TAMPEREEN TEKNILLINEN YLIOPISTO
TAMPERE UNIVERSITY OF TECHNOLOGY

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Differences in Organizational Cultures – A Challenge for IT Projects

Julkaisu 1105 • Publication 1105

Tampere 2013

Tampereen teknillinen yliopisto. Julkaisu 1105
Tampere University of Technology. Publication 1105

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Thesis for the degree of Doctor of Science in Technology to be presented with due permission for public examination and criticism in Auditorium 125, at Tampere University of Technology, Pori, on the 11th of January 2013, at 12 noon.

Tampereen teknillinen yliopisto - Tampere University of Technology
Tampere 2013

ISBN 978-952-15-2968-9 (printed)
ISBN 978-952-15-3004-3 (PDF)
ISSN 1459-2045

ABSTRACT

An organization is a system of activities that consists of two or more persons, organizations or both. It has certain goals it is aiming to achieve. An organization is continuously and in most cases consciously coordinated by an officially nominated or informally selected leader, and the organization itself can be legally constituted or informal. The cooperative nature of an organization means that the survival of the organization is dependent on both the willingness and the ability of its members to cooperate and communicate. An organization may be born of "itself" if two potential members find it useful to cooperate, or it can be established by a certain founder or founders.

An organization is a small society with its own particular culture that affects the behavior of the members. This inherent value system, known as the organizational culture, can be designed for a certain purpose or it may have arisen unconsciously. The visible signs of an organizational culture include organizational design, dress codes, graphic layouts, or status symbols. The invisible side of organizational culture consists of values and beliefs to which the members of an organization conform, often unconscious of the impacts of this commitment. This invisible part of culture gives a form to the visible (or audible) manifestations of organizational culture. The organizational culture of companies is often called business culture.

Five different studies were conducted to approach the impact of differences in business cultures between customer and supplier on the success of an IT project: a literature review, case study, complementary study to the case study, Delphi-based study for experienced experts, and an open survey for grassroots users. The results of each study were consistent with each other and proved that differing organizational cultures must be taken into account when setting, planning and managing an IT project. The impacts of differences can be both positive and negative. Special attention should be paid to those differences and organizational characteristics that have been experienced as having mostly negative affects. These characteristics were

- The lack of a common language
- The lack of managerial support and commitment to the project
- Differences in the parties' organizational structures
- Substantial differences in the size, ownership, and corporate form of the parties.

A list of questions to be asked and activities to take part in was produced during the Delphi process in order to find out if there were differences that should be paid more attention to during the different phases of project.

According to the case study, differences in the size and structure of the organization, different juridical forms or form of ownership and differences in corporate relationships or in styles of using power have their impacts on co-operation. The unexpected finding that dividing tasks according to gender might be a risk factor highlighted a need to study the equality policy and situation in firms included in the case study. In this complementary study, a weak correlation between an organization's official equality policy and the success of an IT project was found.

In addition to the themes named above, the Delphi-based survey conducted in 2010 highlighted two other themes: differences in understanding time, and the importance of a common language. An open survey, conducted in 2011 among the end users and grass-root workers involved in IT projects, confirmed the earlier findings and highlighted the importance of prompt and understandable communication, management's involvement in the project, respect of common goals and timetables, and a clear and transparent hierarchy and command chain on both sides.

ACKNOWLEDGEMENTS

There are many people without whom this study would not have been possible. There are more people who have helped me in this research. And there are even more people who have had a great impact on experiences and thoughts I have had during the last thirty years. To mention some of them in this acknowledgements chapter does not mean that those whose names are not mentioned were somehow worthless or that their contributions to this work were less significant. However, there are some persons who represent the certain turning points and crossroads on the way to defending this thesis.

First of all I give my thanks to those six CEOs, who I have had the privilege to work with during the past 30 years, and who have given me many ideas and thoughts about leadership and business: Jouko Kuisma, Martin Glader, Christian Doepel, Tom and Stefan Brandt and Timo Prihti. I have spent many memorable moments with each of you. Each of your business and leadership philosophy differed from the others' and each company and corporation had a different operating culture. Furthermore, Mr Timo Prihti made all this possible by letting me study in conjunction with my work and finally granting me study leave.

Secondly I have the pleasure to thank my colleagues and co-operators, all the people who during the years have discussed projects with me and inspired me with ideas. To name a few: Mr Ari Hagfors, both Antti Virtanens, Mr Pekka Seppänen, Mrs Ritva Ravanti and Mr Jan Haglund. I miss our conversations. Sometimes we were out in space, sometimes we found ourselves deep underground, but in every case we achieved the goal!

The third group to be given a special mention are my teachers at Tampere University of Technology: Prof. Hannu Jaakkola, Prof. Pekka Loula, and lecturers Harri Keto, Timo Mäkinen, Jari Palomäki and Timo Varkoi.

The reviewers, Prof. Miklos Biro and Prof. Mikko Ruohonen gave valuable hints and comments enabling the improvement of the thesis to its best, and Mike and Sue from the language office Pelc helped me to fine-tune the language.

The last but even more important group of back-office and support team is made up of my family and friends. My wife who always remembers to say that this project was sold to her with the sentence "at most one weekend per month, sometimes less often…". My parents, who have always stood behind me, sometimes even too close… And all those friends and relatives who have wondered: "Will you ever know what you are going to be when you grow up?"

The answer I will give you now is: Maybe, sometime, but meanwhile: Thanks to all of you for walking by me.

This work has been financially supported by the following foundations: The Finnish Cultural Foundation, the Satakunta Regional Fund of the Finnish Cultural Foundation, the Foundation for Economic Education, the Ulla Tuominen Foundation, the Satakunta University Foundation, and the High Technology Foundation of Satakunta.

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ABBREVIATIONS

BTB	Business to business
CAD	Computer aided design
CAM	Computer aided manufacturing
CMM	Capability maturity model
ERP system	Enterprise resource planning system
IT project	Information Technology project
PBO	Project-based organization
PMM	Project Maturity Management
PMMM	Project Maturity Management Model
POO	Project-oriented organization
SPICE	Software process improvement
SQL	Standard for database and query language

DEFINITIONS

Agile methods	Light, self-modifying methods for lean and agile software engineering
Macrocultural	In this thesis, the term macrocultural is used to describe that the ethnic, religious and /or national culture of the people or organizations is the same, e.g. they live in or come from the same macrocultural area
Groupware	Software that enables workgroups to work and communicate together regardless of where they are located, e.g. Lotus Notes, Novell Groupwise and Microsoft SharePoint

PREFACE

What does a native of Pori say when he sees an old good friend after many years?

- Oh, are you still alive?

And the other answers:

- You seem to be lingering here too, don't you.

That is all.

Or maybe not. After ten years, if they meet again, the same discussion will be repeated. No more is needed to let a native of Pori to know that he is important, he was noticed by someone else from Pori. But go and say the same to someone in another part of Finland, as my father did after I had told the tale to him. That poor old man whom my father greeted with those magical words got very angry. "Do you really wish that I was not alive" was his bitter answer.

The whole new style of dialect described above, let us call it just downplaying, was not the only cultural difference I had to get accustomed to when I moved to Pori on the waves of Millennium. And all those odd (Hofstede & Hofstede, 2005) local habits in business and work as well as in social life I wondered about but my colleagues seemed to take as natural as sunrise and dawn eventually opened my eyes as time passed by.

As a newcomer in those small local circles I also found myself left without any social contacts outside work and family, and this not only made it easy for me but even inspired me to continue with the IT studies I had given up in the early 1980s when I entered employment. During those early years of Information Technology, the programming languages were an important part of the discipline. We studied many different languages like Pascal, Cobol, Fortran, and SQL. The only one of these I met in my later studies was SQL. The new programming philosophy with objects, graphic user interfaces (GUI) and graphic programming environments was taught in Java. The idea was that languages come and go. Instead of languages the major weight in professional disciplines was on processes and methods like Agile methods, SPICE, CMM and so on.

It was at the very beginning – perhaps at least partly due to my first degree in Business Administration at the beginning of the 1980s and my experiences in several projects – when I found that in all of those fine and useful methods there seemed to be something missing, but I just did not know what. I had a feeling but I was unable to describe it.

I studied and worked at the same time. At work, at the end of 2000 we started a project to replace an ERP system that was over 12 years old with a new one. The criteria in the selection procedure were set on a functional and technical basis. Three candidates met most of them. The price eliminated one of the three, and there we were: We had to choose between two candidates, one who had their office, sales, production and support in Helsinki, 300 kilometers away from us, and the second, located 300 meters from our headquarters. Those who had lived 12 years with a system supplied and supported from Helsinki wanted no more of this kind of support model and capital-centered culture. We all placed our trust in the fact that people living in the same town would understand each other better.

The project turned out longer and harder than any of us had imagined (Lilja, 2006). It went in a completely different way than all the other over twenty projects I had been involved with during the past 20 years. But it – as said above – finally opened my eyes. As well as cultural differences between nations and ethnic groups (Hofstede & Hofstede, 2005), between districts inside a country or between families representing different classes (Järvinen & Kolbe, 2007), there are also cultural differences between different companies (Lilja & Jaakkola, 2010), even though they are from the same town. And this cultural aspect was almost completely forgotten from methods and models like Agile methods, life cycle models like Waterfall, or models like SPICE and CMM. As a matter of fact, the whole relationship and interaction between customer and supplier was what I had missed – and what was largely missing - from models that were designed for improving software engineering. The aspect of these models is on software engineering rather than on supplying and implementing software for customers and cooperating with them.

In the human world, there is always a need for social competency and the capability to understand different cultures. This soft knowledge will be highlighted if the software we are developing is unique and tailored just for one customer or business or if there is something else in the product, service, or customer's business that requires the capability for customer and supplier to communicate and co-operate with each other. In spite of the importance of these social and human factors like business culture or organizational culture, they have been conspicuous by their absence from the top topics of discussion.

The next chapters will present one of those rarely used ways to approach IT projects in more detail: Studying the organizational and cultural differences between supplier and customer. Conducting this study has been a learning process in both personal and occupational meaning. The process also highlighted the fact that the success of an IT project is a complicated sum of technical, contractual, managerial, and organizational issues.

1 INTRODUCTION

The focus of this thesis is not on models or methods but on the cultural differences between customer and supplier and the impact of these differences on a common project and possibilities of anticipating features that might cause problems during the co-operation. The failures of IT projects have caused enormous losses during the past decades. Nobody knows the exact sums but it has been estimated that in the US alone failed projects cost firms more than 78 billion US dollars per year (Levinson, 2001). It has also been estimated that in most failed IT projects an organizational, cultural, or other socio-technical attribute can be found that has been at least partially involved with the failure. However, these soft factors have not been researched very much as the main interest has been directed to technical and contractual issues as well as software engineering methodology, including process improvement (Patnayakuni & Ruppel, 2010).

The title of this thesis "a challenge for IT projects" might equally well have been "a challenge for ERP projects." In the literature both terms are used partly as parallel terms, partly as structures where an IT project may include an implementation of ERP, and sometimes even synonyms. Normally among ERP projects, there are only a few projects that could be called "purely ERP projects," due to the fact that most projects also include other IT elements like networks, infrastructure, and communications. In this thesis, the focus is on cultural differences between customer and supplier, and on the problems these differences may cause to a common project, not only when implementing ERP but also when implementing CRM, CAD, CAM or new groupware, communicating system or IT infrastructure. Thus cultural differences might be challenging in terms of IT projects.

In the next chapters there will first be a brief overview of the reasons why we should be interested in cultural differences as the success factors of an IT project. At the beginning, there will be a more detailed description of the kinds of issues that actually opened the author's eyes. After this motivation, the hypothesis will be presented and the assumptions and decisions made during the process will be described. I will also discuss the location of this study within the disciplines and give a summary of the methods used in the research. Chapter three presents a literature review and the findings of the review concerning fundamental concepts and a state-of -the-art approach towards cultural differences in general and especially in relationships between customer and supplier located in the same ethnic or national cultural area. In relation to this, there is a discussion of the general definitions of organization and organizational culture, assessing and classifying organizational culture, and relations between culture, project and information systems research. In addition to these basic concepts there will be a brief review of the state of the art before the presentation of each study and its results. This form was chosen to highlight the particular issues of each part of the research.

Chapter four will briefly present the case study (Lilja, 2006), which gave a kick-start to the whole process, and its findings. Among those results there was an unexpected and confusing finding that differences in equality policies and masculine or feminine attitudes of participants might indicate the success of a project. In chapter five, a complementary study will be presented, which was conducted to give further information concerning the unexpected finding of the case study. This complementary study was published in PICMET 2011 (Lilja & Jaakkola, 2011). The finding of the case study was so unexpected and alarming that an attempt was considered necessary in order to find more information about the issue and whether it could be confirmed or rejected by checking official sources. Although the main question of this part remained unclear – the results neither confirmed nor rejected the impacts of official equality policies – the results and the discussion around the gender and equality issues in the literature highlighted the importance of gender as a part of organization culture. Furthermore, one of the dimensions Hofstede recognized as impacting an individual's behavior in all ethnic cultures was the masculinity – femininity dimension (Hofstede & Hofstede, 2005). It is good to bear in mind that in this context the term "gender" should not be understood in the biological but the psychological meaning.

Chapter six covers a Delphi-based study that collected the experiences of seasoned experts concerning cultural differences and the impacts of these differences in IT projects. Chapter seven presents an open survey that collected the experiences of grass-root level users involved in IT projects.

In chapter eight, the conclusions section, all these studies will be tied together, and we will learn that the differing business culture has its impacts. The kind of partner we will work with is not insignificant. The common validity and reliability of the series of research studies included in this thesis is also discussed, and finally a list of questions and checklist of issues will be presented that should be taken into account before any contract is signed.
Figure 1 presents the structure of this thesis.

Although this thesis has been written in form of a monograph, it includes some of the text from publications that have been written and published during the research. The publications, their titles, forums where they have been presented, and the author's contribution to the publications will be presented in Table 1.

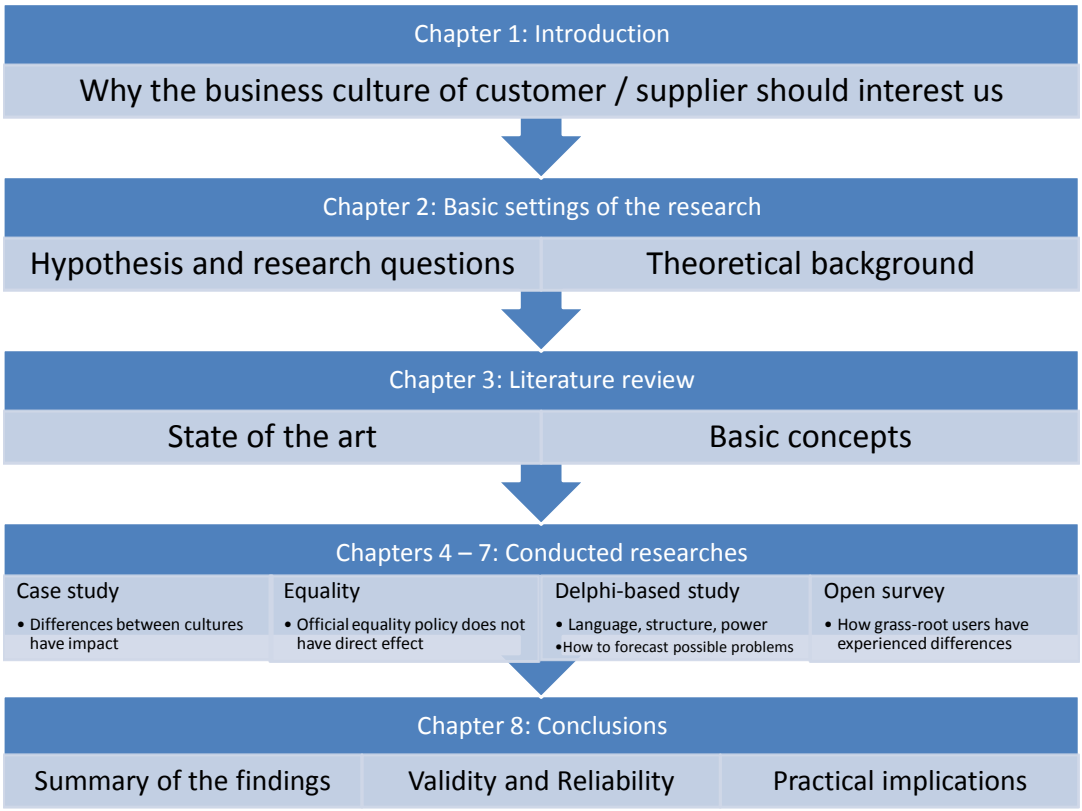

Figure 1: The structure of the thesis

Table 1: Publications connected to this thesis

Nr	Title	Forum	Review process	Author's contribution	Chapter
1.	The differences between the supplier's and the customer's business cultures and their impact on the result of an IT project (Lilja & Jaakkola, 2010)	Technology Management for Global Economic Growth (PICMET), 2010	Review in two phases: Abstracts and papers	The paper presents the case study conducted by the author in 2005 - 2006.	4
2.	The differences between the supplier's and the customer's equality policies and their impact on the result of an IT project (Lilja & Jaakkola, 2011)	Technology Management for Global Economic Growth (PICMET), 2011	Review in two phases: Abstracts and papers	Reports author's own research, complemented the findings of the case study	5
3.	Using the Delphi Method (Lilja, et al., 2011a)	Technology Management for Global Economic Growth (PICMET), 2011	Review in two phases: Abstracts and papers	Presents experiences from two different Delphi variations. One of these was used by the author when conducting the main research of this thesis	6
4.	The Importance of a Common Language in the Requirements Defining Process (Lilja, et al., 2011b)	Technology Management for Global Economic Growth (PICMET), 2011	Review in two phases: Abstracts and papers	Presents findings of two pieces of research concerning the need for a common language. One formed the main research of this thesis.	6
5.	Using Google Scholar as a tool for literature review in software engineering (Lilja & Palomäki, 2012)	Technology Management for Global Economic Growth (PICMET), 2012	Review in two phases: Abstracts and papers	Presents the methods and tools used in the literature review part of this thesis	3
6.	The use of power: Differences between supplier and customer and the impact on the results of an IT Project (Lilja & Linden, 2012a)	Technology Management for Global Economic Growth (PICMET), 2012	Review in two phases: Abstracts and papers	Presents findings of two pieces of research concerning the use of power in different organizations. One formed the main research of this thesis.	6
7.	The impacts of the formal structure of customer and supplier on the outcome of an IT project (Lilja & Linden, 2012b)	Technology Management for Global Economic Growth (PICMET), 2012	Review in two phases: Abstracts and papers	Presents findings of two pieces of research concerning the impacts of the organization's structure. One formed the main research of this thesis.	6

1.1 WHY BOTHER ABOUT YOUR OWN OR SOMEONE ELSE'S BUSINESS CULTURE?

Lesson from practice: *It is early morning at Tampere in the office of a medium-sized IT company in the early 1980s. The agreement on the purchase of a new ERP system was signed last week and now the project groups of both supplier and customer should meet and start the project. Two groups of people are sitting opposite each other at the table. The customer assumes that they are waiting for someone but whom? There are no more empty places around the table. Suddenly the door opens and a huge dark-haired man enters carrying jugs of coffee and tea.*

" Good morning to you all" he says. "I am the CEO of this firm and because I know nothing about information technology or the software we just have sold to you I came here to make and serve you some coffee and tea." As he served the drinks, he presented each person involved in the project as well as the company's background and products, as well as the good and bad habits and routines they usually followed during projects. And he did all this with good humor.

After that we presented ourselves and told the suppliers about our background, company, products. We said much more than we would have without the good atmosphere which that bear of a man had created in the room. The results of that meeting were much better than we had expected. And most important of all, we saw that even if we were operating in quite different branches, we had something in common: namely the same type of leadership style and the same attitude to work and people.

It is difficult to imagine that such results would have been achieved if before the meeting someone had run through the corridors shouting and looking for a female clerk whose turn it was to make coffee, as happened some years later in another project.

A company has many sides. Legally, it is a juridical person with its own duties and rights, privileges and responsibilities. A company also has its own rules that it should follow as far as they do not break the law. Financially, it can be seen as a joint venture of those who have money and those who have a business idea. Sometimes these two participants might be one and the same person or persons. But in addition to these bureaucratic sides of the company, it has an image, a façade that conveys messages to people both inside and outside the firm about the values and customs of the organization. The image of the company might be given by one strong and powerful person, as it was in the example above, but in most cases it is a collage of key persons, their beliefs and traditions, bravery and fears, ambitions and frustrations combined with tacit knowledge, written and unwritten rules and traditions of the organization and surrounding society. This jigsaw puzzle forms the way in which the company works. One definition for business culture according to the book "Exploring corporate strategy" (Johnson & Scholes, 1988, p. 38) is "the way we do things around here."

We meet concrete examples of these business cultures all the time in our daily life. If we are taken blindfold to some supermarket we know immediately after opening our eyes where we are or at least to which chain this supermarket belongs. We might know that in certain boutiques we must wear a certain style to get service at all, and in others we need to chase away the sales persons if we want just to have a look around. And of course there are shops where we have to hunt for personnel if we would like to buy something.

Lesson from practice: *In 1989 I was involved in the search for an IT system for a new company formed around a very special branch. We had found a technology supplier whose solution matched our needs, we had also found an ERP solution we believed to be suitable for the new company, and the only question was who would be the contractor with total responsibility for the project. We visited the references with and without the candidates, and on one of these visits, arranged by one of the biggest IT vendors in Finland, we were taken to a machinery company where they had supplied both the infrastructure and programs. The presentation given by the technology manager and project manager of that company was quite unique among the long list of references. They started by praising the software and machines but the supplier and especially its project manager (who was with us) and the project team did not get a good word. They were said to be lazy, incapable and not at the level of knowledge required for that kind of task. On the return back to our office our hosts were very quiet.*

In business-to-business marketing, the features of the culture that are most easily seen are the quality of products and services, the punctuality of deliveries and payments, the handling of claims and requests, and the dress code. It is very easy to understand that if we receive components under all quality standards or if we receive some important spare part two weeks later than agreed and claims are never answered, the cost caused by the supplier's unacceptable business culture might be very high, even if some compensation is received. And if we as a supplier have to wait for settlement for months after the due date or if the money does not come at all, we have lost not only computational costs but also real money. These examples are as well known in the business world as the other extreme: Goods with high quality are delivered as agreed, claims are handled accurately, and settlements made on time. But sometimes, even if both the customer and supplier represent the latter type of business culture, they do not necessarily understand each other; the language and terminology may be strange or critical parts of the business logic are not understood in the same way. Although quality and punctuality are desirable virtues in all cultures, their interpretation may vary in different cultures and an agreement may be interpreted in different ways or the common project may not be as high a priority on both sides. The consequences in such cases may be extra work, claims, trials, and a break in co-operation. All these results have significant cost effects to both parties.

Lessons from practice: *In bank statements in other European countries, accounts are normally presented as seen from the bank's side. The money on the account is presented as*

a debt to the customer (-); the negative balance on bank account is presented as a receivable from the customer (+). In Finland, however, the statements are normally presented from the customer's point of view: the money on the account is the customer's money (+) and the negative balance is the customer's debt to the bank (-). When a foreign bank implemented their own system in their new Finnish subsidiary some years ago, they forgot this among the many other things. Naturally, the bank's customers were shocked.

The lack of a common language has proved to be one of the biggest cultural problems in IT projects, beginning from the tendering/offering process and continuing through the whole project life cycle (Lilja, et al., 2011b). This is mostly due to the fact that both customer and supplier are specialists of their branches but have not necessarily any or only little knowledge of the opposite partner's business. The same problem arises with strange terminology. Both the customer and supplier may use in its operational communication terminology that is common in their branch but is not used at all or is used in different meanings in other branches (Lilja, et al., 2011b). And furthermore, some of participants may use terminology that is used only by them. The understanding of the customer's business logic is important for everyone who engineers, manufactures or delivers instruments, tools or other equipments to be used in the customer's business. IT products like programs, computers, or communication services also belong to this category. Bigger systems are commonly implemented on a project basis. The success of the project requires that each participant has the same opinion on what has actually been agreed or what is the priority of this project.

So, if these questions have a key role in every IT project, why has there been such little discussion of them? In every company each person sees the problem through the context of his/her knowledge, education and experience. Lawyers see the question in two parts: What has been agreed and who has not fulfilled the agreement. The financial department for its part might ask the lawyers: Who pays? The engineer asks: What is the problem? Then he checks the requirements and answers: It was not in your specifications. An alternative answer might be: It was described in that way in the requirements and that is how we did it…

Heard in the practice: "*I hate that damn firm. I will never again have any co-operation with them. I am completely tired of their way of doing things, as if they were forbidden to use their own brains… "*

The impact of the business culture is always bidirectional both inside and outside the organizational border. Not only do people inside the border give small parts of their personal values and attitudes to the common organization culture but they also adapt those habits and ways of doing things they believe to be good for them. Unfortunately these habits are not necessarily the official ones but part of the tacit knowledge and subculture. The subcultures whose impact on business culture is significant are, for example occupational and labor union cultures. On the other hand, people outside the

organization might see certain features of the organization as either so attractive that they begin to behave in the same way themselves or so disgusting that they become aggressive when meeting such features. The way the customer's or supplier's personnel feels the visible or otherwise perceptible features of a partner's business culture has an impact on their attitudes to the partner and the common project.

There are also various organizational and cultural features that are associated with structures rather than directly with human behavior. These are the size, structure, height, and width of an organization. It is easy to imagine that if we put a huge worldwide corporation and a small firm with ten employees on opposite sides of the table in a project, there will be one who dominates and the other who squeaks. It is safe to assume that organizations with different structures will have difficulties understanding each other's decision making and leadership. A company with a low hierarchical organization structure with short and direct command paths may find it very hard to understand why a corporation with several divisions and multiple command paths needs weeks to handle a case that took a mere five minutes for them.

Lesson from practice

In one project we found it very difficult at the moment problems arose to get in touch with the support staff nominated to be responsible for our case. At first we thought that they must be busy, later we imagined that they just did not care about us and became more and more angry and skeptical, which in turn did not enable a good conversation atmosphere between us and them. The truth was, however, that at this supplier one person might belong to three different organizations: To the project organization with projects they were responsible for, to the process organization where they might have duties for product development, supporting and testing teams, and also to the hierarchical base organization where their primary superior tried to employ them in sales. Three positions, three superiors, but just one employee!

