«I would be happy if they only would admit that they got a great system for very little money»

A Case Study of Interpersonal Conflicts in Large IT Projects

Lena Christine Lund Aronsen

Master thesis, Department of Informatics

UNIVERSITY OF OSLO

01.08.2013

II

«I would be happy if they only would admit that they got a great system for very little money»

A Case Study of Interpersonal Conflicts in Large IT Projects

IV

VI

Abstract

Large IT projects are increasingly common and are often initiated in key sectors of society. Implementing a large IT project is a complex process, both for the customer and the supplier. Many people are involved, and the project demands key personnel possessing extensive business and management skills, as well as technical knowledge. It is well known in order to succeed, the development model, project management, estimates, plans and contracts must be well planned and maintained. The scope of a project is in other words extensive. The project may last for several years. However, a fundamental aspect of long-term business relationships is the importance of a well-functioning collaboration relationship between customer and supplier.

The motivation behind this study is to give interpersonal conflicts in IT development projects a broader attention. The focus is on interpersonal conflicts and their impacts towards the progress of the project, and the factors that contribute to such conflicts. An interpretative case study was conducted to investigate these issues, using the data collection methods semi-structured interviews, questionnaire and document analysis. The use of repertory grids outlines how 13 practitioners perceive interpersonal conflict. Findings include five salient problem areas of large IT projects: Contracts, estimates, interpersonal issues and interaction, project process and management and organizational relations. These issues are discussed with regards to four theoretical conflict approaches: problem-solving, systemic, narrative and transformative.

Keywords: Complex IT projects, Repertory Grid, interpersonal conflict, conflict escalation, conflict theory

Acknowledgements

First of all, I want to express my deepest gratitude to my advisor Jo Hannay for his constructive feedback and guidance through the thesis work. Thanks also to my internal supervisor Lars Groth, for quick responses and valuable advice. You have given me many new perspectives and ideas, and I have learned so much during this process.

I also want to thank all my informants – without your contributions it would not have been possible to conduct the study. Thank you so much for participating and sharing your experiences and knowledge with me!

I am also grateful to Magne Jørgensen and Kjell Steffner for their contributions.

<div align="center">*</div>

Thanks Lene, for your endless encouragement.

And finally, I would like to warmly thank my fiancée Mats for his support (and daily cups of coffee) as well as contributions to the thesis.

Lena Christine Lund Aronsen
University of Oslo
August 2013

X

Table of contents

Table of figures

Table of tables

1 Introduction

Production of most goods and services are dependent upon information technology systems. The demands to IT systems are increasing, and there is an emerging need of integration of systems as well as renewals and upgrades. The scope of such projects is extensive in means of size, economy, personnel as well as other resources. Exceeding of budgets and schedules makes the project costly and delayed. The customer does not receive what they needed, and expectations are unmet as well as loss of productivity. The supplier is affected by low profit and loss of reputation. The financial loss of the project is often severe. On the organizational level, business relationships are damaged, and the frustration leads to pointing fingers at scapegoats.

Especially the financial loss receives negative coverage in the media, and the examples are many: the Norwegian Medical Association reveals that Oslo University Hospital conglomerate spends 40 FTEs on physically transporting medical images between its four hospitals, because the IT systems of the four are not able to communicate with one another [1]. The Oslo Area public transport ticket system, Flexus, has experienced numerous technical and organizational problems that have led to repeated delays in its development project, which was supposed to be finished in 2005. The costs of Flexus is estimated to be about 600 million NOK [2]. The Norwegian Public Roads Administration went from a budget of 275 million NOK and deadline in 2008 to a rough estimate of finishing in 2017 – with a price tag expected to proceed at least 1 billion NOK [3]. Other projects with great financial loss include Tress-90 (1 billion NOK) and Golf (1 billion NOK). Fundamental societal institutions like the Police and the digital emergency network also have a portfolio of failed projects with insufficient functionality [4].

1.1   Motivation and goals

An information technology project is a process that not only depends on technical efficiency, but also on business relationships, thorough project management and well-functioning collaboration between customer and supplier. Research has shown that human traits are critical success criteria for such projects [5], and number of empirical studies of IS development projects find that empathy and improvisation are required skills in addition to managerial control [6]. The potential of interpersonal conflicts is high when the uncertainties

and risks of the project are high [7]. The improvement of interpersonal relations has been proven to reduce overruns, and frequent communication between customer and supplier is one of the main success criteria of such projects [8].

It is interesting that interpersonal conflicts in large IT projects do not seem to be sufficiently documented (if documented at all). Interpersonal conflict seems to be hushed up or neglected, or disguised as some sort of professional dissension regarding the contracts. It is reasonable to assume that professional dissensions can relatively easily be worked around, and it is thus probable that interpersonal conflicts escalate difficult situations, compromise productivity and progress, or even terminate projects. Conflicts and poor measures of cooperation between customer and supplier in system development is mentioned briefly in the literature, but is not given much space [8, 9].

The motivation behind this study is to give interpersonal conflicts in IT development projects a broader attention. The context of the thesis is large and complex IT-projects. Large projects are increasingly common and are often initiated in key sectors of society in order to achieve societal gain. The goal of the study is to contribute to empirical data on how interpersonal conflicts affect large projects, and to establish what factors that are perceived by practitioners to trigger interpersonal conflict situations.

1.2 Research objective

The thesis will explore four different approaches to interpersonal conflict: problem-solving, narrative, systemic and transformative. The research is conducted as a case study within the interpretivist paradigm, and data collection methods are interviews, document analysis and questionnaire.

1.2.1 Research questions

The research questions are mainly focused on identification of interpersonal conflicts and their impact, as well as analyzing how the conflict approaches can be applied within the context of large IT projects. The overarching theme of the study is therefore *identification of characteristics of interpersonal conflict within large IT projects*. In order to disentangle this issue, research questions include:

- How do practitioners perceive interpersonal conflicts?
- What factors are critical considering interpersonal conflict?
- What are the perceptions of third party interventions?
- How can established interpersonal conflicts be approached?

The research questions will be answered by semi-structured interviews based on course of events, triggering factors and approaches, a questionnaire of contracts and project management, as well as a document analysis based on guidelines provided by the Norwegian government.

1.2.2 Delimitation

The investigation has focused on being descriptive in order to identify contributing factors to interpersonal conflicts. However, the investigated projects are large, and the findings may not be applicable to smaller projects. The thesis will mention juridical aspects descriptively, but will not discuss the legislation. The focus on contracts is solely within a Norwegian context. The study is conducted considering the setting of one supplier and one customer, and the role of subcontractors is not specifically discussed. The area of investigation is focused on the projects' initiation, development and implementation phases, which means that maintenance and guarantee phases are not dealt with explicitly.

1.3 Related work

Hannay and Benestad [10] conducted a study on productivity threats in a large agile project. The authors list ten different problem areas, and many are related to interpersonal issues; namely restraints on collaboration due to contracts, ownership and culture, conflicts between organizational control and flexibility, volatile and late requirements from external parties and overloading of key personnel. Their findings include, among others, that ownership for tasks and competence was not explicitly stated or communicated adequately. The project also lacked human resources with extensive knowledge of business rules in addition to system requirements and technical frameworks, which forced key personnel to fulfill several roles and thus work and collaborate with extensive context switching. The study did not focus on conflict, but it is likely that the productivity threats uncovered in the study are instrumental in several conflicts in IT development projects.

Elstad and Gustavsen [11] studied interpersonal conflict between managers and users during deployment of new IT systems. The authors stress that some research reports focus on conflict in information system development projects, but not on post-development issues, which is their main objective. Their analysis shows that the interpersonal conflicts directly influenced system success within the organization. Elstad and Gustavsen explored perceived benefits and user satisfaction of the system in three different companies that implemented a new system, which imposed major changes within each organization. The main theme of the study is how user perception of conflict influences the success of the use of the new system. The study describes how disagreements and negative emotions can influence the end users' perceived benefit and satisfaction of their work situation. The results show a correlation between these two aspects, and by implementing a new system; both social and organizational factors will influence the end users. The authors argue that that acquiring organizations should reduce elements that influence the end users negatively.

Barki and Hartwick [7] argue that interpersonal conflict is a neglected subject in information system development. Results of the data suggested that interpersonal conflict was reflected in three key dimensions; disagreement, interference and negative emotion. Further, they investigated the relationship between interpersonal conflict, conflict management and information system development outcomes. While conflict management was found to have positive effects on project outcomes, it did not substantially mitigate the negative effects of interpersonal conflict on these outcomes. The impact of interpersonal conflict was perceived as negative, regardless of management methods or resolution.

1.4 Outline

The thesis is divided into eight chapters:

Chapter 1 is the introductory chapter. The background, motivation, goals and research questions are outlined as the framework of the thesis.

Chapter 2 reviews interpersonal conflicts and mediation theory. The chapter presents how conflicts usually emerge as well as various conflict approaches and mediation styles. The strong and weak sides of the four conflict approach models are discussed.

Chapter 3 describes characteristics IT projects, project management and contract standards. General issues of large projects are outlined.

Chapter 4 contains a brief discussion of qualitative and quantitative methods, research paradigms, methodology and methods used in research. The chapter also contains the research design of the study, and an explanation for the chosen approaches.

Chapter 5 outlines the framework of the Repertory Grid Technique proposed by George Kelly, and presents how the technique was applied in the thesis research.

Chapter 6 is a presentation of the analysis and results from the collected empirical data.

Chapter 7 presents a detailed discussion of the findings as a reply to the research questions, which connects the theoretical basis with the empirical data.

Chapter 8 concludes the thesis and contains proposals for future work.

2 Conflict and mediation

Conflicts are natural. Regardless of their constructive or destructive nature, conflicts contribute to development and change. Conflict situations can provide useful ways to discover diverse viewpoints or alternative solutions to various issues, enhance efficiency and support cohesion. Conflicts also have a potential for deteriorating or destroying valuable relationships, and may result in stress and insufficient psychosocial working conditions. In this chapter, we will explore interpersonal conflict in the work life and how such conflicts escalate. Then we present a theoretical framework of conflict approaches.

2.1 Definition

An interpersonal conflict arises when two or more persons in a mutually dependent relationship have some sort of incompatible goals. Kjelland-Mørdre et al. [5] use the following categorization: 1) Disagreements regarding *prioritization of goals and resources*, which can be solved through negotiation. 2) Disagreements regarding *opposition* between stakeholders. These conflicts further divided into *interest-based* conflicts (related to scarcity of resources like money or time), and value-based (considering moral, ethical, political and social issues). 3) *Relationship* conflicts, which make up a large part of interpersonal conflicts. These conflicts are difficult to handle through negotiation. Relational conflicts often originate from case conflicts, but the relational aspect is caused by an escalation of the original conflict. It should also be noted that some people are more likely to be involved or contribute to conflicts, and is sometimes referred to as a 'type A personality' [12, 13]. The type A personality includes traits like impatience, aggressiveness and competitiveness.

2.2 The staircase model

Interpersonal conflicts have a tendency of rapid escalation both in scope and intensity. At some point, the conflict seems to start to 'live a life of its own', independently of what originally triggered it. The literature often refers to conflict escalation as «the staircase model»:
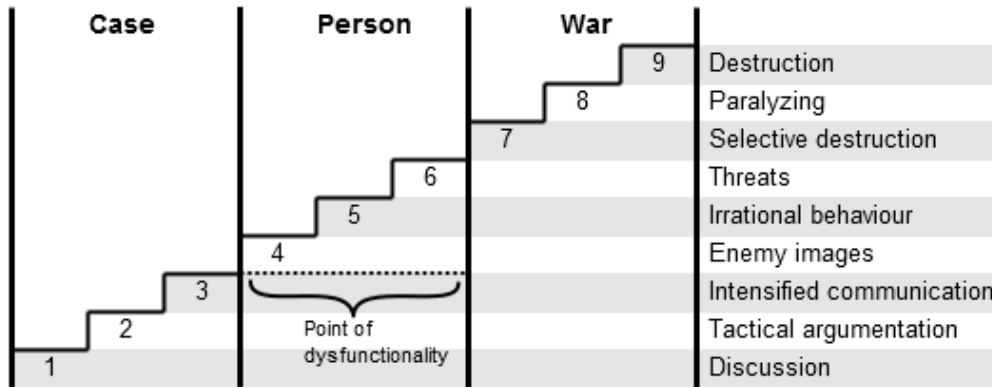
Figure 1 – The staircase model.

Adapted from Glasl in Einarsen [14], p. 89 and Haslebo [15], p. 275.

The phases are not constant, as the conflict may return to earlier stages or go in cycles. The first phase is oriented towards case-related issues. The next phase, the person phase, is oriented towards personal traits and issues. The involved parties tend to view each other as unprofessional at this stage. The last phase is the war phase. The immediate goal of a party at this stage is that the other party must surrender, be destroyed or otherwise be pacified or excluded from the context.

2.2.1 Phase I: Case

The first phase is relatively calm, and there may be ongoing discussions considering an issue of common interest. People may present different perspectives to each other in an enriching and interesting manner. Attention is focused on the subject of discussion, and both parties act rationally.

From this phase, conflict escalation might proceed as follows: If one party for some reason starts to become frustrated in the discussion, the result is often a shift from general discussion to more tactical arguments. Attention becomes focused on finding weak points in the other party's arguments. It is easy for one party to start rejecting any suggestion from the other party regarding the original issue, even though the proposals might be constructive [12]. Eventually, the parties become more intense and enter a state of «win or lose». They will claim to still be discussing the case, but this is merely an excuse to talk about the «bad» arguments of the other party.

2.2.2 Phase II: Person

When the conflict enters the person phase, the situation tends to become worse quite quickly. The parties mix up case issues and person issues, and start to express open hostility towards each other. Everything the opposing party says is interpreted in the worst sense. At this stage, the parties are not talking *to* each other anymore, but *about* each other. They can no longer close their eyes to the other party's «hopelessness» etc. This leads to a stabile negative emotional state of resignation and anger. The focus on personal traits has replaced the case as the subject of discussion [14].

When the parties do not feel acknowledged by each other, the communication flow may take another form, for instance from face-to-face communication to letters of judicial content. Morality and ground rules can be set aside and unfair actions can take place, such as threats or even violence [12]. Collaboration is difficult to sustain at this level, since the negative perception as to the other party is considered to be an inherent trait of that party – an «enemy image»; i.e., the perception of the other party is characterized by banal simplifications such as 'good' versus 'evil', and the grey areas in between are usually ignored [16, 17]. Each party will have descriptions of the course of events which differ strongly from those of the other party.

Communication between the parties may temporarily discontinue somewhere in this phase. This may lead to a «point of dysfunctionality», which escalates the conflict further without any direct interaction between the parties.

2.2.3 Phase III: War

The lawlessness of war takes over, as inhibitions and restraints on violent attitude and behavior are abandoned. The strategy is selective destruction; to paralyze and destroy the other party until they surrender. Organizations seldom reach the war phase [15], however, the party with the upper hand literally or figuratively «destroys» the other party, by attacking their weak spot in order to «win» the conflict. The original relationship between the actors is forgotten, peripheral or irrelevant.

2.3 Group dynamics

Following the staircase model, the *point of dysfunctionality* marks an important shift in the conflict, which will happen somewhere within the person phase - when the parties stop their interaction.

Keeping a dialogue between the parties is considered essential for keeping the peace at interpersonal and structural level. However, involved actors often lack the skills needed to express themselves clearly, which can be caused by the stressful situation. When a conflict emerges, we spend time and energy on interpreting and re-interpreting what the intentions of the other party's statements mean. It is suddenly difficult to comprehend what the other person is up to, which causes suspicions of their intention [18]. The psychological effects of being in a conflict situation may manifest themselves in several ways. These effects are used consciously or unconsciously by both parties.

2.3.1 Strategies

Even though both parties' intentions may be well meant and rational from each party's point of view, the result on the other party of the chosen strategy can be the opposite. The parties' perception of the situation will influence their behavior more than their intentions. The behavior strategies, or tactics, are used to get some sort of advantage by influencing others [19]. Such strategies can be divided into rational and non-rational strategies. Rational tactics emphasize reasoning and good judgment, while non-rational tactics rely on emotions and on spreading misinformation and causing disengagement. The effects of using tactics also carry possibilities of unintended consequences. Being angry and shouting does not only fail to change other people's behavior, but also causes a negative atmosphere for all participants. Both groups thus become disruptive and uninterested.

2.3.2 Accusations and tension

Accusations of lies are common when conflicts escalate, while in reality, the parties interpret the situation differently. An individual's perception of the situation *is* her or his perception of the situation, and the likelihood of the other party actually lying or trying to fool anyone deliberately, is low [20]. In addition, the involvement in a conflict generally causes stress within the individual. As a consequence, both cooperation as well as communication skills can be influenced both in constructive and destructive manners. High levels of tension make

it easy to lose control and become irrational and trigger emotional outbursts, which can enforce a shift from the case phase to the person phase.

2.3.3 Manipulation

Manipulation is defined as conscious, strategic planned action in order to reach a given goal. In a conflict, both parties possess and use somewhat manipulative elements, especially when the conflict escalates. When we are under pressure and stress over time, we feel threatened by the other party. When the conflict is intensified and the manipulative aspects and strategies become more evident, the probability for enemy images is high [21]. The opposing party is seen with negative intentions and qualities, and the perception of own intentions is seen as purely best behavior. As a result, the group cohesion on each side improves, but the conflict escalates quickly.

2.4 Mediation

When a conflict has emerged, it can be approached in several ways depending on the situation, escalation level, emotional intensity, dependency between the parties and desired outcome of the situation [22]. Choosing not to manage the conflict is also an active action that contributes to the situation. To induce constructive changes in a conflict situation requires a variety of roles, functions and processes, some of which may push a latent conflict into the open [18]. Involved parties can find it hard or impossible to believe that the situation can be resolved at all when the conflict is deadlocked. An option is to get external help by somebody unaffected by the conflict.

Conflict management is interdisciplinary, and is based on aspects of conflict theory, negotiation techniques and communication theory. However, the mediation field is diverse, and there are several ways to deal with a conflict from a mediation point of view. These tend to differ on the manner of involvement that the mediator should employ in a conflict process [15, 23, 24]. A mediator is somebody who is approved by both parties, who facilitates in various ways in the conflict situation. The mediator can hold a formal position as mediator or function as mediator in an informal role[1].

---

[1] Throughout the thesis, we will use the term mediator when we refer to the person with the functioning

2.4.1 Mediation paradigms

The traditional mediation paradigm is mainly based upon a linear mindset, and the conflict can be represented as a set of events following a chronological timeline. The mediation is structured, and the goal is to aim for consensus between the parties. Such a goal is often the main focus of *judicial* mediation [22]. In judicial mediation, a judge fulfills the mediator role, but has not got authority to impose a resolution. Some newer paradigms in mediation view the conflict as cyclical, as an ongoing process where several aspects are repeating themselves. The goal of the mediation is to interrupt the cycle from being destructive and to make it constructive. Broadly speaking, the traditional models are concerned with the past and what has happened, while the newer models are concerned with the future, focusing on relations and interaction.

Regardless of paradigm, the mediation technique must be adjusted to the conflict dynamics. The purpose of mediation is not to declare a winner – unlike in a litigation process – mediation is voluntary, and the mediator does not have formal power to impose decisions. The parties often have common interests among several case dimensions, which may have been neglected or forgotten as the conflict escalated [20]. The main task of a mediator is to assist the disputing parties in achieving their own resolution of the conflict, or, an acceptable settlement.

2.4.2 Facilitating and evaluative models

Mediation models are divided into facilitating and evaluative models [22]. Facilitative models are concerned with structuring the problem domain, and the parties are helped to outline their own solutions to the issues. Evaluative models are based on recommendations by the mediator, which directly influence the ongoing process between the parties.

2.5 Conflict approaches

We will present four different conflict approaches and discuss their strengths and weaknesses. The models differ mainly due to case orientation (where the case is viewed as the content of the conflict and conflict management process, and where one emphasizes rationality and avoids focus on the relation) and relation orientation (where the aim is to improve the relation between the parties and to focus on their values).
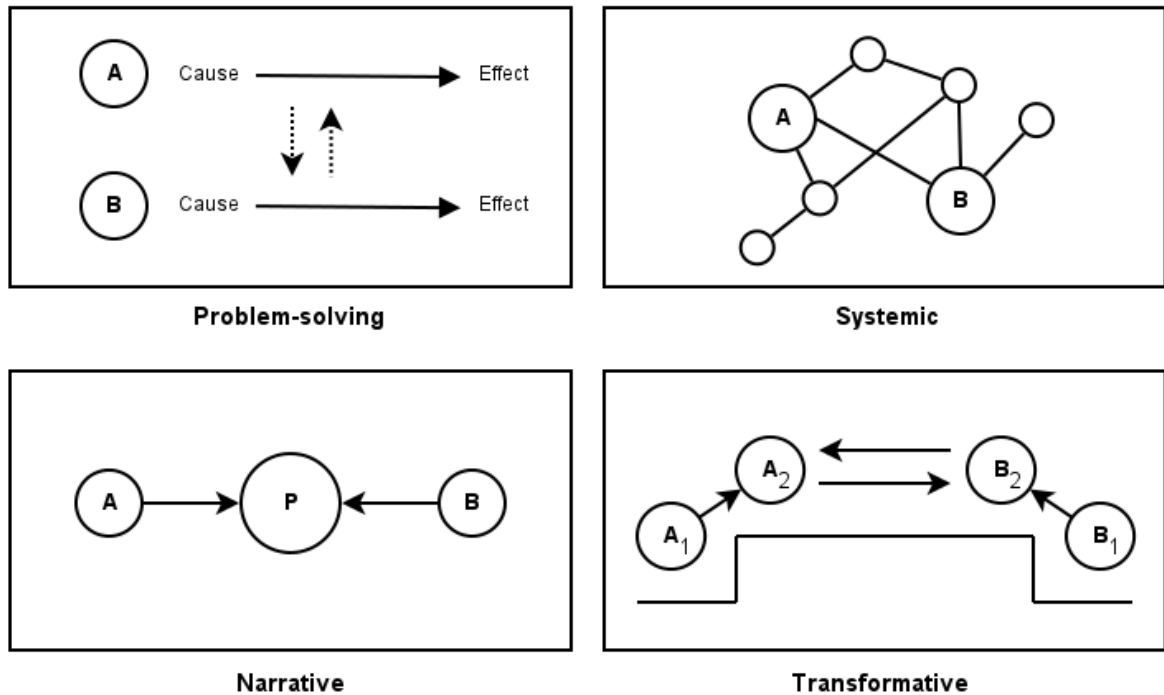
Figure 2 – Conflict approaches

The figure visualizes the disputing parties (A and B), and P (their problem, or conflict). The manner in which the mediator is involved varies according to the various methods.

