goals. These goals can be seen as partly *conflicting*. It is our opinion that this goal conflict needs special consideration when discussing how the goals should be fulfilled.

The goals of the IT-system suppliers could be seen as partly conflicting since their profitability is dependent on the price of their services to the customer. Good relations between representatives of supplier and customer can reduce this goal conflict. The IT-system supplier of ESAB expressed that knowledge of customer goals is important for the supplier to be acquainted with since the customer cannot give too detailed instructions to the supplier when implementing the ERP-system.

The earlier mentioned goal conflict between customer service and key persons being involved in the implementation work is important to consider. The participation of key persons in the implementation is crucial for its success even if it might reduce the customer service over a period.

Another potential goal conflict could be between the aim for centralisation and the aim for flexibility. Both companies aimed at better control and shared information resources through systematisation and standardisation of information processing. A potential risk is that this might reduce flexibility.

The apprehensions about which conditions that were the most important for a successful ERP-system implementation were a bit different in the companies. At ESAB, with a lot of implementation and project experience, the ERP-project itself was more in focus. At JOAB with less experience, other aspects were more frequently discussed. At ESAB apprehensions were expressed about driving force, implementation planning, choice of the best system, organisation of key persons and perceived benefits in the organisation. At JOAB apprehensions were expressed about education, planning, choice of the best supplier, engagement from the management and engagement from the persons affected by the ERP-system.

5. An Evolving Method for Establishing Goal Dialogues

The method we present in this paper has evolved from our case studies. It is based upon work routines applied in the research project together with experiences from this way of action. In this method a number of existing method components are combined and adjusted to this context. These method components have been developed by our research group in earlier projects (see e.g. Goldkuhl and Röstlinger 1993, Goldkuhl et al 1997). These method components belong to a method family which we call SIMM (Situation adaptable work and Information systems Modelling Method). One method in the SIMM family is Change Analysis (CA/SIMM), which is a structured method for early phases of business and IT development. CA/SIMM has an emphasis on problem solving, critical evaluation, communicative interaction, and creative thinking (ibid.). We have used method components from CA/SIMM in or-

der to analyse goals and problems, as described later in this paper. The method for goal dialogues is still evolving and need further testing in different empirical contexts.

5.1 Identifying Key Participants

Before starting a goal dialogue the method users must be introduced to the organisation (unless they belong to it). A project leader or another person with a lot of knowledge about the organisation and the IT-project is suitable to give this introduction. The project leader is important when identifying key participants. The introduction should cover the organisation's important features, its products or services, etc. Together with analyses of existing business models this information should give the method users a proper understanding of the organisation. If there are no relevant documents of business models this might be reconstructed in this phase. In each situation there has to be a judgement of how much process reconstruction there has to be done in order to reach a good picture of the organisation.

After having done this it is possible to identify key participants that should be brought together for goal dialogues. Key participants can be categorised in several dimensions, as discussed in section 4.3 above. They belong to different departments or functions within the organisations, they have different positions at the organisation, and they possess different roles in relation to the IT project. Each key participant can be viewed through these dimensions. When identifying participants it is critical to ensure that these dimensions are covered in a suitable way, in order to catch as many nuances as possible in the goal dialogues. There also exist external participants that could be important to involve; such as customers, suppliers, financiers, and suppliers of IT-systems.

In this phase the number of participants must also be decided. Many participants implies rich dialogues covering many perspectives, which would result in high quality outcomes but also be more time consuming. Available resources must be compared to the desired outcome. In order to reduce time it is possible to arrange a first meeting with all participants to explain purpose of the analysis, method activities, graph techniques, etc. Then follow individual interviews with all participants, based on the questions proposed in section 3.1 above. Initially, the relevance of those questions must be judged for the particular situation and the questions might be changed or adjusted. As a complement to individual interviews it is also possible to conduct group interviews. In this way the analysis could cover more participants or even everyone in a small organisation. Group interviews may on the other hand be inhibiting for some participants. Thus, group interviews cannot totally replace individual interviews, but if the participants have similar positions and influence in the organisation group interviews may give a rich view of different goal apprehensions and possible goal conflicts. Group interviews could also serve as a time for discussion, close to the feedback seminars mentioned above.