There are organizational structures and features that impact direct on the capability of a company's own personnel to take care of the projects they are responsible for. One of these is the hybrid organization structure, which means that the same organization is structured in two or more different ways. This poses several challenges to an individual member of staff who might have two or more superiors, many responsibilities, all with high priority and no one to delegate the tasks to. In such organizations there might be a bigger turnover of employees, more sick leave, trouble when recruiting new people, and so on. In projects it means that the opposite party very soon notices that there is something wrong with the project but they are not necessarily aware of the reason. In such a case, it is very easy to think that some individual person does not care about our project and insist on changing him/her.

After having encountered various situations like those described above, I began to see some relationships between the situations and the companies behind them. What if the reason for success and failure, delight and trouble in certain projects lies not in the individuals but in the organization? What if certain organizational cultures or features in them just do not match each other?

There has been research on international and ethnic cultural differences and their impacts on international co-operation, as well between different companies in terms of companies, divisions, and departments belonging to the same corporation. This research has been motivated by export and import, manufacturing in countries with lower costs and later by trends like outsourcing manufacturing to subcontractors. However, there have been only a few studies concerning cultural differences in companies operating in the same cultural area and the impacts of these differences on co-operation, particularly between the customer and supplier of an IT project.

The present research was inspired by 25 years of experiences, some of them described above, and motivated by a desire to understand better the complicated ecosystem formed by a customer and supplier involved in the same project, with employees of both organizations, owners, leaders, managers, financial partners and other stakeholders.

This chapter described some of the observations and experiences that were the prime movers behind the questions this thesis is trying to find an answer to. The next chapter will present the questions and give a brief description of the methods used and assumptions and decisions made during the process.

2 HYPOTHESIS, RESEARCH QUESTIONS AND LOCATION OF THE RESEARCH IN THE FIELD OF DISCIPLINES

This chapter presents the hypothesis behind the research, the research questions, and the location of the research in the field of disciplines. There will also be a short description of the limitations and assumptions that occurred and/or were made before and during the research as well as those caused by the selected methods and decisions made. Also, the reasons for the decisions and selections will be discussed although the methods will be presented in later chapters.

2.1 HYPOTHESIS AND RESEARCH QUESTIONS

One of the first researchers approaching the impacts of different cultural backgrounds on ways to do business and co-operate with other units inside and outside the organization was Geert Hofstede, who studied the companies and partners of the worldwide technology corporation IBM. Hofstede created a theory about cultural distance which explains differences in behavior (Hofstede & Hofstede, 2005). Richard D. Lewis was inspired by Hofstede's earlier studies and created a Cultural Types Model that classifies different cultures according to three archetypes. In Lewis' model each culture is a combination of these three archetypes. This combination defines a common way to act in each culture (Lewis, 2006).

Although the works of Hofstede and Lewis may at first sight seem to cover the same issues, the ways to approach the cultural problem and the points of view differ from each other. Whereas Hofstede highlights the distance of each national and ethnic culture from the other and explains the behavior of an individual via these distances, Lewis takes more notice of different ways to act in different cultures (Figure 2).

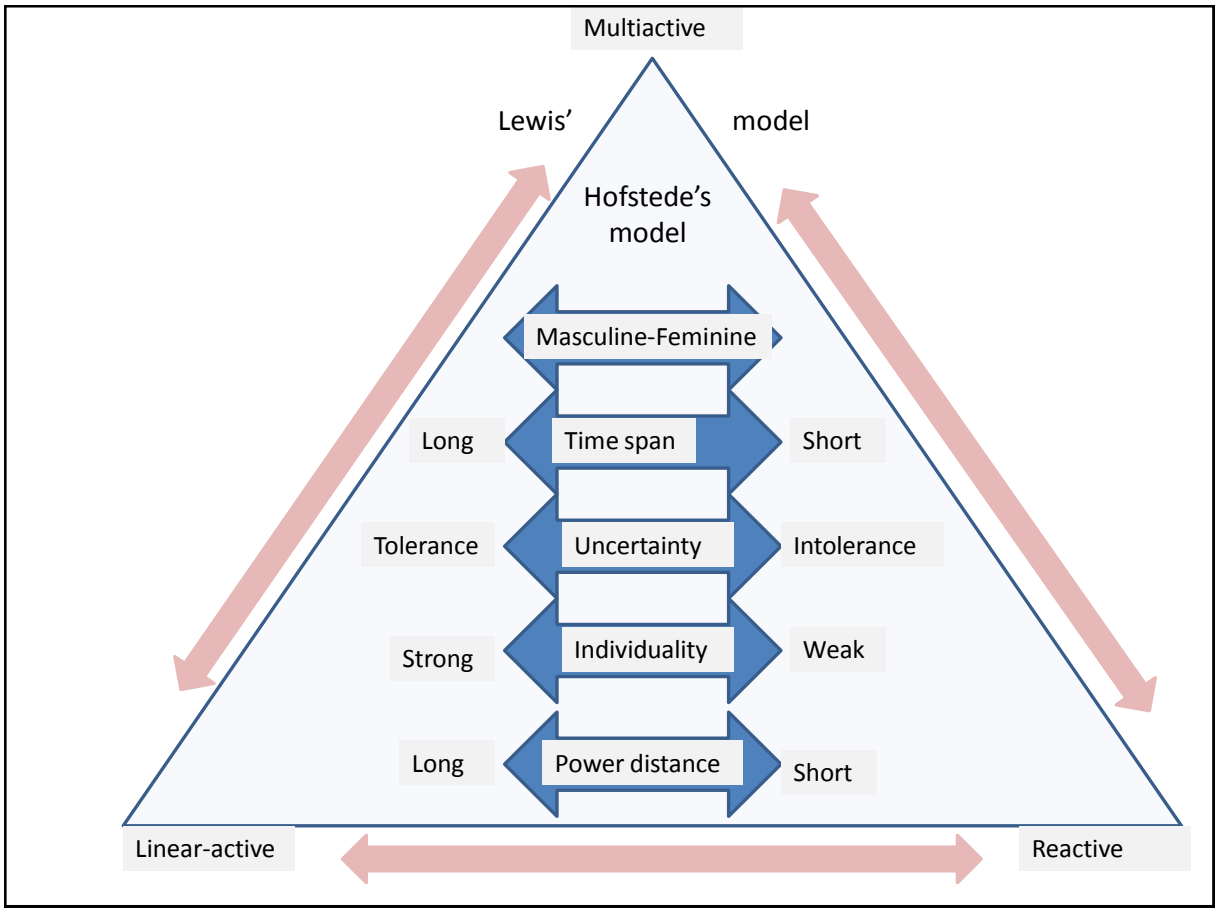

Figure 2: Lewis' (outer triangle) and Hofstede's models of cultural differences

It is worth noting that both Hofstede and Lewis approach macrocultural differences and pay only little - if any – attention to cultural differences between two organizations having the same macrocultural background. The logical question to be set after this note is: Could the same phenomena and rules – or something like them – be found from the interaction of two organizations with the same macrocultural background?

The hypothesis which this research is testing is based on the experiences gained while working in different IT projects within the past 25 years: Not only technical and contractual aspects but also cultural differences between different companies and other organizations involved in an IT project must be taken into account when planning, preparing and negotiating a project. The research hypothesis assumes that there are always cultural differences in business cultures between two companies, even though they originate from the same macrocultural area, which impact in either a positive or negative way on co-operation and via this on the success of an ongoing IT project.

The main research question in this research is:

> Are there such kinds of cultural differences between firms originating from the same macrocultural area that could endanger the success of an ongoing IT project, where one firm is the supplier of the system and the other is the customer?

The sub-questions derived from the main question were: According to the opinions and experiences of the experts as well as the ordinary people involved in the projects

1. What kinds of differences in the culture of the opposite partners might cause a risk to the project?
2. Could these risky characteristics be seen in advance? and
3. Is it possible to create a brief set of questions that could indicate the risks and help open the discussion between the participants of a project?

In this thesis the focus is on the impact of different business cultures on the co-operation between supplier and customer in IT projects, and particularly in ERP implementations. This means that we need to pay attention not only to issues concerning software engineering but also to topics such as:

> Business cultures of different organizations co-operating in the same project when at least one of them is operating on a business basis
>
> Management of a project, which in this case is defined as an IT project and in many of the cases could be more accurately defined as an ERP-implementing project.
>
> Management and administration of organizations like companies, teams, public organizations, and so on.
>
> Organizations involved in the project, each having their own organization culture.
>
> People working in the organizations and on the project being impacted by the organization cultures but at the same time having their own impact on it.

To be able to answer the research questions attention must also be paid to the following questions:

- How do we define the success or failure of a project?
- When discussing business culture, what do we mean by the terms “business culture,” “organization(al) culture,” and “corporate culture”?

2.2 THEORETICAL FOUNDATION OF RESEARCH AND LOCATION IN THE FIELD OF DISCIPLINES

The theoretical base for this work can be found from Max Weber's and other organization theoreticians' ideas on organization, Edgar H Schein's works concerning organizational culture, Richard D Lewis' works on cultural collisions, and Geert Hofstede's works on cultural differences on the macrocultural level, that is, between countries and continents. Also, the dimensions of national cultures found and defined by Hofstede (Hofstede & Hofstede, 2005) have been borne in mind when conducting the research and writing this thesis.

It is easy to see from the hypothesis and questions presented in chapter 2.1 that the work could be classified as belonging to more than one discipline or – in other words - to be multidisciplinary. Figure 3 presents the location of the research in the field of disciplines. The main disciplines are software engineering – due to limiting the projects to IT projects – and business administration, because the research tackles aspects like managing projects, managing business culture, managing success in projects, and so on. The aspects of people and employees add personnel management or – in more modern terms – human resource management, work psychology, and social sciences. Organizational aspects refer to social and humanistic sciences as well as to administrative and managerial sciences.

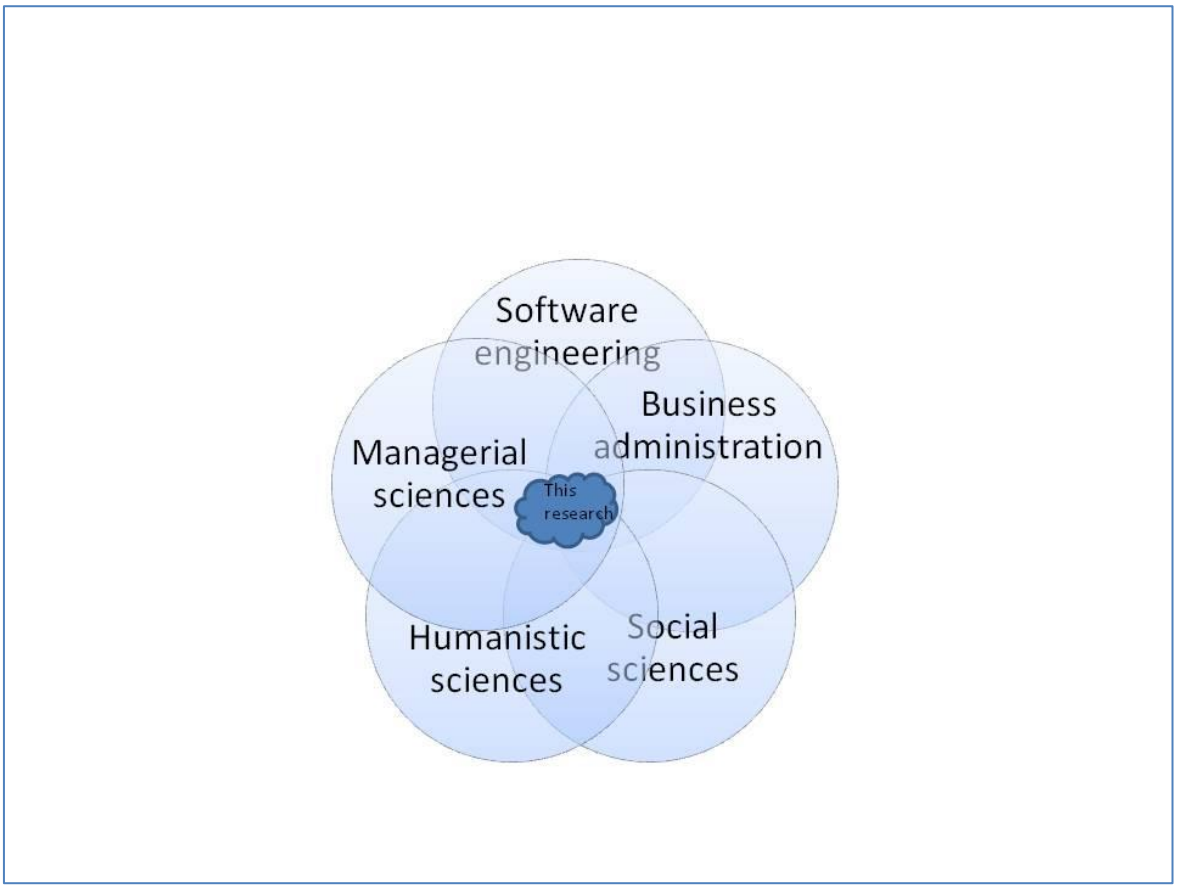

Figure 3: The location of the research in the field of disciplines

The concept of multidisciplinary research can be defined in many ways. In *Disciplinary, Multidisciplinary, Interdisciplinary - Concepts and Indicators* – (Besselaar & Heimeriks, 2001), multidisciplinary research has been defined as a subform of non-disciplinary research, in which the subject under study is approached from different angles, using different disciplinary perspectives. However, neither the theoretical perspectives nor the findings of the various disciplines are integrated in the end, unlike the second form of non-disciplinary –interdisciplinary – where the results of a study of a certain problem are more coherent and integrated. Peter Buckley and Malcolm Chapman for their part seem to have a different approach. In the article Theory and Method in International Business Research (Buckley & Chapman, 1996) the terms Interdisciplinary, transdisciplinary and multidisciplinary are used mostly as synonyms to define research that combines methods and key concepts from several core disciplines. In their work concerning multidisciplinary research in smart structures, Chandra et al. present the opinion that if there is a need for expertise from several core disciplines the research is multidisciplinary (Chandra, et al., 1995).

The multidisciplinary nature of research is not very unusual in modern research (Cummings & Kiesler, 2005). More and more research is recognized as multidisciplinary in one way or the other. Most of these studies are made by multidisciplinary research teams or groups where expertise of several disciplines can be found in the form of each researcher having the education and expertise of his/her own discipline. In this case, the research has been made by one person with both a technical and financial background. Although the multidisciplinarity in this research is not supported by a multidisciplinary team, the approach is justifiable due to the fact that the fields of both information systems (Lucas, 1989) and management and organizational sciences (O'Connor, et al., 2003) are multidisciplinary and draw their theory from many fields.

2.3 RESEARCH APPROACH, LIMITATIONS OF THE RESEARCH AND CHOICES MADE

The topics of this thesis span many disciplines. The thesis approaches cultural and organizational issues that are traditionally studied by qualitative methods, e.g. interviews, surveys, action research, or ethnographic methods (e.g. (Metsämuuronen, 2003), (Myers & Avison, 2002) (Silverman, 2004)), and analyzed e.g. by classifying, interpreting, reading, and/or rewriting (Metsämuuronen, 2003, pp. 195-204). Sometimes several methods can be used together or combined with quantitative research and analyzing techniques, although many authors also warn about the risks involved in using many techniques together, e.g. (Metsämuuronen, 2003, p. 207), or setting methods and approaches against each other. The research target in behavioral science is the truth (Hevner, et al., 2004), and one of the alternative goals in qualitative research is said to be to collect facts (Alasuutari, 1999, pp. 90-91), although the results (or “truth”) gathered from the same material may vary

depending on the interpreter, the time when, the context in which or background against which findings are interpreted (Metsämuuronen, 2003)(Alasuutari, 1999, p. 91).

The fact that the research questions and hypothesis were founded on experiences from practice and the findings of a case study rather than on earlier research or a formed theory indicates that this research might with good reason be said to be based on the methodology called grounded theory (Järvinen, 2011) (Metsämuuronen, 2003, p. 176). However, one of the main targets of this research was to find out if the findings of the case study could be confirmed and also to find out how experienced experts would try to forecast future problems with a simple set of questions and thus avoid open conflicts, whereas the grounded theory method aims only to build a new theory, not to verify it (Metsämuuronen, 2003, p. 180).

Epistemologically qualitative research is often divided into three philosophical perspectives: Positivist, Interpretive, and Critical (Myers & Avison, 2002, pp. 5-6) (Figure 4). Positivists consider reality as objectively given. Reality can be described by measurable attributes, which are independent of the researcher and the measurement tools. The aim of positivist studies is generally to test a theory and increase understanding of the surrounding world. The interpretive perspective considers that access to a given or socially constructed reality is possible only through social constructions, e.g. language, beliefs, shared meanings, or consciousness. The goal of interpretive studies is to understand researched phenomena through the meanings assigned to them. Critical researchers find social reality to be historically constituted and produced and reproduced by people. The ability of people to change their social and economic circumstances is constrained by different forms of social, cultural, and political domination. The principal goal of critical research is thought to be to raise social critique (Myers & Avison, 2002, pp. 6-7).

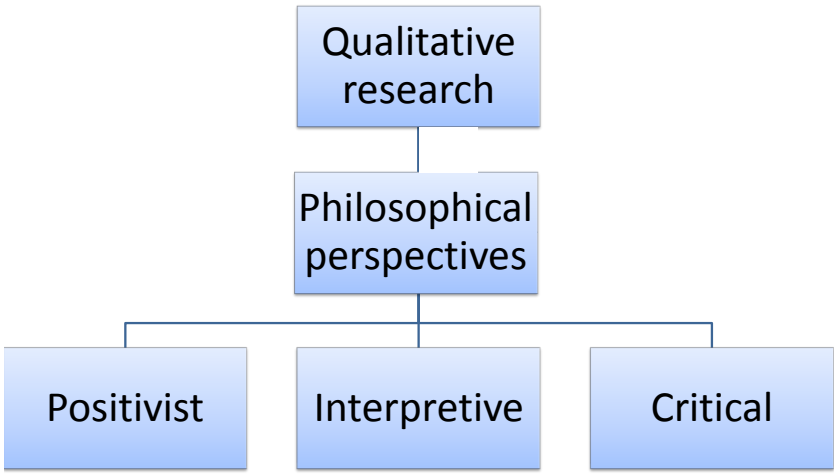

Figure 4: Philosophical perspectives in qualitative research

The term external validity in qualitative research means that the truth is proved by the findings of other researchers (e.g. by literature review), the findings of comparative research or by another researcher using the same material (Silverman, 2004, pp. 91, 175--185), bearing in mind that people and conditions may change as time passes (Metsämuuronen, 2003). Also, the generalizability and objectivity of the findings must be evaluated (Silverman, 2004, p. 91). Internal validity for its part refers to the degree to which findings are able to map and describe the phenomenon in question (Silverman, 2004, p. 91). Authors writing on validity and reliability issues highlight the fact that in qualitative research the critical path in questions of validity and reliability starts from designing and testing the tools used for data collecting (inquiries, interview forms and instructions, etc). The next stage is selecting the source (cases, participants in surveys, members of panels, etc), and the third critical point is the analyzing phase. It is often recommended that someone other than the researcher should take care of the classification of the data. However, Metsämuuronen recommends that the researcher classifies and analyzes the findings him/herself (Metsämuuronen, 2003, p. 195). In general, one condition of valid research is said to be that it does not automatically confirm the hypothesis it should test. Contradictory or unexpected findings must also be allowed (Metsämuuronen, 2003). Figure 5 shows the critical path and actions taken to ensure the validity and reliability of the research in this thesis.

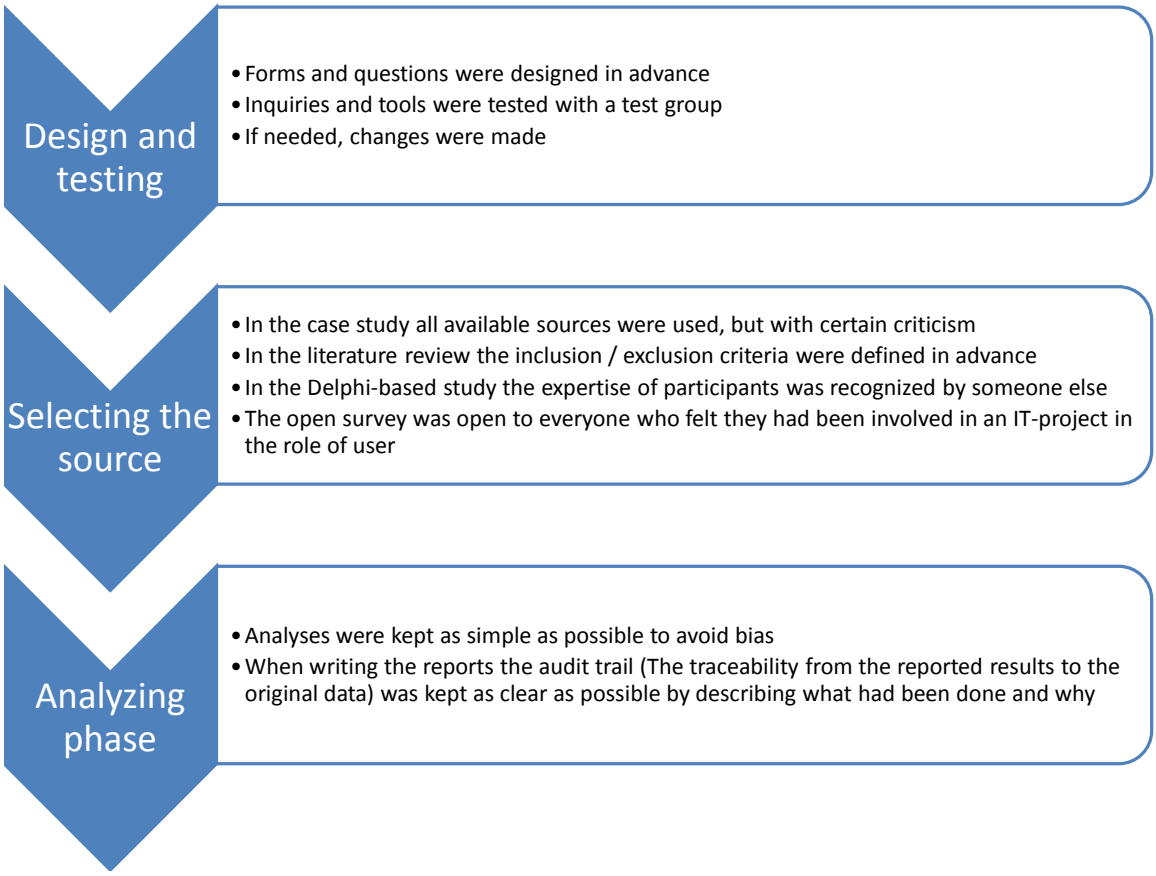

Figure 5: The critical path of validity and reliability

It is worth noting that there are also authors who argue that collecting the data is also in the critical path, especially if data is collected by a third party, e.g. by interviewers who do not have the researcher's education. In such cases, however, the data collection forms, instructions, and training of the interviewers play a big role in avoiding bias.

On the other hand, this thesis is close to information and software engineering sciences, both of which have traditions of constructive and pragmatic approaches. In pragmatic research, validity is measured by the usability of the results, and in constructive research the aim of the research is to produce an artifact (Järvinen & Järvinen, 2000, p. 102). In both approaches the criteria of validity can be described with one sentence: "If it works…" (Järvinen & Järvinen, 2000, p. 123), or in other words, the usability and applicability of the results.

In the research presented in this thesis many different methods were used to collect the data. In the case study the data was collected by surveys and interviews as well as from protocols, memos and other material that was available. All of these methods are typical for qualitative research (Metsämuuronen, 2003), (Silverman, 2004). The findings of the original case study were tested by conducting

a) A complementary survey concerning the equality policy of companies involved in the projects included in the case study,
b) A literature review
c) A Delphi-based study where the panel was formed of experienced experts
d) An open survey for grass-root level users involved in IT projects.

In the surveys used in these studies both open questions as well as structured parts were used. Structured surveys are often regarded as belonging to quantitative methods (Metsämuuronen, 2003, p. 167), but, as Metsämuuronen emphasizes, the analyzing method used can still be qualitative.

The Delphi-based study did not only confirm some of the findings of the case study but also produced a list of questions that could be used to test and decrease the risks caused by cultural differences between participants in an (IT) project. This list could be seen as an artifact or a product of this thesis, and its validity ("Does it work? Is it usable?") (Järvinen & Järvinen, 2000, p. 123) can be evaluated against the fact that the final issues on the list were voted on by experienced experts, bearing in mind that other authors have also highlighted some of these issues. In their comments some of the experts said that the feedback obtained during the Delphi process was helpful and usable in their daily work.

The validity and reliability of each study is discussed in the chapter that presents the study in question. This is due to the fact that each study held its own risks and possibilities for bias, typical for such a study or inherited from internal or external conditions. When evaluating the validity and reliability of the research conducted for this thesis, it is worth bearing in mind that resources are often limited unless the research is part of a bigger

research project with external financing. The limited resources mean that the researcher has only one person available, him/herself, he/she has only limited time to be used for research, and he/she has to settle the extra costs from his/her own pocket. In this case the limited resources forced some compromises concerning the size of sample in the cases, the size of the panel in the Delphi-based study, and the distribution of the invitation to participate in the open survey as well as the recommendation to let the classification be done by someone else.

This thesis approaches cultural and organizational questions in IT projects. Organizational culture was analyzed through language, structure, use of power, and shared meanings. Although hard or demographic data, like number of employees, number of owners, ownership, and branch of the firms was also used, the philosophical perspective of this thesis is interpretive (Myers & Avison, 2002, pp. 6-7). One condition of generalizability in the interpretive perspective is the informative value of the results (Myers & Avison, 2002, p. 111), and another is that the research draws specific implications. This thesis does not argue that all failed projects had failed due to cultural differences between supplier and customer, or that differences in business cultures would always cause the failure of an IT project. On the contrary. The results of this research emphasize the risks of cultural differences (informative), implying that more attention should be paid to the organizational culture of an opposite party, discussing openly, and in advance, possible risks, how to avoid them and what should be done if the risk is realized (specific implication), i.e. contingency planning.

The main literature review was conducted by applying the principles of a systematic literature review. Before that, background information and methodological knowledge were collected by less formal literature reviews. In all of the reviews and data collection the data was evaluated critically (Metsämuuronen, 2003, pp. 13-14). However, in some cases sources which are normally thought to be less valuable, e.g. Master's theses or articles in commercial journals were also included if they were seen to present new opinions or approaches to the problem in hand. On closer review, most of these sources were left out.