2.6   Problem-solving approach

Problem-solving is the dominant mediation theory of today [23]. The goal is mainly focused on achieving a settlement between the disputing parties. The settlement is based on a process of listing all issues the conflict emerged from according to the parties, and then deciding what is most «fair» to resolve these issues. The problem-solving approach is based upon the assumption that the issues can be negotiated, and stresses the interests of each party and focuses on the case content. The conflict is regarded as a short-term situation.

2.6.1   Cause and effect

The preceding events which formed the conflict are approached as a chronological set of events and corresponding actions, in other words, a «cause-and-effect» mindset. When some sort of issue is present, the cause can be directly identified. To resolve the conflict situation, we make a rational analysis of the events that was experienced during the conflict. The prerequisites of the conflict are usually clearly perceived by both parties, but they are interpreted differently. Additionally, if one or both parties have acted in such a way that the

other party felt offended, the chance of diverging explanations of the course of events are higher [14]. However, when the parties agree that the conflict has become a problem that demands some sort of solution, a third party can be introduced in the situation in order to negotiate, or they can structure a negotiation session by themselves.

2.6.2 Negotiation process

The conflict is managed by rapid progress. A zero-sum outcome (one party's gain is a result of another party's equivalent loss, and is thus obtained at the expense of the other party) is likely to be unsatisfactory for both parties. Making an interest analysis can offset this situation [5]. An interest analysis is based on identification of interests that lie behind each party's standpoint, to form a basis of mutual advantages. The chances of negotiation process itself being successful are high as the interests of both parties are accommodated.

The interest analysis will also determine if the negotiation should be *distributed* or *integrated*. Distribution negotiation is competing strategies about winning some aspects and losing others. The overall goal is to maximize own gain. Integration negotiation is focused on cooperative strategy, as the goal is to form an agreement that is perceived as reasonable by both parties. The actual negotiation is often placed somewhere between these two approaches.

The negotiation process is a competition of offers and counter-offers, which will generate offers through discussion. The parties will try to convince the other side of their rightness, and the mediator will look for common ground in order to steer the discussion towards a win-win situation. When the range of issues is narrowed, and it is difficult to distinguish between that one suggestion is more applicable than the other, the parties often discuss tradeoffs in order to settle the remaining difference. This can be done by splitting the remaining difference or using an arbitrator, or simply flip a coin [25]. The assumption is thus a focus on sharing the loss evenly between the parties, regardless of how the conflict emerged. The discussion is a search for possible areas of compliance, as well as encouraging the parties to reflect on negotiable interests.

2.6.3 Mediation structure

Discussions of the past between the disputing parties are usually discouraged, as there is a great risk of focusing on blaming the other party for being the original cause of the conflict. The mediator will lead the discussion towards the future situation in order to develop ways in which the interests of both parties can be met simultaneously. The conflict is then solved step by step. The mediator asks questions to uncover the content of the conflict. This encourages the mediator, as well as the parties, to seek to uncover underlying interests that have direct connections to the conflict. The mediator spends a lot of time on individual meetings with the parties rather than common meetings. When the issues are negotiated and prioritized, the mediator should develop a plan to implement the negotiated solutions. The plan should be very specific regarding what is going to be done, how, and by who, and when, in order to avoid further conflicts. This is based on the assumption that the conflict is resolved as the parties now agree on what the original disagreement was all about. The conflict follows a process from escalation to de-escalation (by negotiation) to resolution within this context [26]. The mediation process is phase-oriented and follows certain rules, such as being rational and case oriented at all times [5]. The mediator may set time limits in order to ensure the progress of the mediation, and then move on to next stage.

Extensive negotiations may feel intimidating or alienating to the participants, and it is normal to react to such situations by shyness, arrogance or aggression [5]. A mediator will probably be highly directive in her/his attempts to reach acceptable goals, and control the process as well as the substance of the discussion. The areas of focus is on «resolvable» issues, while areas of disagreement are avoided, as consensus is less likely. An improvement of the relationship is considered to be a positive side effect rather than a goal in itself. Relations and emotions are not explored as they may delay the productivity and efficiency of the mediation process.

2.7   Systemic approach

Systems theory provides a model for understanding a range of group-level processes, including development, productivity and interpersonal conflict [19]. A system in this context is broadly defined as a complex and adaptive structure, such as a living organism. The system is viewed as consisting of interacting nodes which communicate and influence each other. Systems theory evaluates the nodes in terms of their positions or roles within the system as a whole. Rather than trying to fix a specific node, systems theory prescribes change in terms of

how the system adapts to the environment. The approach is holistic, and anything within the system must be seen in the context of the system [27]. The system adapts and responds to demands of its surroundings, and is a dynamic model. Systems gather input, process the input and produce some sort of output. The interaction of sub-systems and individual nodes are the ongoing processes that determine the system as a whole.

2.7.1 Input processing

Systems evolve due to their internal processing [19]. Applied within an organizational context, input is defined as any factors that are present when a group begins its work on a project. Such factors can be characteristics of individual members, such as skills and experiences, as well as group-related factors, such as cohesiveness. Through numerous connections within the system, the input influences the processes that take place when the members work together on their project, including communication, planning, conflicts and leadership. These processes combined transform input to output, which include actual artefacts like products and decisions, as well as changes to the factors that serve as input to the system, such as increased knowledge. In order to understand the dynamics of a system, it makes sense to focus on exploring rather than explaining the interactional patterns of actions and events.

2.7.2 Disrupting the subsystem

According to systems theory, a conflict is a result of internal processes of the system. In order to restore the system's functionality, the system must be given feedback that restores the interactional patterns. A disturbance, i.e. a mediator, will become a part of the system. As the conflict is an inherent subsystem, it will need to be approached from within.

The nodes of the system are responsive to influence from their surroundings, and according to system theory, the nodes will adapt to given feedback on their actions [19]. The mediator steps into the system and manages the ongoing processes. The mediator will collect information the about processes to strategically influence the output. This can be done by passive observations of the parties, both between internal groups of individuals, between the opposing parties and then get an overall perception of the structural relations. The mediator will diagnose and improve the system of interactions among the nodes in order to improve their functioning both as a unit and as individuals. Conducting interviews with nodes that are

16

immediately attached to the conflict as well as nodes that are affected by the dysfunction can uncover such information. The mediator will pay attention to attitudes and behaviors that are transmitted from the subsystem to other nodes of the system.

The output is what changes the subsystem. The mediator will form hypotheses based on the collected data, and test them iteratively in order to see the changes they cause. The mediator will work to identify the parties' original wishes and goals with the intention of creating a logical overriding frame. This is achieved by an extensive use of circular and reflective questions [28]. The goal of such questions is to make individuals think more clearly about the possible consequences of their actions. The questions become especially relevant around suggestions, advice and prescriptions in that they provide a check on whether what is suggested would work or not. In other words, the mediator interacts with the system in order to influence it. The result of mediator interaction is unknown, but is likely to create movement towards a different direction than the one that fuels the conflict.

2.7.3 Output and feedback loops

As a system provides output (often referred to within system theory as feedback), the output process can be used to influence the system [29]. An example of this can be that a manager adapts her leadership style over the years based on feedback given from colleagues. The feedback of the system fundamentally depends on the communication between the various parts of the system, which emphasize the focus on interactional patterns. By focusing on identification of feedback loops within the system, a mediator can gather information on what kind of decisions that should be made to solve stagnating processes within the system.

2.7.4 Conflicts

An interpersonal conflict paralyzes the system as it deadlocks interaction between the involved nodes, and creates its own subsystem. Interpersonal conflicts are likely to arise when people take actions against others that have consequences they do not anticipate [15]. The consequences can be immediate or delayed, which complicate the conflict situation further. A change in a node or subsystem affects the whole system, and steers it towards another direction. There are often non-obvious dependencies among several nodes that create conflict. Conflicts in the system emerge when the interaction between the nodes break down.

2.7.5 Ensuring sustainable changes

The causes of the conflict are subordinate, and the mediator regards every version of the course of events as one of many. The mediator's task is to listen for similarities and differences within the descriptions, and discover the connections between them [15]. This is done in order to sense emergent common ground between the parties. The mediator has a very prominent role. The approach explicitly about underlying values of the conflict [22]. To achieve changes in the system that are lasting and sustaining, discussions of the past and feelings related to the past are neglected. This will change the output and restore the functionality of the system.

2.8 Narrative approach

Narrative theory views conflict as emerging within peoples' shared social and cultural stories (see below). This approach assumes that the stories and the meanings assigned them are more «real» when describing events than identification of causes. Stories and their interpretation can be changed through dialogue when the conflict narratives have been destabilized. The destabilization enables opportunities for alternate understandings of the conflict events.

2.8.1 Storytelling

When we want to share something with others, we tell stories (narratives) about our experiences. The stories are personal interpretations of events and their meaning [15]. The story has a beginning, an intrigue and assumption and consequences for the future. In the story there are friends and enemies, villains and heroes, victims and saviors. The story organizes events in time, places them in relation to each other and provides meaning. Some events are pointed out by the storyteller to be extremely important and determining regarding the following events.

2.8.2 Power relations

The meaning we give the narratives places us in different power positions towards other people. The stories must thus be understood within their cultural background, and the social context they emerge in. Solving conflicts requires a strong awareness of power relations. Monk and Winslade present an example of such power relations by referring to a child custody case. The father placed himself in a story about males supposed to be the provider of the family, and he was worried that the mother would not be able to properly care for the

child. The father concluded that he should get full custody. The social context in which each conflict has developed is thus significant, in that it shapes how each participant has perceived the conflict.

The narrative approach involves identifying the various discourses and assumptions that are taken for granted which have contributed to the conflict to begin with [24]. Conflicts emerge within a cultural context that has a direct influence on how the parties construct their stories.

2.8.3 Totalizing descriptions

Conflicts are created through the stories the parties tell about the course of events, and can be therefore be influenced through dialogue. In other words, conflict stories construct reality itself rather than merely describe reality [24]. Typically, tales of conflict have been repeated and reworked by the each party, and an escalation occurs when the parties compete about who has the dominating conflict explanation. The story told by the individual parties is what Monk and Winslade calls *totalizing descriptions,* which do not give room for other descriptions of what happened or could have happened. In every conflict story, there are some basic hidden assumptions that are perceived as facts. These facts can in reality be accusations and judgments. The accusation and judgments are so thoroughly disentangled to each party within the story that there is no room for additional descriptions about the event. By their description, the parties summarize a complex situation that they claim to give a total picture of the situation and the other party.

2.8.4 Externalization

A conflict story shuts the conversation down. When the parties are in defensive states with totalizing descriptions of each other, a mediator can initiate a destabilization of the tension to make the conversation between them functional again. The mediator's task is to help the parties separate the story that locates the conflict within the other party or their relationship. This process is called externalization [24]. When the conflict is seen as an external «object» or actor, there is a fair chance for shifting focus from accusations, judgments and personal traits back to the underlying problem. The mediator will listen to the parties' individual stories in order to identify the underlying narratives, and try to identify how the conflict affects the parties. The goal of the externalization is to make the participant speak of it as if it was an external object or person exerting an influence on the parties, without identifying the

external object closely with one party or the other. The approach makes the parties able to move beyond shame and blame very quickly [24].

The externalization makes the involved parties change position as they are invited to opposition towards the conflict instead of each other. This enables them to resist the control the conflict has imposed upon them.

2.8.5 Co-authoring a new story

The mediator will help the parties engage in a dialogue about their conflict story, in order to deconstruct it and replace it with new and collaborative stories. When the narratives are destabilized, they can be reconstructed in order to negotiate solutions [20]. This can provide new insight, explanation or even resolution options. The goal is to produce a story of cooperation and understanding until the conflict story becomes redundant.

The co-authoring process is focused around a story of cooperation and well-functioning dialogue. Co-authoring is achieved through the mediator asking questions to uncover exceptions to the conflict; i.e., by referring to events outside the conflict. When they are aware of each other's diverging stories, both parties must moderate their separate stories and merge them [15]. The focus of the narrative approach is not on final agreement, but on reaching many points of agreement on the way. The narrative approach focuses mainly on events of the past, in order to redefine it and give it new meaning.

2.9 Transformative approach

The problem-solving approach has been criticized for being too focused on case-orientation and that the mediator forces the solution upon the parties. The transformative approach emerged as an alternative framework due to this issue [22]. The most well known contributors to transformative mediation, Bush and Folger, argue that typical problem-solving solutions will not last, as the settlement will not be built upon the interests of the involved parties [23]. They explain this statement by that conflicts emerge due to a crisis in communication, and the involved parties need to be empowered to manage the conflict themselves in order to produce sustainable collaboration conditions.

The transformative approach assumes that conflict situations are best solved if the parties' interaction is transformed. The purpose of mediation is to explore possibilities for this transformation. Rather than developing agreement, the transformation of attitudes is a superior goal.

2.9.1 Interactional crisis

The basic assumption is that interactional crisis is what conflict means to people. The failure of constructive communication makes the involved parties weak, which in turn makes them powerless and creates a sense of lost control of the situation. This state is the most significant negative impact of conflict, and the overall sense of weakening is something that occurs as a very natural human response to such situations [23]. Further, these negative attitudes often feed into each other on all sides as parties interact, in a vicious circle that intensifies each party's sense of weakness. Then the interaction between the parties quickly degenerates and assumes a mutually destructive, alienating, and dehumanizing character. The foundation of the conflict is not only about rights, interests or power, but that the conflict makes or forces the parties to behave in patterns they find uncomfortable.

2.9.2 Empowerment and recognition

In order to destabilize the destructive interaction, two states of mind must be achieved to change the attitudes of the disputing parties. Reversing the interaction will improve the relation between them [23]. *Empowerment* is to enable the parties to define their own issues and to seek solutions on their own. This is achieved when the parties experience enhanced self-confidence. The other state, *recognition*, is to enable the parties to see and understand the other person's point of view, to improve a sense of empathy. This does not mean that they necessarily agree on the content of the argument of the other party, but that they understand how they define the conflict and why they seek the solution they try to achieve. Restoring the dialogue demands that both parties strive to understand the perspective and subjectivity of the other party.

2.9.3 Identification of opportunities

A mediator seeks to transform the disputing parties by empowering them to understand their own situation and needs, as well as encouraging them to recognize the situation and acknowledge the needs of their opponent. The mediators' task will be to help the parties to

identify opportunities for empowerment and recognition shifts as they reveal themselves through the parties' conversation as they explore the problematic issues.

The mediator will let the parties take all the decisions and support them on that they self got the best presumptions to take good decisions. Transformative mediation is thus a phaseless and process-oriented mediation model, as the parties decide the discussion discourse, and the mediator follows their lead [23]. The parties are encouraged to consider and reconsider the past, which improves the chance of empowerment, and also provides a basis for recognizing the views and experiences of the other. The mediator will focus on the information in their discussion rather than the stories about the conflict events.

2.9.4 Transforming the interaction

The intention of transforming the interaction is that the parties strengthen their capacity to analyze situations and be able to take constructive decisions to ensure their own interests. The transformation requires that the capacity to see and assess the other party's perspective is improved on beforehand, which creates understanding and tolerance for the other perspective. To acknowledge the other as subject is to acknowledge the other as a responsible actor with a right to have their own experiences [20]. When they experience such acknowledging communication, they will be less concerned with defending themselves, and be more inclined to take responsibility for the situation. The result of the transformation is that the disputing parties change their way to relate to the situation and interaction, and they are empowered to resolve conflicts more easily without a mediator later.

However, transformative mediation is considered a success when empowerment and recognition is improved. The disagreement may still remain, but the interaction is transformed. The parties will move on to new positions in which they are more likely to give and take considering their own interests. Working with empowerment and recognition usually results in a settlement that the parties develops, whereas focusing on settlement usually results in ignoring empowerment and recognition [23].

2.10 Chapter summary

This chapter has defined interpersonal conflicts in an organizational context, and discussed conflict escalation patterns. We have also presented four different methods of approaching such conflicts, which are briefly summarized in this table:

	Relational focus	Goal	Mediator role	Focus
Problem-solving	No	Agreement	Leading	Past events
Systemic	Yes	Improved interaction of nodes	Controls the process	Interaction here and now
Narrative	Yes	Externalizing the conflict	Integrated	Identification of underlying needs in the stories
Transformative	Yes	Empowerment and recognition	Secondary role	Explores the past to improve the future

Table 1 - Summary of conflict approaches

The four approaches differ in terms of structure, relational focus and case orientation, but all of them have in common that they seek fairer treatment of the disputing parties than a lawsuit may offer.

The outcome and quality of the conflict approach is heavily dependent on how the parties understand the situation and interact with each other and the mediator, as well as the parties' dedication to the process.

3 Large IT projects

The decision of acquiring a new or upgraded system will often have its basis in strategic choices and originate from an organizational process of change, or by itself lead to organizational changes. The uncertainties related to such projects are high, as neither supplier nor customer know (or are able to find out) what they actually are developing on beforehand. There is no simple solution to improve the predictability of software development projects [30]. Large IT projects are difficult to manage due to demanding product requirements and time schedules, but the extensive project process also demands interdisciplinary resources like financial aspects, legal aspects and HR management.

3.1 Software development methodology

Regardless of development approach, almost all models contain some sort of analysis phase, design phase, programming (construction) phase and testing. Projects usually choose and adapt a development model according to perceived characteristics of the project and product, such as previous experience, competency, time and economy.

3.1.1 Traditional methods

The traditional waterfall-oriented models have distinct phases the process follows; such as a pre-study of the problem domain, gathering specific requirements, a design phase, testing and implementation. Each phase is finished and followed by a new one in a predefined sequence. This approach demands a formal and detailed process description, and the project documentation includes descriptions of roles and activities. As the model is relatively rigid, it can be difficult to adjust the process during the project.

3.1.2 Agile methods

Agile methods focus less on strict frameworks and documentation. Agile methods iterate over the development phases, and the software is delivered to the customer as increments. Requirements are also specified incrementally, and become more detailed during the process instead of identified and planned on beforehand, which provides an option to go back and change, improve and add new functionality as the process proceeds. An advantage within this methodology is that it offers a versatile option to make sure that the customer is closely integrated in the development process.

3.2 Project initiation phase

The acquiring organization (the customer) makes a cost/benefit analysis when they plan to initiate an IT project. The analysis is built on discussions of and identification of needs in order to get a system that supports their tasks. Larger organizations usually have established routines on how trading with suppliers are supposed to be conducted. Extensive rules apply to public procurements.

3.2.1 Business analysis

The business analysis (or requirement analysis) is the activity of determining the business needs and specifying the requirements of the new system on a general level [31]. The customer specifies the business processes they want the new system to support. This is among others what kind of tasks the system is supposed to handle, other systems the new system should be integrated or compatible with, GUI, capacity and so on. It describes what the customer wants, what they want to procure, and what the supplier should deliver, which lays the foundation for the sale process and the contract between customer and supplier. The supplier has extensive knowledge on technical possibilities, but lacks the corresponding knowledge on the customer's business processes that the new system should be designed to support. On the other hand, the customer often does not know the technical possibilities and may need to see examples on what is possible before specifying more detailed requirements to the system.

3.2.2 Sale process

The business requirements are the starting point for negotiations between customer and supplier preliminary to signing a contract. These specifications provide the basis for estimation of costs and the basis for design, implementation and testing. The requirements can also be elicited cooperatively between the customer and the supplier, or being processed and changed under the negotiation preliminary to the contract. The customer describes which tasks they want the new system to manage, and the supplier proposes a solution based on the descriptions. The supplier must collect information about the customer organization and their tasks as well as knowing the technical opportunities thoroughly. The requirements are sometimes sent to relevant suppliers with optional requests for development methods and processes and so on. The providers reply with how they wish to fulfill the specifications.

26

3.2.3 Public procurements

Public procurements are subject to specific rules for the sale process, how deliveries can be specified, what to emphasize when choosing supplier, documentation requirements, requirements on reasoning on decisions, and so on. The purpose of these rules is to achieve fair competition and to accommodate equal treatment of the available suppliers [32]. Projects initiated by the public are required to be notified on Doffin[2], a database of Norwegian public procurements, when the project has a contract value above 500 000 NOK.

3.3 Contracts

An establishment of a relation between a customer and a supplier is formally regulated in terms of a juridical binding contract. The contract regulates the collaboration and distributes the responsibility between the parties. Software as a product is juridical positioned between manufacturing purchases and service obligations, which imply that customization and support is also a part of the product [33].

The final product may be complex and may be divided into several partial deliveries. This structure requires the project to have a flexible framework for development and collaboration with reasonable acceptance of delay and minor errors, from both customer and supplier. The specification of the requirements makes the basis for the contract between customer and supplier, and the parties go into a mutually dependent relationship.

Each party must fulfill their responsibilities sufficiently. However, there is still an imbalance between the parties considering sufficient skills and competence related to such projects, which may unnecessarily complicate the project process [32]. The need for clarity related to the distribution of responsibility and risks during the contract liquidation is especially important when the assignment contains large values and the potential of loss is big, which is the norm within IT projects.

3.3.1 Contract standards

The Norwegian IT sector use mainly three contract portfolios:

---

[2] See http://www.doffin.no

Statens Standardavtaler - SSA: A contract portfolio provided by DIFI (Agency for Public Management and eGovernment), which was developed to respond to the need for managing a cost effective and ensure a safe procurement process [34]. The portfolio is aimed at public procurements, but can also be used by private actors.

IKT-Norge: A portfolio provided by IKT-Norge, an ICT industry interest organization. The contract portfolio is aimed to balance the relationship between customer and supplier, and accommodate both sides' need for clear responsibilities considering the control and management of the project [35].

The SSA portfolio and IKT-Norge portfolio have been criticized for being somewhat unbalanced, and a new contract portfolio was developed to provide an alternative. *PS2000* was originally a research project managed by the Norwegian University of Science of Technology (NTNU) and SINTEF, but is maintained today by the NCS (Norwegian Computer Society), one of Europe's oldest computer societies.

PS2000 seeks to maintain the interests of both parties to a larger extent than SSA and IKT-Norge, and includes explicit distribution of responsibilities and risk management. The contract is known to provide a reliable framework, and is frequently used in larger public IT projects in Norway [36], as well as being the only Norwegian contract standard that regulates implementation by iterative and agile processes. The project model allows for changes in frame conditions and demands during the process, and aims for parties being able to evaluate iterations at control points and for planning next iterations.

Other types of contracts include purchase agreements, maintenance agreements and operational contracts.

3.3.2 Changes and deviations

Although the procurement could suggest one contract portfolio over the other, both parties should thoroughly consider which one that would fit the project. A good contract standard is only the first step on the way towards a well-functioning agreement [32]. However, the standards can be modified, but is not recommended. Deviations should rather be specified in

appendixes, as changes may alter the initial motive of the contract. Modifications can result in internal contradictions or unregulated areas, which can be difficult to discover and add complexity regarding disagreements between the parties.

3.4 Price models

The price model decides how the supplier invoices the customer, which may contain bonus and incentive arrangements. The price model is also an important risk-sharing factor of the project. There are various price models to choose from, and it is also possible to introduce price ceilings, where the supplier pays the additional costs after a given time.