If results from the interview are registered directly in an IT-application it is possible to analyse goal and problem relations during the on-going interview. This would save time and also verify that the method user has correctly understood the informant.

5.2 Goal Analysis

In order to analyse and relate different goal statements we use the method component goal analysis from CA/SIMM (Goldkuhl and Röstlinger 1993). The purpose of goal analysis is to clarify which goals different participants strive for in the IT-project and to increase the possibility to reach desired results. Goal analysis is made on an individual level since goal dia-

logues imply that differing apprehensions are made visible and possible to discuss. Goal statements from each interview are documented in a goal list and then analysed and related to each other in a goal diagram. The analysis aims at discovering relations between main goals and means, which gives an understanding of how subordinated goals are important in order to fulfil main goals. The analysis also aims at revealing goal conflicts, i.e. goals that cannot be fulfilled simultaneously.

Goal analysis based on interviews can be specified according to different aspects. Our case studies have revealed some important aspects:

- Individual, departmental, organisational goals
- Presuppositions and effects – goals related to the IT acquisition process
- Goals related or unrelated to IT issues
- Participants' three dimensions – horizontally, vertically, and time relation to the IT-system

5.3 Problem Analysis

During interviews with key participants not only goals are explored but also problems that the new IT-system is supposed to solve. These problem statements are structured and analysed in the same way as goal statements. We use the method component problem analysis from CA/SIMM (Goldkuhl and Röstlinger 1993) for this analysis. The purpose of problem analysis is to identify and analyse problems in order to create a mutual understanding of problem situations. To achieve this an unprejudiced questioning is necessary. Problem statements have to be clarified and problem relations must be analysed. Problem analysis is a criteria independent evaluation of the present organisation, seen from each key participant's point of view. Problem analysis is made on an individual level. Checkland and Holwell (1998) argue that problem situations are best described in a combination of pictures, diagrams, notes, prose, and collection of data. "Rich pictures" are a more suitable tool to illustrate complexity than just linear text (ibid.). This is the reason for combining problem lists and problem diagrams in problem analysis.

During problem analysis it is possible to distinguish between problem statements concerning the present and future situation. These statements either focus on problems that the new IT-system is supposed to solve or problems that may arise (or remain) after the acquisition of the IT-system. Another principle of division is to analyse problems related to different phases in the IT-system's life-cycle. This could for example cover different key participants' relation to the IT-system; whether he or she is involved in the acquisition phase, in the implementation phase or in the usage and maintenance phases.

5.4 Relating Goals and Problems

In this last phase the goal and problem analyses of each key participant are related to each other. This results in a general picture of each key participant's goals, expectations, and apprehensions about the acquisition and implementation of a new IT-system. In this phase the aspects, dimensions, and principles of division used in the earlier phases are important tools when looking for patterns, differences and similarities in the data material.

When this phase is conducted, the method user has produced goal diagrams, problem diagrams, and a textual documentation of each key participant's goal and problem relationships. This is, after an individual verification of the correctness, important inputs for the feedback seminars with all key participants. At the feedback seminar the evaluation of diverging goal and problem apprehensions at the organisational level starts. The organisation is then conducting a goal dialogue. The discussion starts at the feedback seminar but should continue in the organisation. This evolving method aims at supporting a continuous goal dialogue that may help the organisation to avoid bad decisions concerning the IT-project. The awareness of existing diverging goals and the possibilities to bring those goals closer to each other through goal dialogues, are important conditions for a successful IT-project.

6. Conclusions

The case studies aimed at creating organisational consciousness about the importance of discussing and formulating common goals, in order to make an acquisition and implementation project more likely to be successful. A particular focus has been on conflicting goals; i.e. two goals that cannot be fulfilled at the same time. Through graphical illustrations of individuals' goal and problem statements, key participants' expectations have been compared and explicitly evaluated. We have called this process *goal dialogues*. From the experiences of the case studies, we have developed a method supporting goal dialogues. In this paper we have presented this method consisting of four phases; identification of key participants, goal analysis on an individual level, problem analysis on an individual level, and evaluation of diverging goal and problem apprehensions at the organisational level (i.e. conducting a goal dialogue). We have also identified three dimensions that key participants can be divided in, to help deciding which persons to interview when conducting goal dialogues.

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