To avoid biases caused by the relatively small sample sizes in the case study and both surveys it was preferred to avoid the use of statistical methods and instead report the findings of each research in as simple and descriptive form as possible. The answers to the research questions will be more descriptive and suggestive than an absolute yes or no. Due to the relatively small sample sizes mentioned above, more attention was paid to the literature and findings reported by other researchers.

The first piece of research in the set of research studies that this work consists of (Figure 6) is a case study that collected the experiences of customers and suppliers in projects the researcher was involved with within the past 25 years. The experiences were collected by survey and interviews, and complementary data was gathered from protocols, memos, and

journals. This research was done during 2005 and 2006, and the oldest projects included in the research had ended more than 20 years before. How much and what people remembered after 20 years was one possible reason for bias, which must be taken in account. The second possible cause for bias was the selection of cases included in the research. They were not selected randomly but were a retrospective sample of all the projects the researcher had been involved with. The third possible reason for bias was the researcher's involvement in the projects covered by the case study.

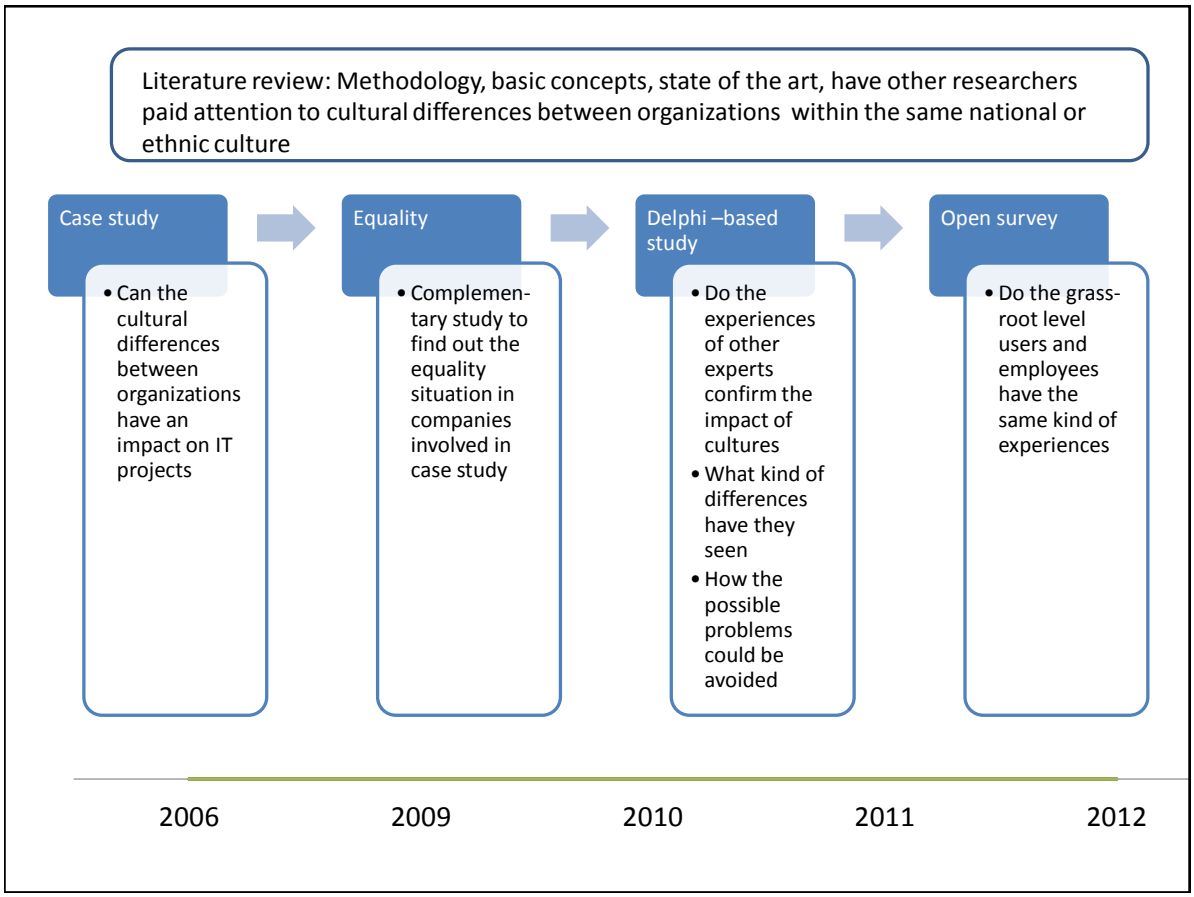

Figure 6: Phases and schedule of the research

To avoid the biases described above and to be able to answer the research questions, there was a need to collect the experiences and thoughts of the people involved in other projects than those included in the case study. This was done by means of two different surveys, one for the experienced experts and the other for the grass-root level workers and clerical workers involved in the projects due to their roles as user or project employee. Due to limited resources, both economic and manpower, the first mentioned survey, which is also the primary research in this research series, could not cover hundreds or thousands of respondents. Instead, a decision was made to collect the data from people who knew what the IT projects might include at their best and their worst. Those people should be experienced experts of IT projects and the method used to collect the data should be suitable for collecting expertise. According to e.g. (Kuusi, 1999), (Laakso, et al., 2010) and

(Lilja, et al., 2011a), the Delphi method is well suited for collecting opinions, knowledge and tacit information from a limited group of experienced experts.

The basic Delphi process is based on three iterative rounds, but in this case it could be seen in advance that the number of subjects to be evaluated in the third round might be large. The modified version of Delphi in which the third round was divided up into two parts and a summary phase was added afterwards (Figure 7) was used, and the whole process was conducted using the web-based survey tool Webropol. The method, selection of panelists and conducting of the study will be presented in more detail in chapter 6. The version of Webropol available at that time did not completely support feedback to respondents, which is an essential part of the Delphi process. This was seen to be the most relevant possible cause for bias. As a result, and to ensure the reliability of the Delphi results, a decision was made to include in the feedback to the respondents, if possible, only the original data given by Webropol. If there was a need to edit answers to guarantee confidentiality, only the names and places were changed. The summaries of answers were written mostly with the copy-paste method direct from the Webropol data.

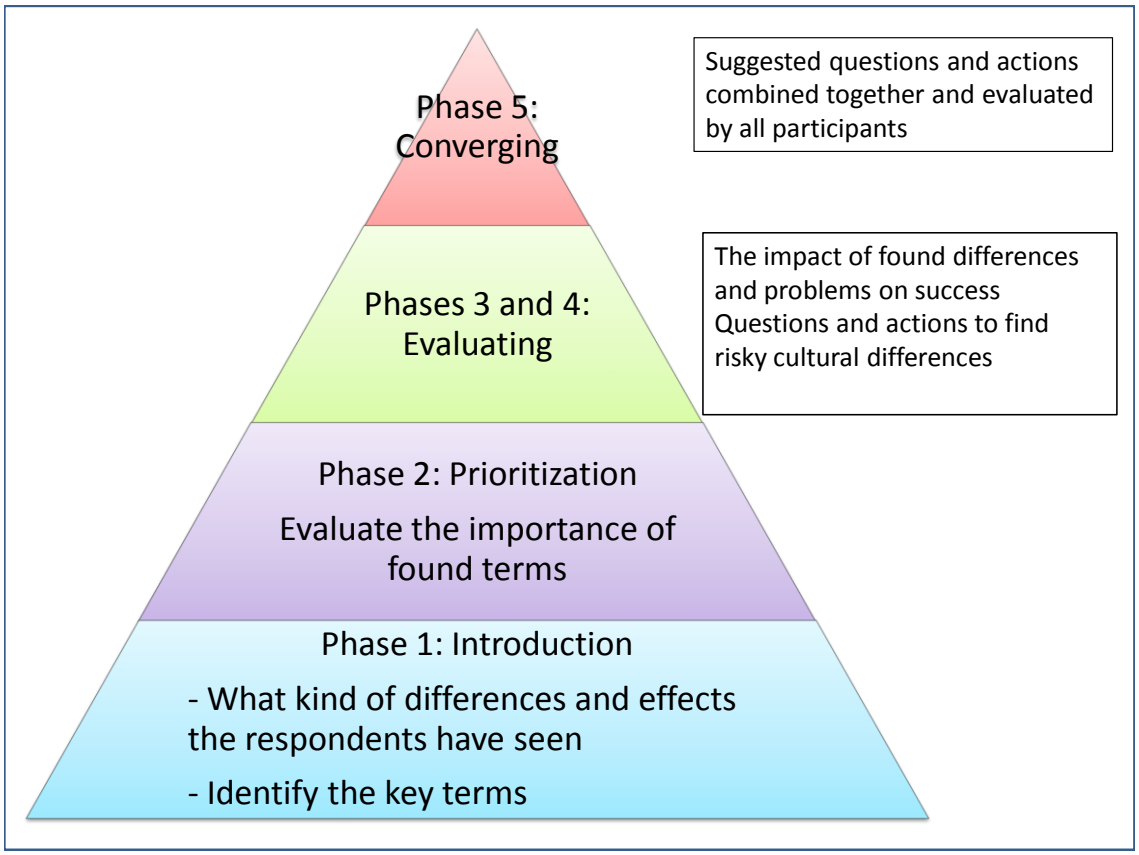

Figure 7: The phases of the Delphi process

Most of the people involved in the IT project and suffering from a failed project are clerical workers and the employees who have to use the system whether it works or not. Their experiences and attitudes to the project, the system, the supplier or the customer as well as to their own organization have an important position when discussing the success of an IT project (e.g. (Wei, 2008); (Rasmussen, et al., 2011); (Pries-Heje, et al., 2006)). Their

opinion may in many cases vary from the opinion of experts, who might themselves have chosen the supplier and the system to be implemented or who have defined the requirements, use cases and so on. To collect the experiences of these grass-root level employees, another survey was conducted. In this survey there was only one phase and the basic intention was to compare the results of this survey to the results of the Delphi-based process described above. The survey and comparison of the results is presented in more detail in chapter 7.

The case study gave one unexpected result indicating that the tacit masculinity of the organization culture and the different equality policies of supplier and customer might have a bigger impact on the outcome of the project than earlier expected. This finding spawned a further study in which the equality policy of each participant in the projects involved in the first piece of research was evaluated. Because approaching issues of equality had not been collected in the original case study data, an extraordinary round of interviews by e-mail and data inquiries was conducted. The long time span between the first project and the research caused some trouble to find the information needed, but also made it easier for people to answer the questions which some of them found to be politically sensitive. This research and its results will be presented in chapter 5.

The literature review was made applying the concept of systematic literature review. The potential search terms and inclusion and exclusion criteria were defined in advance, the timetable for data mining was scheduled, and the process was documented. As search engine all the electronic databases and libraries available for Tampere University of Technology were used, but after a comparative test search made when preparing the third conference paper, Google Scholar remained the primary search engine and libraries' own engines were used to view articles and papers related to an interesting hit. The papers, articles, book chapters and books found were roughly evaluated and – if they seemed to fulfill the inclusion criteria – saved on computer in pdf form – if available – for closer evaluation and final inclusion or exclusion. The citation information and a link to the file were saved in End Note's database to be used in later phases of the review process. During the search process it appeared that certain search terms had such an enormous number of hits that it was impossible to go through all of them. These were restricted by branch, number of allusive papers, and relevancy. If the quantity after that was still enormous, hits were checked until there was no paper fulfilling the inclusion criteria within the 50 latest checked papers. On the other hand, I must highlight the point that the small number of allusive papers was not an automatic reason for exclusion. It was very clearly seen that the newer the paper, the fewer other papers referred to it. To get a holistic view of the state of the art the newer and less known papers were also included. A description of the whole process as well as the results of the review will be presented in chapter 3.

This chapter presented the hypothesis and research questions of the thesis and briefly described phases of the research process, and the assumptions, restrictions and decisions

made within it. In this chapter also the scientific background and context of this thesis was discussed. The next chapter will present the literature review process and findings and discuss the state of the art.

3 LITERATURE REVIEW: STATE OF THE ART

Public search engines have advanced a great deal since they were first published on the Internet. Their databases have grown, some of the first pioneers have been eclipsed, and those who have survived have been forced to cede the leading position in the markets to a relatively new competitor, Google. At the same time different actors, such as universities, publishers, libraries, and government ministries and departments to give some examples, have built their own search engines and databases for several purposes, one of which is to offer students, researchers and professionals easy and effective access to material they need in their work, research and studies. There is no doubt that the purpose is a good one, even if not necessarily altruistic. However, these private search engines seem to have one problem: each of them is designed for a certain database, metadata, and a certain specific group of users. Anyone who has conducted a literature review, searched research studies and papers to see the state of the art or simply tried to find an answer to a single question, has been able to see that the same query or search term may give quite different results depending on the search engine and database used.

Partly due to this fact, it seems to be an established practice in literature reviews to scan different databases with their own search engines using queries and search terms defined individually for each engine and database. Although this might be effective in disciplines where the number of databases is relatively small and search terms can be defined unambiguously, it is in many cases laborious. We should also be careful to search for all the forms in which the words can be used, as well as synonyms and established abbreviations. The use of many individual search engines designed specifically for a certain database may cause the risk of bias if we are unable to make sure that the terms and queries used have exactly the same meaning in every search.

Some years ago Google published a universal search engine that is – or at least it is supposed to be – capable of including in its results also those papers and research studies that are not freely available but belong to the database of some library, publisher or university, i.e. Google Scholar. Google Scholar was for a long time published as a beta version, but currently it has been institutionalized. It is targeted for scientific and educational data mining and querying and has found its place in the academic world. But can it be used as a serious competitor for publishers' or libraries' own search engines in research and studies?

The literature review presented in this chapter was conducted with the help of Google Scholar, although the other tools and search engines were also used. In this chapter the process and tools used in the literature review, including Google Scholar, will be presented and evaluated, the results presented, and the reliability and validity of results obtained via the process will be discussed.

3.1 BACKGROUND

The literature review is a part of the research with the aim of finding out if differences in the business cultures of customer and supplier have an impact on the results of an IT project. The other parts of the research are a case study, an additional study conducted to prove a single finding of said case study, a Delphi-based survey collecting experienced experts' opinions and knowledge, and a single survey collecting the experiences of ICT users during the projects they were involved with. The hypothesis tested in this research is that there are always some differences between the customer's and supplier's business culture and that these differences have an impact on the co-operation and success of an IT Project.

3.2 LITERATURE REVIEW IN THEORY

Literature reviews are performed to advance our collective understanding of what has been done before, the strengths and weaknesses of existing studies, and what they might mean. As a researcher, we cannot perform significant research without first understanding the literature in the field (Boote & Beile, 2005). Chris Hart presents one definition in his book "Doing a literature review" (Hart, 1998 / 2006), according to which a literature review is "*the selection of available documents, both published and unpublished, on the topic, which contain information, ideas, data and evidence written from a particular standpoint to fulfill certain aims or express certain views on the nature of the topic and how it is to be investigated, and the effective evaluation of these documents in relation to the research being proposed*". Hart also stresses that the purposes of a literature review are to demonstrate skills in library searching, to show command of the subject area and understanding of the problem, and to justify the research topic, design and methodology. Furthermore, Hart reflects on these purposes for the common specification of academic work and especially the specifications of a doctoral thesis, saying that a literature review demonstrates specialization in scholarship and a high level of scholarship, enables the making of a new contribution to an area of knowledge, and shows in-depth understanding of the topic area and work related to the research.

In their article "Conducting a Literature Review," Jennifer Crowley and Frances Slack (Rowley & Slack, 2004) argue that the literature review is important:

1. In supporting the identification of a research topic, question or hypothesis
2. Identifying the literature to which the research will make a contribution, and contextualizing the research within that literature
3. Building an understanding of theoretical concepts and terminology
4. Facilitating the building of a bibliography or list of the sources that have been consulted
5. Suggesting research methods that might be useful and
6. In analyzing and interpreting results.

These six aspects could also be combined into one phrase: in giving a theoretical base for the research, the methods used in the research, and the researcher.

On the other hand, Creswell (Creswell, 1994) sets out three criteria that a literature review should meet: “to present results of similar studies, to relate the present study to the ongoing dialogue in the literature, and to provide a framework for comparing the results of a study with other studies”. To fulfill these criteria Creswell (Creswell, 2002) presents a process with five phases: “identifying terms to use typically in your literature search; locating the literature; reading and checking the relevance of the literature; organizing the literature you have selected; and writing a literature review”.

What makes a literature review validated and reliable? Chris C. Beahler et al. (Beahler, et al., 2000) write that search accuracy and reliability are impacted by the inclusion of a broad range (both the subject matter and the organizational structure of the database) of databases. In an organized and indexed database, all entries should be analyzed by a professional indexer(s) who assigns relevant subject headings from a controlled vocabulary list. This allows searching using controlled vocabulary or subject headings, eliminating the need to include synonyms, equivalent conceptual terms, or alternate spelling in the search strategy. On the other hand, we must bear in mind that when setting the research questions and defining the query terms in our minds we do not necessarily have the index or vocabulary list available. It may not be possible to avoid synonyms in real life. Strike and Posner (Strike & Posner, 1983) suggest that a good synthetic review has three characteristics:

1. It clarifies and perhaps spreads the problems within a field of study rather than bypassing them
2. It performs a “progressive problem shift” that gives us a new perspective on the literature with more explanatory and predictive power
3. It fulfils the common criteria of a good theory.

According to Strike and Posner, terms like consistency, parsimony, elegance, and fruitfulness characterize a good synthesis.

Jennifer Crowley and Frances Slack (Rowley & Slack, 2004) put a lot of weight on evaluating the sources and their relevancy, reliability, validity, and accuracy in respect of the problem or question researched. They also remind the reader that a researcher should evaluate the purpose for which the article, book, or web material was written and published as well as the publisher’s status in the discipline.

Justus J. Randolph argues in his article (Randolph, 2009) that many literature reviews are in one way or another faulty, and he lists a taxonomy of six characteristics originally presented by Cooper in 1988, to which each planned and conducted literature review should fit. These characteristics are Focus, Goal, Perspective, Coverage, Organization, and

Audience. Each characteristic is divided into categories as shown in Table 2 and a literature review is supposed to fit at least one category in each characteristic.

Table 2: Taxonomy of literature reviews according to Randolph and Cooper

Focus	Goal	Perspective	Coverage	Organization	Audience
Research outcomes Research methods Theories Practices or applications	Integration (a) Generalization (b) Conflict resolution (c) Linguistic bridge-building Criticism Identification of central issues	Neutral representation Espousal of position	Exhaustive Exhaustive with selective citation Representative Central or pivotal	Historical Conceptual Methodological	Specialized scholars General scholars Practitioners or policymakers General public

The role of the search strategy has been highlighted by many authors. J. Randolph (Randolph, 2009) emphasizes the defining of explicit and comprehensive inclusion / exclusion criteria to ensure that those and only those works are included which are relevant to the research. Furthermore, he argues that deciding on the data collection policy is an important strategic choice: are we collecting an exhaustive, semi-exhaustive, representative, or pivotal set of articles. However, planning the search and data collection procedures is not enough. Both Randolph (Randolph, 2009) and Timmins & McCabe (Timmins & McCabe, 2005) emphasize the documenting of all the selections and decisions made, and the queries, databases and search terms used. Thorough documenting serves the researcher, those who are evaluating the research, and those who are using the results afterwards by helping them to identify the strengths, weaknesses, and possible biases in the literature review.

The way both Randolph (Randolph, 2009) and Timmins & McCabe (Timmins & McCabe, 2005) recommend the literature review to be conducted is close to the concept of the systematic literature review, which during the last decade has taken root in the financial, social, medical and even the software engineering domains (Brereton, et al., 2007).

The basic concepts in a systematic literature review are planning, conducting, and documenting the review. It provides the means to identify, evaluate and interpret the available research relevant to a particular topic, interest area or research question

(Kitchenham, 2004). The model Brereton et al. (Brereton, et al., 2007) (Table 3) describe in their article contains 10 steps divided between the three phases named above.

Table 3: Systematic literature review according to Brereton et al.

Planning	**Conducting**	**Documenting**
Specify Research Questions Develop Review Protocol Validate Review Protocol	Identify Relevant Research Select Primary Studies Assess Study Quality Extract Required Data Synthesize Data	Write Review Report Validate Report

It is worth noting when looking at Table 3 that conducting a literature review requires continuous documentation during the process: from specifying the research questions to validating the final report we have to collect and register data, write protocols and instructions, make notes and so on (Kitchenham, et al., 2009), (Hart, 1998 / 2006), (Okoli & Schabram, 2010). There may also be a need to identify and select the libraries and databases to be used (Beahler, et al., 2000), (Boote & Beile, 2005), (McKee & Britton, 1997), as well as tools for storing and analyzing the data and preparing the synthesis (Beahler, et al., 2000), (McKee & Britton, 1997). Although it is possible and allowed to include these steps in the "Develop Review Protocol" step or the identifying and selecting steps, they are in their nature such independent parts of planning that it could be better to present them separately, as described in Table 4.

Table 4: Synthesized model for a systematic literature review

Planning	**Conducting**	**Reporting**
Specify Research Questions	Identify Relevant Research	Write Review Report
Select databases and libraries to be used	Select Primary Studies	Validate Report
Select tools for storing and analyzing the data	Assess Study Quality	
Develop Review Protocol	Extract Required Data	
Validate Review Protocol	Synthesize Data	
Documenting the decisions, findings, and conclusions during the whole process		

If we combine the common parts of the definitions presented above, we get the following criteria for an acceptable literature review (Table 5):

Table 5: Criteria for an acceptable literature review

The aim of the literature review	
Aim	***In other words***
To demonstrate skills in library searching	To prove the researcher's technical skills
To show command of the subject area and understanding of the problem	To prove the researcher's knowledge of the topic
To justify the research topic, design, and methodology	To prove the need for this research and to validate the design and methodology to be used in the research
To advance collective understanding of the subject area and of what has been found earlier	To collect, synthesize and report in a compact and readable form the key results of recent research in the subject area
To form a base and a context for this research (and future research)	To form a base on which a new theory can be constructed and to define a context within which the new theory must be evaluated and developed
Criteria for a well-conducted literature review	
Planned, tested, documented and evaluated process	A review should be planned, tested, and documented so that in the same conditions someone else should be able to obtain the same results. The reliability and validity of the process and its results should be evaluated
Selection of available documents	Not all documents but those which are available to the researcher
Both published and unpublished	Unpublished documents are also acceptable
On the topic	Not all topics but the topic that you are researching or sufficiently close to it.
Contain information, ideas, data and evidence	Should give something to the research and / or to the researcher
Written from a particular standpoint	Reflects the aspects, traditions, opinions and attitudes of the author and discipline within the framework of which it is written
To fulfill certain aims or express certain views	The book, article or paper has been written for a certain purpose, commonly to present the state of the art in the subject in question
On the nature of the topic and how it is to be investigated	Giving basic details and background information about the topic as a basis for ongoing research
The effective evaluation of these documents in relation to the research being proposed	The critical evaluation of the documents from the standpoint of the topic of the research being done
The findings are reported and evaluated	The results of the literature review should be published to advance collective understanding of the subject area and to perform a public evaluation of the review

3.3 VALIDITY AND RELIABILITY

In every research there is an aim to obtain *valid* knowledge, that is, the results should be "true" (Alasuutari, 1999), (Silverman, 2004). There are many types of validity, (Cook & Campbell, 1979), but in this literature review two kinds of validity can be distinguished: *Internal* validity, the question of whether the results obtained within this research are true (Silverman, 200), and *external* validity, which refers to the question of whether the findings can be *generalized* (Silverman, 2004), for example, to other searching engineers beyond the research at hand. In most research there is a need to begin with a literature review (Metsämuuronen, 2003): earlier studies on and around the research topic. The data sources of literature review concern secondary data, which are useful not only for finding information to solve the research problem, but also for understanding and explaining the research problem better. It is good to realize that a secondary data source provides information that may have been collected for different purposes, and another researcher is not always aware of all of those purposes. The foremost advantage of using secondary data is obviously the enormous saving in time and money. On the other hand, there are also some serious drawbacks in working with secondary data, since these data have usually been collected for another study with different objectives. It is therefore of the utmost importance to identify what we are studying, what we already know about the topic, and what we want to have further information on. In this research the inclusion and exclusion criteria should in fact function as a tool to evaluate the relative truth of the literature found by Google Scholar. Thus, we can say that the research results we have obtained are at least internally validated. External validation would need a further study consisting of a comparison with different searching tools (Metsämuuronen, 2003). It is worth noting that before the main review was started, one review was conducted using both Google Scholar and competing databases. The results of this test will be reported in chapter 3.4.9.

The probability that a single application of a given method chosen at random will be successful may be called the *reliability* of the method. The reliability is the ratio of all the successful applications of the method to all its applications in a sufficiently long run of attempts to apply it. In principle, the reliability of a method can be characterized by a single number. Yet the probability that a particular application of a given method will be successful may be affected by the special circumstances under which the method comes to be applied. This probability will then differ from the reliability of the method. More particularly, in this case the probability of some pre-assigned application of the literature search from Google being successful may depend upon the choice of the person who is searching, upon the physical, psychological, and social conditions prevailing in his/her environment, upon the choice of instrumental equipment and the way of handling it, provided such choices are compatible with the search. Perhaps the most crucial factor for the unreliability of the results of Google searching is that the database is continually evolving, i.e. documents are continuously being added as well as deleted, and so the order of the search results differs depending on the time of the search.

When conducting a systematic literature review the reference chains should also be followed (Metsämuuronen, 2003). Most of the search engines of the libraries the Google Scholar link led to offered an easy way to do this. However, in terms of validity and reliability, it must be asked whether this guarantees better validity or reliability. The second article in the chain may have been written for slightly different purposes, in a different environment and circumstances, the third more different, and so on. And how long should these chains be followed? In this study, the probability that the papers which may have been relevant in terms of the topics of this research were already in Google Scholar's list of hits was thought to be so great that reference chains were followed only if there were some special reason to do it. Instead, the libraries' links for related papers were followed, which were seen to ensure a comprehensive sample of contemporary research on the topics.

3.4 PROCESS IN PRACTICE

This chapter will present the literature review conducted to gather the state of the art in the subject area of research presented in chapter 2 – that is: to collect the research, findings and opinions of other researchers concerning the hypothesis and research questions derived from it. First there will be a description of the review process and decisions made during the process. The experiences, findings, and ideas concerning the tools used during the process will then be presented. The end of the chapter will discuss the possibilities of improving the efficiency and usability of the process.