3.4.1 Fixed price

In fixed price contracts, the customer and supplier agree on a price, and they decide in advance what should be developed within the given price. The price of the project is predictable and should not be exceeded. The fixed price model is well suited for deliveries that can be thoroughly specified, like standard solutions. The model is based on risks analysis. SSA is based on fixed price, in order to ensure scope control. Fixed price may introduce risk to the supplier if external conditions or unexpected events severely delay the project, as the supplier will not receive payment for the full work effort.

3.4.2 Ongoing invoicing

The ongoing invoicing price model is based upon the premise that the supplier gets paid by the hour as long as the project lasts. This model is suitable for projects that cannot be specified in detail. The model may increase the customers' risk as their budget might be exceeded, and the model provides little predictability for the customer. Ongoing invoicing is the price model of IKT-Norge. This price model offers little contract administration and change management.

3.4.3 Target price

The target price model is based on estimates and risk assessments, and is adjusted by incentives and sanctions. The parties agree upon a target price, and the consequences of overruns (the supplier covers some of the costs) and early completions (the supplier gets some of the savings) are regulated by the contract. PS2000 is based on the target price model. The model acknowledges that demands can be changed during the project. The advantage of

target price is the common incentives on delivery of quality to the agreed time and costs for both parties, and agreements considering scope is ensured as well.

3.5   Project management structure

Large projects demand extensive resources spent on organization and management to ensure a successful project. The customer organization initiates the project, and acquires the project deliveries when the project is finished. The management of a large project is usually delegated within a somewhat fixed framework containing different roles [37]. The figure shows a simplified hierarchy:
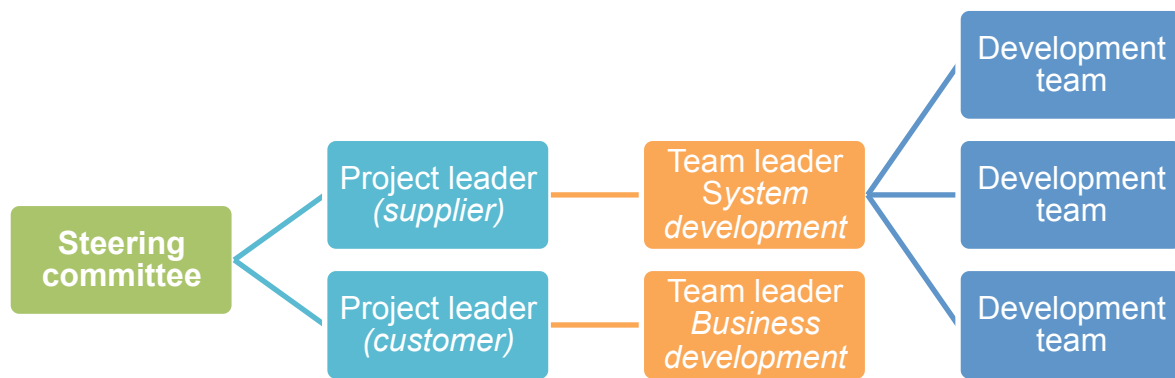
Figure 3 - Project management structure

3.5.1 Project Steering Committee

A large project is managed by a steering committee (referred to as 'coordination groups' within PS2000), which have the overall managerial responsibility of the project. The group decides how the project will be managed and what kind of development methodology they want to use. The functions of the committee include planning the project strategy, controlling the project scope and progress and resolving conflicts. The project steering committee consists of representatives from customer and supplier.

3.5.2 Project leaders

The project leaders are the connecting links between the steering group and the project groups, and must communicate well. The project leaders are supposed to follow up the project progress according to the approved plans. The project leader prioritizes the requirements and wishes, and suggests proposals for the steering committee in order to

receive a decision on what is going to be the next development focus, and give the committee a sufficient knowledge base for taking such decisions. The project leader must possess extensive knowledge on system development as well as the domain the new system is supposed to accommodate [32].

3.5.3 Project teams

The project teams implements tasks they receive from the project leaders, and the teams are supposed to be relatively self-organizing.

3.6 Risks and success factors

Implementing a new system within the line organization is a major challenge, as the business change and development of the system are performed in separate processes. Sufficient quality within acceptable time and cost frames must be ensured. Strong focus on control may constitute a barrier to the process interaction, which increases the overall risk of the project [6]. Given the complexity of the project, and the functional and organizational, the risk factors are many. Large projects are not initiated often, and the system development process offers a range of challenges that is different than for the overall activities of the organization. However, IT projects have two master risk types: overruns and the risk of the system not possessing the required characteristics [32].

3.6.1 Risk assessment

A risk analysis of an IT project should be built upon identification of the risks, and then quantify all risks connected to the activity that is analyzed. Risks are any potential adverse circumstances and uncertainties facing the development. Risk analysis assesses expected project outcomes and the acceptance level of tolerance of risk against the probabilities of achieving these outcomes [31]. The assessment of risks is about suggesting and describing risk reducing events in order to control them. Such risks can be project related (affect the time schedule and resources), product related (affect the quality of the software that is developed) or business related (will affect the organization that is developing or owning the software) [31].

3.6.2 Overruns

Most of the estimates are performed at the beginning of the software development process, before the requirements of the customer are sufficiently defined. Advanced and complex development means costly changes, and the downstream cost of putting the project back on track after implementing changes will grow and, frequently, grow exponentially [30, 31]. Changed and new requirements are perceived as the clients' most frequent contribution to overruns, while overruns are prevented by the availability of competent clients and capable decision makers. It should be noted that in projects where collaboration was facilitated by daily communication between customer and supplier, they experienced a lesser magnitude of effort overruns. In addition, employing a contract that facilitates risk-sharing may also have a positive impact on overruns [8].

3.6.3 Project success criteria

The prerequisites for a project to reach its given goals are mainly related to factors like personnel (are we positive, neutral or negative towards the goal?), resources (do we have the sufficient equipment and economy in the project?), work methods (have we chosen the right methods?) and external conditions (how are we influenced by competition, the market and other factors outside our control?). The real prerequisites are a combination of these factors [9]. Savolainen et al. [38] conducted a study of the literature on software development project success and failure from the suppliers' perspective. The findings show that success criteria from the supplier's perspective is measured out of possibilities of future business, good relations with the customer, suppliers short-term business success, suppliers' long term business success, profitable projects and long term benefits. Daily communication between supplier and customer experienced a lesser magnitude of effort overruns, however this was related to technical knowledge. Good communication is a trait that managers point to when explaining project success [39].

3.7 Chapter summary

Successful projects are often attributed to developer competence, while unsuccessful projects are attributed to customer incompetence [8]. However, as we have seen in this chapter, large IT projects are more complex than that. The project process requires competent actors who are able to make decisions, elicit well-defined requirements and adequate project administration, in order to avoid lack of scope control, undefined success criteria and bad

communication flow. The contract portfolio and the price models are critical factors of an IT project as well as functioning managerial and organizational roles. We have also seen that keeping a good relation with the customer is considered important IT project success criteria, and it has been outlined the importance of well-functioning collaboration.

4 Research Methods and Design

This chapter presents an overview of research methods, and the research design used in the thesis. The design includes both qualitative and quantitative data. The qualitative aspects of data collection provide depth and interpretation of the domain while quantitative data provide an overview of prevalence. Both types are important aspects in order to gather reliable data of a study.

The purpose of this chapter is to present decisions made in the research process of the thesis, and thoroughly present the research design. We will present several research paradigms, methodologies and methods available within the domain.

4.1   Quantitative and qualitative research

In quantitative research we collect information that can be measured and expressed as numbers. Such research is typically broad, and use questionnaires and surveys, and the data is statistically analyzed. Empirical data gives most of the information. In qualitative research, we collect deeper information in a narrower field, focusing on understanding context. The choice of approach depends on the research question and what we wish to find out. None of them is better than the other, and they are particularly useful to combine [40, 41]. The combination of quantitative and qualitative methods provides complementary information.

4.2   Research paradigms

A paradigm is a basic belief system or a worldview that guides the researcher. There are several overarching approaches – paradigms – to research, and choice of paradigm influences how the collected data can be interpreted. The following presentation of the paradigms is adapted from Myers [42] and Guba [43].

4.2.1 Positivistic

The positivist paradigm assumes that reality is objectively given, and emphasizes the use of quantitative data and methods. This view assumes that the world can be measured, and is thus independent of researchers and their instruments and repeated investigations will converge to the same results.

4.2.2 Critical

The critical paradigm assumes that reality is produced and reproduced by people, and their ability to change social and economic circumstances is constrained by various forms of social, cultural and political domination. Critical research focuses on the impact of hegemony in society.

4.2.3 Interpretive

Interpretive research understands reality through the meaning people assign to it, and is aimed at discovering the deeper underlying process of the subject under investigation [44]. Interpretive research is reflexive, as the background and values of the subjects directly influence the researcher and vice versa.

4.3 Methodologies

Research methodologies provide guidelines on how to conduct research and how to collect data. Various methodologies can be used across different paradigms.

4.3.1 Action Research

Action research is an iterative approach. The researcher aims to acquire knowledge on a problem, then develops a proposal for a solution and tests it. If the solution does not offer appropriate outcome, a discussion on new methods is done, and the process is repeated until a sufficient solution is identified. The researcher is actively involved in the process, and the information flow will go both ways between researcher and the researched subjects in mutual collaboration. This approach is not value free, as the researcher has an opinion on how the situation should be, and the research will influenced by their normative viewpoint.

4.3.2 Ethnography

Ethnography originates from anthropology, and is mainly concerned with how social and cultural aspects affects people in their everyday life. The researcher observes the culture by focusing on interactional patterns within a group of people, and identifies how internal factors like different roles and boundaries of their culture influence them. Ethnography is an analytical approach, and seeks to discover descriptions that is meaningful the people they study. The researcher will need to become a part of the society s/he studies.

4.3.3 Grounded Theory

Grounded theory is an inductive methodology, and analyzes the data collected in fieldwork in order to identify consistency and develop a theory based on these data. The outcome will then be grounded in the field data. Grounded theory focuses on the interaction that emerges between the data collection techniques and analysis of the data, and the result is the development of a concept of patterns within large groups.

4.3.4 Case Study

A case study is an in-depth examination that provides a description of an event, a situation or a phenomenon. The goal is to achieve better general understanding of the phenomenon. Case studies that are carried out with care and objectivity are recognized as indispensable tools for understanding group processes, and is a preferred approach when the research wants to study a descriptive question (what happened?) or an explaining question (how or why did this happen) [41].

4.4 Methods

The methods are the procedures a researcher use to collect the empirical data. There is a wide range of methods available, and we will present a few common techniques:

4.4.1 Interviews

Interviews can be structured, semi-structured and unstructured [45], and the degree of formality differs between these three. A structured interview typically follows a strict set of questions, which are similarly presented to each interviewee. The semi-structured interviews are characterized by some predefined questions that are intended to make the interviewee talk about themes the researcher wishes to investigate, usually formulated in a predefined interview guide. An unstructured interview is more like a conversation with no specific agenda. Interviews function as an overview of content and context and provide useful in-depth information. There is a risk of bias from the interviewer, as the questions might be chosen with an agenda in mind, or hints or cues in the way the interview is conducted somehow influences the interviewee. Interviews are also generally time consuming.

4.4.2 Observation

Observation is useful combined both with quantitative and qualitative methods. The researcher observes and registers social interaction or behavior related to the purpose of the research. The observation can be passive or participatory. Participant observation allows the researcher to interact with the subjects that are investigating, for example asking for an explanation on why a green button was pressed instead of the red one. Participant observation is often combined with taking notes. Participant observation is a powerful method when conducting qualitative research, as the researcher will be able to discover inconsistencies and contradictions among the participant's actions, especially in combination with interviews [45]. The passive observation is typically used quantitatively, for example registration of how many people who pressed the green button instead of the red button within a given time frame. The researcher is not interrupting the normal interaction.

4.4.3 Document analysis

A document analysis outlines the purpose and intention behind a document, and the researcher interprets what kind of view that is created on behalf of the document. A document in this context is broadly defined, and can include text, pictures, books, articles and official documents, in short, both printed and online material. When conducting a document analysis, the researcher follows a systematic procedure for evaluating the document; it is thus not a descriptive analysis. The documents should be selected after four criteria [46]: authenticity (is the document what it claims to be), credibility (considering impartiality, is the document a first hand source), representative (some documents are more reliable than others), interpretation (being critical to the document). The goal is to interpret the context, motivation and purpose of the document, in order to identify tendencies. When conducting document analysis, the researcher analyzes existing data collected and processed by somebody else. The researcher relies on the description and interpretation of data rather than having the raw data as a basis for analysis.

4.4.4 Focus groups

A focus group interview enables collection of a wide range of viewpoints at the same time. The group dynamics can encourage the interview participants in a discussion. An aspect that the researcher will have to manage is that some people might be more inclined to participate in the discussion than others. The researcher is constructing a discussion situation, and is not

a «fly on the wall» [45]. Bringing a group together in a discussion that experience similar situations, but have not had a chance to share them can lead to rewarding sessions for participants who gain new ideas and perspectives. The researcher can study the group interaction as well as listening to the discussion.

4.4.5 Questionnaires

A well-designed questionnaire is suitable to receive answers on specific questions from large groups. The quality of a questionnaire is dependent upon the sampling of respondents (representative and non-representative) and the formulation of the questions. The outcome of a questionnaire is quite specific, and the collected data is easy to quantify. When the researcher creates a questionnaire, the questions should be easy and straightforward, and not too long. The questions should be short and concrete, and the questions should not have the possibility to be interpreted differently. Conducting a pilot study, and avoid logical mistakes and ambiguous formulations can ensure this. The answer options should be mutually exclusive categories [47]. Another aspect the researcher must be aware of, is to avoid leading questions, as the respondents might feel that there is a «right» and a «wrong» answer be inclined to reply the «right» answer (which also applies to interviews).

4.4.6 Utilities

Using utilities can increase the reliability of the data collection methods [45]. Photo, video and audio recording are common to use in research, supplemented with note taking.

4.5 Quality measures

The choice of data collection methods and interpretation will carry strict delimiters within the study. Sufficient reliability and validity within a study means that the research is conducted in trustworthy manners. *Reliability* ensures the consistency of the findings. The reliability is high if the same result would be found if the study was repeated. However, this is often not possible within qualitative research, as interviews often are used as a data collection method. This is ensured in order to provide as much transparency of the research process as possible [45]. *Validity* is an assessment of the chosen methods and the how they were conducted, and measure if the researcher studies what s/he claims to study. The researcher must thus be critical in the inspection of the representativeness of samples and their relevance, and consider if other options would provide better material. Using both quantitative and

qualitative research methods provide different kinds of data and increases the trustworthiness of the study.

4.5.1 Triangulation

Choice of methods may provide different data. If the researcher only uses one data collection method will risk unbalanced results. This is avoided by using several methods in the same research project, and is called triangulation. Triangulation is to underpin findings using other types of sources of evidence, different data sources and methods. Triangulation ensures validity of the research [41, 45].

4.5.2 Ethical considerations

The researcher must consider possible consequences the research can have for the individuals that are investigated, as well as the society. This means that a researcher must be honest considering the research and the use of it, and ensure confidentiality and independence in the process [45]. Some ethical issues are even regulated by law (for instance collecting sensitive data), and others are like guidelines, such as loyalty towards the investigated subjects and not to step over their personal limits. The research participants will give their informed consent when participating in the research, and should be informed that they can withdraw their consent without explanation any time.

4.6 Thesis research design

In this thesis, I have chosen to conduct a case study within the interpretative paradigm. The methods used are interviews, questionnaire and document analysis, which ensure triangulation. The interpretative paradigm was chosen in order to identify the underlying causes of conflict situations according to the meaning the people affected by conflict assign to them. A case study in this context is a study of large and complex projects in organizations, not a technical analysis. Case studies allow the researcher to maintain coherent characteristics on managerial and organizational processes [41, 48], which was why this methodology was chosen.

4.6.1 Interpretive IS research

Tan and Hunter [49] stress the importance of understanding the cognition of users and information system professionals, and how the repertory grid technique can provide an

insight to common understandings between these groups. They discuss the diagnostic outcomes of repertory grids and suggest how it can be used for practical interventions at individual and organizational level, and between stakeholders like managers, users, engineers and teams. It is argued that is that cognition should be focused on to a larger degree, as it is far too critical to be ignored as it can impact on outcomes of information systems.

From a descriptive point of view, Edwards et al. [50] discuss the repertory grid technique and its place in empirical software engineering research. They argue that the structural framework of personal construct theory is well suited for studies of human and organizational aspects of software engineering, and present applications within software engineering projects. The article accounts for an overview of repertory grid and its foundation with a literature review. The authors argue that the repertory grid technique is well suited for exploration and evaluation within system development processes.

4.6.2 Data collection techniques

In order to get a deep understanding of the domain, I chose to conduct interviews following the repertory grid technique. This method provides both quantitative and qualitative data.

In order to get an overview of project management and the use of contracts, I interpreted data from a previous survey[3]. This survey was also chosen in order to identify main characteristics of IT projects in comparison to other types technical projects in order to uncover specific characteristics of IT projects.

Document analysis are particularly applicable to case studies as they provide information on the context the participant operates in [41]. A document analysis was conducted on a background of documents considering management and implementation of larger projects, in order to identify contributing factors of conflict and possible preventive initiatives by actors that are in a position to influence this domain.

4.6.3 Comments on the interview process

The repertory grid technique is a form of semi-structured interview that produces a precise description of the interviewees' view on a subject with little bias of the researcher, as the

---

[3] The survey was conducted by Kjell Steffner (http://www.lynxlaw.no) and Tekna (http://www.tekna.no).

interviewee determines the content. The technique introduce less bias than other interview methods [51, 52]. The purpose of the technique is to gather descriptions of the interviewee's experiences of a specific situation or event, and not their general opinions on a given topic, which was the main reason for choosing this particular interview technique. As this technique and its application are somewhat complex, it is thoroughly presented in Chapter 5.

The interviewees were chosen on background of the thesis supervisors' network and knowledge of conflict situations. Some participants were found by asking the interviewees if they knew somebody who had experienced severe conflict situations. All interviewees were approached by mail, and given a brief presentation of the study and its purpose. They were also informed that they would represent themselves in this setting and not their respective organizations. The interviewees chose the location for the interview sessions, mainly in their offices.

As a preparation, I made an interview guide with the four conflict approaches in mind (see appendix), and I also conducted two pilot interviews in order to ensure the validity of the interview technique and the questions. A total of 13 interviews were conducted, and the interviewees had various roles: project leaders, product owners and jurists. The jurists were typically responsible for procurement as well as follow-ups of the contracts. The questions were subject to minor adjustments according to the individual interviewee, as they followed the interviewees' train of thought. The interviews took place in February 2013 – April 2013, and each interview lasted for about 90 minutes. The interviewees were given an information sheet guaranteeing anonymity (see appendix). The interviewee was asked to sign a form regarding consent to participate in the research, approving the use of audio recorder, and they were also offered the option to read a summary of their individual interview. The interviews were audio recorded and transcribed for the purpose of subsequent clarifications.

4.7 Limits within the design

Conflicts often grow to be profound and personal. Methods used in studies of conflicts need to reflect upon such matters in order to achieve a deeper understanding of underlying issues of the dispute. An overall problem when discussing personal experiences with conflict is that the interviewee might feel inclined to say what they think is «right». This makes the trust and

relationship between the researcher and the informant especially important. The researcher must be careful not to be too personal with the questions in such settings [53].

An aspect of this particular study of is that the choice of interviewees is a convenience sample. The process proved to be very difficult to find people who were willing to discuss their conflicts. The sample can be a threat to validity due to the risk that the interviewees may only represent some particular aspects of interpersonal conflict situations in large IT projects.

Another weakness of the design is the lack of participatory or passive observation. The observations would contribute to the validity of statements done in the interviewees, as observation as a method is suitable for investigating if the informants act the way they say they do [45]. Being regarded as an internal actor in the community can be difficult and thus be able to attend meetings or other conflict-saturated interaction arenas would simply take more time than the scope of the thesis, especially in terms of the confidentiality of such interactions.

Regarding the research design, the optimal methodology might be action research. The researcher would have an active role and be able to test different hypotheses in order to affect the conflict and analyze the result. However, such an approach is very difficult as an action researcher within the project will likely not be perceived as impartial to any conflicts arising, and on the other hand, participants are often not willing to accept outside help in their conflicts.

5 Repertory Grids

The repertory grid technique (RGT) is an interview technique that was originally developed in the context of clinical psychology. The goal of the technique is to get a common understanding of a persons opinions and personal frames of reference. RGT is used in a variety of fields today, such as educational purposes, marketing, politics and human resource management, to name a few. In the context of information system development, RGT has been used in research on improving team performance [54], identification of system requirements [55] and developer performance [56].

This chapter will start out with a brief walkthrough of the background of the technique, followed by a description on the different elements of a repertory grid. The next section is about different analyzing techniques that can be applied to the collected data. Grids can be analyzed both quantitatively and qualitatively. The chapter finishes with a description of how the technique was applied in the thesis research.

5.1   Personal Construct Theory

The American psychologist George Kelly wanted to develop an investigative technique that would remove the influence of the observer's frame of reference from what s/he observed, in order to be able to improve the treatment of his patients. In addition, he was interested in a method that would enable him to make precise statements – and predictions – about the behavior of individuals. With this in mind, Kelly developed Personal Construct Theory in 1955, which makes up the theoretical foundation for RGT [57]. His theory was built on an assumption that people organize their experiences with the world into classifications and contrasts. The process of this organization is called construing. As each individual develops and adjusts her or his system over time due to new experiences, the set of constructs is subjective, and he referred to the set as the personal construct system. According to Kelly, the degree to which we understand other people and ourselves is measured by the extent to which we understand how others make sense of their construct system. An individual's unique set of constructs provides a framework for understanding the actions of the various elements in their world.

This basis supports new choices and assumptions when we face something new or an unfamiliar situation. Fransella [58] (p. 5-6) summarizes Kelly's understanding of human behavior as humans are 'scientists' who derive hypotheses (have expectations) from our theories (our personal construing). We subject these hypotheses to experimental testing (we bet on them behaviorally, and we take active risks in terms of them). We observe the results of our experiments (we live with the outcomes of our behavior), we modify our theory (we change our minds, and we change ourselves). Kelly devised RGT as a method of exploring these systems.

5.2 Grid components

A grid comprises three components: elements, constructs and assessments of elements on constructs. The elements make up the primary objects the grid is based on. Constructs represent the interviewee's interpretations of the elements. The assessment shows how each participant interprets each element relative to each construct:

Topic: Bikes I consider to buy			
	Model A	*Model B*	*Model C*
Light	**3**	**2**	**5**	Heavy
Cross-country	**1**	**4**	**1**	Racing
Reasonable price	**2**	**2**	**5**	Expensive

Figure 4 - A repertory grid

5.2.1 Topic

The topic is the subject the researcher investigates; something the interviewee should be able to relate to. The shows an example of bikes, and the topic is 'bikes I consider to buy'.

5.2.2 Elements

An element is simply an example related to the topic. General examples on elements include traits, artefacts, actions and emotions, but are commonly expressed as activities or nouns. They may be physical objects, people, events or more abstract units, depending on the research context. Although elements can be almost anything as long as they are relevant and representative to the topic, they should be of the same type, and be as concrete and specific as possible. Abstract elements often appear to be ambiguous meaning and hide tacit meaning,

and will make the elements difficult to compare. When elements are mixed from different categories or subtypes of the same category, a comparing would not make sense [52] For instance, comparing elements such as mountain bikes, bike A and bicycle lamps is unnecessary.

5.2.3 Constructs

In order to gain insight into the interviewees system, the element must be seen in some sort of relation to each other. The elements must be systematically compared. The constructs are describing the elements, and are terms that the interviewee uses in order to differentiate between the elements. An example of a construct could be a description of dogs, like *high activity level* as opposed to *low activity level.* The purpose of the constructs is to function as two opposing poles. This originates from Kelly's argument that personal constructs are bipolar by nature, and the features of objects can be divided into exclusive categories [52]. When considering the purchase of a new bike, a person may have three suitable models with different features to choose from. For instance, two of them appears to be appropriate for leisure time and one is meant for professional cyclists, a possible construct that distinguishes the bikes from each other is cross-country vs. racing.

The researcher can supply both elements and constructs in order to ensure that the interest in certain aspects of the topic is covered, however, the interviewee should ideally elicit the repertory grid components.

5.2.4 Linking elements to constructs

When the elements and constructs are identified, the next step is to show how each element is being assessed on the constructs. This can be done three ways: dichotomizing, rankings and ratings. Kelly used a scale of two, as he believed that the reality is made of dichotomous constructs [52]. A dichotomous scale does not provide nuances, as the sorting process of the elements will be binary. When placing an element, one pole of the construct is preferred, or the other one. Ranking requires the elements to be numbered in regards to the opposing poles, and provides greater discrimination than dichotomizing. When using rankings, the researcher must keep in mind that the interviewee might be forced into distinguish between elements that does not possess any significant differences [49].

The most common linking mechanism is the use of ratings. As ratings enable the interviewee to consider the elements in relative terms on the construct dimension, the researcher will achieve a richer picture of the overall structure of their construct system [59]. Each element is given an individual score in relation to the construct poles, and elements can also be given the same value. The rating scale is usually a five-point scale Likert scale, but the scale can be as narrow or wide as the researcher wishes. However, using even-numbered scales will force the interviewee to make a decision on regarding an element as closer to one of the poles and will have to do distinctions that may not exist [49]. This is a significant advantage over dichotomizing and ranking.

Some elements may not make any sense on a particular construct and should not be assessed, regardless of technique. For example, the element 'dog' would not make any sense on the construct *cross-country - racing*, and should be left out of the assessment.

5.3 Analyzing grid data

Grids are subject to wide range of interpretation methods. The subchapter will review some analysis methods recommended by Jankowicz [52]. There are many ways to analyze grids, as the flexibility of the technique offers both quantitative and qualitative data. Grids can be analyzed individually and across groups, manually or using software packages. However, the choice of analysis must be built into the interview strategy [52, 60]. The researcher will need to decide on the appropriate analysis technique before conducting any interviews and build it into the research design, and choice of analysis method depends upon the research questions.

Qualitative analysis methods review the strategy in which the interviews where applied, how the interviewee responded and resonated, and the analysis is built on categorizations and interpretations of these descriptions. Quantitative data can be collected from statistical methods, which are based on analyzing the matrix provided by the ratings between the elements and constructs. Using statistical tools will concentrate the information of the grid, and loses some details in the grid, as the qualitative aspects will be neglected.

5.3.1 Eyeball analysis

An eyeball analysis is a preparation to other analysis methods or analysis method of its own. Eyeball analysis is a short review on how the interview process was done and what came out

of it, and the purpose is to familiarize oneself with the grid. No matter what analysis techniques that are used, Jankowicz emphasize that an eyeball analysis always should be conducted as a first step of the overall analysis process. The researcher will consider how the interviewee has represented the topic, and how s/he rated the elements on the constructs. This process will perhaps reveal differences and similarities between certain constructs or elements, or what kind of elements and constructs the interviewee emphasized.

5.3.2 Frequency count

Frequency counts are about counting the number of times a particular element or construct with similar content was mentioned, and is often used to find common trends among several interviewees. The main advantage of frequency count is that it is very effective for identifying patterns when the elements are specified by the interviewee [54]. This is especially useful when the interview strategy contains elements elicitation by using categories in more than one interview. However, a frequency count is a very rough guide, only general trends will be identified, and not small differences between them.

5.3.3 Content analysis

Content analysis is another manual RGT analysis method. The researcher identifies and categorizes themes based on the grid data. Content analysis involves developing a series of categories that elements or constructs may fall into, and then assigning the elements or constructs to a specific category. The categories should emerge from coding methodology. Elements and constructs are analyzed separately, and the frequency of each category can indicate underlying patterns across groups. However, content analysis does not take the assessments of the elements into consideration. Including Honey's method [61] requires constructs supplied by the researcher in the interview session. Applying the method sums each interviewee's perspective by finding matching scores between the elicited and supplied constructs.

5.3.4 Cluster analysis

Cluster analysis groups similarly assessed elements and constructs together, and shows how the interviewee structures her/his thinking:
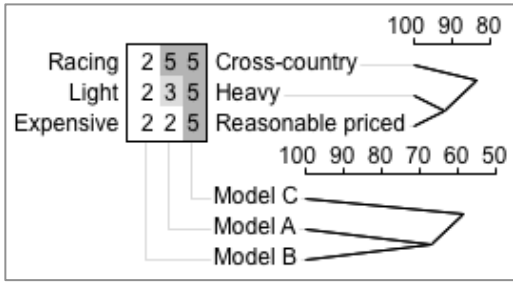
Figure 5 - Cluster analysis of a grid

The constructs make up the rows and the elements the columns. Based on the algorithm, which uses distance measures to reorder the grid, a dendrogram is shown on the left hand side. The dendrogram shows an overview of constructs and elements that got high correlation in the rating values. The order of the elements and the constructs is changed in comparison to the raw grid. The new order reflects the differences and similarities in the rating of the elements and the constructs. The interpretation of a cluster analysis is based on the assumption that elements and constructs with are closely correlated has very similar meanings according to the interviewee.

5.3.5 Principal Component Analysis

A principal component analysis simplifies the grid data by breaking it down to fundamental structures. The figure provides description of the connections between the elements and constructs of a grid:
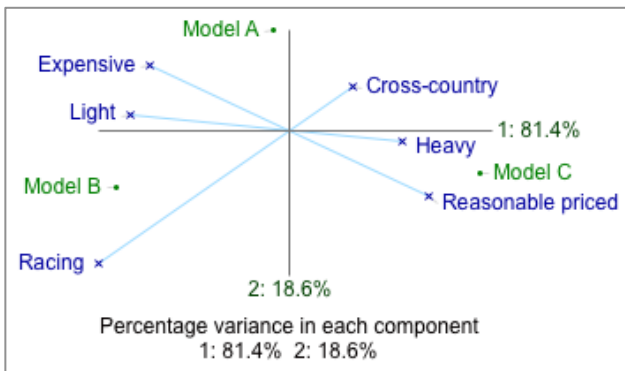
Figure 6 - Principal Component Analysis of a grid

The principal component analysis reduces the complexity of the data by finding a few combinations of variables, called components, that adequately explain the overall data variability and to identify the relationships between the elements and constructs. Inspecting

the placement of the elements and the construct lines relative to the components can provide qualitative data.

5.3.6 Analyzing multiple grids

Due to the flexibility repertory grids provide, they are suitable for generating group data by categorizing the individual responses [58]. However, Jankowicz stresses that also the interview process itself is a part of the analysis, as the researcher follows the interviewee through the elicitation process. Generating group data however suppresses the detail of the grids. The alternative is to supply either elements or constructs (or both) to the interviewee. Supplied elements are easy to compare if the elements are tea types, but is more difficult when they are 'a close friend' [62]. These considerations must as mentioned be built into the interview strategy on beforehand.

5.4   Application of technique

The topic of the interview was interpersonal conflict in large IT projects. We are particularly interested in obtaining a better understanding on how the conflict emerged, its escalation and management, and what kind of actions that could have been taken in order to mitigate the conflict. Conducting repertory grid interviews will then explore how the interviewees construe conflict situations.
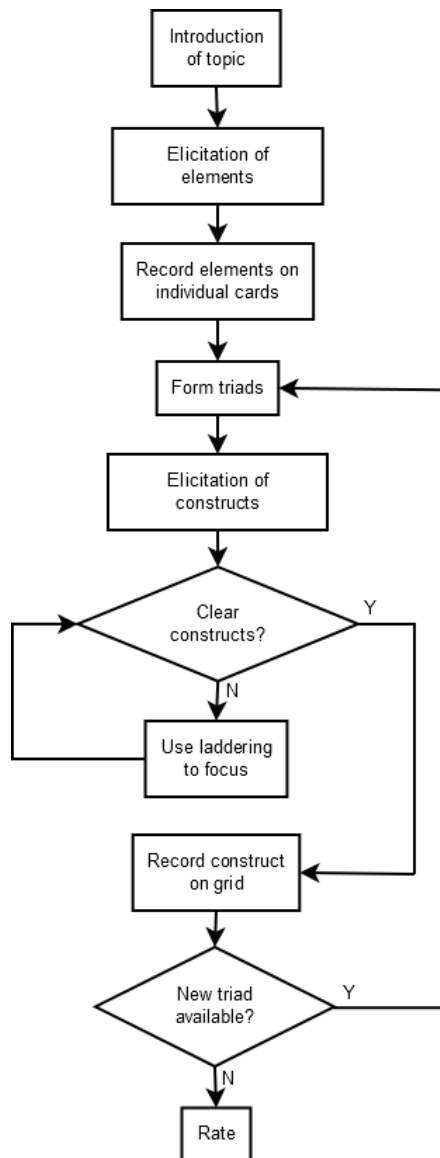
Figure 7 - Conduction of the repertory grid technique

Adapted from Edwards [50] and Jankowicz [52]

5.4.1 Introduction to the interview session

Prior to the interview, the interviewees were not given any information about the RGT in order to enable them to reply spontaneously to the interview questions. The interview guide functioned as a list of themes rather than a rigid question set. The interviewee elicited both the elements and constructs, and was encouraged to think out loud during the elicitation. As a closure of the interview, the interviewee was asked if s/he felt that all aspects of the conflict were considered during the session. Comments made during the elicitations were handwritten by the researcher in order to ensure richer qualitative data.

5.4.2 Eliciting elements

Elements can generally be chosen from four different approaches [52]:

- *Elements chosen by researcher* – the researcher wants to investigate a theory from various interviewees, and this theory guides the selection.
- *Elements chosen by interviewee* – the interviewee chooses personally relevant elements
- *Elements chosen by discussion* – the researcher and interviewee choose the elements together
- *Elicited elements* - the elements are elicited based on a set of questions.

It is possible to provide adequate coverage of the chosen topic with twelve elements, and between five and twelve is recommended.

The elements were elicited, following the interview guide, a predefined set of questions involving the four conflict approaches (see appendix). All interviewees worked on different sets of elements. Each element was written down on a card (size 10 x 7 cm).

Using cards when conducting RGT interviews is not required, but is helpful to the interviewee in order to structure her/his thoughts [52]. If the subject generated more than ten elements, s/he was asked to review the elements in order to determine if some of them were overlapping or hierarchical. The remaining 8-10 elements were used as basis for construct elicitation.

5.4.3 Eliciting constructs

The constructs represent the qualities or features that the interviewee assigns to the elements. In order to elicit constructs, the elements can be compared in groups of two (dyadic elicitation) or three (triadic elicitation). The latter is the most common comparison method, and the interviewee will have to explain similarities and differences among the elements. The researcher can choose to provide some constructs as well, in order to help the interviewee focus on the topic the researcher currently investigates, or, provide all constructs. Providing constructs can help discovering commonalities across a group of interviewees.

The constructs of the interview sessions were elicited through triading. A practice example was used to demonstrate the type of response required («If we were to describe your colleagues, one could say that X and Y possesses theoretical knowledge, while Z possesses practical knowledge») as some interviewees mentioned that the concept of constructs was a bit abstract to understand. For every triad, the interviewee was asked to tell how two elements were alike and one different from these two. This was to ensure that every element card appeared twice so as to eliminate the possibility of a bias towards a particular element, following a predefined list of triads.

The interviewee was asked to shortly describe and elaborate on choices and decisions, as these are often made tacit. It appeared to be helpful to the interviewee to put the cards on the table and rearrange them in order to elicit the construct. The interviewee was encouraged to supply more than one construct for each triad, with no repeated arguments permitted. The constructs were written on cards with another color than the elements, each pole on a separate card. The process was repeated until no additional constructs could be elicited. Jankowicz recommends at least seven to ten constructs to get a varying picture of the informants view on the topic.

5.4.4 Laddering

Laddering is a technique that can be used to clarify and explain the tacit choices of construct elicitation, and improves the level of detail of a construct. A construct such as warm and including opposed to sarcastic and unwelcoming carries more implicit information when discussing a friend rather than friendly/unfriendly. The success of this technique depends upon the skill of the researcher, who must avoid leading the participant in any specific direction and avoid bias.

5.4.5 Ratings

The interviewee was asked to provide a score for each element on a 5-point scale, where the pole made up by the two elements that shared a characteristic, was placed on the left hand side. The hand written cards were moved around between the poles, and the interviewee was encouraged to explain her/his decisions. The interviewee was made aware of the possibility of leaving out the elements that did not make sense on the construct rather than placing them on the middle value.

5.4.6 Interview session summary

After finishing the ratings, the interviewee was encouraged to share her/his thoughts on the interview and the RGT. Most interviewees found the RGT interesting, especially the way they were able to structure their thoughts. The results were fed back to the interviewees, and they were asked to comment on the findings and whether the analysis was a reasonable explanation of their experience of the conflict.

Some interviewees stated that the interviewing technique felt a bit artificial, however, my impressions was that it helped to create an informal conversation, which was perceived as helpful considering the topic.

5.4.7 Analyzing the grids

The data were analyzed individually and then a content analysis was conducted on all the interviews in other to get an overall understanding of the interviews. I performed a cluster analysis, principal component analysis and using WebGrid [63].

5.5 Chapter summary

The RGT and the analysis of the grids provided a unique insight into the individual's beliefs about the approaching and managing conflict situations. These empirical data will be combined with the questionnaire and document analysis in the next chapter.

6 Analysis

In this chapter, the analyses of the repertory grids, document analysis and questionnaire are presented. The repertory grids are analyzed both considering content and structure, as well as a qualitative analysis of the interviews.

6.1 Content analysis of repertory grids

A total of 123 elements and 63 constructs were collected from the interviewees. The content analysis was conducted on the elements and the constructs, as both were elicited by the interviewee. Problems, challenges and experiences will vary between projects and participants, and the individual experiences will also vary based on their role and background, and responsibilities within the project.

6.1.1 Inter-rater reliability

The elements and constructs were sorted by following a coding procedure [64]: open coding (identifying temporary categories), axial coding (modifying the categories) and finally selective coding (deciding on core categories). The element cards were spread out on a table, and then two cards were compared in order to find the first category. Then the rest of the cards were added to the categories or assigned to a new one, until all cards were processed.

The inter-rater reliability measures the reliability of the categorization of inspected entities. Another researcher did the categorization individually as well, then we discussed and negotiated the categories until they were robust, then the categorization process was repeated. The inter-rater reliability should have an agreement score of approximately 90% [52]. The elements were added to a reliability matrix, which showed a satisfactory level of reliability of 96.5% (k=0.965). The variable k is determined by dividing the number the common entities with the total number of entities.

6.1.2 Elements classification scheme

The elements were allocated to 22 classes:

Category	Description	N	Example
Personal issues	Issues and reactions directly related to an individual's personality or traits	11	Gossip
Estimates	Suggestions of time and cost schedules	8	Uneven estimates
Contract	Legal issues and interpretation of the contract between customer and supplier	11	PS2000
Development methodology	Choices made regarding development models	4	Agile
Financial	Financial consequences and issues related to price and amounts of money	3	Understanding the difference between estimates and price
Delivery expectations	Expectations to partial deliveries, functionality and implementation	7	Customer expected a product on a CD
Intention, agenda	Deliberate strategies chosen to weaken the other party's position	4	Letter containing accusations of hidden agenda
Involved parties	Other stakeholders within the organizations that were influenced directly or indirectly by the conflict situations	3	Premise provider
Responsibility	Distribution of responsibility provided by the contract	5	Implementation responsibility
Knowledge, competence	Human resources and competency	6	Customer with more knowledge than supplier
Negotiation	Aspects related to meetings where customer and supplier negotiated over current issues	2	Crucial negotiation situation
Requirements specification	Problem issues directly relating to interpretation of the requirement specification document	5	More specific description in the document
Distrust	Events that emerged after the conflict was established and dysfunctional communication	2	Returning an invoice
Power balance	Demonstration of power towards the other party	7	Power game
System quality	Disappointment in deliveries	2	Deficiencies in delivery
Helpful mechanisms	Proposed and conducted mechanisms for solving the situational problem	7	Solving a cause instead of engaging conflict
Communication	Descriptions of communicational patterns between the parties	5	«Kindergarten» attitude
Project management	Choices made on how to manage a large and complex project with a large number of stakeholders	8	HR management
Organizational relation	Personal descriptions of the ongoing relation between the parties	8	Friendly top management
Feedback	Exchange of feedback after restoring the communication.	4	(Too) close follow-up of the other party's project leader
Strategy	Intentional behavioral patterns taken to make something happen	5	Planned aggressive approach to a specific meeting
External roles	Suggestions for roles that could have been involved in order to help out with the conflict rather than project related issues	3	External quality assurer

Table 2 - Content analysis of elicited elements

The largest element categories are *personal issues (11), contract (11), estimates (8), project management (8)* and *organizational relation (8)*.

6.1.3 Constructs

The content analysis for constructs was carried out similarly to the elements. The agreement score for the constructs was 85.7% (k=0.857), and the constructs were allocated to 12 classes:

Category	Description	N	Example
Interaction	Issues related to communication and collaboration between individuals, interpersonal relationship	9	Cooperation - quarreling
Personal traits	Characteristics based solely on factual or perceived traits of individuals	5	Competence - ambition
Renegotiation	Short-term problem solutions during the project	7	Establishment of negotiated content in deliveries – defensive position
Project process	Management of project processes and resources	11	Managing personnel - managing processes
Risk evaluation	Measures for assessing risks during the project	1	Uncertainty – learning process
Problem management	Distinguishing between case conflict and person conflict	3	Suppliers attitude – attitude towards system
Managing deliveries	Implementation of deliveries in customer organization	4	Management of delivery – management of communication
Strategy	Choices taken when the conflict had reached a critical state	4	Competence - micromanagement
Expectations to project	Overall expectations to the collaboration and working together	4	Customers requirements – suppliers framework
Technical	Technical disagreements	2	Development methods – domain knowledge
Contract - responsibility	Responsibility regulated by the contract	9	Contract – financial consequences
Contract - legal	Legal issues that emerged during the project	4	Legal competence – management style

Table 3 – Content analysis of elicited constructs

The largest categories of constructs are *project process (11), interaction (9)* and *contract responsibility (9)*. The analysis of constructs is somewhat more vague than the elements, as each interviewee uses constructs subjectively. The meaning assigned to a construct by one interviewee may not possess the exact same meaning to another person, which can introduce

nuances internally in sets of «similar» constructs. The interview notes were used in order to overcome this issue of tacit meaning.

6.2 Statistical analysis of grids

The process of doing a content analysis reveals main trends of the inspected data. Inspecting the frequency of entities of each category, suggests prominent themes of the data. The elements indicated that there were five distinct problem-saturated areas: *Contracts, Estimates*, *Interpersonal relations, Project management and Organization*. The constructs indicated interaction, project process and contract – responsibility as prominent. These findings form the basis of the statistical analysis of the repertory grids. The elements of the problem areas were combined with supplied constructs.

6.2.1 Supplied constructs

By combining elicited and supplied constructs in a grid, the researcher can make sure that a particular area of interest is covered across the group of participants [65]. The intention of using supplied constructs was to identify what kind of aspects that the interviewees experienced to escalate the conflict rapidly, what kind of aspects that should be prioritized in a conflict situation, and how the chosen contract and process models were influencing conflict, in order to identify general trends. The supplied constructs were:

- *Personal conflict – case conflict*
  Is the element of factual character, or did it contribute to a focus on personal traits? The construct was chosen in order to identify what kinds of aspects that contributed to escalate the conflict from case oriented to personal oriented.

- *Serious problem – livable conditions*
  How did the elements influence the everyday of the interviewee? How serious were the various aspects? When a conflict already is escalated and may even have caused other conflicts and disagreements, what could mitigate the situation?

- *Related to agreement – related to process*
  Is the element or situation caused by ongoing processes of the project, or is it caused by decisions stipulated in the contract? What kind of aspects did the interviewee

perceive as predetermined factors, and what aspects could have emerged due to project collaboration and interaction?

The intention of each supplied construct was not explained explicitly to the interviewees, however, they were asked to think aloud how they interpreted the supplied constructs.

6.2.2 Principal Component Analysis and Crossplots

The problem areas and supplied constructs were analyzed using Principal Component Analysis (PCA) and Crossplots in order to identify connections of elements and constructs of the grids, and thus show patterns among the interviewee's responses. Principal Component Analyses is well suited for identification of «what needs to change» [52]. PCA represent patterns of variability in ratings in the grids, and identifies main trends, (if any) in how the interviewees think. The components should cover 80% or more of the variance [52], and this is evident for all PCAs in this analysis. More components are thus not included. The first principal component identified is the horizontal axis, and the second component is the vertical axis.

The distance between elements will reflect their ratings according to the set of constructs. The length reflects the amount of variance in the ratings of that construct. If a construct is close to one of the components there are similarities between them. If constructs are close together they have similar ratings. Elements that are close to the point where the two components lines cross are have dual meanings. Elements that are clearly at one extreme or the other on the components have clearer interpretations [58]. The length of the constructs in the diagrams indicate the amount of variance in element ratings accounted for constructs that account for a lot of variance help to summarize the data succinctly and are therefore important.

Each element is marked with a number in order to distinguish the elements elicited by the same interviewee. Diagrams containing the ratings of each element are listed in the appendix.

The data is presented as crossplots (showing how much influence the elements had on each dimension) and pingrids (showing dependencies between the constructs). Blue labels represent the constructs, and green labels represent the elements.