3.4.1 Systematic literature review

The literature review was conducted during a long period, from August 2009 to May 2012. The first part of the process was to seek a methodological background for both the literature review and the research, which consisted of two surveys. The basic guidelines for the literature review were adopted from the ideas of Metsämuuronen, (Metsämuuronen, 2003), Thietard et al., (Thietard, 2001), Brewerton & Millward, (Brewerton & Milward, 2001) and Brereton et al., (Brereton, et al., 2007). According to these writers, a systematic literature review is a thoroughly planned, described, and documented process in which the relevant research is identified and located, the prior research is selected, and data is collected and evaluated critically. The process and the findings should be reported and validated separately.

3.4.2 The process

The planning of the process and defining of the criteria for inclusion and exclusion, search terms and databases used for searches was done in autumn 2009 and winter 2009 – 2010. During the spring and autumn 2010 the selected methods and tools were tested by means of three smaller reviews made for papers presented at Picmet 2011. The method was tuned in accordance with the experience gained via these test reviews. The main review process

was started in August 2010 and the final analyzing and synthesizing work was finished in May 2012.

3.4.3 Tools

The tools used in the review were:

1) Mind Map program to plan, control and document the process. The map formed during the process is at the same time a plan, research diary, and collection of notes.
2) EndNote program to collect references that passed the rough inclusion criteria with abstracts and papers for closer review.
3) Adobe Acrobat to create a research dictionary for the papers mentioned above.
4) Adobe Reader to read the papers and books selected.
5) Microsoft One Note to collect notes and clips that the other programs were not able to handle.

3.4.4 Search engines

The databases and search engines used in the review for a paper (Lilja, et al., 2011b) were CRCnetBASE, ScienceDirect, Gale Virtual Reference Library, Knovel, McGraw-Hill, National Academies Press, O'Reilly, Palgrave, Referex, Springerlink, and UC Press. If libraries insisted that the query select a branch, the following branches were selected when available: Information technology, IT, Business Management, Social sciences, Computer science, Computing & information technology and/or Technology. A comparative search was done using Google Scholar, and this proved that relevant material was neither omitted nor more found compared to individual searches made without branch selections. Compared to queries with obligatory (as well as voluntary) branch selections, a query with Google Scholar appeared to find more relevant papers from the same databases / libraries. Due to the multidisciplinary nature of this research, the decision was made to use Google Scholar for the searches of the main review.

During the execution of the main queries it was found that Google Scholar could be even more useful if there were the possibility to limit searches to only those databases having a contract with the university's library to make the full papers available. At that point, the availability from alternative libraries had to be checked every time if the first database linked to the hit was unavailable. Also, the possibility to change the order of hits found in accordance with availability as mentioned above or in accordance with the number of citations would be preferable. However, in most cases Google Scholar offered a link to the SFX service, which listed available sources for the full text and the holdings of the nearest libraries, as shown in Figure 8. In addition to this, there was also a list of articles in which a user interested in the article in question had also expressed an interest.

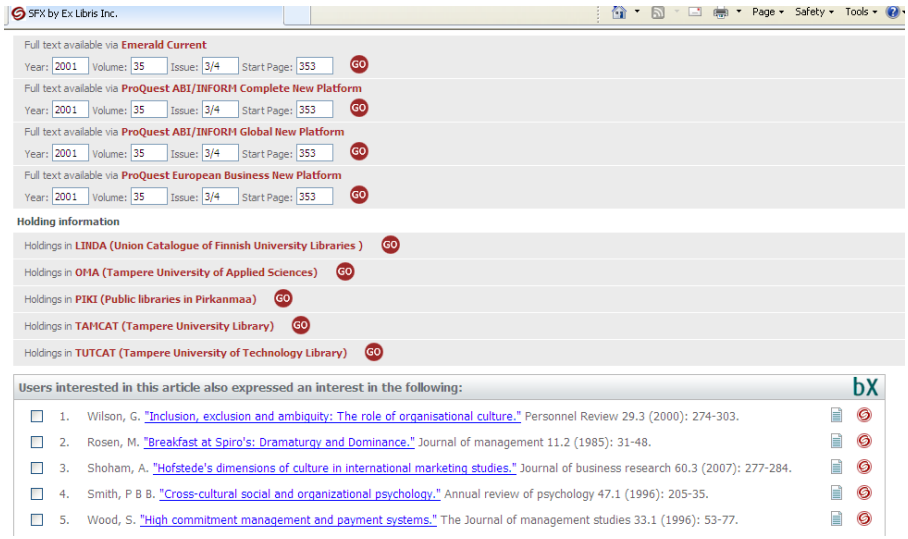

Figure 8: An example of the view given on the SFX page.

In addition to the Google Scholar queries, the properties of each database were utilized to recognize the articles, papers, and research close to the found hit. Figure 9 and Figure 10 present the views of two publisher's search results given by the hit from Google Scholar.

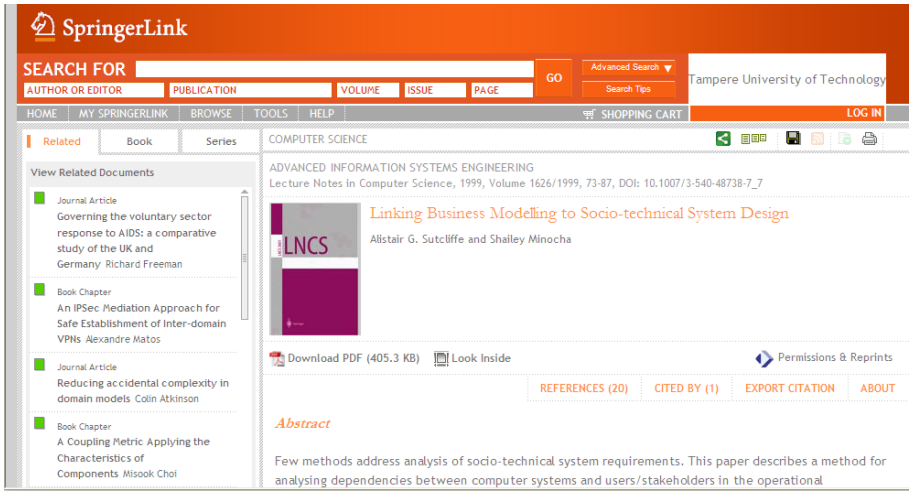

Figure 9: SpringerLink's view of related documents

Figure 10: ScienceDirect's view of related articles

3.4.5 Defining the research questions for a literature review

The research question presented in chapter 2.1 was:

> Are there such kinds of cultural differences between firms originating from the same macrocultural area, which could endanger the success of an ongoing IT project, where one firm is the supplier of the system and the other is the customer?

From this formulation the following sub-questions were derived:

1. What kinds of differences in the opposite partner's culture might cause a risk for a project?
2. Could these risky characteristics be seen in advance? and
3. How could we minimize the negative impact of these differences?

The aim of the literature review is to find out both the state of the art, that is what other researchers have found and written concerning the topics, and the background knowledge, e.g. definitions of base terms and phenomena behind the topic of the ongoing research.

When conducting the case study a model was built that classified the success of a project according to the following dimensions:

- How timetables were kept to
- How cost budgets were kept to
- How the goals were achieved
- The bugs found in the system
- The fixing of bugs
- The users' adoption of the system
- Updates to the program
- Unforeseen but necessary modifications to the program during the implementation

In addition to these, each participant was asked to evaluate the success of the project he/she was involved with.

In order to be able to evaluate the classification made in the first study, looking at how other researchers have classified business culture and what type of criteria they have used is unavoidable. Bearing in mind that one of the aims of a literature review is to describe the state of the art, a set of research questions was formed as follows:

1. Have other researchers reported connections between the differences in business cultures of supplier and customer and the success of a common IT project and if so, what kind of impacting differences have they found?

2. Have other researchers reported connections between the structure of the organization and the success of an IT project?
3. How can the success (or the failure) of an IT project be defined and what kind of criteria / measures should we use?
4. How has business culture been classified by other researchers and what type of criteria / measures have been used?
5. How are the organization and the organizational culture, business culture, or corporate culture defined in the literature?

During the test phase (a literature review for the paper mentioned in chapter 3.4.4), it transpired that limiting the search to IT or IS projects alone eliminated a considerable amount of research that was relevant from the point of view of project knowledge, although not from that of handling information systems or software engineering projects. The decision was made that research concerning projects in other technical disciplines would also be included if it was relevant and tackled cultural differences.

3.4.6 Inclusion / Exclusion and Stop criteria used

The exclusion / inclusion criteria used were defined in two steps. The rough criteria used in the Google search were (Table 6):

Table 6: Inclusion and exclusion criteria in the first round

Include	**Exclude**
Include items concerning business cultures and organization cultures in the meaning of business organizations, and the impact of differences in cultures and organization structures on project success if - The paper or book is available via the Internet - The environment the paper is written for is comparable to ours - The paper is published in a known collection, magazine, or conference, or it otherwise benefits the subject.	• Items concerning culture as a business (opportunity) or business in the branch of culture • Items concerning cultural differences between ethnic groups, different countries or continents ○ Apart from Hofstedt, Schein and other principal researchers • Items without any link to organizational or business culture (search matched just to the word "business," "corporate," "organization," etc.) • Search will be stopped for each search term and database when the results from this point to the end seems to have more than 1000 records containing less than 10 possible relevant citations, they have already been included by other search words, or they seem to have nothing to do with the subject

The number of hits found with some search terms can total such a huge amount that the possibility to limit the search to only those cited at least a given number of times would assist in the finding of the most relevant research. In this review the walk through hits was stopped if no relevant hit was found out of the hundred latest checked hits and if the original stop term could not be fulfilled. This complementary "cut-off criteria" was defined to prevent the review of the results of one individual search term from taking too long. When defining this we were conscious of the possibility that some important research might stay hidden, although the network of search terms (Table 7) proved to be comprehensive in respect of the targets of this research. During the data collection phase, a big proportion of the research papers fulfilling the inclusion criteria were hits in more than one query. Unfortunately, it was not possible to collect accurate statistics on this.

The more accurate inclusion criteria to be used in selecting the papers for inclusion in the analysis were defined according to the experience gained during the test rounds and the first search round. The criteria were:

- According to the title and abstract the paper can answer the research questions or at least offer a new point of view on the question.
- According to the abstract the paper might include some information approaching the research area
    - If one or other of the criteria above were fulfilled, the same criteria were evaluated according to the text, and furthermore the purpose of the author, the context, topicality, and the reliability of the text were considered.

3.4.7 Running the process

The process was started by defining the query in Google Scholar as an exact term. Hits (Figure 11) that fulfilled the search terms, Table 7, were reviewed to see the context in which the search term occurred. If the document seemed to fulfill the inclusion criteria, the availability of the full-text version was checked, the paper was downloaded, and the citation information was transferred to EndNote with an abstract if possible. The paper and the EndNote record were then connected. If the citation information was not available but the paper seemed to be worth reading, the file was downloaded to a separate directory and the URL for the paper was saved as a pdf comment if possible. Some papers were protected so that this was not possible. In such case the URL was saved as a text file. This was repeated with each search term until the stop condition was fulfilled. If the query returned mostly irrelevant hits, excluding criteria like "military," "biology" or "medical" were used (Figure 12) to target the search to the desired subject areas. In the latest English version of Google Scholar there is also a limited possibility to restrict the search to certain subject area(s). Due to the fact that when starting the review this feature was not available, and also due to the fact that this alternative is not yet available in all language versions, it

was not utilized in latter searches to avoid possible biases caused by changes in the query method. During the whole process, notes, statistics and special findings, ideas and hints for new search terms were recorded on the same Mind map that contained the original plan.

Table 7: Search terms used in queries run by Google Scholar

Sub-subject	**Culture**	**Organization structure**	**Success**	**Supplier chain**
Keywords	Business culture	Hybrid organization/s	Failure/s in ERP project/s	Strategic alliances
	Organization culture	Hybrid organization/s	Failure/s in IT project/s	Supplier chain
	Organizational culture	Matrix organization/s	Project failure/s	Supply chain
	Organization culture	Matrix organization/s	Failure/s in ERP implementation/s	
	Organizational culture	Hierarchical organization/s	Success in IT project/s	
	Corporate culture	Hierarchical organization/s	Success in ERP projects	
	Enterprise culture	Project organization/s	Success in ERP implementation/s	
	Project culture	Project organization/s		
		Organization/al structure		
		Organization/al design		

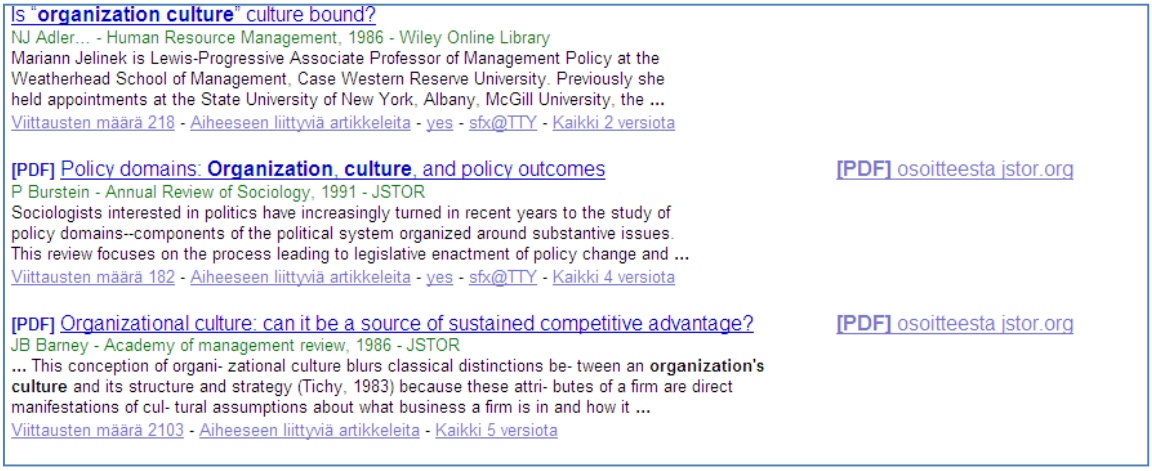

Figure 11: An example of Google Scholar's view.

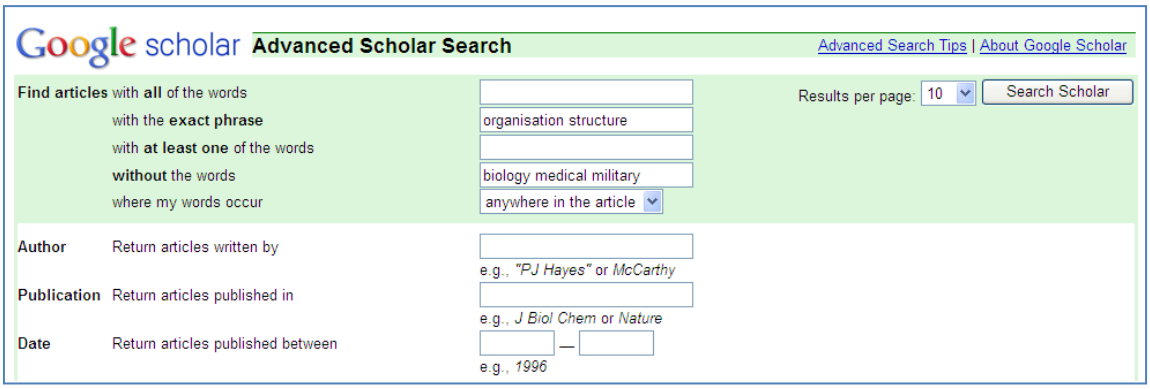

Figure 12: An example of excluding criteria

Out of the total of 780 909 hits matching the search terms in queries, 1816 hits were recognized to be interesting in terms of this research (Figure 13). The queries were grouped into 4 groups and the hits into 5 according to their subject and role in this research. The papers dealing with business and organization culture are under the title “Culture”, the group consisting of research on different organization structures is called “Organization structures”, research concerning the success and failure of projects were collected under the title “Success”, and the studies concerning strategic alliances and supplier chains were grouped together. The fifth group “Other subjects” covers the hits which could not be put into the other groups but which were seen to be worth closer analysis from the point of view of this research. If some paper belonged to more than one group, it was put in the group depending on the query in which it was first found.

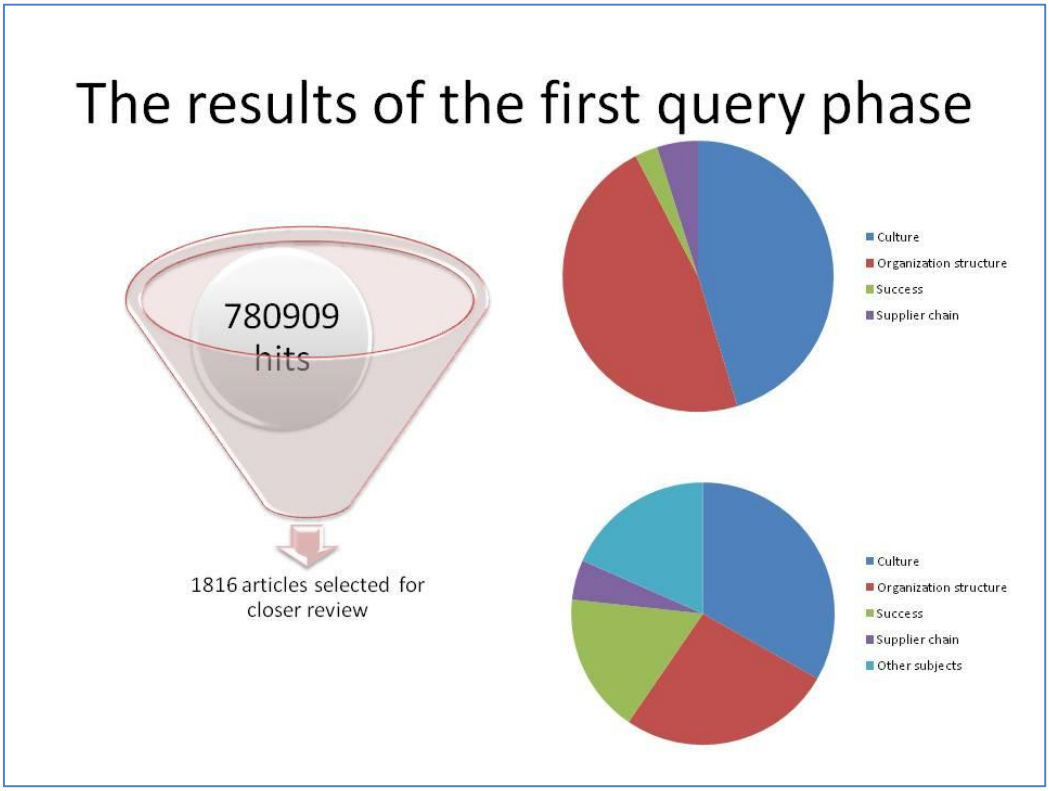

Figure 13: Results of phase one in querying the keywords with Google Scholar.

3.4.8 Second round

In the second phase, the papers that had been found were subjected to a more detailed search to identify those to be included in the final review or, to put it another way, to exclude those that obviously had nothing to contribute to the research. To be able to do this, papers in pdf form were first indexed by using the indexing feature of Adobe Acrobat. The directory formed by Acrobat was then included in Adobe Reader's usable indexes list. The intention was to use the internal search function of Adobe Reader to identify the documents that were the most interesting in terms of this research. The idea proved to be good in principle. When writing e.g. about experiences concerning organization structures, a list was obtained of all the documents saved containing the terms "experiences" and "organization structures" to check if these studies had something to contribute. In practice, the situation was not so simple. Some of the documents were protected so that the index creator could not read them. Some of the papers, especially the older ones, had been scanned as pictures, and were thus unavailable for indexing. If this had been the only technical problem, it could have been eliminated at least partially by searching the abstracts and key words stored in EndNote. Unfortunately, not all libraries and publishers support the importing of abstracts and / or key words into EndNote. Finally, a combination of traditional reading of headers, titles, abstracts, texts and references and the use of indexes and searches by Adobe Acrobat and EndNote was used to elicit the research and papers relevant to the current research and to identify those that had not yet been accessed but could be worth reading.

3.4.9 Analysis and Synthesis

The papers that passed the second phase were read, and the findings, notes, and opinions were evaluated and reflected against the research questions presented above. The draft of the report document is being kept open and updated at the same time as the findings are collected in the Mind Map and in the field "Research notes" in the current record of the EndNote database. The correct form of citation is transformed from the EndNote to the document. The final statistics are shown in Table 8.

In accordance with the sub-review for the paper published in 2011 (Lilja, et al., 2011b), conducted during the development and evaluation of the process to test the procedure, the number of papers selected by the queries run during fall 2010 was a total of 32756 unique hits. Out of these hits 189 papers, books and articles were selected for closer inspection in accordance with their relevance as concluded from titles and abstracts, and finally, 18 papers were included in the review report. This review dealt with a certain limited subject, i.e. the lack of a common language between project partners, but the percentage of the research papers that finally passed the third round was relatively small, only 0.05 % (Table 8). In the main review the percentage of items passing the first and the second phase is smaller, due to the larger amount of search terms and the wider spread of subject areas where these terms might occur.

Table 8: Number of hits in test phase and main review.

	Test phase		**Main review**	
Hits found	32756	100 %	780909	100 %
Items passing the first phase	186	0.57 %	1816	0.2 %
Papers finally selected for the reports and thesis	18	0.055 %	302	0,039 %

3.5 RESULTS OF LITERATURE REVIEW

This research deals with some concepts that must be first presented and defined. What is business culture, is it the same as organization culture or a subset of organization culture, and if so, what is an organization? How has organizational culture been assessed and how could the success of a project be defined and measured? In this chapter we are looking for answers to these questions from the results of the literature review starting with the definition of an organization.

3.5.1 Defining an organization

The concept of an organization can be defined in many ways. One common definition of an organization given in organizational science has been that an organization is "a *system of activities of two or more persons, consciously coordinated and controlled by the executive in order to achieve a set of objectives"* (Ichiishi, 1993). This activity-based approach distances itself from other classical definitions, which are based on persons forming an organization either consciously or unconsciously. It has been said that no widely accepted consensus on the definition of organization exists, and as theorists reason about organizations trying to answer fundamentally different questions, they construct different definitions of the basic phenomenon (Carley & Gasser, 1999). Carley and Gasser listed some examples of how organizations are characterized:

- *Large-scale problem-solving technologies*
- *Comprised of multiple agents (human, artificial, or both)*
- *Engaged in one or more tasks; organizations are systems of activity*
- *Goal directed (however, goals can change, may not be articulable, and may not be shared by all organization members)*
- *Able to affect and be affected by their environment*
- *Having knowledge, culture, memories, history, and capabilities distinct from any single agent*
- *Having a legal standing distinct from that of individual agents*

They also noted that one basic task for an organization is to override the cognitive, physical, temporal, and institutional limitations of an individual agency. These individual limitations can be overridden by joining together, cooperating, and coordinating (Carley & Gasser, 1999). Using these keywords we could define an organization as a coordinated and – in one way or another – structured way of co-operation.

A somewhat more humanistic definition of organization was formed by Dietz who wrote that a common core in all definitions of the notion of organization can be found in the literature: *An organization is a system of human beings with a particular purpose or mission* (Dietz, 2003). Furthermore, Dietz states that communication between members of an organization is an elemental part of the definition. He defines an organization as a social system formed by social individuals or subjects performing two kinds of acts: productive acts and coordinative acts. By means of production acts, the subjects contribute to bringing a material or immaterial act to be exploited in the environment of an organization. Coordination acts make subjects enter into and comply with commitments and agreements towards each other regarding the performance of production acts. Coordination encompasses all interaction inside the organization and between the organization and subjects in the environment (Dietz, 2003).

Sicilia et al. created a semantic definition of organization stating that the concept of organization requires that there are certain relationships between organization members. Each organization can undertake projects, enter into agreements, and own property. They pointed out that this view of organizations is able to model both an informal and legally constituted organization (Sicilia, et al., 2006). This approach sees organizations as independent actors but also notes the relationships between members. Barnard wrote that the concept of cooperation forms the base for the definition of organization as a system of the consciously coordinated cooperation of two or more persons. The survival of an organization is dependent on the willingness of members to cooperate, the ability to communicate, the existence of a goal, and common acceptance of it (Barnard, 1968).

Ferber et al. highlighted the diversity of the definitions of organization. They say that "organization" is a complex term with several explanations. Referring to the definition first proposed by Gasser, they define an organization as being a "*framework for activity and interaction through the definition of roles, behavioral expectations and authority relationships (e. g. control)"* (Ferber, et al., 2004). Ferber et al. found this definition to be too general and without any indication of how to design organizations and therefore turned to Jennings and Wooldridge, who proposed a more practical definition: They saw an organization as a collection of roles standing in certain relationships to each other. These roles take part in systematic institutionalized patterns of interactions with other roles (Wooldridge, et al., 2000). However, there was still something lacking from the definition: The partitioning of roles. All the organizations, except the very small ones, are structured and consist of several sub-organizations which may for their part consist of other sub-organizations and so on (Ferber, et al., 2004). From the definitions presented above, Ferber et al. derived the following features of organizations:

- *An organization is constituted of agents (individuals) that manifest a behavior.*
- *The overall organization may be partitioned into partitions that may overlap (called partition groups hereinafter)*
- *Behaviors of agents are functionally related to the overall organization activity (concept of role).*
- *Agents are engaged in a dynamic relationship (also called patterns of activities by Gasser), which may be "typed" using a taxonomy of roles, tasks, or protocols, thus describing a kind of supra-individuality.*
- *Types of behaviors are related through relationships between roles, tasks, and protocols.*

Gillian C. Hopkinson argues that an artificial definition of organization created in the framework of some theoretical context may be problematic for members of the organization and constructs a definition of organization based on the stories of those standing in the frontline. By combining the narratives of customers, suppliers and manufacturers, dealers and other participants, she found that each participant builds his/her own definition of the organization they form together. The views varied from partnership to customer-supplier relationship and from entrepreneur to employee. Hopkinson states that even inside one (sub)organization, the definition is fragmented and the degree of fragmentation increases as we cross organizational borders (Hopkinson, 2003).

3.5.2 Organizational and Business culture

Organizations can be seen as small societies with their own particular cultures, having an impact on the behavior of the members of the organizations (Litwinenko & Cooper, 1994). According to Kanungo, more than 160 different definitions of culture can be found, almost all of them including basically identical characteristics of culture (Kanungo, 2006). The concept of culture has been developed in the discipline of organization studies in two ways: As a critical variable and as a root metaphor (Smircich, 1983). The importance of the organizational culture can be described in four sentences: Cultures offer an interpretation of an organization's history that members can use to find out how they will be expected to behave in the future. They can generate commitment to a corporation or organization and its values so that members feel they belong to and work for something they believe in. Cultures can also serve as organizational control mechanisms, consciously or unconsciously approving or prohibiting certain patterns of behavior. And, finally, there is the possibility that some types of organizational cultures can be associated with greater efficiency (Martin & Siehl, 1983). In this chapter the aim is to present some typical but differing definitions of culture in terms of organizational culture.