6.3 Contracts
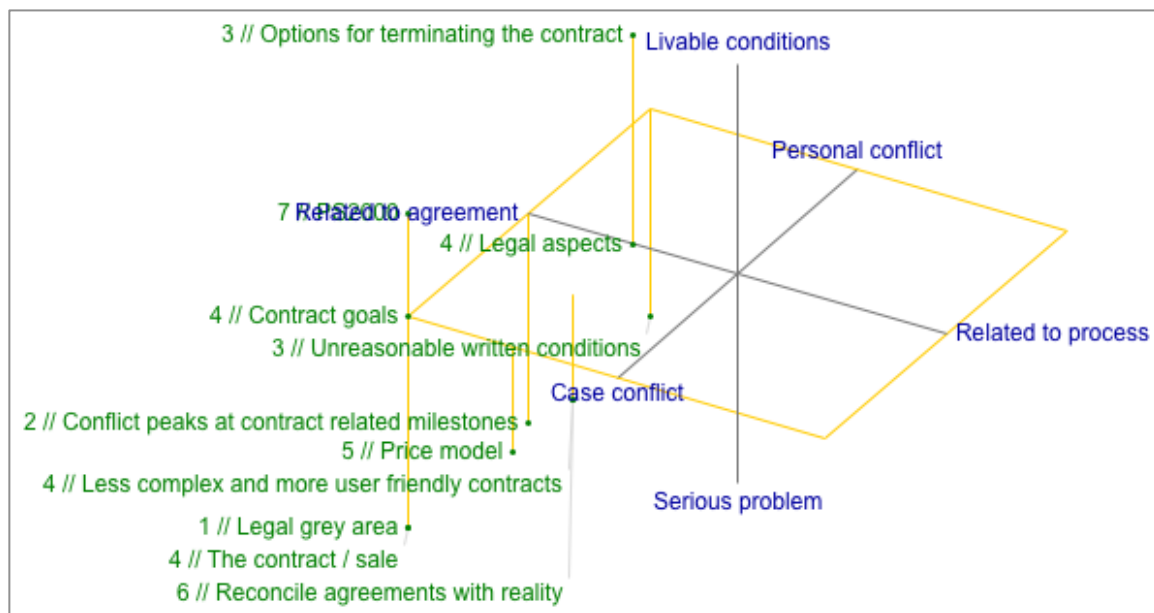
Figure 8 – Contracts crossplot

For the element category CONTRACTS, figure 8 shows a clustering of elements mainly related to *related to agreements, case conflicts* and *serious problems*. This may indicate that nearly all of the elements were considered to be related to the agreement between customer and supplier, and the emerging serious problems were perceived as case conflicts. Only one element, «options for terminating the contract» is rated to be connected to with livable conditions.
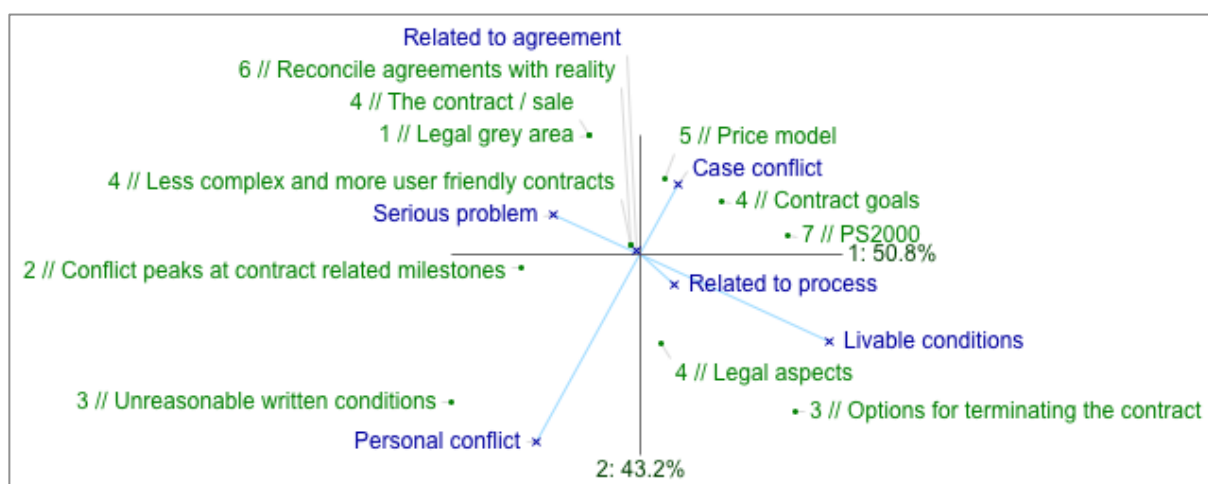
Figure 9 – Contracts pingrid

Figure shows 9 that the *personal – case conflict* construct is perceived differently from the *serious problem – livable conditions* and *related to agreement – related to process* constructs (which are perceived more similarly among the interviewees). The positioning of the elements shows that «unreasonable written conditions», «conflict peaks at contract related milestones», «options for terminating the contract» and «PS2000» are perceived as the most clear-cut elements.

6.3.1 Summary of Contracts category

It should be noted that when conducting the interviews, the interviewees gave the impression that the contract itself caused conflict situations. However, the ratings suggest that the *related to agreement – related to process* construct is not very salient when plotted against the two principal components, neither related much to the *serious problem – livable conditions* construct. A suggested interpretation of this aspect could be that underlying assumptions and processes like disagreements on project management and other relational issues structured the conflict, but that the conflict mainly manifested in contract related issues, such as «unreasonable written conditions» which are directly related to the contract.

6.4   Estimates
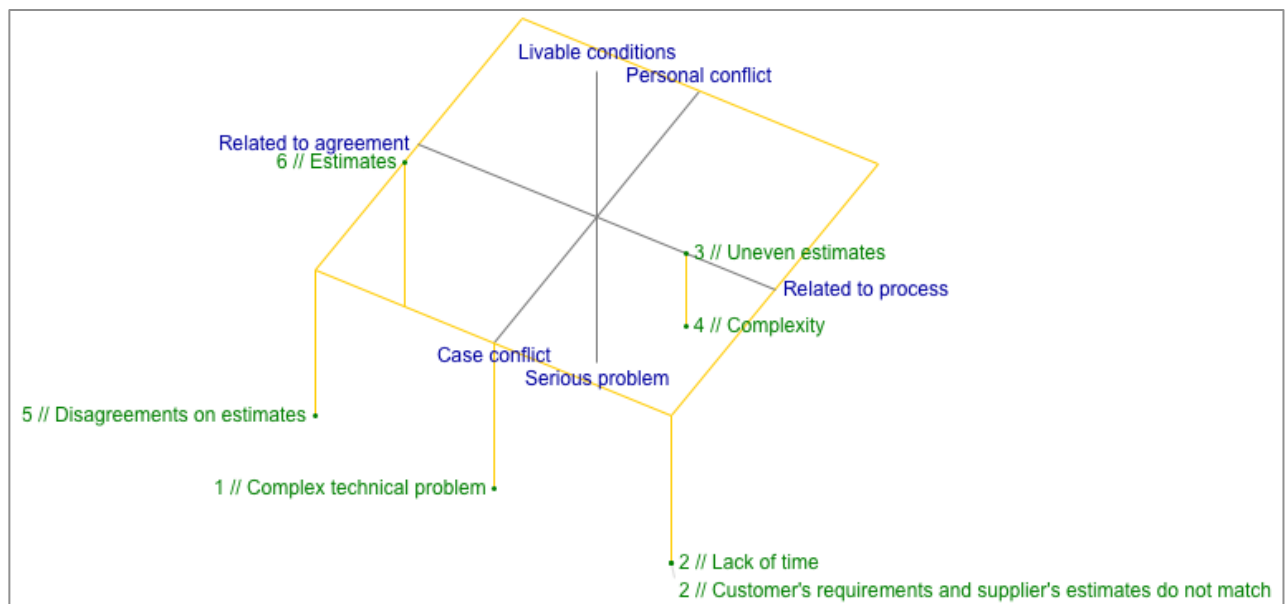
Figure 10 - Estimates crossplot

The distribution of elements related to the ESTIMATES category outline a more widespread picture than CONTRACTS. «Disagreements», «unacknowledged complexity», «lack of time» as well as «customer's requirements and supplier's estimates do not match» are all

considered to be serious problems, however, they are perceived to mainly be caused by case conflicts. In fact, most of the elements are considered to be serious problems, and related to the agreement and process. The elements «lack of time» and «customer's requirements and supplier's estimates do not match» did receive the exact same ratings, however, provided by the same interviewee. Other elements that were perceived as serious problems are «disagreements on estimates» and «complex technical problems».
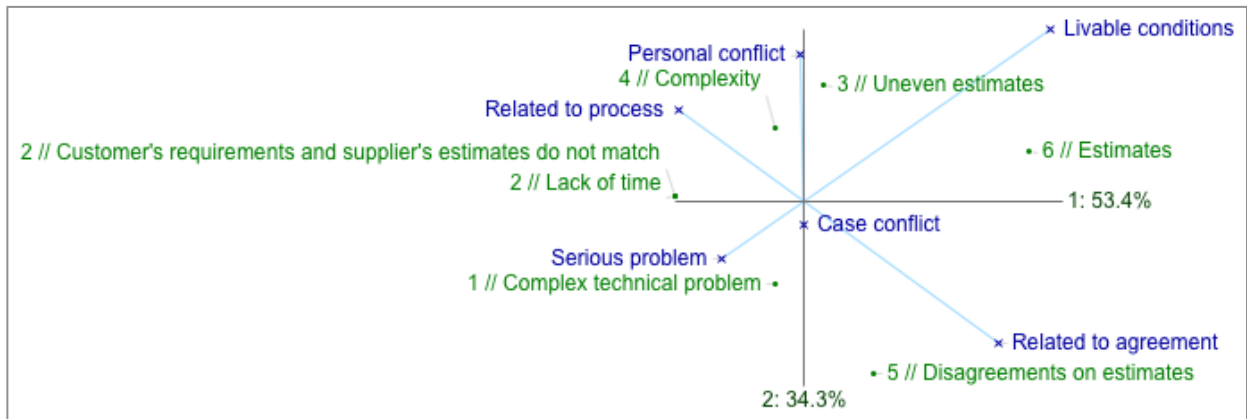
Figure 11 - Estimates pingrid

Figure 11 shows that the constructs related to the ESTIMATES category are perceived quite differently among the interviewees. *Related to agreement – related to process* and *serious problem – livable conditions* constructs are salient, but perceived differently. Distinct elements are «disagreements on estimates», «uneven estimates», «lack of time» and «customer's requirements and supplier's estimates do not match».

6.4.1 Summary of Estimates category

Indications of the ESTIMATES figures include that uneven estimates seem to be emerging when the process has progressed for some time, and then the technical solution was more complex than anticipated in the first place. This is not surprising, as several interviewees pointed out that they often fought over estimates when the conflict escalated, as a consequence of implicit complexity of the delivery. However, problems related to estimates did not influence the escalation of personal or case related issues. What caused case conflict is vague, which may be interpreted that the estimate in itself is not the triggering cause in such conflicts.

6.5 Interpersonal relations

As one might expect, the two previous problem areas were mainly focused around case conflicts (and serious problems). The elements related to interpersonal aspects are distributed differently:
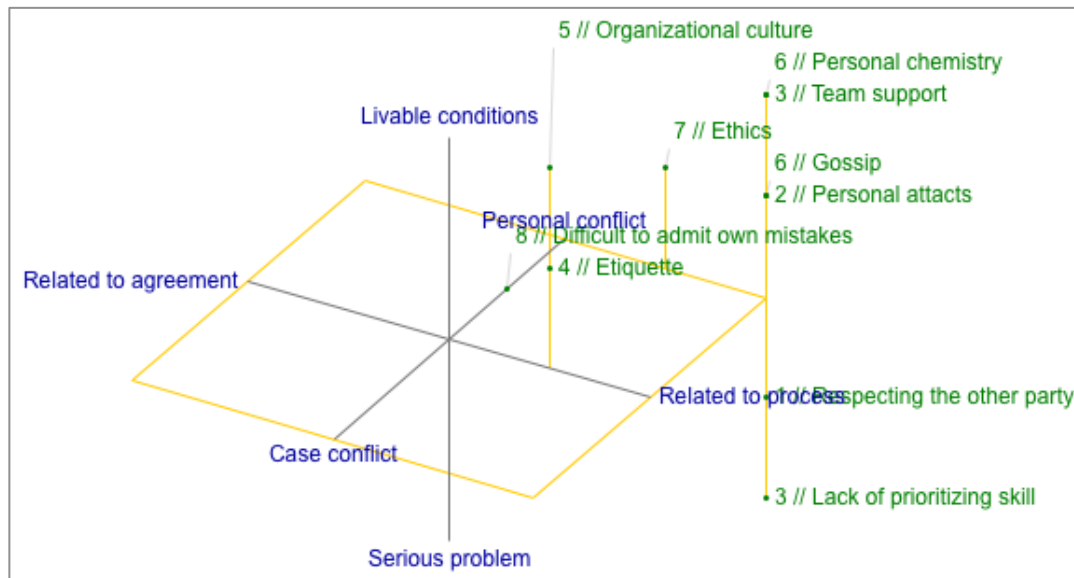
Figure 12 – Interpersonal relations crossplot

Figure 12 shows that all elements were placed in the *Personal conflict / Livable conditions / Related to process* quadrant. This may indicate that the interpersonal issues were perceived mainly livable and noticeable in the everyday life of the project. Only one element, «lack of prioritizing skill» is rated a serious problem.

Figure 13 – Interpersonal relations pingrid

The placement of the elements reveals that some interpersonal issues were related to the more factual dimension of the matrix, such as «organizational culture» and especially «etiquette» is important in this context. «Lack of prioritizing skill» is closely related to *serious problem*.

6.5.1 Summary of the interpersonal relations category

Indications from the INTERPERSONAL RELATIONS figures show that interpersonal aspects are perceived as livable and emerged during the project process. The connections between elements and constructs are slightly vague, and do not provide any clear proposals to interpretations of interpersonal issues. However, there is a similarity between *personal conflict – case conflict* and *related to process – related to agreement*, which may indicate that contract related issues like interpretation or requirements contributed to case conflict also in the interpersonal domain.

6.6 Project management
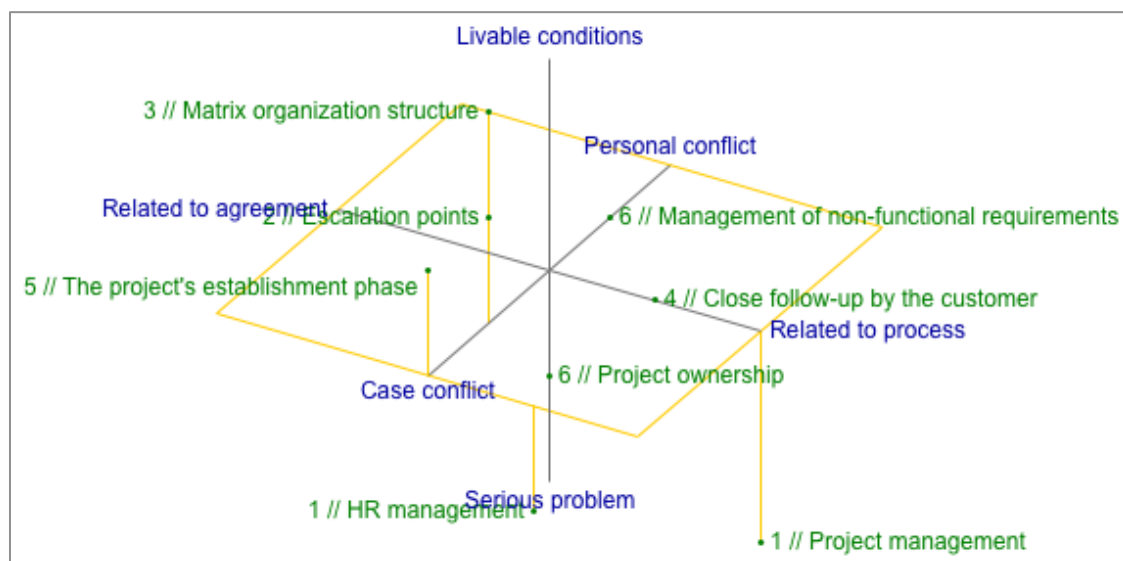
Figure 14 – Project management crossplot

The figure shows an element distribution spread on all dimensions. The elements that were perceived to contribute to serious problems were *project management* and *HR management*. Contributions to achieving better environment for collaboration were the *project's establishment phase, escalation points,* and *use of matrix organization structure*. The distribution of elements contains several options that would create a more livable situation.

66
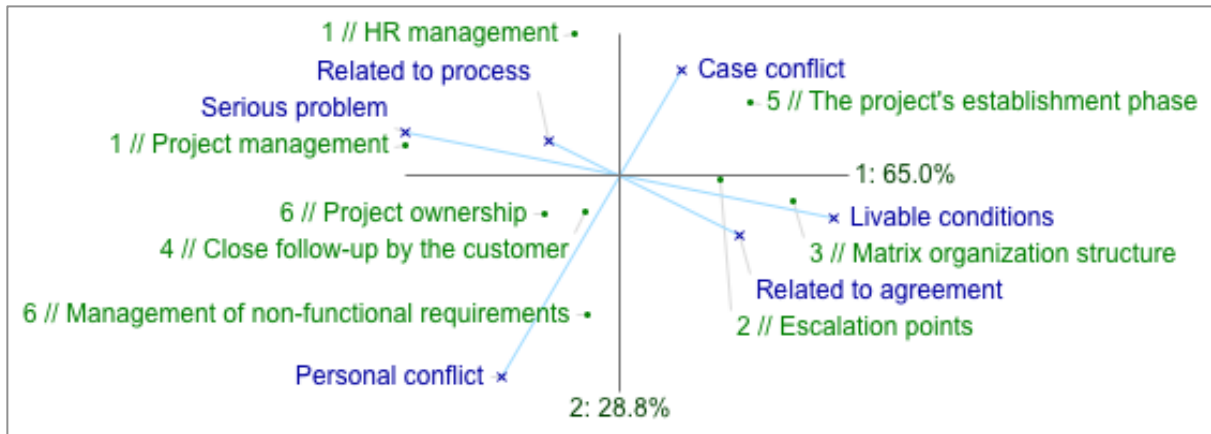
Figure 15 – Project management pingrid

This figure shows similarities between *serious problem - livable conditions* and *related to agreement - related to process* as well, and quite different from the *personal conflict – case conflict*. Positioning of the elements shows that the *management of non-functional requirements* is likely to cause personal conflict. The *HR management* and *project management* are, not surprisingly, important to the success of project process and management. Serious problem – livable and related to process – agreement were perceived relatively similarly by the interviewees.

6.6.1 Summary of Project Management category

The project process and management figures show that there are no specific themes within the process that indicate why conflicts emerged, and there is thus no consensus among the interviewees in this area.

6.7 Organization
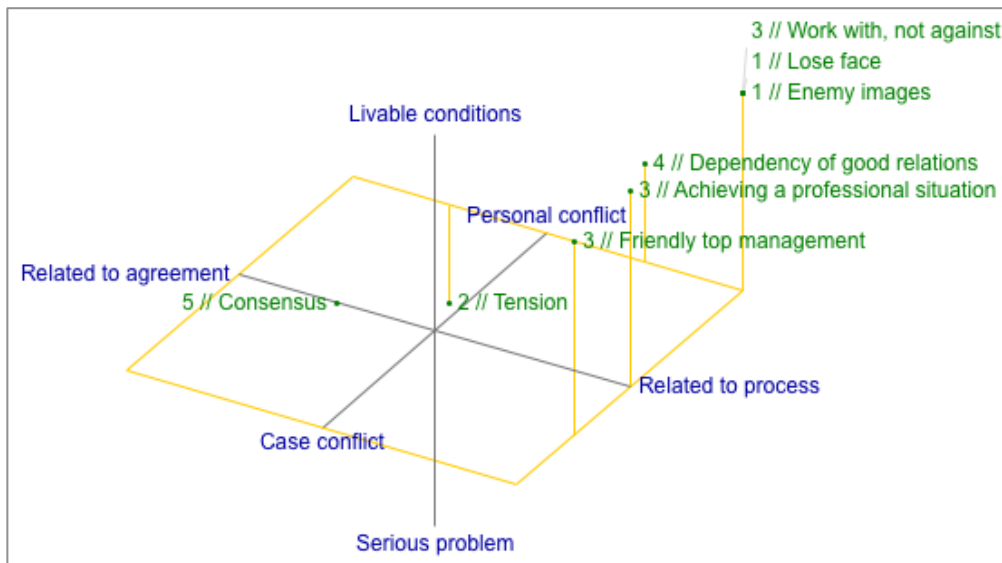
Figure 16 - Organization crossplot

The figure shows a clustering of elements on the *personal conflict / livable conditions / related to process* dimension. *Consensus* is perceived to be related to agreement, and *tension* is rated towards a serious problem. It should be noted that the selection of elements seen in a context with interview notes, show that the interviewees perceived some of the elements to be fairly manageable by themselves, but were serious issues in relation to other problems. An example of this is for example *enemy images*, which by itself did not influence the interviewee's perception of the situation much, but related to the overall conflict, the enemy images were causing severe interactional problems between the customer and the supplier.
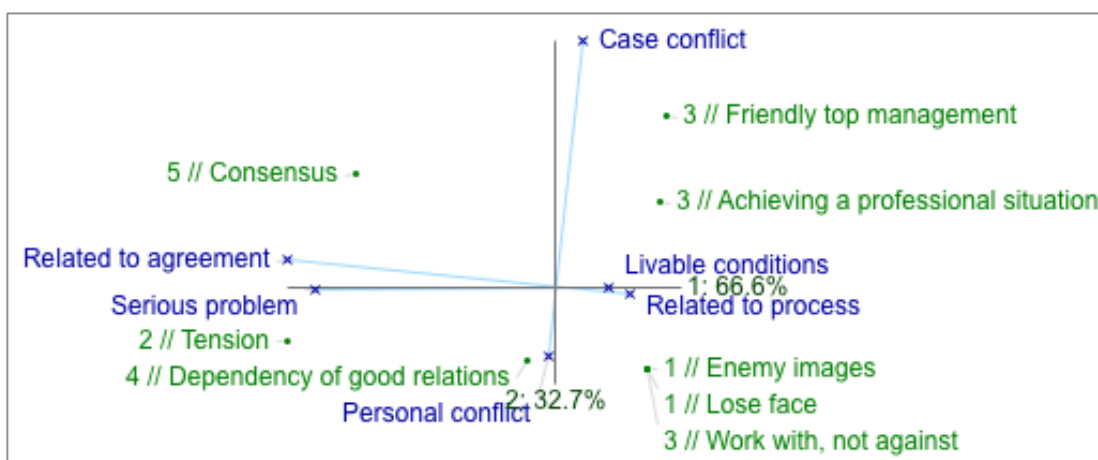
Figure 17 - Organization pingrid

The figure shows that the interviewees perceived related to agreement – related to process and serious problem – livable conditions similarly. Friendly top management is positioned as

a particularly salient element, which may have influenced the level of case conflict in that particular conflict.