In every organization there is a culture with an inherent value system, specific to that organization (Atkinson, 1990). This system, called the organizational culture, can be

designed for a certain purpose or it may have grown unconsciously, as time has passed. The visible signs of organizational culture indicate certain ways of working, like organizational structure, office design, external and internal communication (Atkinson, 1990). The original organization culture is created by the founders of the company and expresses the beliefs and the prejudices of the founders and the management team (Atkinson, 1990), (Schein, 1995). Schein viewed the concept of organizational culture as close to its meaning in social psychology: The culture identifies and differentiates a social group (Schein, 1984). Buch and Wetzel refer to both Schein and Sathe when they define organizational culture as a combination of visible and audible artifacts like dress codes, status symbols, or newsletters, and a collection of assumptions and prejudices, often unstated but manifested by those artifacts (Buch & Wetzel, 2001). They also note that culture is a reflection of many subsystems, i.e. managerial, social, and technical, at work. Ostroff et al. draw a connection between organizational culture and organizational climate by stating that climate is what people see and report happening to them in an organization. Organizational climate is a personal sense of organization and its practices, policies, procedures, routines, rewards and punishments. Culture explains practices and explains why something happens (Ostroff, et al., 2003).

Mary Jo Hatch criticized Schein's model of organizational culture for underestimating the role of symbols and processes in organizational culture. According to Hatch, Schein's model is stable and does not include the dynamics that are always present in organizations. Hatch added symbols and the continuously ongoing bidirectional processes of manifestation, interpretation, symbolization, and realization to Schein's model (Figure 14) (Hatch, 1993).

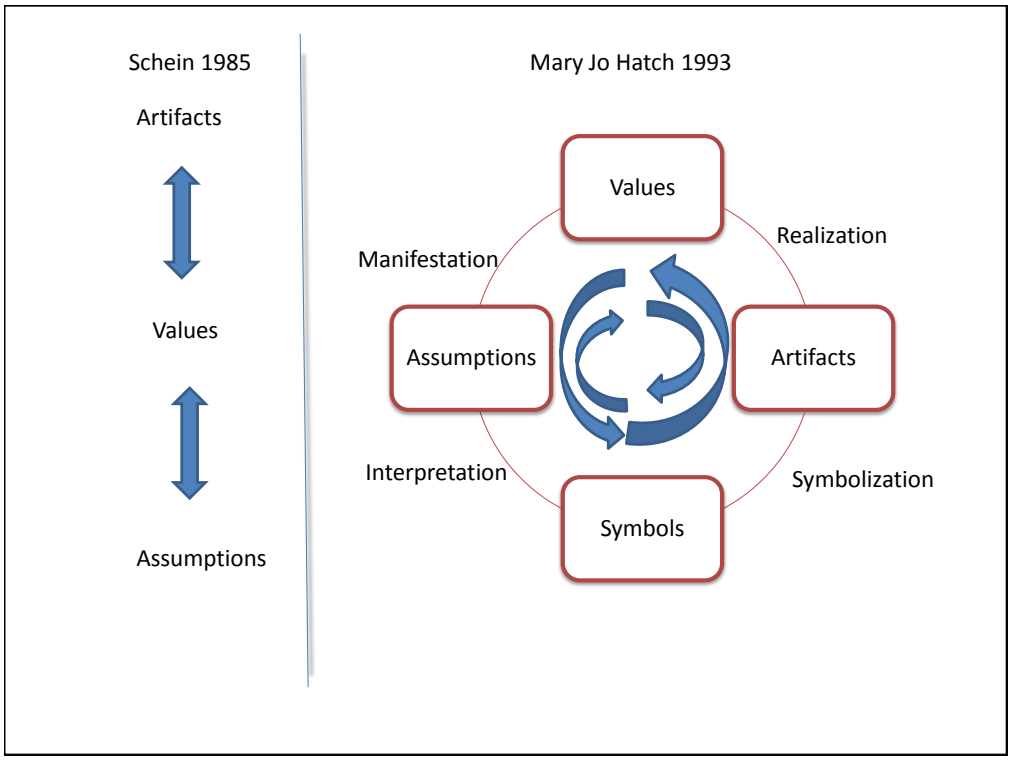

Figure 14: The Schein and Hatch models of organizational culture

The difference between the two models is that whereas Schein's model focuses on what artifacts and values tell us about the basic assumptions behind them, Hatch's dynamic perspective poses questions such as "*How is culture construed by assumptions, values, artifacts, symbols and by the processes that link them?*" (Hatch, 1993). Schein's point of view targeted cultural changes whereas the dynamic view accepts both stability and change as results of the same processes.

Schein later presented a model of three management cultures (Schein, 1996), in which he highlights three subcultures of organizational culture. He termed these subcultures "culture of engineering", "culture of operators" and "culture of executives (CEOs)" (Figure 15). According to Schein, these three subcultures have a particular impact on the common assumptions of the organization and especially on the organization's capability to learn, invent, and adapt new technologies and skills. These capabilities are needed, not only in the organization's daily business, but also in implementing new methods and technologies in information systems, manufacturing, or management, e.g.

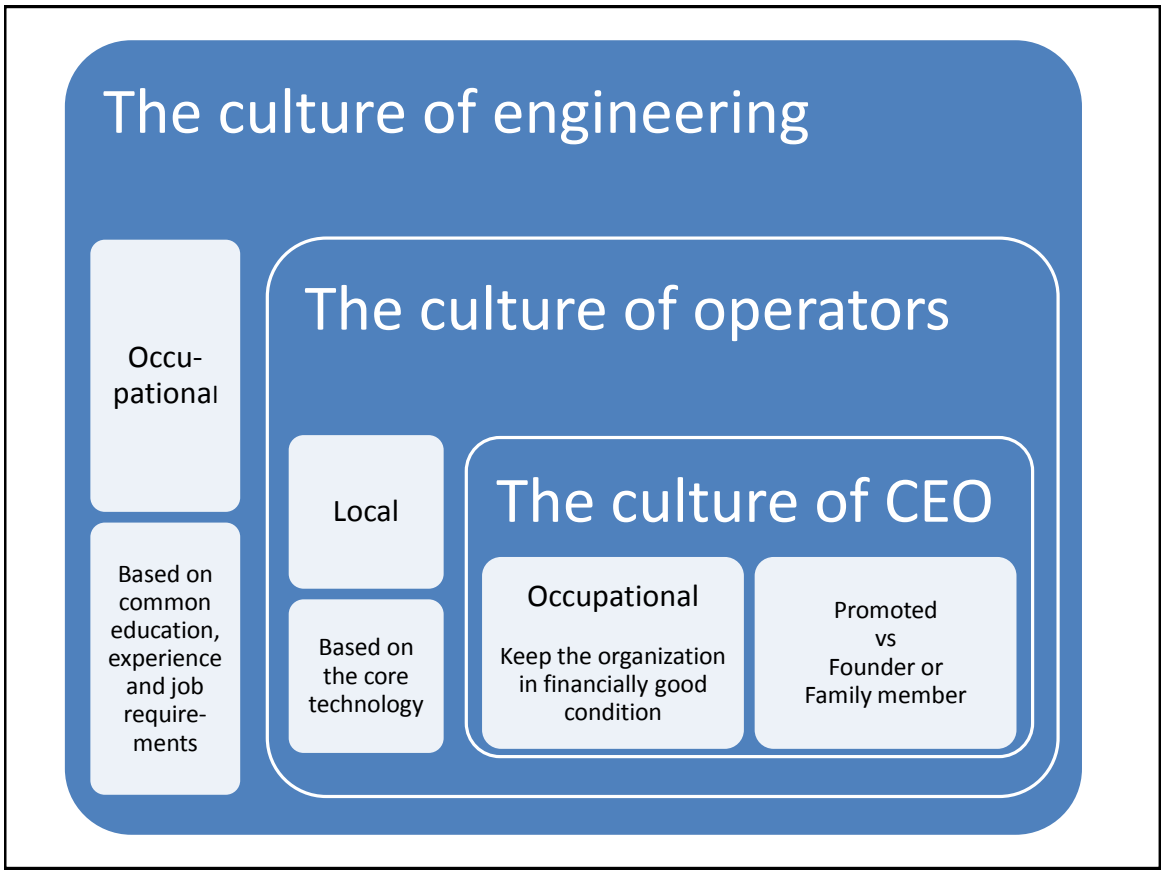

Figure 15: Three cultures of management according to Schein

Organizational culture deals with the values and beliefs to which members of an organization conform, often unconscious of the impacts of this commitment (Acs, et al., 2010). Due to this, members do not necessarily have a critical approach to their behavior. Values legitimize different objectives and different objectives in their turn generate different types of conflicts. To solve these conflicts, organizations with different cultures

tend to focus on different types of problem-solving techniques (Acs, et al., 2010). A firm or company is the basic cultural unit and social group for working people. And as in any group there is a dominant personality in the company, a leader, entrepreneur, director, whose role is to engineer the values and beliefs to which employees conform. The unity of organization culture is also maintained by recruiting employees having a similar background and education (Acs, et al., 2010).

P.K. Ahmed defines culture as a pattern of arrangement or behavior adopted by a group of people (team, department, company or corporation) as the accepted problem-solving method (Ahmed, 1998). He divides culture into two components: Explicit, which represents the visible part of culture, the patterns of behavior and the artifacts people produce and live within, and implicit, which refers to the values, norms, beliefs and premises which stand behind the visible behavior and determine it.

Al Alawi et al. wrote, combining the definitions of (Park, et al., 2004) and (McDermott & O'Dell, 2001) that organizational culture can be defined as the collection of shared assumptions learned by an organization while solving the problems of external adaptation occurring when coping with the environment. These assumptions are then taught to new members. They stated that each organization has its own unique culture that reflects the identity of the organization in two dimensions, visible and invisible. The visible dimension contains articulated values, the mission of the company and philosophy behind it whereas the invisible dimension includes the hidden values that guide the actions and perceptions of the members of the organization (Al-Alawi, et al., 2007).

Al-Shammari notes that although many writers use the terms corporate culture and organizational climate as synonyms, differences between these terms can be found. He considers the organizational climate as an artifact of corporate culture, an embodiment of shared values and assumptions visible to employees. He also emphasizes the importance of organizational climate for job satisfaction (Al-Shammari, 1992).

The anthropological approach to corporate culture highlights both the material and nonmaterial components of culture whereas the economic concept concerns material elements (Brinkman, 1999). Traditional elements of corporate culture e.g. values and attitudes, express only part of the corporate culture. To approach the corporate culture as an entity, also the materialistic elements like the materials and technology used, products and services produced, and the operation environment should be included in the definition of corporate culture (Brinkman, 1999).

Hofstede defines culture as the mental programming and software of the mind, saying that every person carries a pattern of thinking, feeling and acting that they have learned during their life. The role of the social environment is bidirectional: It acts as a source of software but it is also the result of combining individual mental programs. Hofstede refers to the anthropological approach and states that culture is always a collective phenomenon that is

at least partly shared with people living in the same social environment (Hofstede & Hofstede, 2005, pp. 2-4). For Hofstede, the kernel of a culture is a collection of values (Hofstede, et al., 1990) (Figure 16).

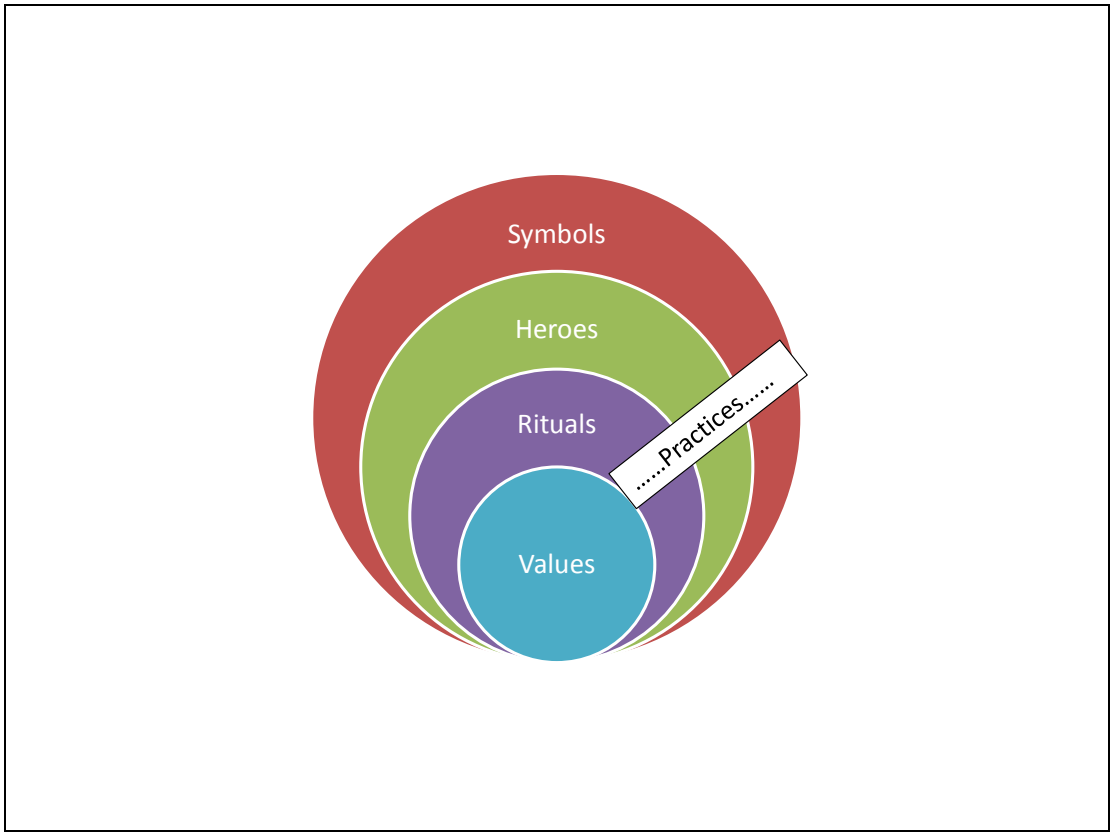

Figure 16: Manifestations of culture: From shallow to deep (Hofstede, et al., 1990).

The existent organizational culture is both manifested and maintained by the actions of the members of an organization (Harris, 1994).

A somewhat critical opinion is represented by Dianne Lewis, who states that organizational culture is only one dimension of the concept of organizational behavior. She also notes that, with few exceptions, the role and impacts of managerial control in forming and changing the organizational culture have not been addressed (Lewis, 1996). Lewis recognized four main themes in the literature concerning the definitions of organizational culture. The first theme concerned the argument whether culture is the visible and observable patterns of behavior or the underlying shared assumptions behind the behavior. The second theme is the role of the culture in the organization: Is it a variable or a root metaphor? As a third theme, she names the impact of the culture on the organization. She also sees a linkage between the second and third theme: Researchers who state that culture has an impact on the effectiveness of an organization see culture as a variable. The fourth theme is the creation and transmission of the culture: Does the behavior lead to shared feelings or do the shared feelings create the behavior? (Lewis, 1996). Dianne Lewis also notes that the concept and term of culture has been borrowed from another discipline,

anthropology, although it is now a basic concept in many disciplines under the context of organizational behavior, e.g. management sciences, psychology, sociology, etc. (Lewis, 1998). Taking advantage of the term born in other research tradition may cause difficulties in understanding the nature of culture. However, culture is an interdisciplinary phenomenon. According to Lewis, the nature of organizational culture is three-layered (Figure 17). The visible and observable level that includes behavior, symbols, processes and forms, reveals the feelings, beliefs and values of an organization. This second level for its turn reveals the culture of an organization – that is: Basic assumptions behind the visible symbols and behavior (Lewis, 1998).

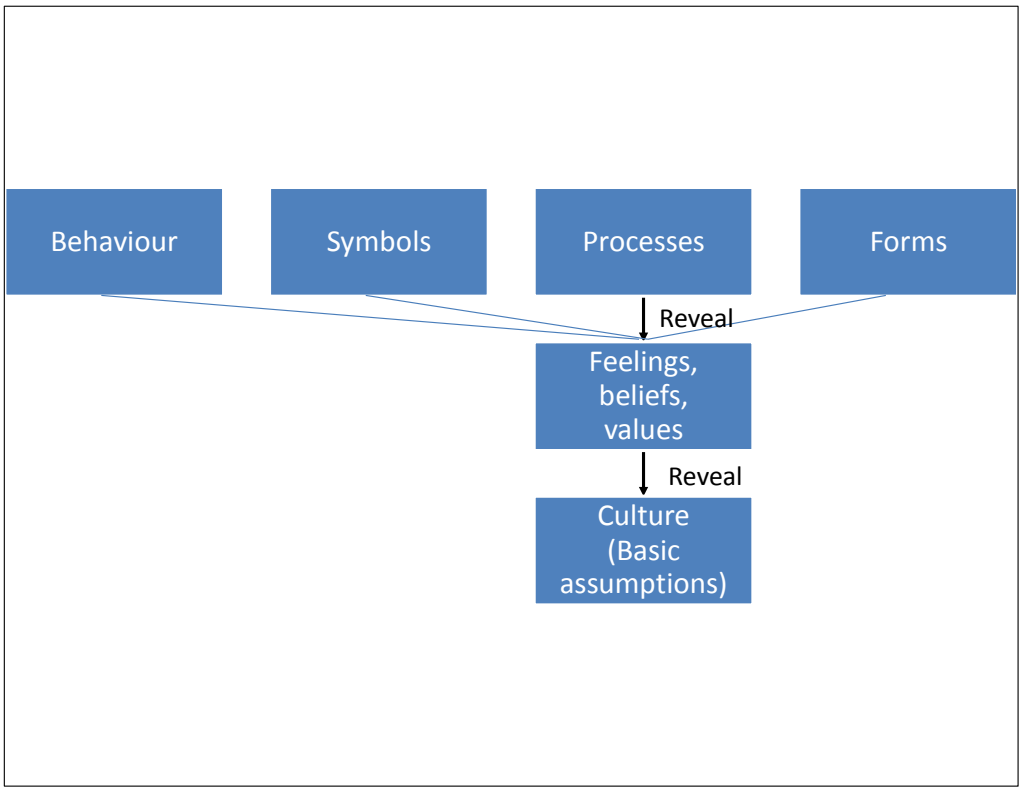

Figure 17: The three-layered nature of organizational culture (Lewis, 1998).

The Lewis' model is as a matter of fact, a more detailed modification of Schein's model.

Ogbor criticizes the contemporary concept of corporate culture and writes that it is possible – from a dialectical perspective – to "*see the corporate culture as an organizational practice that fosters consciousness, identity-securing practices, employee-empowering and the promotion of diversity in the workplace*" (Ogbor, 2001).

Pettigrew defined organizational culture as a collection of symbols impressed by language, rituals, and myths all of them expressing ideologies, values, beliefs, and assumptions (Pettigrew, 1979).

The system theoretic approach presents culture as a subsystem as a part of organizational system where each subsystem has its own functions and impact on the whole system (Figure 18) (Smircich, 1983):

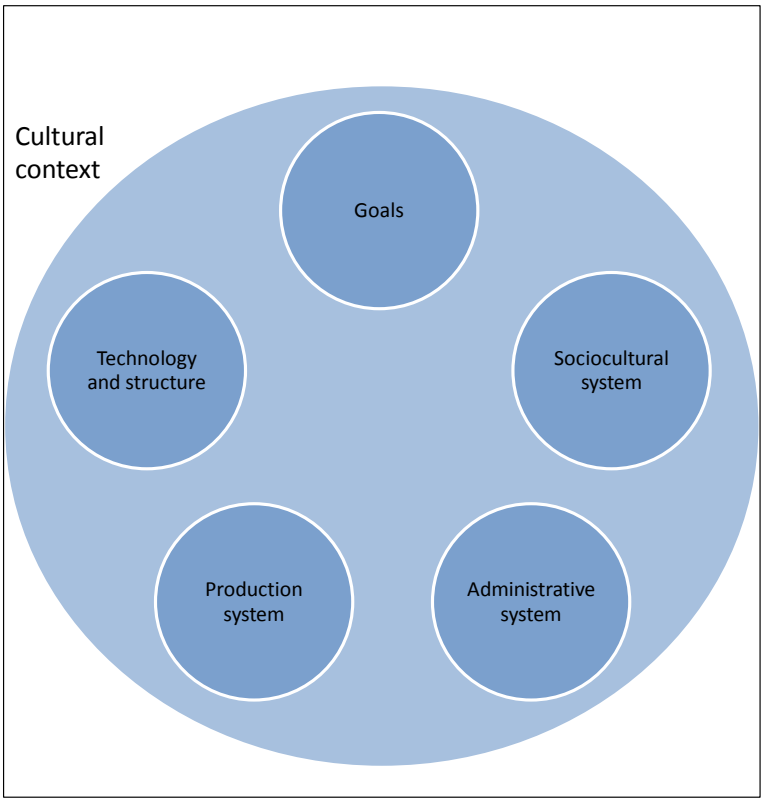

Figure 18: Culture and the systems theory framework according to (Smircich, 1983).

3.5.3 Culture, organizational culture, corporate culture and business culture

The topics of this research are closely related to the concept of business culture. But what is the relationship between the concepts of culture, organizational culture, enterprise culture, corporate culture and business culture? Weber et al. argued that the concept of culture has been "*ill-defined, with no distinction drawn between the national and corporate levels of culture*" (Weber, et al., 1996). Baligh approached this question by viewing culture as an integrated part of human, organizational and business life, noting that cultural aspects like religion is often ignored in business (Baligh, 1994). Sarah Franklin for her part connected the invention of the term "Enterprise culture" with the debates in the context of phenomena known as "Thatcherism" (Franklin, 1990). Gorman draws a light equation mark between organizational and corporate culture and says that corporate culture is a combination of different organizational and managerial cultures and practices which unites an organization, gives a meaning to both workers and managers of a corporation, takes care of the transmission of learning and handles the emotions (Gorman, 1989). Harrington and Guimaraes (Harrington & Guimaraes, 2005) seems to use organizational culture and corporate culture as synonyms in their work which aimed to find corporate cultural types that were related to absorptive capacity. Also Fiona Harris and Leslie de Chernatony draw

an equation sign between terms “organization’s culture” and “corporate culture” in their work, approaching corporate branding and brand performance (Harris & de Chernatony, 2001), whereas B. E. Hermalin states that corporate culture is not the same as national culture although there certainly exist some national, regional and ethnical properties inherited into a corporate culture (Hermalin, 1999). Laurence Jackson (Jackson, 1991) discusses the term “business culture” as a synonym for organizational culture or corporate culture and Igo & Skitmore (Igo & Skitmore, 2006) define organizational culture with terms which partially seems to agree with Gerry Johnson and Kevan Scholes who defined the business culture as “the way we do things around there” (Johnson & Scholes, 1988, p. 38).

Most of the authors seems to view organizational, business or corporate culture as a part of a corporation’s or organization’s identity, but T.C. Melewar and Elis Karaosmmanoglu write that among the managers they interviewed, there was no unanimity whether the corporate culture was a product, determinant or part of corporate identity or none of those (Melewar & Karaosmanoglu, 2006). However, there was a high unanimity that the corporate culture of the organization is essential to its commercial success. Ogbor, for his part, says that corporate culture is important because common values and beliefs are needed when the business environment is ambiguous and complex. But the corporate culture can also be used as an instrument for repression, domination, and the hegemonic perpetuation of a group within organizations and the whole society (Ogbor, 2001).

Although researchers seems to be relatively unanimous that terms corporate culture, organizational culture and business culture are describing the same phenomena, Rob and Zemsky note that corporate culture differs from the culture of other groups in that a corporate, the firm or its managers may in some cases be willing to affect the culture and its manifestations (Rob & Zemsky, 2002). In this context it must be, however, highlighted, that all kind of organizations may be targets of conscious organizational change.

Due to the multidisciplinary nature of terms with word “culture” included, the terms can also be used in other than organizational contexts. M. Çule and M. Fulton, e.g., seems to use the term “business culture” in the meaning of “national ways to do business” (Çule & Fulton, 2009).

3.5.4 Does the culture matter?

P.K. Ahmed highlights the importance of organizational culture for innovativeness. According to him, the culture that approaches change as a positive prospect is a primary premise for innovation (Ahmed, 1998). The organizational culture also creates moral binds between the company and its employees (Acs, et al., 2010) and gives the organizational rules for bad and good – it creates the business ethic code of the company or corporation. In management sciences, there is a lot of research which proves that organizational culture has its impacts on an organization’s efficiency (e.g. (Weber & Pliskin, 1996)), safety (e.g. (Ruighaver, et al., 2007)) or ethical aspects (e.g. (Vitell, et al., 1993), (Sims & Brinkmann,

2003)) but there research is lacking on approaching the impacts of organizational culture on information systems implementing projects in the discipline of computer science (Wangler, et al., 2000). Wangler et al. highlight that to start an implementing project that recognize the cultural aspects we should first at least be capable to model culture to be able to predict its impact on the implementation. They describe the impacts of culture on implementation of ERP packages with the knowledge meta-schema that is partially presented in Figure 19.

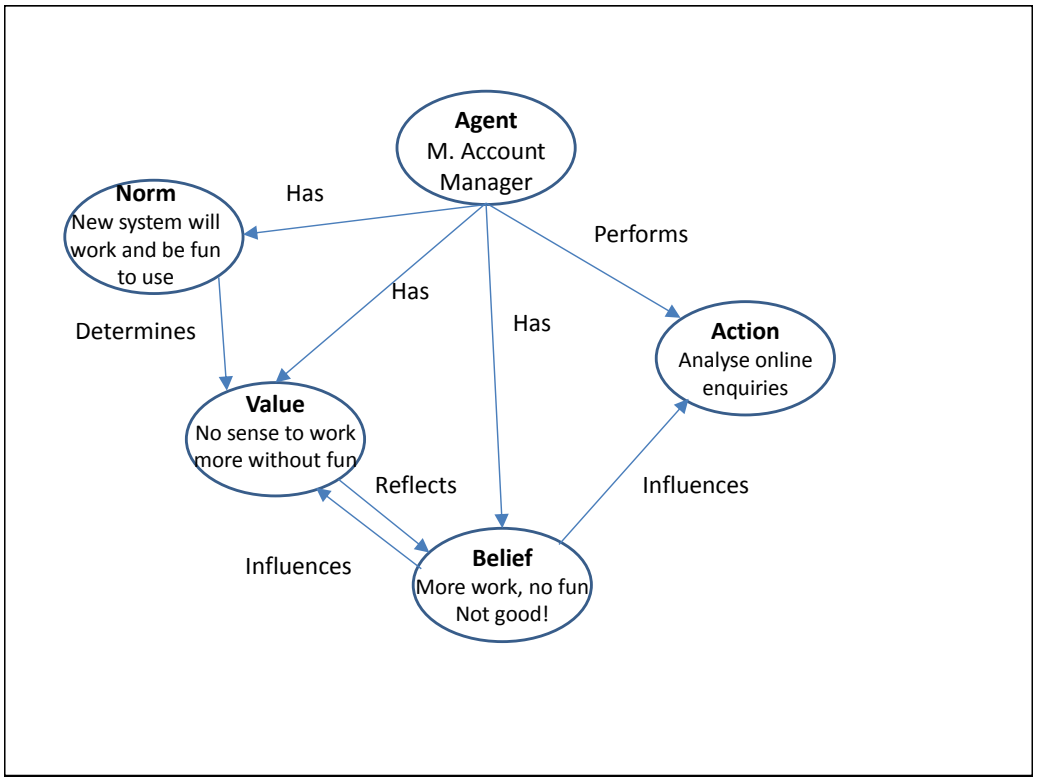

Figure 19: A partial example of the knowledge meta-schema according to (Wangler, et al., 2000).

These partial meta-schemas drawn out of each agent and aggregated to organizational level form a cultural meta-schema of an organization. Wangler et al. note, however, that instead of exact and valid information their results give a signal of potential importance of culture.

3.5.4.1 Project as organizational function

The number of studies approaching organizational culture, cross-cultural differences, the national levels, and their impact on IT development and use of information technology has increased within the last years. However, research approaching the organizational culture and/or the organizational context in which IT projects are implemented is still rare (Prifling, 2010).

Canadian researcher Adnane Belout wrote that in the past, projects have been seen as technical systems instead of behavioral systems, and that relatively little attention was paid to the human resource factor (Belout, 1998). In Australia, Baccarini et al. researched risk

factors in IT projects and found under the topic of political circumstances three issues that are dependent on the organizational situation (Baccarini, et al., 2004):

1. Organizational culture does not allow or advance managerial support for the project,
2. Projects may suffer from a lack of executive support due to the political game that belongs to organizational culture
3. Projects may have a number of requirements that are political in their origin. The requirements may have been slipped to the requirements definition to advance interests of some participant, not the whole organization.

Michael Prifling approaches the influence of organizational culture in his case study. He notes that although the impacts of organizational culture on IT projects have been researched since the mid 1970's, the risks caused by organizational environment are often ignored by project managers. He also highlights that organizational risks may obstruct other risks and that all risks could be construed as organizational (Prifling, 2010). In his research he found that the organizational culture in the organization located in the co-operative banking sector was emphasizing consensus and balance, which led to too many open projects at the same time, which in turn led to delays and poor quality. They also found that the impact of the organization culture on the other project variables is bidirectional: Because there was no penalty for delays, the organization as well as the project managers accepted the situation and took the schedules as just a formality.

Andersen compared the base culture in the organization to culture exemplified in projects by using the typology of Harrison-Handy. He found that out of 130 base organizations, 76 expressed task culture, 41 role culture, 12 power culture, and only one person culture, but in projects the culture exhibited was mainly task culture. Role culture was found in 19 projects, power culture in 4, and person culture in 2 projects (Andersen, 2001). He also divided the projects into IT projects and non-IT projects and the culture into 15 areas such as "manager," "subordinate" etc, and measured the organizational type per area. The results proved that task culture is stronger within IT projects than projects in general (Andersen, 2001). A project organization is a form of organization that is accepted to be learning-intensive (Disterer, 2002).

According to Hillson, among the elements contributing to project management capability captured in ProMMM (Project Management Maturity Model), there are also areas of organizational culture (Hillson, 2003). The role of organizational culture becomes highlighted at maturity level 4, called "Natural project management organization," where the organization should have a fully project-based culture. This means an organizational culture where there is a top-down commitment to project management, with leadership by example, and proactive project management is encouraged and rewarded. Yazici found in his research that to survive with schedules, budgets and expectations, organizations should be able to change their cultures into a form that supports knowledge sharing, collaboration,

and empowerment (Yazici, 2009). According to her, organizational culture has a significant impact on project success as well as on the long-term success of organizations.

Pliskin et al. found in their research that the organizational culture had an impact on the success of implementing information systems. They identified seven cultural factors that affected the implementation: Innovation and action orientation, risk taking, integration and lateral interdependence, top management contact, autonomy in decision making, performance orientation, and reward orientation (Pliskin, et al., 1993). Furthermore, they found that these factors alone were not the reason for failure but also the gap between the presumed and actual culture, which raised resistance as a rational response to this gap.

Large information system projects are organizationally challenging because they involve parties from many different organizations (Markus & Tanis, 2000), even competing ones: Supplier and customer, subcontractors of the supplier, and sometimes even subcontractors and vendors of the customer.

J. Tolsby states that the organizational culture emerges most importantly in the intersection between an organization and IT (Tolsby, 1998). He states that an organizational culture can in many ways be a hindrance to the successful adaptation of IT. Tolsby describes the military organizational culture as hierarchical, risk- averse and having a high job rotation rate which he believes leads to a situation where difficult decisions were left for successors, jobs were split, and workers deskilled. Users and their representatives were not heard in project teams. Tolsby states that the development and implementation of the new system was unable to change the organizational culture. The dominant organization culture made it less receptive to adopting the IT system (Tolsby, 1998).

Hefner notes that when implementing new SWE concepts like CMM the culture of an organization should be acknowledged and practices should be prioritized according to current organizational culture and also the weaknesses should be recognized and potential needs for change should be identified (Hefner, 2003). He states that organizational goals and project goals are very often in conflict with each other. Governance programs are seen as time-consuming and counter-productive for project goals.

Hefner touched on the meeting of customer and supplier when stating that one of the key problems between two organizations arises from the axiom "The customer is always right." In the original context it implied that the wishes of the customer should be understood and addressed. However, it is commonly used as permission to violate organizational terms the customer does not agree with (Hefner, 2003). As an example, Hefner mentions the customer’s unwillingness to pay for the supplier’s Quality Assurance time. In the customer’s opinion, they have paid for the product as it is described in the contract and costs for assuring quality are the supplier’s responsibility. Suppliers, for their part, may have an organizational standard that a separate Quality Assurance must be made for each implementation.

3.5.4.2 Business culture and cooperation

There are numerous reported studies approaching the impacts of cultural differences between different countries, religions or ethnic groups on co-operation between two groups, e.g. (Hofstede & Hofstede, 2005), and (Kanungo, 2006). However, the majority of this research concerns only a few of all the differences between two organizations with same national, ethnic and religious background. This chapter presents some findings from the literature that highlight the organizational aspect of cultural differences.

The capability to co-operate is mostly addressed as a personal attribute, part of one's social capital. However, firms seldom observe the cooperation and due to this are unable to reward workers for co-operation (Rob & Zemsky, 2002). Rafael Rob and Peter Zemsky found that emphasizing the individual co-operative capability of employees makes the corporate culture more co-operative.

In 1972 Robert Harrison wrote in his article that the failure to recognize and understand the ideological differences between organizations may cause organizational conflicts. He defines the term "organizational ideology" in a way that makes it at least as a part of if not as a synonym for organizational culture: "More than a set of prescriptions and prohibitions… establishes a rationale for do's and don'ts". Harrison created a conceptual framework for classifying organizations and noted that recognizing the type of organizational ideology of both one's own and the opposite organization may help in avoiding and solving conflicts (Harrison, 1972)

Peter Ackers states in his work that enterprise culture and industrial relationships go hand in hand and industrial relationships are not just an archaic relic but a part of modern business life. Although he is concerned with relationships between enterprises and labor organizations, he highlights some issues which affect industrial relationships and which can be seen as having their roots at least partially in enterprise culture: These are the different ways to use power and handle conflicts, attitudes to equality, gender and minorities, worker participation and involvement and flexibility (Ackers, 1994).

Al Alawi et al. highlighted the role of organizational culture in knowledge sharing. The findings of their research indicated that trust, communication, rewards and organization structure were the cultural elements that were positively related to organization sharing (Al-Alawi, et al., 2007).

Bali notes that the common models of behavior that form an organization's culture are less explicit than formal rules and procedures but these patterns may have a powerful impact on the way that employees and managers approach commercial objectives, external interest groups like customers or suppliers, or profit maximization (Bali, 2000). He also notes that a person who has been a member of an organization can himself be a product of the organizational culture.

K. Blomqvist wrote in his dissertation that differences in organizational cultures may have a negative impact on developing relationships and co-operation. He states that, like a culture based on shared history and experiences may cause tensions in interfirm relationships, it can also create conflicts in partnerships (Blomqvist, 2002, p. 68) p. 68. Marko Mäkilouko for his part states that cultural sympathy and understanding foreign cultures as a social phenomenon helps in maintaining team cohesion and avoiding cross-cultural problems (Mäkilouko, 2004). Nikander and Eloranta studied the possibilities to find early warnings of failure in project management and found that one of three causes for problems standing out from the basic material was "Differences in project culture." If organizations in the same project had different organization cultures, problems would probably arise. In a further analysis, they found that problems and causes like management, project culture, multiple reasons, organization, personnel skill and talent, lack of resources and attitudes all impact one another (Nikander & Eloranta, 2001).

Culture impacts communication and information in organizations. These impacts are seen in the decision to communicate or not, ways to communicate, with whom to communicate, as well as in the information given. In some organizations the weight of informal communication is greater whereas in other organizations the majority of information comes via official routes (Brown & Starkey, 1994).

Hyder and Eriksson write that key factors in alliances are motives, resources, and trust. If we have a good reason, that is acceptable for both partners, if we have allocated enough resources for realizing the alliance and if all participants can trust that no party will behave opportunistically, the alliance may succeed (Hyder & Eriksson, 2005). But this is not enough. According to Hyder and Eriksson, differences in organizational cultures may create communication gaps, misunderstanding and distrust, which may lead to the death of an alliance (Hyder & Eriksson, 2005).

An interesting detail is presented by Kosalge and Motwani, who highlight the roles of sub-organizations and subcultures inside an organization and their impact on an ERP implementing project. They found that in both case companies they researched, the effective use of the ERP system was reached just after changes to the organization's structure and ways of doing things – that is: organizational culture (Kosalge & Motwani, 2008). The need for change in these cases had arisen partly due to the fact that in some sub-organizations the organizational culture was quite different compared to each other, and in some – not necessarily the same ones – the attitudes against the changes needed in the processes was so strong that co-operation was difficult. Joanne Martin and Caron Siehl might have recognized these cases as a good example of what they call "*Counterculture*." Counterculture is a form of subculture that consciously or unconsciously acts otherwise – but not necessarily against – than the dominant organizational culture. It is likely to emerge when there is a strong authority and tightly centralized organization – something

against which to rebel. The counterculture often has a charismatic leader (Martin & Siehl, 1983).

Mello and Stank researched the cultural premises for changing organizational culture to support supply chain management (SCM). In their report they state that firms lacking the required cultural elements (trust, commitment, cooperative norms, organizational compatibility and top management support) run the risk of failing when implementing SCM (Mello & Stank, 2005).

3.5.5 Culture in information systems research

The organizational culture has historically played a relatively small role in IS research. Avison and Myers noted in 1995 that although there are exceptions the term "culture" has been used, as a general rule, rather narrowly in the IS literature (Avison & Myers, 1995). Avison suggested that the orthodox view of the culture concept should be abandoned and the contemporary anthropological idea of culture should be used. According to Avison, the modern concept of culture includes the following properties:

1. Attention will be paid to ways in which members of organizations create and recreate meanings by using information technology.
2. The culture will be considered as an ever-changing emergent concept through which people conceptualize the world they live in.
3. Seeing the culture as a forever-changing conceptual process vitiates Schein's suggestion that culture could be managed (managing the organizational culture has proved to be difficult if not impossible).

The rise of the socio-technical approach, see e.g. (Patnayakuni & Ruppel, 2010), at the end of the 1990s and in the early 2000s as well as the increased number of outsourcing cases ((Miller, et al., 2009), (Hendry, 1995) has enhanced the interest in organizational and cultural issues in software engineering and information technology (Jaakkola & Heimbürger, 2009). However, there are still only a few papers and research approaching the topic, and, furthermore, most of them approach the cultural differences from the point of view of national and ethnic cultures.

3.5.6 How can cultures be classified

Many writers in management literature, sometimes even in scientific literature, tend to classify cultures in terms like "good", "valuable", "bad" and so on (Alvesson, 1989), (Atkinson, 1990). This kind of simplified classification may help people to explain to themselves why they enjoy or hate their work, but it is not necessarily a good base for an a more detailed analysis. In 1972 Robert Harrison presented a typology of four aspects (role, power, task and person) for understanding organizational culture (Harrison, 1972). In a power culture there is a certain source of power that spreads influence throughout the organization. A role culture is based on bureaucracy, logic, rationality and defined roles set

to the members of an organization. In a task culture the power is based on expertise, not on position or charisma, and structurally, the task culture can be described as a network or matrix. A person culture pays a lot of attention to the development of human potential and well-being. This kind of culture is formed by a group of people deciding that it is in their own best interest to be organized on a collective basis rather than an individual basis. A person culture can be described graphically as a cluster with no dominating individuals.

This typology was further developed by Handy (Handy, 1996) and utilized by Erling S. Andersen in his study on Norwegian project culture (Andersen, 2001). Deal and Kennedy divided the organizational culture into four generic cultural types: The tough-guy macho culture, the work hard/play hard culture, the bet-your-company culture, and the process culture (Deal & Kennedy, 1983). Scholz in turn identified three typologies based on different cultural dimensions: The evolution dimension (how cultures vary over time), the internal dimension (how the internal stakeholders, properties and circumstances of an organization impact its culture), and the external dimension (how an organization's external stakeholders and environment influence its culture) (Scholz, 1987). The last named dimension can be seen to be in accordance with the Deal-Kennedy typology (Andersen, 2001) but the Deal-Kennedy typology can also be interpreted to describe the different ways an organization reacts e.g. in problem solving.

Quinn and McGrath based their typology on transactions with information exchange in organizations. They divided organizational culture into four generic cultures: rational (Market), ideological (Adhocracy), consensual (Clan), and hierarchical (Hierarchy) (Quinn & McGrath, 1985). Dubinskas for his part concentrates on two opposite models of organizational culture: a Taylorist, control-oriented funnel model and, in contrast, a more chaotic fermentation vat model with flexible learning (Dubinskas, 1991).

The typology of Trompenaars and Hampden-Turner seems to be close to the Harrison-Handy typology. Just like Harrison-Handy it consists of four cultures: Family, Eiffel Tower, Guided Missile, and Incubator. The status of the family culture is created by close and powerful parent figures. Thinking in such kind of culture is intuitive and holistic. In the Eiffel Tower culture, status is built by superior roles. Thinking is vertical, analytical, logical, rational, and efficient. Typical of the Guided Missile is that status is realized by organizational members who contribute to targeted goals. Thinking in the Guided Missile culture is problem-oriented and cross-disciplinary. The Incubator culture achieves status by growth and by creative individuals applying creative thinking (Trompenaars & Hampden-Turner, 1999).

Philip Atkinson presents another way to classify business cultures in his article (Atkinson, 1990). The list of factors that were thought to be important in indicating the predominant culture within a company is a result of a brainstorm by a group of managers:

1. Ethos - the way things were laid out.
2. Spirit or teamwork.
3. Warmth and friendship.
4. Ideals - company messages and how they were displayed.
5. Management style - what people did, not what they said.
6. How they talk to you, the tone, and manner of communication.
7. Listening to us - is there evidence.
8. Attitudes to employees portrayed through noticeboards.
9. Involvement - did people incorporate the ideas of others.
10. Ambiance - was it a nice place to be.
11. Telephone response.
12. Promises not kept - especially between departments.
13. Events - was there evidence of a corporate get-together.
14. Criteria for selection/appraisal - was it a pleasant experience.
15. Type of communication.
16. Negative rumors and the failure to address them.
17. Reception - staff entrances and goods inwards and outwards.
18. Stereotypes of departments - what is projected by opinion leaders.
19. Answering the phone - was there a concern for helping.
20. Tidiness in all areas.
21. Clutter in non-manufacturing areas.
22. Participation - did people participate.
23. Belonging - did they feel at home.
24. Motivation - the process - was it carrot and stick.
25. Shared corporate values - were they known by all and displayed.

Harrington and Guimaraes base their two-dimensional model (Table 9) of four competing value dimensions on the works of Quinn and Quinn & Rohrbaugh, highlighting that many other researchers have also used the competing values framework to model organizational culture (Harrington & Guimaraes, 2005). They note however that ethnographic culture researchers argue that the competing values framework simplifies the concept of culture and that some other researchers find the framework to correspond to the cognitive representation of value patterns learned over time. Harrington and Guimaraes state that although the competing values framework is not as rich as the qualitative ethnographic studies, it has been proved to be valid for measuring the common cultural dimensions in organizations (Harrington & Guimaraes, 2005).

Table 9: Characteristics of the four competing values dimensions (Harrington & Guimaraes, 2005)

	External Focus	**Internal Focus**
Flexibility	**Developmental** adaptability, growth, resource acquisition, risk taking, adhocracy, compliance by ideology	**Group** cohesion and morale, development of human resources, supportive, clan, compliance by affiliation
Order	**Rational** planning and goal setting, efficiency, competence, compliance by contract	**Hierarchical** Stability and control, information management, conservative and cautious, compliance with rules

Hofstede et al. classified organizations by factors like *"Need for security," "Work Centrality"* or *"Need for authority"* and by the following attribute-pairs:

- Process-Oriented versus Results-Oriented
- Employee-Oriented vs. Job-Oriented
- Parochial vs. Professional
- Open System vs. Closed system
- Loose Control vs. Tight Control
- Normative vs. Pragmatic

They also divided cultural differences into three levels: National, occupational, and organizational. The national level includes the differences caused by national culture (without forgetting the ethnic background, religion, gender and other factors that cause differences in national cultures even within the same nation), the occupational level includes the differences caused by education as well as by occupational traditions, and the organizational level includes the differences caused by different organizational cultures (Hofstede, et al., 1990)

As an extension to Quinn and Rohrbaugh's *Competing Values Framework* (Quinn & Rohrbaugh, A spatial model of effectiveness criteria: Towards a competing values approach to organizational analysis, 1983), Quinn and Cameron (Quinn & Cameron, 1983) presented six dimensions of organizational culture (Table 10):

Table 10: Quinn and Cameron's six dimensions of organizational culture according to (Igo & Skitmore, 2006)

Dominant Characteristics	Degree of teamwork Sense of belonging Level of creativity Level of dynamism Focus on goals Focus on competition Reliance upon systems Emphasis on efficiency
Organizational Leadership	Leadership style and approach that permeates the organization. Roles: Mentor, facilitator, innovator, broker, producer, director, coordinator, monitor
Management of Employees	How employees are treated Degree of consultation Degree of participation Degree of consensus Working environment
Organizational Glue	Bonding mechanisms that hold the organization together, e.g. teamwork, loyalty, commitment
Strategic Emphasis	Organizational strategy drivers • long-term development of human capital • innovation • stability • competitive advantage • growth • acquisition • achievement of goals.
Criteria for Success	How success is defined Who gets rewarded profits Market share and penetration Sensitivity to customers Concern for people Development of new products and services Dependability Optimum cost

Maurice B. Line typifies different organizational cultures using animal metaphors. The Lion Culture dominates its field without a great deal of effort. According to Line, it is typical for this culture that there is one and only one dominant male at the top, powerful but manipulated by the females. The Chimpanzee Culture consists of very intelligent but aggressive individuals, forced to co-operate with each other in order to survive. The leading member is challenged all the time and can never feel secure. In the Bonobo Culture the bonds between members and the corporate spirit is strong (among real bonobos this is due to high sexual activity), and this kind of organization is possible only in very special conditions, like a monopoly. The Gorilla Culture is gentle, playful, cohesive, and

unaggressive, but the organization and especially its leader may often be seen as frightening by the others. The Hyena Culture is rather unpleasant. Hyenas are carrion-eating animals that kill if needed but prefer to take advantage of carrion. The cohesion inside the organization is however strong. The Wolf Culture hunts by teamwork, the organization has a very strong hierarchy, and members obey the leader at all times. The cohesion and loyalty are very strong. The organization with the Cow Culture has a pathetic atmosphere. The leader needs his organization around him to be something and has a very limited vision about what to do – except attack when he feels himself threatened. But the reasons for attacks are not always very rational. In the Sheep Culture the head of the group sees off rival individuals in a very certain manner. However, the leader has no idea of what is going on, and the outsider (in nature the shepherd) can easily manage the whole group. The Elephant Culture is undiscriminating, long-lasting, and creates a strong cohesion between members who supports each other. Neither the group nor the members can be bullied away, and so this kind of organization can trample all over the area. The Cat Culture differs from the others. The members of such an organization are very independent, working in teams only if necessary, fighting against invaders only if they believe victory to be possible. The organization is flexible and democratic, because the members do not like authority, but on the other hand, all the decisions are made on the basis of self-interest (Line, 1999). The allegory between humans and animals is naturally just a part of the truth, but nevertheless, it provides a set of easily recognized characteristics of different organizations.

3.5.7 Assessing organizational culture

What kind of tools and sources can be used when assessing organizational culture? In their literature review, Jung et al. identified seventy instruments designed to explore organizational culture. However, the majority of these instruments were at a preliminary stage and needed a lot of developing (Jung, et al., 2009). In their research, Linna & Jaakkola searched for culture assessment tools for software engineering companies. Their point of view was mainly outsourcing and differences in national cultures (Linna & Jaakkola, 2010). They recognized several culture assessment tools, mainly aimed for assessing national culture and based on the theories of Geert Hofstede and Richard Lewis. However, Linna & Jaakkola concluded that using existing tools requires in most cases more knowledge about culture and deeper cultural awareness than SE companies generally have. They highlight the fact that each cultural level (group, team, organization and national) needs a particular assessment tool, and state that there is still a need for a tool set that would be easy to use and applicable for different needs and organizational environments. When discussing sources that could be used in the assessment process, the situation is better. The organizational world inevitably produces documents, artifacts, and behavior that can be studied. Bali has listed examples of different documents and other information that could be combined to form a view of an organization's dominant culture. These include reports, letters, memos, emails, health & safety regulations and rulebooks, protocols, forms of

address, stories and myths, jokes, rumors and speculation, dress codes and career paths (Bali, 2000). Like Jung et al., Dianne Lewis also found a wealth of techniques but highlighted the fact that, almost without exception, they all included a study of behavior and stated that behavior is not always a good indicator of values and assumptions (Lewis, 1996).

Buch and Wetzel (Buch & Wetzel, 2001) presented a process of three steps to analyze organizational culture. The process starts with learning and getting to know the mental model of the culture. In this phase the persons analyzing an organization learn the skills needed to conduct a cultural analysis. They should know the theories of both organizations and culture and understand the open systems theory because culture is a reflection of many subsystems. The second phase in this model is to observe the organization and to collect the artifacts and espoused values by going into the field. Also, documents, reports and other written material should be collected, speeches and meetings recorded, and so on. In the third phase the collected material is analyzed to infer the basic assumptions from the artifacts and espoused values.

The cultural audit is a model presented by Fletcher and Jones for measuring corporate culture. It is based on the use of different organizational culture types and dimensions. The relevant dimensions are first measured and scored with the help of these measurements. The organization is then classified according to the scores. Examples of dimensions in the short-term aspect are perceived workload, amount of job discretion and role clarity, and in long-term aspects include commitment, morale, training, career development, and quality of service. Fletcher and Jones classify the cultures into four bipolar types: Homogeneous vs. heterogeneous culture, enriched vs. managed culture, developing vs. stationary culture, and balanced vs. dissonant culture. They also point out that there is no ideal culture but in each context and situation there are cultures which work better and cultures which work worse. However, the types presented can be used to describe the culture, e.g. an organization may have a heterogeneous, managed, developing, or balanced culture (Fletcher & Jones, 1992).

Hofstede et al. used interviews and questionnaires to assess values and practices in several work organizations. The questions in the questionnaires were targeted to assess work goals, general beliefs, perceived practices, and typical behavior of a member of the organization. The common scale used in the questionnaires was a 5-point semantic differential scale and the questions were formulated as statements such as *"Employees are told when a good job has been done," "Variety and adventure in work are unimportant"* or *"Employees are afraid to disagree with superiors."* Also the data concerning size, branch, structure, control system and demographic profile of both management and employees was collected (Hofstede, et al., 1990). A. Hopkins states that surveys are the predominant strategy for studying organizational cultures (Hopkins, 2006). It is typical for surveys that questionnaires are sent to individuals and data is then aggregated to the organizational level. According to Hopkins, the survey method is well suited to research individual

attitudes and values as well as practices. He warns, however, that the survey method provides a relatively superficial description of an organizational culture. Practices may be too complex or processes too dynamic to be completely described by questionnaires. Hopkins states that the ethnographic method – that is living in the organization and observing it from the inside – is the key to this kind of problem (Hopkins, 2006). Surveys, which consist of a set of written items that require respondents to respond in some meaningful way, are, however, an effective and efficient tool for gathering information (Sleezer & Swanson, 1992). Sleezer and Swanson highlight the fact that culture surveys are not only tools for researchers but also the management of an organization can use them as a source of information and a tool for interactive communication. According to them, the current situation should be analyzed before developing the survey, the survey instrument should be designed to collect specific information, the survey should be administered consistently, the data should not be over-reacted to, and the results of the survey should cause immediate but meaningful actions. The latter two pieces of advice are mainly directed to those who conduct surveys for managerial purposes.

Quinn and Cameron developed an assessment tool based on Quinn and Rohrbaugh's Competing Values Framework to be able to determine the relative importance of cultural traits inside an organization and to be able to establish the dominant culture type characteristics of the organization as well as the overall culture profile in terms of the Competing Values Framework and six key dimensions of organizational culture. The data they collected consisted of base information (History, size, branch and structure, market areas etc) and the results of a survey conducted by OCAI Method. The OCAI Method is a survey designed to indentify the current culture of an organization (Cameron & Quinn, 1999). The basic OCAI form includes 6 questions, each with four alternatives to choose from. The answers of each respondent are scored, the sum and average of the scores are calculated, and a graph of the organization's profile is drawn (Igo & Skitmore, 2006), (Cameron & Quinn, 1999).