6.7.1 Summary of the organization category

The organizational relations figures indicate that the interpersonal interaction was an outcome of process and could possibly contribute to more livable conditions between the parties. The personal relations between the parties was considered to be fairly ok to live with, however, seen in a context with other issues, they were considered to be serious and should have been managed at an earlier stage.

6.8 Qualitative analysis of interviews

The structure of a repertory grid session also provides rich qualitative data, which has not been that visible in the content analysis and the statistical data so far. We will now inspect the narrative data provided from the element and content elicitation by referring to the transcribed interviews. All sessions were audio tape-recorded with the consent of the interviewees. The recording allowed the researcher to go back and listen to examples and explanations by the interviewees in order to further interpret their statements. A short summary of themes is given of the interviews (identification number does not necessarily correlate with identification number of the figures). The themes are listed out of what the interviewees emphasized:

#	Main content
I	Replacing personnel, disapproval of deliveries, a person with an agenda, accusations and threats, contract scope
II	Project scope and quality, price models, estimates, communication, ripple effects as a consequence of lack of progress
III	Personal prestige, delays, ethical issues, tactics, restoring relations
IV	Disapproval of deliveries, demotivation, difficult personalities, extreme requirements, low quality
V	Accusations, lawyer roles, threats and retaliation, contract related issues, interpretation of contract
VI	Delays, bad feedback, distrust, estimates, price model in the contract

VII	Estimates, responsibility for issues, renegotiation of contract and price model, high risks, challenging sale process
VIII	Delegation of responsibility, lack of internal unity, management style, roles, not-invented-here-syndrome
IX	Low quality of deliveries, contract issues, scope control, price model, gossip
X	Formalized conflicts, diffuse responsibilities in agile, milestones, micromanagement, disappointment regarding expectations to deliveries
XI	Estimates, missing documentation of decisions, contract, price model, negotiations
XII	Focus on schedule instead of quality, roles, project scope, implementation, responsibility for decisions
XIII	Contract issues, estimates, bad sale process, renegotiations, hard tactics

Table 4 - Main themes of interviews

6.9 Questionnaire

A questionnaire could be used to further inspect the categories among a larger group of IT professionals. Due to lack of time during the thesis process, a survey based on the identified problem areas of the repertory grids was not conducted.

However, in order to enlighten some of the other research questions, I contacted Kjell Steffner in order to obtain the raw data used in a survey initiated by Tekna, The Norwegian Society of Graduate Technical and Scientific Professionals. This survey was conducted in relation to their project management network and the use of contracts.

As we have discussed earlier in the thesis, the contracts and their use is a frequently mentioned artifact considering interpersonal conflicts in IT projects. The survey is thus included in this thesis to help identify the use of contracts within large projects, but as the recipients have a broad background (as well as an insufficient overall amount of replies), the findings may not be necessarily be generalizable, but offers an outline of tendencies. The survey was conducted in April 2012.

6.9.1 Recipients

The recipients of this survey were recruited both from private and public sector, distributed on several business areas. 18 of the 52 recipients was involved in ICT:
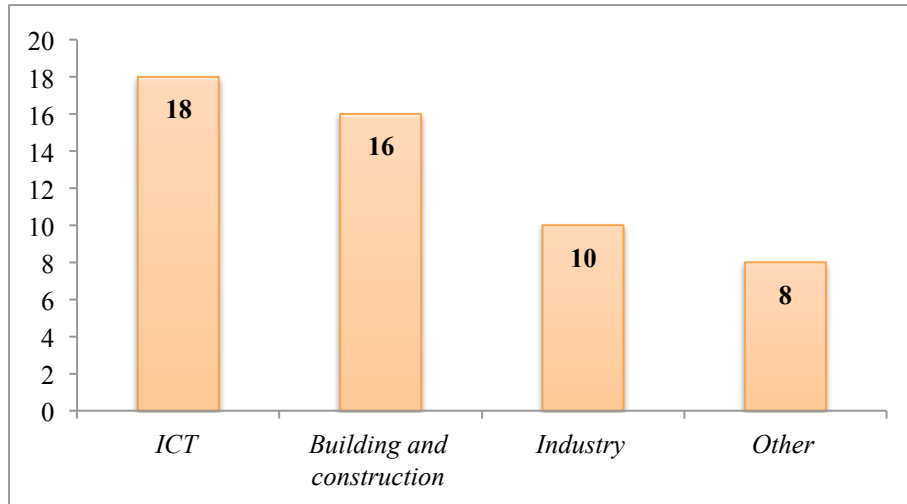
Figure 18 - Background distribution of survey participants

The recipients' attitudes considering the use of contracts in projects was further investigated by rating a list of assumptions, visualized in Figure 19:
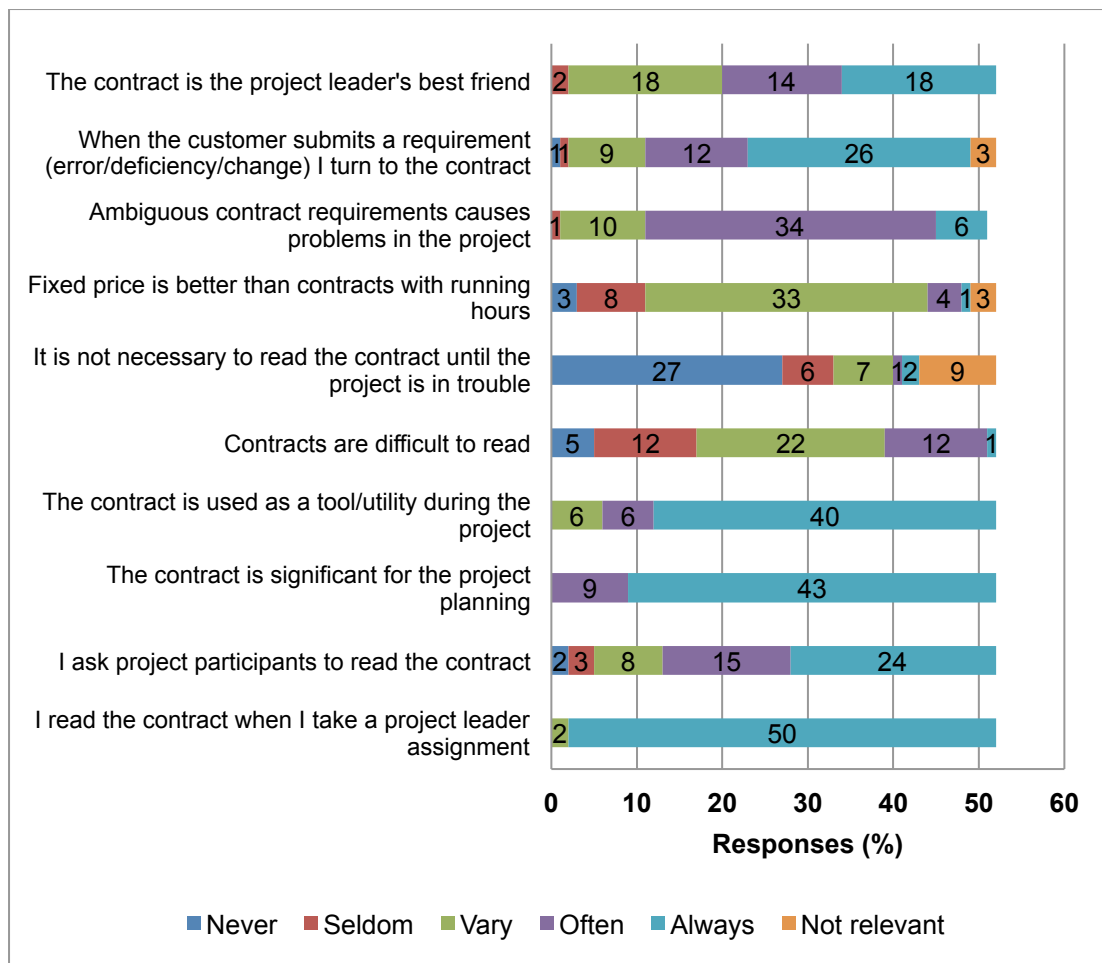
Figure 19 - Project management and contracts

What we can see from this figure is that certain aspects like change requests and ambiguous contract requirements produce problems in the project, are not distinct to IT projects. Such aspects could thus be considered to be «the way it is». Another aspect is that the contract is often referred to in technical projects. Choice of price model and identifying the most suitable model for a project vary, also for a broader group than ICT. The contract is significant for the project planning in technical projects.

6.10 Document analysis

A document analysis is based upon the researchers interpretation of some sort of document written by somebody else. The author of the document has thus different intentions than the research objective of the thesis. The underlying criteria for choosing documents were mainly based upon how customers and suppliers identify critical factors perceive challenges in large and complex projects and how they propose such challenges should be managed themselves.

As many large IT projects often are initiated by a public actor, I chose to investigate a recent white paper, «Digital agenda for Norge – IKT for vekst og verdiskaping[4]», and in order to identify how the public regards themselves in the customer role, and what kind of challenges they see in such projects. White papers are drawn up when the Government wishes to present matters to the Storting that do not require a decision. White papers tend to be in the form of a report to the Storting on the work carried out in a particular field and future policy. These documents, and the subsequent discussion of them in the Storting, often form the basis of a draft resolution or bill at a later stage. A white paper is the responsibility of the department's management, and is developed as an outcome of a collective process reflecting their opinions and advice.

The other document I chose for the document analysis, the report «*IT i praksis 2013[5]*», is a comprehensive report of strategies, trends and experiences within the use of IT in the 500 largest private and public businesses in Norway. The report is supposed to contribute to the development of IT in the private and public sector, and outline important strategic challenges that the society will have to face.

6.10.1 «Digital agenda for Norge – IKT for vekst og verdiskaping»

The white paper (Meld. St. 23 (2012-2013) [66]) was published in March 2013, and the author is Ministry of Government Administration, Reform and Church Affairs. Knowledge is presented and acknowledged in order to put issues on the agenda of the Storting. The content is mainly focused on promote value creation and competitiveness, and involving larger parts of the Norwegian citizens in digital participation. It also outlines an ambition of a fully digitalized public sector and a private sector that conducts its business digitally. In order to reach this goal, the Ministry emphasize that ICT is increasingly more important as a core function of society, and they thus want greater focus on the need for advanced ICT competence. ICT will be the source of improvement in society through growth and productivity, and thus be important to general welfare and wealth. The document emphasize that large IT projects are difficult to manage and acknowledges that many of them are considered to be unsuccessful. However, it is not mentioned what kind of challenges that usually arise in such projects. The need for advanced competence will be met by support of

---

[4] Translated title: «Digital Agenda of Norway – the role of ICT for growth and value creation»
[5] Translated title: «ICT in practice»

education both in academia and the industry. The fast growth and lack of people is identified as problematic, but identification of problem issues related to the projects seems to be neglected. One concrete challenge is emphasized: there is not sufficient structure for handling the exchange of information across businesses and the public sector, something that stands in the way for the need of common services. By strengthening education and research, they want to find out more on how to organize and facilitate successful IT projects.

This white paper was originally written as a suggestion for planning a strategy for the Norwegian state on how to keep up with sociotechnical development. The white paper contains budgets and action plans. The ambition level of the plan is high, however, with the best intentions. The source thus appears honest and reliable. The unique characteristic of the artifact is that it is an official document with the public greater good as its primary goal, and the underlying assumptions it is based on is strong and reliable. The first part of the document describes the current situation and reflects upon improvements, but the conclusion and summary is mainly normative in its conclusions.

6.10.2 «IT i praksis 2013»

«IT i praksis» [67] is an annual report made by and Rambøll Management Consulting in collaboration with Difi. It should be noted that the document analysis of the report only builds on the edition for the public sector, as the private one is as of today not available. The basis of the report is a survey among IT leaders and administrative managers from both public and private sector. The intention of the report is to contribute to a factually based fundament for the debate of further IT development in Norway. The report points to financial issues and implementation capability as critical factors. Mentioned interpersonal issues include lack of integration of IT managers with technical competence in the leader groups of the companies. They are thus not utilized as strategic resources, which are identified as a weakness of the domain today. The missing public IT strategy of Norway is also problematized, and a suggestion is to allocate power and operative decision-making within an isolated IT department.

Similarly to the white paper, the report also emphasize that numerous large projects was unsuccessful in public sector, which have caused severe financial loss. The report outlines

that management of change in requirements is a contributing factor. It is claimed that without a strong managerial position, society will not gain maximized reward from IT projects.

The report was published in May 2013, and its unique characteristics include a focus on better cooperation and use of resources, without being influenced by economical interests, and the report also possess the advantage of being an extensive and reliable survey. The target group of the report is the stakeholders of the Norwegian IT sector. Another aspect of the report is to uncover how many businesses that consider themselves to contribute to the goals of the white paper, and functions thus as an indication on the progress of this work. The report shows an evident risk related to low priority of change management and suggest an emphasis on changes rather than deliveries, which underpins the assumptions of problem issues emerging in relation to process rather than technical content.

6.10.3 Summary of the document analysis

The white paper argues warmly on the enormous unexplored potential for ICT in several sectors, and briefly mentions that there are challenges related to the way the projects are managed. However, the discussion of these issues is not given much space, which even was identified in the report for 2003-2005 [68]: lack of focus on cost/benefit considerations and benefits realization, and use of resources needs to be organized better. Both documents emphasize the need for interdisciplinary managers with good communication skills.

6.11 Chapter summary

The empirical data have been analyzed both qualitatively and quantitatively, and the most salient problem areas identified by the empirical data is related to interpersonal issues, interpretation of contracts and project processes. These areas are influencing other domains of the projects, such as estimates and what is perceived to be intentional or unintentional misunderstanding the requirement specification. All of these areas are perceived by the participants to be critical factors for interpersonal conflicts influencing the project. The findings show that essential processes are not performing well in large and complex IT projects. It is also shown that some of these aspects are common in other technical sectors as well, however, some aspects seems to be extra evident in the IT sector. The results of this chapter will form the discussion of the research questions in Chapter 7.

7 Discussion

In this chapter, we will discuss the research questions, which, as we remember from Chapter 1, are:

- How do practitioners perceive interpersonal conflicts?
- What factors are critical considering interpersonal conflict?
- What are the perceptions of third party interventions?
- How can established interpersonal conflicts be approached?

The research questions will be discussed in regards to the theoretical chapters and the findings presented in the analysis chapter.

7.1 Perceptions of interpersonal conflicts

The perceptions by the interviewees of interpersonal conflicts are based on several aspects. If we turn to the repertory grid analysis, the interviewees perceived the construct *related to project – related to agreement* as closely related to the *serious problem – livable conditions* construct, and that the interpersonal conflicts are something that lives its own life outside of this. However, there were also found strong correlations between personal conflicts and project process, and that the contract does not offer much help within this situation – it rather seem to complicate the situation. This may indicate that the contract does not regulate the responsibilities between the parties sufficiently, or, that the judicial competence of one or both parties is insufficient. The interviewees perceive a change in the contract (for instance an easy option for termination) as a solution to interpersonal conflicts.

7.1.1 Agile

Another aspect that was frequently mentioned in the interviews was that the agile methodology is built upon an assumption of customer collaboration over contract negotiation[6]. The repertory grid analysis shows that the connection between contracts, human relations and project process seem to point in the direction of contract disputes very quickly. An increased focus on human relations and building a well-functioning collaboration is likely to foster a relationship that is beneficial in the long run [8]. This might indicate that the agile

---

[6] http://agilemanifesto.org/

methodology is not properly adjusted to the project process. Some interviewees mentioned that the initial phase of the project felt more like a waterfall model, which may have caused ripple effects later on.

7.1.2 Contracts

The requirement specification and the contract are two areas that cause problems in large IT projects. However, the empirical data suggests that the project process as an underlying factor contributes to interpersonal conflicts as well. The contract seems to be referred to when the conflict already is in the person phase. One interviewee stated that: «when the collaboration is functioning, we don't need the contracts». This implies that many issues that may be related to the project process, instead of directly related to the contract, which is also supported by the document analysis. The document analysis showed that there is a need for interdisciplinarity among practitioners, and that an understanding of project management combined with extensive technical knowledge will improve the project process significantly

The high level of innovation inherent in the product, as well as the need for interdisciplinary skill and ability to manage parallel processes form some unique characteristics of IT projects and contracts. According to the interpretation of the questionnaire, the intangible nature of the product seems to be the factor that is most difficult to manage, especially when considering judicial issues. This is evident already in the initiation phase.

7.1.3 Product expectations

The quality expectations to the product often seem to be misleading. These expectations are formed during the initial sale negotiations. Some customers claimed that suppliers usually appear very similar through their project offers, which, subsequently, cause tight negotiations. In order to distinguish themselves from the rest, some suppliers may promise features and advantages that may not be properly thought through or planned as a formal offer. One interviewee stated that it is «fairly easy to get eager in the sale process, as we really wanted to win the contract (…) we took a chance, I guess». The ripple effect of such unwarranted promises sometimes formed unrealistic expectations, but became particularly noticeable at later stages. The resulting insufficient quality of the deliveries and disagreements were eventually addressed (too late) in renegotiation meetings.

Many suppliers pointed out that the customers usually want a «castle for the budget of a wooden cabin». This indicates that the success criteria are not defined properly. The supplier will not know when they have met the criteria of the customer. This becomes evident when the project approaches the finishing phase: «We, as a supplier organization, have extensive knowledge in creating a *solution*, but they as a customer have taken an extreme position for expecting a product, a completely finished *product*, while we have made a solution to a problem». There seems to be a need for greater clarity regarding the product expectations already in the sale negotiations.

7.1.4 The sales process of public sector procurements

The sales process and the expectations to the product seem to be even more complex when it comes to procurements in the public sector. The legislation of public sector procurement sometimes forces the customer to choose supplier based on price only. Public sector procurements within IT are prone to additional challenges, as their project deadlines often are connected to political decisions. Suppliers may have little knowledge about the political factors and how they influence the customer. High political ambitions as well as a wish for using new technologies may complicate the process further [69]. The empirical data seem to suggest that the requirements in a public sector context are specified in terms of a waterfall model development cycle, while the actual deliveries are developed iteratively. Public sector procurements often have fixed deadlines that are decided politically.

7.1.5 Scope control

Almost all interviewees pointed at poor scope control as a general problem in IT projects, especially according to the contract. Lack of scope control can occur when the project process is not properly defined and controlled, and leads to delays as well as uncontrolled changes. The uncontrolled changes seem to contribute significantly to interpersonal conflict, as the parties disagree on a feature being in or out of the contract scope. These aspects are difficult to approach, as they demand both extensive technical competence as well as juridical competence.

7.1.6 Placement of responsibility

Many conflicts seem to manifest themselves when the project reaches a control point, and the customer refuses to approve the delivery. The customer thinks the quality is too low and they

have therefore not received what they wanted. A supplier stated that «there is a lack of ownership to the previously taken decisions, and you get the not-invented-here-syndrome when the delivery is disapproved». Another aspect of control points is that some customers stated that they did not really know who had the mandate to approve the delivery, which, in turn, caused ripple effects to later deliveries. This may indicate that the placement of responsibilities in the contracts is unclear or insufficient, which becomes evident in delivery approvals and control points.

Misunderstandings on issues of responsibility and coordination of common resources can lead to a power demonstration on who owns what and on who has responsibility for what. This implies that customer maturity is an important issue when choosing PS2000 for a project. Product owners among the interviewees argued that the customer sometimes micromanages the project instead of taking decisions, which makes the supplier annoyed. A clearer placing of responsibilities seems to be necessary.

7.1.7 Change management

Due to the innovation level of IT development projects, change management is a natural part of the project process. However, changes affect the overall progress of the project, and also add complexity to the project administration. The customer has expectations on how the system will look like, and if this expectation does not match what is delivered, the need for implementing changes arises. The supplier will also need to know what kind of role the new system is supposed to have in the acquiring organization. If the goal is to improve efficiency in the future, the requirements will differ distinctively from developing a system that supports the tasks they manage as of today.

A challenge for the parties is, as early as possible, to reconcile the customer's expectations according to the performance of the supplier. What is to be defined as a change and which consequences this has for the project, must be thought out by the parties and regulated in the contract in a way that makes this practically manageable [32]. A supplier illustrated this by arguing that «a lot of the conflict is caused by to what degree the process is related to agreement, interpreting the agreement-regulated process. Is it regulated by the agreement that the customer is allowed change their mind as often as they like? Like the day before the delivery?» Advanced and complex development means costly changes, and the downstream

cost of putting the project back on track after doing changes will always grow and, frequently, grow exponentially [31].

The change management process is often affected by an insufficient requirement specification. However, the customer should be allowed to change their mind, as they, after all, are the customer, and are the ones who are going to use the system. In order to make the changes as smooth as possible, the customer will need to identify what kind of changes that correspond with the original agreement, and what kind of changes that are improvements to the system (and should be paid for). One supplier stated that «you want to be forthcoming towards the customer», but this attitude should perhaps be slightly adjusted. It seems that the main problem of the estimates and the requirement specification is that the trivial details are spent too much time on, and the focus should be brought back on the features that give actual business value. This can be achieved by paying less attention to written conditions, and by focusing on value features, especially during the planning phase, but must also be kept in mind in the sale process.

7.1.8 Price models

Overruns make an unfortunate dilemma in an already pressured situation. The time pressure forces the supplier to choose between working according to plan or risk compromising the quality of the delivery. Overruns have twofold consequence. The supplier wants compensation for the delay, regardless of cause, as the delay, in the supplier's mind, may depend upon the customer or factors beyond their control. The customer is affected by loss of efficiency, as they do not receive their implementation when they were supposed to. An interviewee stated that «you reach a state when you discover that the customers' requirements are more extensive than the supplier are able to fix within their estimates. When this is clear to both parties, conflicts are born. It is suddenly difficult to distinguish between case and person».

The empirical data shows that the price model becomes a heated issue when the conflict between customer and supplier is established. They become suspicious of the intentions of the other party when the project is threatened by overruns. Fixed price contracting introduces the dilemma of the supplier wanting to narrow the scope, and use cheaper resources, and the customer wanting to receive as much as possible within the time frame. However, ongoing

invoicing seems to contribute significantly to the risk of the enemy images, as the supplier gets accused of overestimation. Target price seems to be the preferred price model among the interviewees, although some interviewees stated that they, as customers, became suspicious of the supplier's intentions, which lead to accusations from the supplier that the customer was deliberately delaying the project, especially if the contract contained ceilings, which in practice lead to a fixed price model.

7.1.9 Critical factors

Practitioners within the domain view interpersonal conflicts as a natural ingredient, however, isolated factor of IT projects, mostly caused by misleading project expectations, scope control, responsibility distribution, change management and price models, which seems to be explained by the interviewees as contract related.

7.2 Third party intervention

Practitioners seem to be very skeptical of third parties. Their main concerns are related to the neutrality and competence of the mediator. There seems to be a general trend of believing that mediation is about sharing the financial costs equally between both parties.

By reviewing Figure 20 (see below), the first steps – case phase – the parties are probably able to solve the dispute themselves, but including a mediator might make it easier to identify common ground and get to the negotiation process quickly. The mediation approaches of the person phase are difficult to manage without a dedicated, external mediator. The late person phase and the war phase must be approached with the knowledge of that the dialogue must be restored, and may take lots of time.

External quality assurance, technical experts and mediators are all perceived to be possible third party options that can be included in customer-supplier relationships. PS2000 has a built-in escalation point, which can be used for conflict situations. This mechanism is rarely used, and the person who is supposed to intervene is sometimes not even mentioned by name.

The interviewees expressed a general skepticism towards including third parties in their conflicts, and they were generally reluctant to get advice from an external actor. The skepticism is mainly built upon their ability of gathering background information and how to

choose who the third party should be: «when the conflict is escalated, it is not possible to agree on who it is supposed to be either – the [opposing party] may get biased support! It is very expensive, too. And, they will never be able to read all documentation and understand the conflict properly». Another interviewee stated that «my impression is that mediators impose a conclusion of letting us share the costs equally, fifty-fifty. A bit our fault and a bit your fault. We feel that we are entirely right, and I guess the other party think the same for them. It is very unfair to meet each other halfway», as well as a third: «it is expensive and really not very productive, because you don't really agree anyway. What is inside and outside the contract scope.. no, it would be too difficult for them».

The quotes summarize the view of third parties among the interviewees – they regard mediation as an imposed solution of sharing the financial costs equally between both parties, as well as a linear timeline perception of the conflict events. The trust regarding a fair outcome by a mediator seems to be low, and, that the process is solely based on some of the aspects of the problem-solving approach.

7.2.1 The neutrality issue

By involving an external third party, the involved parties may lose some of their freedom of action. The interviewees were positive to including third parties on a general level, but they expressed concern regarding who the third party could possibly be. They stated that an external actor must have extensive technical knowledge, judicial knowledge as well as knowing both the actors and the problem domain. But the most difficult part is finding someone who is not somehow connected to one of the parties. The interviewees state that the Norwegian IT sector is too small for this.

7.2.2 Escalation points

If PS2000 is utilized the way it is intended the control points will facilitate quality assurance. However, the contract does not say much about what happens when the customer refuses to approve the delivery. Almost all interviewees claimed that the contract was used a lot, but they also stated that the development parts are so technically complex that they are isolated from the rest of the contract. PS2000 states that an independent expert should be used for objective assessment of quality and function as a mediator if the negotiations of the coordination group do not solve the conflict. The intention of the expert role is to objectify

the basis of the contract disputes, but also to extract the conflict areas and treat them separately from the project. However, the expert is rarely named in the contract.

Another aspect is that it perceived to be drastic to escalate something to the coordination group, and instead, people tend to avoid acknowledging that there is a problem. Framing a problem as a conflict changes how the organization and the stakeholders respond to it. Failure to act upon the situation can allow ripple effects of the conflict to spread to other areas of the organization and external stakeholders [70].

7.3   Approaching interpersonal conflict in IT projects

According to Lederach, managing a conflict is easier the earlier it is detected, as the parties tend to anchor themselves in a rigid position [18]. This assumption seems to be evident for the IT project context as well. Based on the results and analyses of the previous chapter, this subchapter will form a suggestion for approaching interpersonal conflicts. However, it should be noted that this is only one specific way to approach conflicts. The approach is made upon my own interpretation of the results and my discussions with the interviewees, and should be regarded as such.
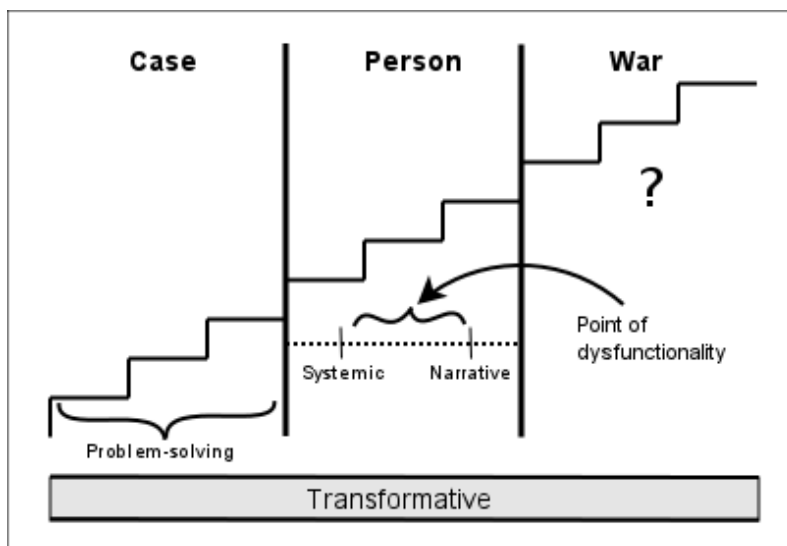
Figure 20 – Suggestions for approaches along the escalation

Adapted from Glasl in Einarsen [14], p. 89 and Haslebo [15], p. 275.

7.3.1 Case phase – problem solving

The case phase is relatively undramatic; as case discussions seem to be somewhat positive and welcomed by both parties in order to find the best solutions for the project. If they decide that conflict management is needed, the problem-solving approach might be appropriate, and the perception of a «competitive» negotiation seems to be legitimate in this phase. A risk related to this approach is that the conflict may reappear if the parties do not target the right causes during the negotiation, or one party perceives the conflict being in the person phase rather than the case phase. The parties are not given the opportunity to shape their own process and results [15]. Applying the problem-solving approach in the person phase is probably counter productive, as questions of guilt and justice quickly become an issue as the opposite party gets accused for being the cause of the escalating events.

The essence of the problem-solving approach is to discover the core cause of the conflict. The individual parties will look for causes at certain points within the process. The goal of the problem-solving approach is to a solution that perhaps lies in the middle of their demands, depending on their choice of distributed or integrated negotiation. If the conflict is in the case phase, the problem-solving approach is probably an option for focusing the attention to solve the case issue and return to the project. The parties are able to conduct a problem-solving approach without a mediator.

7.3.2 Escalated conflicts

The person phase is characterized by difficult communication and deteriorating personal relationships, and the conflicts are directly delaying the project process. Escalated conflicts will often be costly and demanding. When the conflict has entered the person phase, the case orientation is difficult to keep in focus, as the interaction between customer and supplier usually are packed with accusations. The shift from case conflict to personal conflict often seems to be caused by emotional outbursts, which can be triggered from a letter or an email. The investment in the situation, seen in the context of the project resources, puts even more pressure on the interpersonal conflict.

The deterioration in collaboration between a customer and a supplier seems to be dependent upon a shift that occurs when the conflict escalates from the case phase to the person phase. An interesting finding was that, in the case phase, the customer tends to hold the view that the supplier works in the best intentions, especially the development teams. Both customer and

supplier work together towards a mutual goal. However, when the conflict enters the person phase, the view of the organizational relation shifts from collaboration towards a common goal to enemy images. The hostility seems to be anchored in the price models, and they start accusing each other for feathering their own nests. Several supplier representatives stated that the customer suddenly emphasized their relationship as a «buyer and seller» relation, rather than as colleagues.

The interviewees that had been involved in the less dramatic conflicts pointed out that both parties were collaborating on a mutual project, and referred to each other as good colleagues. In more critical projects, the interviewees stated that the parties were enemies, and accused the other party for being unprofessional and downright liars.

7.3.3 Point of dysfunctionality

The empirical data shows that the communication and interaction between customer and supplier breaks down somewhere within the person phase. When the face-to-face interaction ceases, the conflict seems to escalate within the actors' minds, which does not necessarily reflect the actual situation. Some interviewees stated that they stepped back for a second in order to reflect over the situation, and the conflict escalated in the meantime. This means that doing nothing is an active action as well, and possibly tips the conflict from case phase to person phase if that has not already occurred.

7.3.4 A transformative relation

According to our analysis the most sustainable conflict approach is probably the transformative. The transformative model is however difficult to implement in the conflict situation as a quick fix. The transformative model is built on ideal values, and requires some sort of collaboration fundament from early on in the mediation process. The transformative approach would differ a bit from the other approaches within this context, and should be the general fundament of the relation rather than a conflict approach. In order to avoid communicational breakdown, the dialogue between the parties must be maintained. This is probably difficult when the perception of the other party is increasingly negative, and if there are ongoing discussions, the party is probably focused on defending own interests rather than solving the situation. Suggestions for solutions are probably impulsive, and based on

emotions and misunderstandings. A dialogue must be restored in order to identify factors that make the conflict persistent [20].

7.3.5 Early person phase

The early person phase is probably a good place for the systemic approach. However, somebody with a mediator role must be included in the situation. As discussed in chapter 2, the goal of systemic intervention is to restore the interactional patterns in order to make the system functional again. In a conflict situation, the mediator should be integrated as early as possible, preferably before the enemy images are established. This is because the parties will be suspicious of the mediator's neutrality as well as the other party, and they will probably not acknowledge the mediator's suggestions and hypotheses if these are not in their favor [15, 20].

Both parties must also be willing to invest lots of resources in a systemic approach. A change in a viewpoint of a node changes the whole system. This will lead to the establishment of some sort of boundaries in order to delineate and isolate the system – the conflict situation will become a subsystem. Based upon this work, the mediator works with hypothesizes that s/he seeks to confirm in order to restore the system. If it fails, the mediator makes another one and tests it. The systemic approach is suitable in large IT projects as they often last several years, which allows a mediator to collect data from the involved nodes of the system and the conflict sub-system. The mediator will be able to test a variety of hypotheses during the project in order to strategically influence the output of the system. The systemic approach is an iterative, stepwise process.

7.3.6 Restoring the dialogue

Restoring the dialogue will be the first step of moving the system processes out of stagnation.

The parties will position themselves as the protagonists, and probably want to exclude some other opponents on the grounds that it would be easier to solve the problem without their participation. But the reality is that these actors do represent interests in the conflict and therefore must be taken into consideration in a systemic approach, and a sustainable solution requires acknowledgement with all of the relevant issues [20]. When the dialogue is restored, the mediator and the parties can work on formulating realistic goals and identify options in

order to segment the conflict into a controllable sub-system. If this process does not influence the system in a desired direction, it can be seen as feedback to start the session over again.

A systemic mediator will enter the system knowing that all members have a version of what is important and why, and these versions should be explored in order to getting a better understanding of the internal processes [20]. The relational context must be good enough in order to ensure sufficient communication, and the mediator must ensure that context. An advantage with the systemic approach is that it avoids relapses of irritation and anger that caused the stagnation, as the participants do not think about what got them in the conflict situation in the first place, but are encouraged to improve the future situation [15]. The systemic approach is appropriate in the early person phase as the emotions are not in the way of facilitating the mediation process.

7.3.7 Late person phase – narrative intervention

If the emotions are in the way, they must be sorted out first. As blaming is an easy mode to fall into, particularly when the party feels that the other side is indeed responsible. But even if the blaming is justified, it is usually counterproductive in conflict management. Blaming the other party makes them become defensive and they cease to listen. Assessing blame firmly entangles the people with the problem [18]. The systemic approach is suitable if the enemy images are not too well established in the party's perceptions of each other. If the conflict has passed the point of dysfunctionality and they only interact through letters written by lawyers, the systemic approach will be difficult to use as a starting point. This is because the restoration of dialogue will be difficult to penetrate.

An option of the late person phase is the narrative approach. Narrative mediation can involve some problem solving and negotiation around issues - this happens though in a context of building understanding and relationship between participants. Narrative mediation results in reaching more productive understandings about particular problems and their histories, where more productive commitments about working together in more preferred ways are the end result [24].

7.3.8 Avoiding the war phase

A strong move by one party may escalate the conflict almost to the war phase. The war phase applied to the context of the thesis will correspond with (threats of) lawsuits. One interviewee illustrated this as «bringing a lawyer is like bringing a gun to the meeting». At this point, the parties seem to feel that all communication between them must be documented. However, this seems to be done as a preparation for a possible lawsuit: «It happens so often, that when we meet the [other party], what we do not have in writing is not worth anything».

The empirical data shows that neither customer nor supplier is interested in conflict escalating to the point of becoming a court case. At this point, top management is usually involved. Interestingly, interviewees with a managerial position said, e.g., that «when the conflict is handed over to the top management, the communication is less aggressive. Maybe because they are not directly involved? They don't take this as personally».

7.3.9 Approaching conflicts

All four conflict approaches are suitable for interpersonal conflicts within IT projects. Problem-solving, systemic and narrative approaches are suitable at different stages within the escalation staircase. The ideal approach is probably the transformative, however, this requires some sort of groundwork before the conflict emerges. The other three are easier to implement during the conflict escalation. The interpersonal conflicts provide several intervention points. These are determined by the escalation level and the parties' willingness to enter mediation and how much resources they are willing to spend on a mediation process. They also need to decide if they want to prioritize their financial situation or their reputation.

Mediation aims to make the parties control the solutions. The solution is thus chosen, not imposed by the court. This will be a cooperation of solution rather than a competition for gain, and creates possibilities of win-win-situations [20]. However, working with human interaction requires professional competency of several domains: communication, relation, conflict and mediation knowledge. We have seen how the four approaches can be applied within interpersonal conflicts of IT. Some of the approaches require a mediator in this context. One of the research questions was to explore the attitudes towards third parties, as these are seldom used in IT conflicts.

Interpersonal conflicts are caused by interdependencies, but a trend seems to be a requirement specification that is focused on specifics rather than the components that provide business value. As the product is intangible and possess innovative traits, the customer and supplier seem to have divergent expectations both to the project process and the finished product. Disagreement on scope is the most critical factor.

7.4 Interpersonal conflicts in large IT projects – a summary

The grid analysis showed that interpersonal conflicts are disentangled in the other four identified problem areas, as well as sometimes emerge as an isolated factor (when the personal chemistry was perceived to be the basis of the conflict). There also seemed to be a close connection between project management and organizational relations, and between contract and estimates. This aggregated view is summarized in figure 21. The horizontal line represents interpersonal conflict.
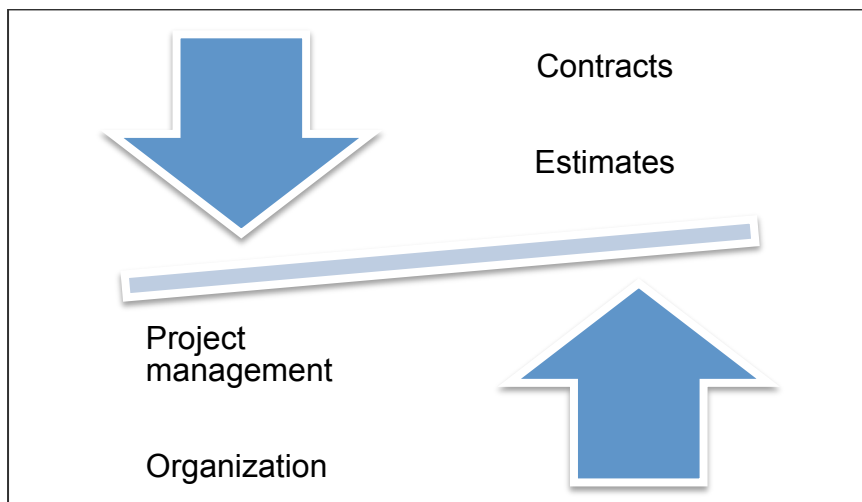
Figure 21 - Dependencies within the problem domains

I have chosen to refer to the two as the relational and the formal dimension.

7.4.1 Relation dimension – soft factors

This dimension consists of project management and organizational relation. The two aspects have in common that the interpersonal conflict seemed to manifest itself and become noticeable, which is supported by the empirical data, which point out that there often is bad

project management that leads to conflict. The conflict is seen as a process whereby interpersonal conflict and management style affect one another.

Within the relation dimension, there is also often pointed to a specific person among the decision makers of the other party that is the root cause of the interpersonal conflict, as this person is «difficult». It seems to be especially important to dare to initiate discussions with that person, and make sure that the communication is clear and open in order to mitigate a more extensive conflict. The interpersonal conflict was intensified when a «difficult» person attempted to renegotiate the contract, especially when the other party felt that the person did not possess that mandate.

The document analysis supports the focus on interpersonal skillsets. The Government expresses a need for IT professionals with interdisciplinary skillsets and good communication skills. This assumption was also mentioned by an interviewee: «we must focus more on facilitation of cooperation. We always manage the technical part one way or the other».

7.4.2 Formal dimension – hard factors

The formal dimension was given much weight and a larger focus by the interviewees than the other problem domains. The main problem areas of the formal dimension are the contract and the estimates. These two aspects were the two areas that most interviewees stated immediately to be the core issue of the conflict, although many changed their viewpoint after reflecting upon the issues and then pointed to process management instead.

The estimates seem to be a minefield of underlying issues related to interpersonal conflicts, which are perceived to emerge about halfway through the development phase. When estimates are believed to be wrong, the parties typically turn to the contract. The supplier's opinion is that the specifications are not sufficient, while the customer thinks that some requirements and dependencies are implicit. This conflict of opinion seems to be the trigger point of the interpersonal conflict, according to the interviewees.

The most significant shift in the relation between customer and supplier happens when the interaction between them breaks down. The breakdown is often a result of an emotional outburst during renegotiations. The conflict is pushed out of the case phase into the person

phase, and combined with the interactional breakdown; an enemy image manifests itself quickly. The discussion of the hard dimension showed that especially estimates and requirements, as well as contract interpretation, are likely to contribute to interpersonal conflicts. However, the discussion also outlined that project management and organizational relations are deeply intertwined in these problem domains, and it seems that the two dimensions feed off each other. About half of the interviewees stated that the interpersonal conflict affected their spare time.

7.4.3 Time range and changes

Large projects are vulnerable to technical progress and changing expectations while the project proceeds, which makes it even harder to integrate extensive functionality and ensure compatibility of systems and databases. The fact that the customers do not know what they actually want until the end often results in contract trouble. The specification is a starting point for the development process, and the deliveries will often not meet the *original* specifications. This must however be accepted to a certain degree, as the complexity of the project and the time range of such a projects must allow deviations from the original specification document. The final requirements of the project cannot be identified until late in the project process. The interviewees suggested, based on the qualitative analysis that there is not necessarily as much need for innovative thinking towards the technical solutions, as there is a need for more emphasis on innovation towards the process. Managing a new technology as well as managing a large project in order to utilize new technology seems to be unnecessarily difficult.

The time range and project management also affects the hard dimension. A customer provided an example where they found it difficult to remember or understand what they originally wanted out of the product: «what did we really mean in this text of the requirement specification? What did we want and what was it reasonable to believe that the supplier should have understood? Also settings attached to estimates. Could this and that really be *that* costly? It cannot be!»

7.4.4 Dependencies and roles

The responsibility of the delivery quality should lie there where the possibility of influence is biggest, and an unfortunate intervention from the customer can contribute to a dilution of the

responsibilities between the parties [32]. Both customer and supplier representatives among the interviewees stated that micromanagement initiated by the customer had an overall bad influence on the soft dimension as well as the interpersonal conflict itself.

However, when somebody gets a decision-maker role and does not possess a perceived sufficient interdisciplinary competence, it is difficult to fulfill this role, and the project starts to «live its own life». The project members will develop an informal role structure in addition to their formal roles in the project. In time, some members will begin to perform specific types of actions and interact with other members in a particular way [19]. In some instances, members may find themselves occupying several roles at the same time with the requirements of each role making demands on their time and abilities. If they feel that they have a mandate from their group or organization, they may impose decisions they are not in a position to take. Lack of proper management may force project members into defining roles of their own, which leads to an operational situation within the project characterized by frustration and imbalanced decisions.

7.5   Chapter summary

The analysis figures of chapter 6 show that the constructs *related to process - related to agreement* and *serious problem – livable conditions* are perceived the same way by the interviewees. The serious problems seem to emerge from project processes, which corresponds with their explanations. However, interpersonal issues are perceived differently. The personal aspects of the conflict are mostly related to project process. The result indicates that the management of the project is the most salient problem area perceived by the interviewees. This is supported by the questionnaire and document analysis. It is not sufficient to define clear delivery units, price, time schedule, risk distribution and acceptance criteria in order to make the project succeed. During the project execution the parties must collaborate closely, and this cooperation must be organized and regulated in a way that fits the chosen development model. The interpersonal conflicts thus have serious impacts on the project process and the lack of progress. Their negligence seems to be a consequence of being covered up as a case conflict, as people might seem to have difficulties to admit that they had collaboration problems. A conflict transformation platform must be short-term responsive and long-term strategic.

The empirical data and the discussion have shown that there is a need for emphasis on project process, and that IT projects have some unfortunate traits (like the uncertainty factors) that are difficult to do something with. However, we have also seen that the distribution of responsibility also contributes to conflicts, and strengthen the project members' prerequisites to collaborate rather than stressing routines, and that the common understanding of needs instead of requirements need to be specified better. It is likely that frequent communication helps to build trust and resolve differences, and help the developers to focus on solving the customers' problems, instead of wasting effort on developing functionality that is neither required nor correct [8]. Mediation does not necessarily need to be the opposite by a judicial approach. The argument for choosing a specific solution might be that it corresponds with current legislation [71].

This chapter has shown that the interpersonal conflicts become evident at a relatively late and critical point of the escalations. It has also been pointed out that the more complicated relation trouble, the harder it is to get a result through mediation. Some of the research questions were therefore concerned with what kind of preventive measures that could be implemented in system development projects.

8 Conclusion

This thesis has explored interpersonal conflicts in the customer-supplier relation in large IT projects. The intention of the thesis is contribute to an empirical base of data on how conflicts affect supplier and customer, by identifying how practitioners perceive conflict and what kind of possible solutions they outline. Such knowledge might simplify the conflict management, as well as provide insights of what kind of warnings that can indicate emerging conflict. Solving conflicts is rarely about who is right. We have seen that estimates and contracts, as well as project process and organizational relations are the factors of conflict as well as the areas of focus to avoid conflict.

8.1   Contributions

The starting point of identification of interpersonal conflicts has been the interviews of 13 practitioners using the repertory grid technique. The interview data were aggregated in an extensive analysis, which identified five problem areas. The problem areas were divided into two dimensions, which indicated that much of the problem lies in the project process and management, which is unnecessarily difficult due to the contracts as well as the innovative traits of the project, which is supported by the questionnaire. There is also an extensive need for interdisciplinarity within the field, which is supported by the document analysis.