Udai Pareek developed the OCTAPACE profile to measure organizational ethos in eight dimensions, which are:

1. Openness – How spontaneous are the feelings and thoughts expressed and feedback received?
2. Confrontation – How are problems and challenges faced?
3. Trust – Does the organization trust – is the organization worth trusting?
4. Authenticity – Congruence between feeling, saying and doing
5. Proaction – Being prepared, initiative, systematic and preventive
6. Autonomy – Using and giving freedom to act, respecting individual and role autonomy
7. Collaboration – Giving and asking for help, team spirit, and co-operation in problem solving

8. Experimentation – Innovative problem solving, feedback used for improving, creative

In Pareek's way of presenting culture, the ethos is the core level, the values that give a distinct identity to the group, team, or organization. The perceived attributes of an organization are termed the climate, and the effect of the climate is the atmosphere of the organization. The fourth, topmost level is the culture that contains the cumulative beliefs, values and assumptions, reflected in habits, rituals, artifacts, codes and norms and so on (Pareek, 1992). In the OCTAPACE process, the data is collected by questionnaire and interpreted and scored by respondents according to instructions.

3.5.8 Matrix as organizational structure in projects

It is also possible to approach the relationship between project and organization from the point of view of organizational (structural) design. Out of the results of the conducted literature review, more than 40 papers, books, and articles were identified as concerning problems that occurred in matrix organizational structures in which one of the dimensions was projects. Although a lot of the research found was made in some other context than software engineering or information technology projects, the results and lessons learnt from them may be applicable in information technology projects.

In projects, with the exception of the smallest ones, there is always some kind of project organization inside the base organization of the company. This project organization has – or at least should have – its own manager with the particular empowerment needed to complete the project, and employees working for the project (Barker, et al., 1988). In IT projects it is quite common that the customer's personnel is involved with the project but not available for the project, which means that they have to serve two masters at the same time (Sy & D'Annunzio, 2003). The supplier, for its part, may have a specialized project organization dedicated for implementing projects but it is very common that members of each project team have several roles in the organization. They may be involved with e.g. both project and user support, project and product testing, project and product development, and so on. In this kind of situation a worker may have more than one superior and he/she may belong to two or more organizational units or sub-organizations (e.g. (Sy & D'Annunzio, 2003), (Hax & Majluf, 1981)). The situation becomes even more complicated if the project organization is a common one between the customer, supplier, and/or subcontractor. It was as early as in 1976 when K. Knight wrote that the matrix organizational form always requires changes to the organizational culture of a firm, and even then the success cannot be guaranteed (Knight, 1976).

The organization described above is often called a "hybrid organization" (Lentz, 1996) (also an organization that consists of actors from private sector, public sector and /or third sector is often called hybrid (Thomasson, 2009)). One of the most common and also most debated types of hybrid organization is the matrix organization. In the matrix organization,

there are two organizational structures combined together (Figure 20), e.g. functional and line or functional and project (Galbraith, 1971). The matrix organization structure is typical of large organizations with needs for greater information processing (Dibrell & Miller, 2002) but is used in everywhere where there is a need, although temporary, to combine two organizations (Arvidsson, 2009).

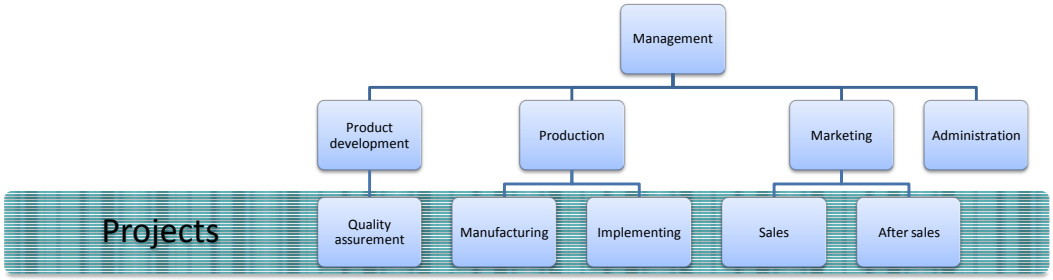

Figure 20: An example of a matrix organization

The design and structure of an organization is both a manifestation of the organizational culture and a factor that affects it (Al-Alawi, et al., 2007), (Carzo Jr & Yanouzas, 1969), (Child, 1973). Strict hierarchies and long and well-defined command chains have sometimes been seen as synonyms for bureaucracy and inefficiency (Paton, et al., 2010) or incapable of responding to increased information processing needs (Gullöv, et al., 2006), and new structural forms have been developed to respond to the needs of modern organizations. In matrix organizational forms, the old hierarchical structure is often left – consciously or unconsciously – as a vertical dimension and e.g. product lines, projects, or processes are brought in as horizontal dimension. This means that all or some of the old cultural properties may underlie the new organizational structure and culture although the need for change is recognized. Oertig and Buergi studied cross-cultural project teams and found that, in matrix settings, team members tended to listen more to the line superior than to the project manager or to the project team leader (Oertig & Buergi, 2006).

The challenges found in pure matrix organizations (Sy & D'Annunzio, 2003) can also be found in organizations where the matrix structure is temporary, e.g. in an organization where a project has been founded for a certain purpose, as well as in project-based

organizations or PBO (Arvidsson, 2009), (Hobday, 2000). N. Arvidsson describes the PBO as a semi-matrix where production and production support is organized as projects but e.g. marketing, distribution, and administration are managed as vertical permanent functions. Arvidsson stated, based on the literature review he conducted and his own findings, that the organizational tensions in project organizations are created by contradictions between the functional organization that aims at performance and predictability, and the project organization, which is often founded for certain purposes, is temporary (at least the members may vary from project to project), and has a pre-defined deadline. These two organizations compete for the same limited resources (personnel, time, money) (Lundin & Söderholm, 1995). In addition to this competition, there is a contradiction between functional, commonly mechanistic processes that are based on standardization and repeatability, and organic processes that are based on adaptability and uniqueness (Dougherty, 1996). The tension inside a matrix organization structure arises from the different ways of horizontal and vertical dimensions to do things, or their different organizational cultures (Arvidsson, 2009).

In his research, Arvidsson categorized tensions into six categories in which he recognized eight sources of tensions (Table 11).

Table 11: Sources of organizational tensions in POO and PBO organizations

Category	**Source**
Time	Differences in organizing principles of line versus projects
Team	Identity and identification of employees Relationships and heterogeneity
Task	Task or process-related differences of opinion
Organization	Detachment challenge Size and complexity of organization (incl. unclear roles and responsibilities)
Transition	Learning boundaries
Empirical	Access to critical resources

Arvidsson concluded that more attention should be paid to the organizational tensions in project-based or project-oriented matrix organizations than is currently the case.

Hovmark and Nordqvist found in their research, that although commitment, dynamism, support, solidarity, and communication increased when changing to a project organization, the increased time pressure and conflicts impacted negatively on success (Hovmark & Nordqvist, 1996). Their research included both functional and project matrix organizations. Although one goal in changing to a matrix structure is to utilize all available knowledge in the most effective way, this is rarely realized because in matrix organizations the conflicts will hardly ever be resolved at the lowest level of the organization (Whitford, 2006). Whitford also highlights the fact that the network form that is sometimes offered as a substitute form violates the unity of command structure as well as the matrix form.

Barker et al. (1988) highlighted the role of individual members of project teams who have different opinions concerning the methods and tools to use and ways to do things when targeting the best possible success. Barker et al. stated that, in this kind of situation, the project manager has a key role in establishing a co-operative team spirit. Bourne and Walker noted the complexity of the matrix organization, the multiple reporting and need to negotiate and compete for limited resources allocated by functional units (Bourne & Walker, 2005). Unlike Arvidsson, who seems to take all the project organizations as matrixes, Bourne & Walker divided project organizations into five types: Functional, Weak matrix, Balanced matrix, Strong matrix, and Projectized. Bourne & Walker also state that projects should be considered as organizations because they have a purpose, sub-organizations, authority and information networks, and their own culture. Projects are organizations, but temporary ones, and their structure and culture reflect that of the founder organization (Bourne & Walker, 2005), (Schein, 1983). In their research, Bourne and Walker found that ambiguity, uncertainty, and turbulence impact everyone in the organization. Goold and Campbell highlighted the slow decision making, searching for consensus and ambiguous reporting relationships, which according to them make many managers feel uncomfortable in matrix structures (Goold & Campbell, 2003) and insisted on increasing clarity in roles and responsibilities in matrix organization structures (Goold & Campbell, 2003b).

One of the subjects under discussion has been that what type of (matrix) organization would be best in managing projects. Eric Larson and David Gobeli analyzed 546 development projects and found out that the pure functional or functional matrix was less successful than other forms of matrix organization. However, the superiority of each type of organization depends on the issue measured. In meeting schedules, the project matrix was better than the balanced matrix but was outperformed by the project team in controlling costs (Larson & Gobeli, 1989). This ambiguousness of the advantages of matrix organization forms has been highlighted by Rees and Porter, who noted that *"Although there can be many benefits to be gained by matrix structures, there are also many potential obstacles"* (Rees & Porter, 2004). They recommended that matrix organizations should be carefully planned and attention should be paid to the selection and training implications.

There are also conflicting opinions concerning the usability of hybrid organizations in projectized business. Irja Hyväri conducted a survey to study the effectiveness of different organizational structures from the point of view of project management, and found that the project team and the project matrix were thought to be the most effective organizational structures for managing projects (Hyväri, 2006). McCollum and Shierman attacked the criticisms of matrix structures presented e.g. by Peters and Waterman and stated that Peters and Waterman's conclusions were incorrect (McCollum & Sherman, 1991). Joyce studied the impact of changing to a matrix structure on fourteen factors that directly or indirectly affect the success of the project (Table 12). He found that although the results were partly in line with assumptions gained from the literature, they varied

depending on the occupation of the respondent and the group he/she belonged to (Joyce, 1986). Kuprenas reported a case study on implementing a matrix organizational structure in a part of the Bureau of Engineering in LA, and stated that even though the implementation was difficult and the problems described in the literature occurred, the performance of the organization improved compared to the former situation (Kuprenas, 2003). As a matter of fact, there is evidence that a matrix organization might be suitable for organizing internal processes like research and development (Knight, 1976) that require specialized knowledge and information handling but do not interact with stakeholders outside the organization or where this kind of interaction is relatively rare, and in which there is no need for fast decision making.

The discussion concerning matrix organizations and their advantages and disadvantages will probably continue, although some researchers argue that the time of matrix organizations has passed by and the era of information technology has brought new organizational models like network and shadow organizations, e.g. (Dibrell & Miller, 2002), (Gusev, et al., 2010). According to Dibrell and Miller, the use of information technology has not only increased the vertical flow of information in hierarchical organizational structures but also made it possible to distribute the same information in horizontal levels, enabling a reduction in organizational control and the levels of the organization. This together with the reorganization of tasks and creation of complete new occupations has affected organizational culture: Although the first applications of IT enabled greater centralization, use of information technology now allows flexibility and freedom from bureaucratic controls (Dibrell & Miller, 2002). In the future, Dibrell and Miller state, the role of information technology will be more like a proxy that acts as a shadow structure than a tool that supports organizational structures.

The structural aspects of organizational culture will be further discussed in chapter 6.4, which connects the findings of the literature review and the findings of the Delphi-based study.

Table 12: Effects of changing to matrix structure (Proposed in literature vs. experienced)

Variables	**Effects of Matrix Structure**		
Organizational processes	**Effect on variable**		
	Proposed	**Experienced**	**Supposed impact of effect on success**
Frequency of formal communication	Increases	Increases (D) No effect (E, C)	Mainly positive
Frequency of informal communication	Decreases	Decreases (D) Increases (E, C)	Mainly negative Mainly positive
Amount of formal communication	Increases	Increases (D, E) Decreases (C)	Mainly positive Mainly negative
Participative quality of communication	Increases	Decreases (E, D, C)	Mainly negative
Directive quality of communication	Increases	Increases (C) Decreases (E, D)	Mainly positive Mainly negative
Coordination	Increases	Increases (E, C) Decreases (D)	Mainly positive Mainly negative
Role perceptions			
Role conflict	Increases	Increases (D) Decreases (E, C)	Mainly negative Mainly positive
Role ambiguity	Increases	Increases (D) No effect (E, C)	Mainly negative
Work attitudes			
Satisfaction with work	Decreases	Decreases (E, D) Increases (C)	Mainly negative Mainly positive
Satisfaction with supervision	Decreases	Decreases (D, E) Increases (C)	Mainly negative Mainly positive
Satisfaction with co-workers	Decreases	Increases (E, C) Decreases (D)	Mainly positive Mainly negative
Satisfaction with pay	Decreases	Decreases (D, C) No effect (E)	Mainly negative
Satisfaction with promotions	Decreases	Decreases (D) Increases slightly (C, E)	Mainly negative Mainly positive
Job involvement	Decreases	Decreases (E, D, C)	Mainly negative
According to W. F. Joyce (1986) E = Engineering group D = Drafting Group C = Control Group			Derived from the literature, e.g. (Joyce, 1986), (Harris & Raviv, 2002), (Rees & Porter, 2004), (Sy & Cote, 2004), (Eisenhardt, 1985) and from the answers of panelists.

3.5.9 Project success

There are many ways to define the success of a project. Adnane Belout wrote that in the literature on project management, many researchers and practitioners consider performance, effectiveness, and success to be synonyms (Belout, 1998), (Belassi & Tukel, 1996). Traditional project management literature has evaluated project success in accordance with general cost (staying within budget), time (staying on schedule), and quality of product (Aloini, et al., 2007), (Narayanaswami, 2007), (Wateridge, 1995). The first two items are explicit and measurable variables but how do we define the quality of a software product or shared information technology project? Lyytinen and Hirschheim (Lyytinen & Hirschheim, 1987) approached this problem by categorizing IT project success into categories "Reaching planned objectives", "Reaching project goals" and "Matching user expectations" in addition to the classic project budget and schedule. The quality – or success – was assessed by obtaining the users' consensus on the differences. In the early decades of software engineering research, different kinds of checklists were also recommended (Abe, et al., 1979) to ensure that the designed product "*would not fail*" or – in other words – that it would work as planned. DeBakker et al. presented in their work a critique of common and traditional success criteria, stating that they had been created for the needs of the vendor or supplier, not the customer (Bakker, et al., 2010).

Belassi and Tukel collected the traditional definitions of project success in one table (Table 13). The lists presented in this table were not particularly designed for IT projects as their background lay more in traditional industries like shipbuilding and construction.

In their study, Belassi and Tukel grouped factors into three groups: Organization, Project manager, and Others, and grouped the respondents according to branch into the following groups: Construction, Defense, MIS, Utilities, Environment, Manufacturing, and Others. They found that success factors belonging to the "Project Manager" group were rated as most important only in the construction industry. All the other groups voted the factors in the "Organization" group as most important. However, when rating the importance of single factors, the following four factors were highlighted: Cost, Time, Quality, and Client satisfaction (Belassi & Tukel, 1996).

Berntsson-Svensson and Aurum collected factors that influenced project success the most from Swedish and Australian companies and grouped them by branch (Berntsson-Svensson & Aurum, 2006). They found the following groups:

Financial Services

- Complete and accurate requirements from project start
- Good schedule estimates
- Enough time for requirements elicitation
- Well-defined project scope
- Rewarding staff for working long hours

Consulting

- Complete and accurate requirements from project start
- Enough time for requirements elicitation
- Good schedule estimates

Telecommunications Industry

- Complete and accurate requirements from project start
- Completing the requirements (if not complete from project start) during the project
- Enough time for requirements elicitation
- Use of a specific method for requirements gathering

Furthermore, Berntsson-Svensson and Aurum divided the results concerning the software industry into two groups, project success factors and product success factors, pointing out that the success of the product should be separated from the success of the software project. They found that the three most important success factors for software projects were:

- In financial services
    - Customer involvement
    - Committed sponsor
    - Overall good requirements
- In consulting
    - Very good project manager
    - Understanding customer's problem
    - Well defined communication
- And in telecommunications
    - Good relations between personnel
    - Understanding customer's problem
    - Complete and accurate requirements

According to Berntsson-Svensson and Aurum, the three most important success factors for a software product were:

- In financial services
    - Satisfied customer
    - Great quality
    - Satisfied top management
- In consulting
    - Satisfied customer
    - The product works
    - Economic benefit for the supplier
- And in telecommunications
    - Satisfied customer
    - Customer comes back
    - The product works

Table 13: Seven traditional lists of critical success factors developed in the literature by (Belassi & Tukel, 1996)

Martin (1976)	**Locke (1984)**	**Cleland and King (1983)**	**Sayles and Chandler (1971)**	**Baker, Murphy and Fisher (1983)**	**Pinto and Slevin (1989)**	**Morris and Hough (1987)**
Define goals Select project organizational philosophy General management support Organize and delegate authority Select project team Allocate sufficient resources Provide for control and information mechanisms Require planning and review	Make project commitments known Project authority from the top Appoint competent project manager Set up communications and procedures Set up control mechanisms (schedules, etc.) Progress meetings	Project summary Operational concept Top management support Financial support Logistic requirements Facility support Market intelligence (who is the client) Project schedule Executive development and training Manpower and organization Acquisition Information and communication channels Project review	Project manager's competence Scheduling Control systems and responsibilities Monitoring and feedback Continuing involvement in the project	Clear goals Goal commitment of project team On-site project manager Adequate funding to completion Adequate project team capability Accurate initial cost estimates Minimum start-up difficulties Planning and control techniques Task (vs. social orientation) Absence of Bureaucracy	Top management support Client consultation Personnel recruitment Technical tasks Client acceptance Monitoring and feedback Communication Trouble-shooting Characteristics of the project team leader Power and politics Environment events	Project objectives Technical uncertainty innovation Politics Community involvement Schedule duration urgency Financial contract legal problems Implement problems

It is worth noting that a “satisfied customer” is considered to be a success factor for a software product but not in a software project (Berntsson-Svensson & Aurum, 2006). However, Berntsson-Svensson and Aurum paid only little attention to this even though it would have been very interesting to find out why it was so. Were the software projects seen as development and design projects without customers, and in that way the company’s internal business or was the customer and his opinion just “sound and fury, signifying nothing” in the minds of project-oriented respondents.

Al-Mashari et al. formulated the categories of Lyytinen and Hirschheim (Lyytinen & Hirschheim, 1987) into four types of success (Al-Mashari, et al., 2003):

- *Correspondence success: There is a match between IT systems and the specific planned objectives*
- *Process success: IT project is completed within time and budget*
- *Interaction success: Users’ attitudes towards IT are positive*
- *Expectation success: IT systems match user expectations*

In the same way, Al-Mashari et al. put the results of Shang and Seddon (Shang & Seddon, 2000) in the form of 5 success criteria for ERP Implementation:

- *“Operational: Cost reduction, cycle time reduction, productivity improvement, quality improvement and customer services improvement*
- *Managerial: Better resource management, improved decision making and planning, and performance improvement*
- *Strategic: Supporting business growth, supporting business alliances, building business innovations, building cost leadership, generating product differentiation and building external linkages*
- *IT infrastructure: Building business flexibility, IT cost reduction and increased IT infrastructure capability*
- *Organizational: Supporting organizational changes, facilitating business learning, empowering and building common visions”*

The original work of Shang and Seddon also included the comment that many of the respondents reported more benefits than were expected, and many of them had found quite new benefits after the cases were written, and that one of the most important of these spontaneously found benefits was the ability to extend systems to new applications and to support new strategies (Shang & Seddon, 2000).

Wateridge (Wateridge, 1998) stated in his survey of the success of IT projects that the participants associated project success in different ways. The grass root users appreciated better working conditions and easier use while the project managers were interested in official and perhaps more traditional goals like being within budget and on time. He emphasized the importance of clear definition or agreement of criteria accepted by all participants to be used when assessing the project success (Wateridge, 1995). Wateridge

found that the criteria used in successful projects differed from that used in failed projects: In successful projects there were criteria like *Meets user requirements, Happy users, Commercial success, Meets budget,* and *Meets quality* whereas in failed projects the criteria used were *Meets user requirements, Meets budget, Achieves purpose, Meets timescales,* and *Happy users*. He notes that many of the criteria are subjective and not necessarily understood in the same way by all of the participants.

Linberg (Linberg, 1999) found that the experienced success of a completed project was in correlation with the experienced quality of the product. He also stated that a cancelled project could have a positive result if there had been organizational learning during the project.

Belout noted that the evaluation of the success may vary depending on the type of rater. Referring to other writers like Freeman and Beale, he writes that project success could be measured from three points of view: Sponsor's, Project Manager's, and Sponsor as Project Manager's view (Belout, 1998). He also presents seven criteria for success originally identified by Freeman and Beale (Table 14). Most of these seven criteria are technical or technocratic in nature and Belout, borrowing from Hubbard, points out that major project failures are usually sociological. He picks up old writers Thornberry and Rogers who both argued that organizational behavior, misdirected priorities, and inadequate training impact project success directly (Belout, 1998). Success in organizational contexts requires qualified and motivated personnel. Taking the points presented above into account, Belout presents the following factors affecting project success: *Project mission, Project schedule, Client consultation, Technical tasks, Client acceptance, Monitoring, Communication, Trouble-shooting, Management support, and Personnel*.

Agarwal and Rathold wrote that one reason for the relative rarity of success found in IT projects may be contextual differences in the meaning of success in the minds of people who evaluate project success (Agarwal & Rathod, 2006). In their research they found that cost, time and scope (functionality and quality of the software) were the significant metrics of success adopted in a software project. Scope was considered to be the most important success criteria and functionality was rated more important than the quality of the software in defining the success of the project. In addition to the three core parameters, some software professionals also considered customer satisfaction and specific priorities of the project as being important criteria.

Table 14: Success criteria and description according to Freeman and Beale (Belout, 1998)

Success Criteria	**Description**
Technical performance	To what extent the technical requirements specified at the commencement of the execution phase were achieved
Efficiency of project execution	The degree to which targets of time and cost were met
Managerial and organizational implications	A measure of client, parent company and user satisfaction, incorporating the degree to which the project was carried out without disturbing corporate culture or values
Personal growth	The satisfaction of the project team, particularly in terms of interest, challenge, and professional development
Project termination	The completeness of the termination, the absence of post-project problems, and the quality of post-audit analysts
Technical innovativeness	The success in identifying technical problems during the project and solving them
Manufacturability and business performance	The ease with which the product resulting from the project can be manufactured, and its commercial performance

In their research, Thomas and Fernández divided the criteria used by companies to define success into three categories (Table 15): Project management success, technical success, and business success (Thomas & Fernández, 2008).

They found that most of the companies involved in the study used at least one criterion from each category. The companies were also aware of the fact that it is possible to have project management success without business success. Success is more than just meeting the requirements defined in the purchasing contract (Thomas & Fernández, 2008).

Table 15: Criteria used by the participants to judge success (Thomas & Fernández, 2008)

Success criteria	**Category**		
	Project management	Technical	Business
On time	X		
On budget	X		
Sponsor satisfaction	X		
Steering group satisfaction	X		
Project team satisfaction	X		
Customer/user satisfaction	X	X	
Stakeholder satisfaction	X	X	
System implementation		X	
Met requirements		X	
System quality		X	
System use		X	
Business continuity			X
Met business objectives			X
Delivery of benefits			X

Davide Aloini, Riccardo Dulmin and Valeria Mininno (Aloini, et al., 2007), applying Agarwal & Rathod's (Agarwal & Rathod, 2006) and Procaccino & Verner's (Procaccino, et al., 2002), (Procaccino, et al., 2005) works, classified ERP project failure as one of four levels:

a) Process failure, when the project is not completed within the time and budget.
b) Expectation failure, when the IT systems do not match user expectations.
c) Interaction failure, when users' attitudes towards IT are negative.
d) Correspondence failure, when there is no match between IT systems and the planned objectives.

A. Fowler and M. Walsh construct the definition of success on the basis of the hierarchical causal chain first presented by Lucas (Fowler & Walsh, 1999). In this chain the elements are acceptance, use, improved performance, satisfaction, and organizational payoff. Fowler and Walsh emphasize the dilemma included in Lucas's definition: The use (or usage) is a relevant measure if the use is voluntary, but if the use is forced, a more relevant measure could be user satisfaction. This, however, highlights the role of users and their individual perspectives in measuring success.

Markus and Tanis for their part (Markus & Tanis, 2000) recommended that a minimum set of project success metrics should include at least the following parts:

1. *Project Metrics* that measure the performance of the enterprise system project team compared to schedule, budget, and functional goals set in the early phase of the project.
2. *Early Operational Metrics* that measure how business operations perform during the phases of implementation and commissioning stages until production use is achieved. These kinds of metrics can be e.g. labor costs, time required to fill an order, customer calls unanswered, partial orders filled, orders shipped with errors, inventory levels etc.
3. *Longer-Term Business Results,* which means measuring the performance of an organization after normal business operation has been achieved. Relevant metrics may include ROI (return on investment), achievement of qualitative goals set when founding the project such as things made only once, faster and more qualified reporting and decision making, ease of maintaining and upgrading of information technology and so on.

Markus and Tanis also note that success of an enterprise-wide system project is multidimensional and relative a) to the time when it is assessed, and b) to the organization's unique goals for the system.

McGinnis and Huan argue that contemporary SE research generally concentrates on new system implementations and excludes support for the final project success although many systems fail shortly after production use is achieved (McGinnis & Huang, 2007). They believe this is at least partially due to the fact that enterprises implementing IT, especially

ERP systems, cannot manage the knowledge. Their hypothesis is that knowledge should be seen as one product of an IT project and handled and measured accordingly. This means saving the knowledge (documenting), evaluating the value of the knowledge, sharing the knowledge, and reusing the collected knowledge.

Müller and Turner divided project success into two components, referring to project management literature in common and Morris & Hough and Wateridge in particular,(Müller, et al., 2007):

A. ***Project success factors****, elements of a project that can be influenced to increase the likelihood of success; these are independent variables that make success more likely* (Müller, et al., 2007).
B. ***Project success criteria****, the measures by which we judge the successful outcome of a project; these are dependent variables, which measure project success* (Müller, et al., 2007).

Müller and Turner argue that success criteria vary depending on the project, its goals, properties, stakeholders etc. They also note that people may judge project success in different ways depending on their personal objectives. It is possible that one person judges a given project to be successful but another finds it to be a failure. In their work they used the following criteria:

- End-user satisfaction
- Supplier satisfaction
- Team satisfaction
- Other stakeholders' satisfaction
- Performance in terms of time, cost, quality
- Meeting user requirements
- Project achieves its purpose
- Customer satisfaction
- Reoccurring business
- Self-defined criteria

Furthermore, they rated the criteria according to project complexity, project importance, contract type and industry sector and classified the projects by application area, project life cycle stage, project culture and contract type to find out the dependencies between these issues and ratings made by the project managers interviewed. The respondents in their survey rated the seven most important criteria to be End-user satisfaction, Supplier satisfaction, Team satisfaction, Other stakeholders' satisfaction, Customer satisfaction, Reoccurring business and Self-defined criteria, whatever that may be (Müller, et al., 2007).