The field of study is limited, and most aspects are still not very well covered and would benefit from further investigation. There is a need for defusing conflict escalation and including mediators as well as quality assurance. A possible solution could be to include such roles already in the initiation phase, and not cover up contract issues as case conflicts. A generally accepted conceptual framework for supporting and encouraging discussions and mutual quality assessments without quoting the contract will possibly destabilize tension. A mutual awareness and understanding of differences in perceived challenges is crucial for efficient problem solving, as well as accommodating the relation.

We have seen how a conflict might escalate within an IT context built on the staircase model. The model consists of a case-, person- and war phase. We have inspected where and what kind of intervention approach that could be suitable within the different phases.

We have also seen that there is a general skepticism towards third parties, and little knowledge of how mediation can be conducted.

8.2 Critical assessment

The thesis does not provide a practical anchoring for rating the approach methods, but provides a basis for further investigation. This study has been focusing on identifying the problems. A similar approach could be used to identify improvement actions by having a solution-directed, rather than problem-directed approach, for example in an Action research. More specific document sources, for instance change request logs and project reports from the project could add a new perspective to the study in order to interpret further what could be done to avoid emerging conflicts.

8.3 Future work

Complex IT projects are interactions of business, judicial and technical competence. When interpersonal conflicts have been established, three different aspects should be identified in order to choose how to approach it:

- *How far has the conflict escalated?*
  This point will determine if the parties will need to include an external mediator to restore the relation before doing anything else.
- *How long will the project last?*
  The time aspect is important due to the intervention options. Some of them are more time consuming than the others, and must be spent much resources on.
- *How interested are the parties in saving the relation?*
  Sometimes it is best to get out of the situation and share the loss equally as a last resort. Before this option is used, the parties must consider how this will impact their reputation, which can be difficult to restore.

Combining these three aspects in Action Research using both passive and active observation, perhaps rooted in systemic mediation will probably be a good starting point for future research. The answers to these three questions can help to point out a tendency of where the

parties are in the escalation process and what kind of mediation approach that will be suitable in that particular situation.

I will round off the thesis with an interviewee quote that I think summarize the issue of interpersonal conflicts in IT projects very well:

> *«It often takes very long time before somebody approaches the conflict. And then the conflict is only dragging out in time and makes everybody feel bad. I think if we had decided to solve the situation instead fighting over bad quality in deliveries, we probably would have invited them to our summer party…!»*

Bibliography

1.   Schreurs, N. *Refser dårlige it-systemer*. 2012; Available from:
        http://www.idg.no/computerworld/helse/article239934.ece.

2.   Ernes, A.K.B. *Flexus burde ikke vært iverksatt*. 2009 11.03.09; Available from:
        http://www.digi.no/807327/flexus-burde-ikke-vaert-iverksatt.

3.   Zachariassen, E. *Motorvegnregisteret vil koste over en milliard*. 2012; Available
        from: http://www.tu.no/it/2012/10/15/motorvognregisteret-vil-koste-over-en-milliard.

4.   Eggesvik, O. *Politifolk kan ikke se video på nettet med IKT-plattform til flere hundre
        millioner kroner*. 2012; Available from:
        http://www.aftenposten.no/digital/nyheter/Politifolk-kan-ikke-se-video-pa-nettet-
        med-IKT-plattform-til-flere-hundre-millioner-kroner-7012240.html - .UT8QfBk1f-k.

5.   Kjelland-Mørdre, K., et al., *Konflikt, mekling og rettsmekling*. 2008, Oslo:
        Universitetsforlaget. 328.

6.   Bygstad, B. and P.A. Nielsen, *Understanding and Managing Process Interaction in IS
        Development Projects*, in *Nordic Contributions in IS Research Third Scandinavian
        Conference on Information Systems*2012: Sigtuna, Sweden. p. 25-43.

7.   Barki, H. and J. Hartwick, *Interpersonal conflict and its managment in Information
        System Development.* MIS Quarterly, 2001. **25**(2): p. 195-228.

8.   Moløkken-Østvold, K. and K.M. Furulund, *The Relationship between Customer
        Collaboration and Software Project Overruns*, in *Agile 2007*, Melnik, Editor. 2007,
        IEEE. p. 72-83.

9.   Gurholt, G. and T.E. Hasle, *Grunnleggende Systemutvikling*. 2003, Oslo: Cappelen
        Akademisk Forlag.

10.   Hannay, J.E. and H.C. Benestad. *Perceived Productivity Threats in Large Agile
        Development Projects*. in *Symposium on Empirical Software Engineering and
        Measurement*. 2010. Bolzano-Bosen, Italy: ACM.

11.   Elstad, A.K. and A. Gustavsen, *En konflikts betydning for IS-suksess*, in *Information
        Systems* 2004, Høgskolen i Buskerud: Hønefoss.

12.   Larsen, R.P., *Konflikter og uenighet på arbeidsplassen*. 1999, Oslo: Cappelen
        Akademisk Forlag.

13.   Kaufmann, G. and A. Kaufmann, *Psykologi i organisasjon og ledelse*. 4 ed. 2009,
        Bergen: Fagbokforlaget.

14.   Einarsen, S. and H. Pedersen, *Håndtering av konflikter og trakassering i arbeidslivet*.
        2007, Oslo: Gyldendal Norsk Forlag AS.

15.   Haslebo, G., *Relationer i Organisationer - en verden til forskel*. 2004, Virum: Dansk
        Psykologisk Forlag.

16.   Burgess, G. and H. Burgess. *Dehumanization*. 1999 07.11.12]; Available from: http://www.colorado.edu/conflict/peace/problem/dehuman1.htm.

17.   Ekeland, T.J., *Konflikt og konfliktforståelse*. 2004, Oslo: Gyldendal Norsk Forlag.

18.   Lederach, J.P., *The Little Book of Conflict Transformation*. 2003, Intercourse, PA: Good Books.

19.   Forsyth, D.R., *Group Dynamics*. 6 ed. 2010, Wadsworth: Cengage.

20.   Nordhelle, G., *Mekling. Konfliktforståelse og konflikthåndtering*. 2006, Oslo: Gyldendal Akademisk.

21.   Nordhelle, G., *Manipulasjon - forståelse og håndtering*. 2009, Oslo: Gyldendal Akademisk.

22.   Vindeløv, V., *Konfliktmægling - en refleksiv modell*. 2 ed. 2008, København: Jurist- og Økonomiforbundets Forlag.

23.   Bush, R.A.B. and J.P. Folger, *The Promise of Mediation. The Transformative Approach to Conflict*. 2005, San Francisco: Jossey-Bass.

24.   Winslade, J. and G. Monk, *Narrative Mediation. A New Approach to Conflict Resolution*. 2001, San Francisco: Jossey-Bass.

25.   Fisher, R., W. Ury, and B. Patton, *Getting to Yes: Negotiating Agreement Without Giving In*. 3 ed. 2011, New York: Penguin Books.

26.   Menkel-Meadow, C., *Toward Another View of Legal Negotiation: The Structure of Problem Solving*. UCLA law review, 1984. **31**: p. 754-1247.

27.   Bateson, G., *Steps to an Ecology of Mind*. 2000, Chicago: University of Chicago Press.

28.   Schein, E., *Helping. How to offer, give and receive help*. 2009, San Francisco: Berrett-Koehler.

29.   Fox, M., *Working with systems and thinking systematically - disentangling the crossed wires*. Educational Psychology in Practice: theory, research and practice in educational psychology, 2009. **25**(3): p. 247-258.

30.   Grimstad, S., M. Jørgensen, and K. Moløkken-Østvold. *The Client's Impact on Effort Estimation Accuracy in Software Development Projects*. in *Software Metrics, 2005. 11th IEEE International Symposium*. 2005. Como, Italy: IEEE.

31.   Maciaszek, L.A., *Requirements Analysis and System Design*. 3 ed. 2007, Essex: Pearson Education Limited.

32.   Føyen, A., *Kontrakter for utvikling av programvare*. 2006, Oslo: Cappelen Akademisk Forlag.

33.   Torvund, O. *IT-kontrakter*. 2007; Available from:
        http://www.torvund.net/index.php?page=it_ktr_00.

34.   *Statens standardavtaler (SSA)*. 2013; Available from: http://www.difi.no/statens-
        standardavtaler-ssa.

35.   *IKT-Norge: Standardavtaler*. 2013; Available from: http://ikt-
        norge.no/standardavtaler/.

36.   *IT-kontraktstandarden PS2000*. 2012; Available from:
        http://www.dataforeningen.no/ps2000.134109.no.html.

37.   Difi, *Prosjektveiviseren*, 2013.

38.   Savolainen, P., J. Ahonen, and I. Richardson, *Software development project success
        and failure from the supplier's perspective: A systematic literature review.*
        International Journal of Project Management, 2012. **30**: p. 458-469.

39.   Moløkken-Østvold, K. and M. Jørgensen, *A Comparison of Software Projects
        Overruns - Flexible vs. Sequential Development Models.* IEEE Transactions on
        Software Engineering, 2005. **31**: p. 754-766.

40.   Silverman, D., *Doing Qualitative Research*. 4 ed. 2010, London: SAGE.

41.   Yin, R., *Case Study Research Design and Methods*. 4 ed. 2009, Thousand Oaks:
        SAGE.

42.   Myers, M.D., *Qualitative Research in Information Systems.* MIS Quarterly, 1997.
        21(2): p. 241-242.

43.   Guba, E. and Y.S. Lincoln, *Competing paradigms in qualitative research*, in
        Handbook of qualitative research, N.K. Denzin and Y.S. Lincoln, Editors. 1994,
        Sage: London. p. 105-117.

44.   Klein, H.K. and M.D. Myers, *A Set of Principles for Conducting and Evaluating
        Interpretive Field Studies in Information Systems.* MIS Quarterly, 1999. **23**(1): p. 67-
        94.

45.   Crang, M. and I. Cook, *Doing Ethnographies*. 2007, Thousand Oaks: SAGE
        Publications Inc.

46.   Duedahl, P. and M. Hviid Jacobsen, *Introduktion til dokumentanalyse*. Vol. 2. 2010,
        Odense: Syddansk Universitetsforlag. 156.

47.   Eikemo, T.A. and T.H. Clausen, *Kvantitativ analyse med SPSS: en praktisk innføring
        i kvantitative analyseteknikker*. 2007, Trondheim: Tapir Akademisk Forlag.

48.   Flyvbjerg, B., *Five Misunderstandings About Case Study Research.* Qualitative
        Inquiry, 2006. **12**(219).

49.   Tan, F. and G. Hunter, *The Repertory Grid Technique: A Method for the Study of
        Cognition in Information Systems.* MIS Quarterly, 2002. **26**(1 (Mar., 2002)): p. 39-57.

50. Edwards, H.M., S. McDonald, and S.M. Young, *The repertory grid technique: Its place in empirical software engineering research.* Information and Software Technology, 2009. **51**: p. 785-798.

51. Steward, V., A. Steward, and N. Fonda, *Business Applications of Repertory Grid.* 1981, London: McGraw-Hill.

52. Jankowicz, D., *The Easy Guide to Repertory Grids.* Vol. 1. 2004, West Sussex: John Wiley & Sons Ltd.

53. Alver, B.G. and Ø. Øyen, *Forskningsetikk i forskerhverdag: vurderinger og praksis.* 1997, Oslo: Tano Aschehoug.

54. Boyle, T., *Improving team performance using repertory grids.* Team Performance Management, 2005. **11**(5/6): p. 179-187.

55. Niu, N. and S. Easterbrook, *Analysis of Early Aspects in Requirements Goal Models: A Concept-Driven Approach*, in *Transactions on Aspect-Oriented Software Development III.* 2007, Springer: Berlin Heidelberg. p. 40-72.

56. Baddoo, N. and T. Hall, *Practitioner roles in software process improvement: an analysis using grid technique.* Software Process: Improvement and Practice, 2002. **7**(1): p. 17-31.

57. Hunter, G., *The use of RepGrids to gather interview data about information system analysts.* Info Systems Journal, 1997. **7**: p. 67-81.

58. Fransella, F., R. Bell, and D. Bannister, *A Manual for the Repertory Grid Technique* Vol. 2. 2004, Chichester: Wiley.

59. Marsden, D. and D. Littler, *Repertory grid technique - An interpretive research framework.* European Journal of Marketing, 2000. **34**(7): p. 816-834.

60. Steward, V. *The Repertory Grid Interview - Session Analysis.* 2006; Available from: http://www.enquirewithin.co.nz/HINTS/skills5.htm.

61. Honey, P., *The Repertory Grid in Action. How to use it to conduct an attitude survey.* Industrial and Commercial Training, 1979. **11**: p. 452-459.

62. Bell, R., *The Repertory Grid Technique*, in *The Essential Practictioner's Handbook of Personal Construct Psychology*, F. Fransella, Editor. 2005, Wiley: Chichester. p. 67-77.

63. Shaw, M., *RepGrid 5*, 2010, Centre for Person-Computer Studies: Calgary.

64. Neuendorf, K., *The Content Analysis Guidebook.* 2002, Thousand Oaks: SAGE.

65. Easterby-Smith, M., *The design, analysis and interpretation of repertory grids.* Int. J. Man-Machine Studies, 1980. **13**: p. 3-24.

66. *Digital agenda for Norge. IKT for vekst og verdiskaping*, 2013, Fornyings-, administrasjons- og kirkedepartementet.

67.   *IT i praksis*, 2013, Rambøll.

68.   *Strategi for IKT i offentlig sektor 2003-2005*, Arbeids- og administrasjonsdepartementet.

69.   Moløkken-Østvold, K., et al. *Management of Public Software Projects: Avoiding Overruns*. in *Hawaiian International Conference on Business*. 2005. Hawaii.

70.   Coombs, W.T., *Ongoing Crisis Communication: Planning, Managing and Responding*. 3 ed. 2012, Thousand Oaks: SAGE.

71.   Blandhol, S., *Meklingens filosofi*. Tidsskrift for Norsk Psykologforening, 2010. **47**(8): p. 689-691.

Appendix

Appendix A: Information sheet

Forespørsel om å delta i «Conflict Management in System Development»

I forbindelse med min mastergrad gjennomfører jeg et prosjekt om hvordan konflikter oppleves og håndteres for kunde og leverandør innen systemutvikling. Masteroppgaven er tilknyttet Institutt for Informatikk ved Universitetet i Oslo. Hensikten med prosjektet er å undersøke hvordan konflikter utspiller seg mellom disse aktørene. Målet er å bidra til økt forståelse av slike situasjoner, og hvordan de bør behandles.

Dette er en forespørsel om din deltagelse til dette prosjektet. Utvalget av respondenter er trukket av veileder Jo Hannay ved FFI, og denne forespørselen blir formidlet via han. Deltagelse i prosjektet innebærer at jeg ber deg delta i et intervju, som vil ta om lag en til en og en halv time. Det er helt frivillig å delta i prosjektet og du kan på hvilket som helst tidspunkt trekke deg, uten å måtte begrunne dette nærmere. Det er ingen andre enn min veileder og jeg som vil få tilgang til opplysningene du gir. De vil bli behandlet strengt konfidensielt.

Resultatet av studien vil bli publisert som gruppedata, uten at den enkelte kan gjenkjennes. Prosjektet forventes å være avsluttet 1. august 2013. Etter at prosjektet er avsluttet, vil opplysningene bli slettet. Anonymisert materiale fra prosjektet vil bli direkte sitert og/eller referert til publikasjonsøyemed.

Med vennlig hilsen

Lena C Lund Aronsen   **Jo Hannay (veileder)**
E-post: lenacar@ifi.uio.no   E-post: jo.hannay@ffi.no
Telefon: XXXXXXXX   Telefon: XXXXXXXX

Samtykkeerklæring

Jeg gir herved mitt samtykke til å delta i prosjektet om konflikthåndtering i systemutvikling. Kryssene i feltene nedenfor angir om jeg ønsker å være med på lydopptak, og om jeg ønsker å motta en oppsummering av mitt eget intervju.

Jeg godkjenner bruk av lydopptak:

JA   [ ]

NEI   [ ]

Jeg ønsker å lese gjennom oppsummeringen av mitt intervju før det brukes til forskning:

JA   [ ]

NEI   [ ]

JA, jeg har lest og forstått det ovenstående, og ønsker å delta i prosjektet:

……………………………………………………………………………………

DATO/STED   NAVN

Appendix B: Interview guide

Linear	• What, or who, started the conflict? Think of the situation when you became aware of the conflict situation. • Describe how critical this conflict is. • Who should have taken the first step to fix the situation?
Systemic	• What kind of measures could have been made in order to improve the long-term relationship? • Is the power relation between the parties somewhat balanced? • What would you do to prepare yourself and do differently if the situation had occurred five years time from now?
Narrative	• Can you give P a name? • Is there something in the conflict that you can identify as common for both parties? • What does the problem do to you and your work situation? How can this be managed in order to improve that?
Transformative	• How does P influence the other party? • Is there anything you would say that the other party has been right about the whole time? • What is the most acceptable outcome from your perspective? What do you think the other party think about that?
General level	• What do you think about involving third parties? • To what extent do you think the contract function as a tool for conflict resolution?

Appendix C: Distribution of ratings in the repertory grids

Contracts

Estimates

Interpersonal relations

Serious problem	3	5	4	4	4	4	5	5	2	1	Livable conditions
Related to agreement	3	4	4	4	5	5	5	5	5	5	Related to process
Case conflict	4	3	3	5	5	5	5	5	5	5	Personal conflict

100 90 80 70

100 90 80 70 60

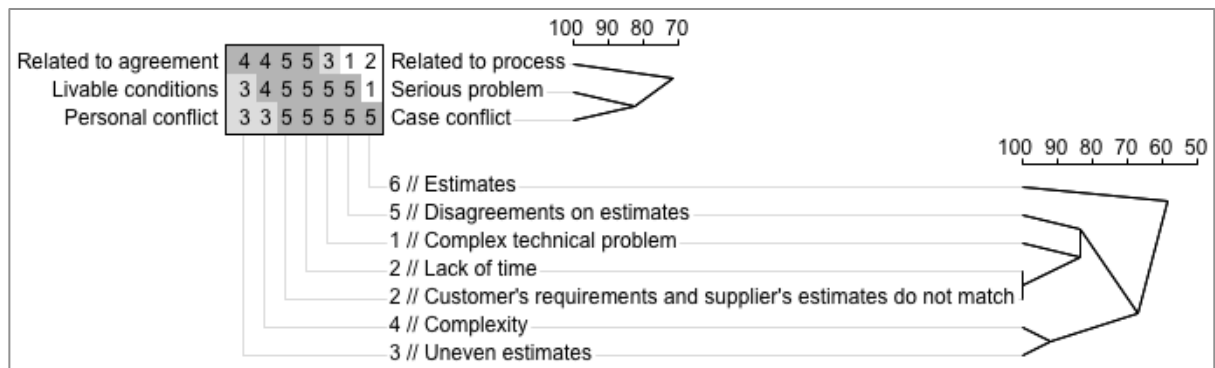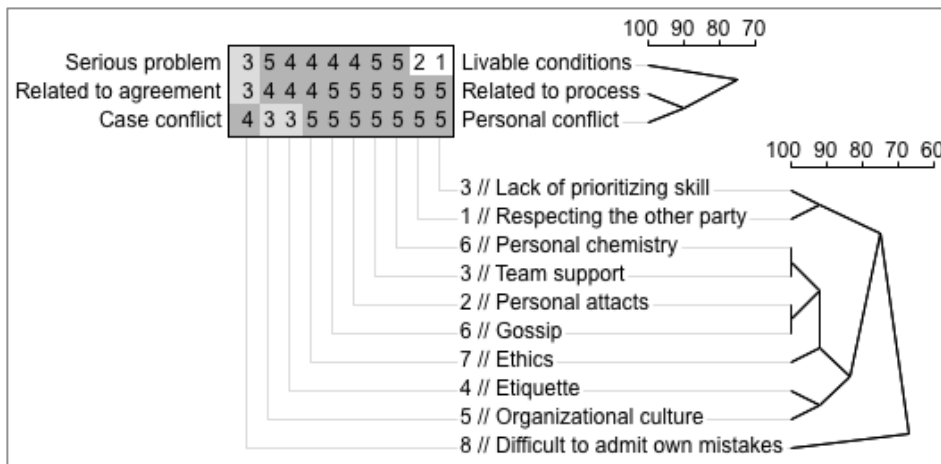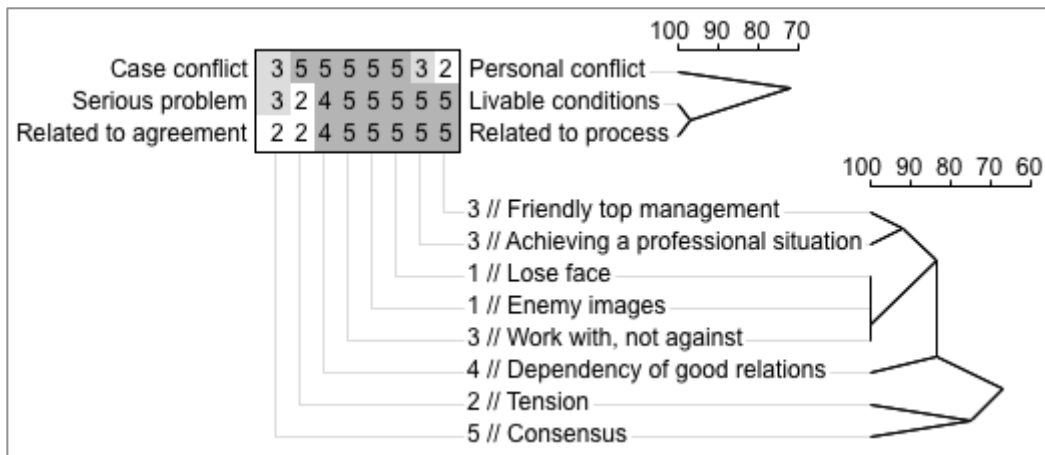3 // Lack of prioritizing skill
1 // Respecting the other party
6 // Personal chemistry
3 // Team support
2 // Personal attacts
6 // Gossip
7 // Ethics
4 // Etiquette
5 // Organizational culture
8 // Difficult to admit own mistakes

Organization

Case conflict	3	5	5	5	5	5	3	2	Personal conflict
Serious problem	3	2	4	5	5	5	5	5	Livable conditions
Related to agreement	2	2	4	5	5	5	5	5	Related to process

100 90 80 70

100 90 80 70 60

3 // Friendly top management
3 // Achieving a professional situation
1 // Lose face
1 // Enemy images
3 // Work with, not against
4 // Dependency of good relations
2 // Tension
5 // Consensus

Project management

Livable conditions	5	3	3	4	4	2	2	1	Serious problem
Related to agreement	5	3	4	3	4	3	3	3	Related to process
Personal conflict	3	2	3	3	5	5	4	4	Case conflict

100 90 80 70

100 90 80 70 60 50

3 // Matrix organization structure
2 // Escalation points
5 // The project's establishment phase
1 // HR management
6 // Project ownership
4 // Close follow-up by the customer
6 // Management of non-functional requirements
1 // Project management