In the survey conducted by Weiss and Andersson among the CIOs, VPs of IT and IT staff members working in seven different Fortune 500 companies, the respondents named the

metrics with which they measured IT project success or with which their efficiency was measured (Weiss & Anderson Jr., 2003):

- Time to market
- Balanced scorecard
- Cost / benefits
- Product / service innovation
- Percentage cost / sales
- Safety, legislative mandates
- Customer satisfaction
- Enterprise system implementation

Weiss and Andersson note that *measurements of success in the IT project and organizational environment are also those for the business: a balanced scorecard approach (which includes organization-wide indicators, including "learning" and financials as well as business objectives); time-to-market; product/service innovation; and customer satisfaction* (Weiss & Anderson Jr., 2003).

J. D. Procaccino wrote that it is normally difficult to define a concept like ''success'' due to the fact that the point of view of project stakeholders may vary depending on their job, the practices, organizational culture and goals which the organization sets for the system (Procaccino, et al., 2005). J. D. Procaccino et al. found in their research that the most important factors for project success according to developers were the presence of a committed sponsor and the level of trust that the customers and users had in the project manager and project team (Procaccino, et al., 2002). The developers found the projects successful if they were experienced as internally motivating work in developing software systems that both met customer user needs and were easy to use (Procaccino, et al., 2005).

Bernroider and Ivanov validated the CobiT model (*Control Objectives for IT and related Technology*) with some empirical research. They found the most commonly used metrics for success to be (Bernroider & Ivanov, n.d.):

- Project meets stakeholder expectations
- Project is on time and budget
- Project follows project management standards and practices
- Project receives post-implementation reviews
- Project has certified or trained project managers
- Stakeholders participate in projects (involvement index)

Another way to approach the theme of success is that of risk management specialists. In risk management, one cannot always guarantee success, but one has the goal of identifying and responding to potential problems fast enough to avoid crisis situations. Bearing this in mind, a project manager can achieve the main goal of project management: Control of risks

(Addison & Vallabh, 2002). In this approach, the identification of risks and risk factors play a key role. Addison and Vallabh listed several items recognized as risk factors in not only their own but also in other researchers' work:

1. Unclear or misunderstood scope/objectives
2. Unrealistic schedules and budgets
3. Lack of senior management commitment to the project
4. Failure to gain user involvement
5. Inadequate knowledge/skills
6. Lack of effective project management methodology
7. Misunderstanding the requirements
8. Gold plating
9. Continuous requirement changes
10. Developing the wrong software functions
11. Subcontracting
12. Resource usage and performance
13. Introduction of new technology
14. Failure to manage end user expectations

The list above is not comprehensive. Not all of the risks exist in all projects and in some project a risk may be indentified that is specific to that project that is not mentioned above.

Cule et al. proposed a model where risks were categorized into two main categories: Inside risks and outside risks. Inside risks were divided into risks originating from the project manager and / or the organization itself and risks caused by the task. Outside risks were divided into risks originating from the client and risks caused by the environment. The identified risks were collected and evaluated by category (Cule, et al., 2000). This model is based on the assumption that risk management is the vendor's responsibility. Ropponen and Lyytinen, for their part, noted that the capability to cope with the development risk is contingent upon many external factors including organizational characteristics, technology characteristics, and individual characteristics (Ropponen & Lyytinen, 2000). As a conclusion of their research they derived six software risk components:

- scheduling and timing risks,
- system functionality risks,
- subcontracting risks,
- requirements management risks,
- resource usage and performance risks, and
- personnel management risks.

Ropponen and Lyytinen also stated that awareness of the importance of risk management and practices in managing risks have an impact on scheduling risks, requirements management risks, and personnel management risks. Furthermore, they highlighted the

fact that environmental contingencies were observed to affect all risk components and suggested that risk management practices could be improved with a detailed understanding of the environmental context (Ropponen & Lyytinen, 2000).

DeBakker et al. researched the impact of the risk management method used on project success (Bakker, et al., 2010). In their research they found that in addition to technical risk factors, organizational risk factors like top management support and user participation also affected success. They also found that there was not enough evidence that contemporary risk management practices had been able to impact project success.

Keil et al. listed and rated risk factors for an IT project in Finland, Hong Kong, and USA. They found that the following eleven factors were among the most important in all three countries (Keil, et al., 1998):

1. Lack of top management commitment to the project
2. Failure to gain user commitment
3. Misunderstanding the requirements
4. Lack of adequate user involvement
5. Failure to manage end user expectations
6. Changing scope/objections
7. Lack of required knowledge/skills in the project personnel
8. Lack of frozen requirements
9. Introduction of new technology
10. Insufficient/inappropriate staffing
11. Conflict between user departments

Furthermore, they created a risk categorization model with two dimensions: Importance of risks and Level of control, and divided the risks according to their importance (High / Moderate) and at which level they were controlled (Low / High). They found that the risks rated as most important often lay outside the project manager's control (Keil, et al., 1998).

King and Burgess first identified ten top ranked success factors from the literature, which were:

1. Top management support
2. Project team competence
3. Interdepartmental co-operation
4. Clear goals and objectives
5. Project management
6. Interdepartmental communication
7. Management of expectations
8. Project champion
9. Vendor support
10. Careful package selection

After that, they identified different models used to describe the success of an IT project and combined the factors and models into a dynamic model of ERP success factors (King & Burgess, 2006). In this model the factors were grouped into four groups (Organizational context, Supporters, Project organization, and Outcomes) and the dependencies between the groups were described with terms “Influences”, “Evaluate”, “Support”, “Deliver” and “Change”. The idea of the model was to describe the impacts of factors in each group on factors in the other groups.

An IT project is always an investment that should always be productive in the long term. Criteria that approach the impacts of an IT project on the productivity of a company and thus the productivity of Information Technology itself was highlighted by Beard and Sumner, who reviewed other research and identified a great number of business benefits expected to be gained when implementing a new system (Beard & Sumner, 2004). The benefits were functional, operational, organizational, and above all economic, like improving the quotation cycle time, reducing inventory levels, improving profit margins etc.

We can also approach project success and its definition and metrics by having a look at project failure. If a project is a failure it can hardly be a success. But what is a failure? According to Barry Boehm, a project termination does not (necessarily) mean project failure. In some cases, for example, circumstances or the environment may change during the project so that the basis for the project no longer exists. The sooner this is detected, the more successful the termination. Terminating a project can be natural and healthy (Boehm, 2000). Ravi Narayanaswami noted that research conducted as case studies did not consider a project a failure even though the budget and / or schedule had overrun if the operational goals were gained which in many cases required interventions (Narayanaswami, 2007).

J Cannon says that a failure could be defined in many ways. He presents a common definition that lies in the perceptions of the host organization. A visible form of failure could be e.g. a project that is late or over budget, or that is not able to realize the expected benefits or gain the acceptance and enthusiastic support of users and management (Cannon, 1994). Chulkov and Desai stated that a “bandit policy” of project managers, the tendency to start a risky project instead of a safer one in the hope of potential higher rewards is one of the explanatory factors behind failures (Chulkov & Desai, 2005).

In the citations and references above, the criteria and factors of success and failure were under discussion. However, it is good to bear in mind, as noted by Lim and Mohamed, that these two concepts do not necessarily mean the same. Criteria are the group of principles or standards by which judgment should be made and factors, for their part, are the set of circumstances, facts, or influences contributing to the result (Lim & Mohamed, 1999). Lim and Mohamed, for their part divided success criteria into a micro view and a macro view. They defined the macro and micro viewpoints as looking at the forests or the trees. In the macro viewpoint, they included completing in scheduled time and satisfaction regarding

utility and operation. In the micro viewpoint, they included completing in scheduled time and staying within budgeted costs and reaching the agreed quality, performance, and safety. They also note that users and stakeholders normally evaluate success in the macro view and constructor partners in the micro view (Lim & Mohamed, 1999).

The success of an IS project can also be evaluated in terms such as quality of information, quality of the system, quality of services, user satisfaction and net benefits, like in the model of Delone and McLean, first presented in 1993 and updated ten years later (DeLone & McLean, 2003). In this model, the quality of the system, quality of information and quality of service feeds the satisfaction of users and their intentions to use the system, which in turn increases net benefits. However, if we are discussing the success of a project, we should (as we can see from the literature presented above) include some other participants in the model: project owner, stakeholders, and supplier. The connections between the factors should be bidirectional. In an ongoing project, continuous interaction can be found between quality, use, satisfaction, and benefits, and via this interaction the success of the project will be built or destroyed. Figure 21 presents the original model of DeLone and McLean (black lines) and remarks derived from other sources of literature (red lines) as a synthesized model for the success of an IS project.

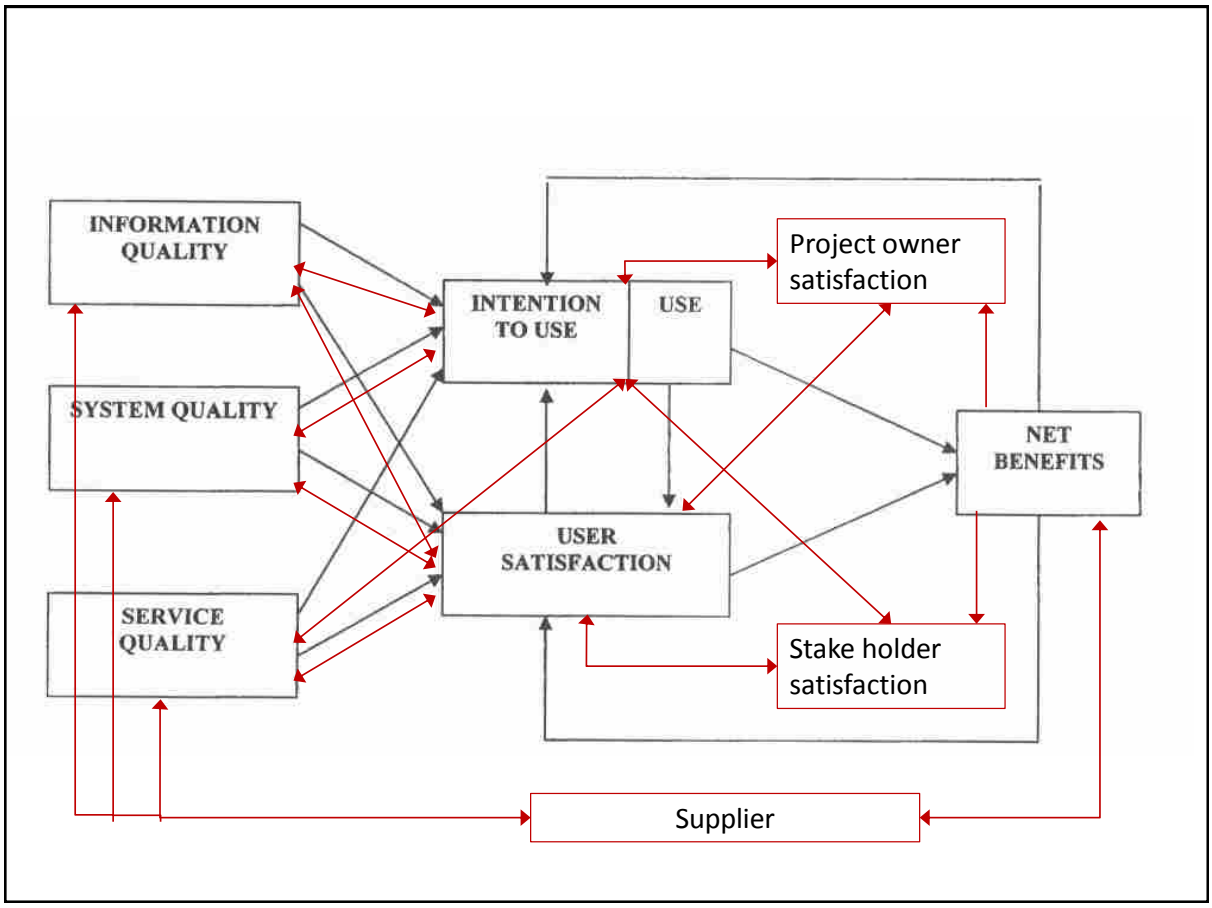

Figure 21: IS Success model by DeLone & McLean completed with remarks from other sources of literature

3.6 DISCUSSION

A literature review was described in chapters 3.1 – 3.5, which, using Google Scholar, EndNote and Mind Map, and adopting the applicable parts of the terms of systematic literature review, searched for an answer to the research questions defined in chapter 3.4.5. In this chapter we will discuss the quality aspects of the process: the strengths and weaknesses of the tools and methods, the possibilities of bias in each phase, and the reliability and validity of results produced using these tools. Please note that the features of web-based services can change rapidly and that the information given in this chapter is based on the situation before December 2011. Also, the properties and versions of the programs used might have been updated since these were purchased.

3.6.1 Google Scholar

Google Scholar proved to be useful for scientific data mining. The researcher is able to write the search terms and queries easily without having to have knowledge of SQL or the other querying languages. If one wants one can use Google's own include / exclude notations (+ /- -terms) but in Google Scholar this can be avoided by using the "Advanced scholar search" property.

The "include citations" option produces a huge amount of hits containing only citations from the original papers, so it would be advisable to use the choice "At least summaries." In each Google hit record there is a field "Cited by," which contains the number of citations referring to this article. This information can be used when evaluating the value of the research and paper, but can only be transferred to your own program manually. Furthermore, it is not possible to search or sort by this field although it could be a good idea to limit searches, for example, to only those referred to at least 50 times or to sort them in order in the "Cited by" field.

In the Google hit record there is a link for an SFX service if your organization (e.g. university or library) has a contract with it. This link shows the availability of both paper versions in the library and whole texts available in a file with the publishers and libraries that provide this for one's organization. The record itself contains a link to the primary document provider, but not all universities have a contract with this provider, so it is recommended to check the SFX service too.

Advanced Scholar Search contains the possibility to limit the subject area for searches. The whole area of sciences is divided into seven subject areas, and also including or excluding patents and / or legal opinions is possible. In this research this property was not used, due to the fact that it was not available at the beginning of the research and at the moment of writing this paper it is not available in all the country / language versions. Google Scholar

uses the IP of the source network to identify the country from which the computer is connecting, and offers the default user interface accordingly. This is understandable for services offered to the general public, but for services like Scholar – although it is possible to change the language – it might cause an extra possibility of bias if the user is not able to use the English version or does not recognize the need and opportunity to do so. It could be a good decision for Google to update all the language versions at the same time or, at least, to inform the user if some of the freely selectable versions have more properties than the one the user is currently using.

The biggest danger for bias when using Google Scholar lies in the number of hits, which in many cases may be appreciable. The art of selecting the relevant ones is one of a researcher's core skills, but Google could assist even better than now, if the hit record contained and showed the subject area mentioned above, and the publication date of the paper or article. In relation to the subject area, it is worth noting that Google Scholar suffers from the same shortcoming as the other database and search engine providers: the lack of a common worldwide standard for classifying the subject areas of research and papers.

3.6.2 EndNote

The EndNote program used in this research was version X.0.2 from 2006, when the research project was started up. An update to a newer version was eschewed to avoid the bias caused by different versions and differences in databases. Most libraries and publishers support the direct download of citations to EndNote, either in EndNote's own format or in some common format for citation transfer. During this research only three publishers were found who were not able to support any kind of automatic transfer. Cites from these sites were transferred manually by clipboard.

There is one feature which causes the possibility of bias when using EndNote but which has nothing to do with the EndNote program: the diversity of citations formed by publishers and libraries. Although there are or at least should be established practices regarding the content of a citation, especially how to write the authors, revisions and pages, they vary from publisher to publisher. This requires extra work for the researcher to check the form of names and revisions from the original paper when writing the report. Also, the inclusion of an abstract and indexing terms could be provided by more publishers than is the case nowadays, although they can be added manually directly to EndNote. Adding the relevant elements of the paper manually to a tool used in screening papers may increase the possibility of bias and is, furthermore, time-consuming.

Including citations in the document is possible in two ways: either by using EndNote's "CiteWhileYouWrite" property or by adding them manually. The CWYW property is usable when writing with Microsoft Word versions 2007 or newer, and if the format required for the paper is known in advance. In this case citations were added to the Word's citation

manager manually although the Word version used did support automatic citing and reference lists. The main reason for this was the need to check the format of names and revisions described above.

The search property in EndNote is powerful and multifunctional. It is possible to target the query to any field, to a certain field or group of certain fields. The Boolean operators in use are equal, greater than, less than, contains, field begins with, field ends with, and word begins with, and the logical operators are and, or, and not. Each field can have a different search term and operator. This was found to be a useful tool for eliciting the relevant papers for closer reading in phase two, on the condition that the abstract and index terms were available in the database. Furthermore, the possibility to define and use four fields for the user's own purpose was found helpful when evaluating the papers and using them. One of the user-defined fields was used to store the Cited by information from Google Scholar and another for storing the papers in which the researcher used each reference – if used.

In the EndNote database there were two different fields for notes, named "Notes" and "Research Notes." Most publishers and libraries directed the notes stored in their databases to the Notes field, but some of the download programs imported these to the field "Research Notes." This caused difficulties when storing the text found and used in one's own research in the "Research Notes" field, as described in chapter 4.2.7, because the pre-stored notes first had to be moved to the Notes field.

The use of EndNote does not seem to increase the possibility of bias, but, on the other hand, nor does it decrease them, due to the incomplete standardizing of export file formats on libraries' and publishers' sites and the data content of export records. If this is kept in mind and the data used in EndNote are checked, especially if the user is inexperienced with the program, there is no particular risk of bias caused by using EndNote.

3.6.3 Mind Map

The Mind Map program used was Mind Manager v. 6.2.399 sp 2 from December 2006 by Mindjet LLc. This program was used for planning the research, documenting the research, and creating the conceptual schema for the subject area of the research in the form of a mind map. The use of Mind Manager does not contain any particular cause for bias but the possibility of bias comes from the researcher himself: how well has the plan been made, does the planned list of search terms cover all the relevant possibilities, will all the actions, findings and exceptions be documented and are all the relevant findings reported? A well made and updated mind map, however, will help the researcher to see the possible defects and errors and thus start corrective actions in time.

3.6.4 The research process

The key points of the research process in terms of bias, reliability, and validity are the selection of databases, definition of the search terms and inclusion, exclusion and stop

criteria, the evaluation of the documents found, and the elicitation of the analyzable and synthesizable research papers. This chapter reviews these factors point by point to evaluate their impact on the reliability and validity of this research.

3.6.4.1 Selected databases

The main research was conducted using Google Scholar, which uses as its data source every available database and site containing documents defined in the query phrase. In the research presented in (Lilja, et al., 2011b), the search was conducted in two ways, first with the search engines of the libraries and publishers listed in chapter 4.2.2, and then with a comparative search using Google Scholar. The search using Google Scholar gave 16.9 % more hits than the single searches together. Some of these hits were duplicates, and some were hits from pages and documents fulfilling the terms of the query but without scientific relevancy. The number of hits to be selected for closer review was 4 % greater (179 vs. 186). According to experience obtained from both the test phase and the main search phase, use of Google Scholar did not introduce bias via the databases.

However, it must be noted that there may be subject areas where relevant and actual data are hidden in databases and sites to which public search engines do not have access. The sensitivity of the searched data must be kept in mind and the usability of public search engines like Google Scholar evaluated case by case.

3.6.4.2 Defining the search terms

Defining the search terms is probably one of the most risky phases in the literature review process from the point of view of bias, reliability, and validity. Even with single words there may be differences in spelling (e.g. organisation vs. organization), singular and plural versions of the word (hierarchy vs. hierarchies), synonyms used in common language, technical language, social sciences etc., or the same word may mean different things in different subject areas (e.g. power, work). The difficulties will be multiplied if the search term is a phrase. Should it be in active or passive form, in the future, present, imperfect…? The sky is the limit. In this review the search terms (Table 7) were defined as simply as possible, bearing in mind that the retrieved documents had to be able to answer the research questions.

The chosen policy caused an increase in the number of permitted queries, e.g. the term “Failures in ERP projects” produced several different queries, and also the number of research studies and papers selected for closer review is many times greater than with the policy of using just strict search terms derived directly from the research questions. From the viewpoint of research quality, this is a double-edged sword: on the one hand, there is more material to use when answering the research questions but, on the other hand, the huge mass of data elicited raises the possibility of missing some piece of important data and may also reduce the accuracy of the results.

It is also important to keep one's mind open for new search terms derived from the texts found or ideas obtained during the process. In this research the idea of an IT project as one kind of strategic alliance occurred to the researcher via one article, irrelevant by itself, but one that awakened the gray brain cells. This resulted in the inclusion of a whole new subject area – the supplier chain – in the plan and thus into the review process. Of course, such additions should be done with care, or otherwise there is the danger of a never-ending process.

The bias caused by too strict, too wide, or completely erroneous search terms is best eliminated by defining the inclusion, exclusion, and stop criteria carefully. Reliability also depends on whether the right documents are included in the results. The validity is best guaranteed by including in the results the hits that best answer the research questions.

3.6.4.3 Defining the inclusion, exclusion and stop criteria

The inclusion and exclusion terms should be defined so that the relevant current documents answering the research question are included in the results, and the irrelevant ones are omitted. The stop term should be defined so that the researcher moves on to the next query when it is probable that there will no longer be any new findings from the results of the present query.

In this research, the inclusion criteria were defined to include items concerning business cultures and organization cultures in the meaning of business organizations, and the impact of differences in cultures and organization structures on project success (Table 6). In addition to this, there were some restrictions concerning the availability, environment, author, and publisher of the document. The exclusion criteria excludes material with no links to the subject area and the stop term stops the search for each search term and database when the results from that point to the end seem to have more than 1000 records containing less than 10 possibly relevant citations, they have already been included by other search words, or they seem to have nothing to do with the subject. To prevent wasting time on infinite searches, the following cut term was defined during the test phase: the walk through records would be stopped if no relevant record had been found out of the hundred latest checked hits and if the original stop term were not be fulfilled.

In practice, going through 100 records without any new, current, or relevant record was frustrating even if there were only some queries that produced such a huge amount of irrelevant records that this cut term was implemented. It was found useful to define this kind of stop and cut term to avoid randomized cutting of the process in queries producing answers in thousands of documents.

The way in which the results are processed has an impact on the reliability of the final results. The relevant research and papers can never all be captured in a single review. If we are able to collect a representative sample of opinions, results and findings concerning the target, or if we can prove that we have reviewed enough papers to be able to say that there

is no relevant research on this subject, the next possible cause for bias is in processing the results. In this research the most critical phase regarding reliability is the evaluation of the documents found and the elicitation of results for analysis and synthesis.

3.6.4.4 Evaluation and elicitation

In the second phase, all the documents and papers included within the first phase were evaluated. This phase ended in May 2012. The experiences gained show that reading and evaluating papers requires discipline from the researcher. The number of papers to be elicited was relatively large, 1816, and the number of questions to be answered was 6, requiring both exact and general answers. The exclusion of an irrelevant document requires at least the reading of the abstract and in most cases the reading of the whole paper was necessary. This can be considered proof of success in following the inclusion and exclusion criteria in the first phase, although there is no possibility to estimate how many relevant documents have been excluded. The index file created by Adobe Acrobat is helpful when searching documents containing certain exact phrases and answers to simple questions but how much it assists the whole process depends on the number of indexable documents.

To analyze and synthesize the final findings, a Mind Map with six sub-maps has been created, one for each sub-question. Each sub-map was updated with the findings and results from the elicitation and at the same time the concept of the report was written down. Results showed that all of the research questions were answered and within the answers also opinions outside the mainstream were reported.

3.6.5 External and internal validity

Internal validity answers the question “Are the findings true?” In a literature review where the findings are collected from other reports, they are evaluated and validated in many stages: when publishing the report, when including it in a database and – finally – when including it in the results of the literature review. The only stage the researcher doing the literature review can have an impact is the last-mentioned. In these cases it might be recommendable to evaluate the internal validity also by asking the question “Does this finding at least partially answer some of the research questions?” If the findings have been evaluated as worth including and they also answer the research questions, it can be assumed that the internal validity requirements have been fulfilled.

External validity answers the question “Can these findings be generalized?” The requirement of generalization may vary from a certain specific discipline to the whole of mankind. If the research is for example on the use and impact of a certain new molecule, generalization may mean answering whether or not this finding can be used by those who are researching the same phenomena, but if medical research is being carried out on some common disease, the findings should be generalized in a much wider area. External validity should be evaluated while bearing in mind the purpose of the research. As with internal

validity, it should be remembered that in a literature review the results of other researchers are being evaluated and the question of generalization should have been answered at least once before. Another good question to ask when evaluating external validity is whether the result answers the research questions or some of them at least partially. If the answer is “Yes,” it should be possible to generalize the finding.

3.6.6 Reliability

The reliability of any research method means the probability of another researcher who does the same research with the same method and same attributes obtaining the same results. In a literature review, the repeatability of some review is theoretical because the number of research papers and databases available is growing all the time. The question that should be answered when evaluating the reliability of a literature review is: “If the review was conducted by someone else in these conditions, with the help of our documentation, using the same databases and the same research questions, would he get the same results?” If this question can be answered “yes,” we might be able to evaluate the reliability of the review.

3.6.7 Conclusions concerning the availability of Google Scholar

Google Scholar could be a valuable tool for literature reviews. However, the subject of our research must be evaluated before starting the more detailed planning of the review process. If the research around the subject is limited and concentrated in certain institutes or if the results are collected in a limited number of databases, using the databases’ own querying tools may be more effective and less time-consuming.

Using Google Scholar as a tool for scientific data mining gives the researcher large numbers of research papers to evaluate and the danger of bias in excluding and including papers increases. This is why the careful planning of the process, defining the inclusion and exclusion criteria, and selecting the tools to be used for collecting and analyzing the data are essential parts of any literature review process, but especially when the primary search engine is Google Scholar.

When using Google Scholar the tools provided by publishers and libraries must not be forgotten. The lists of related documents might give hints about documents, which otherwise might have been lost inside the mass. Additionally, the possibility of downloading citation data is useful, although there is a need to synchronize the forms and contents of transfer files between different publishers and database providers.

The order in which Google Scholar displays the results of a certain query could be a good subject for further research. If it were possible to sort the results e.g. by number of citations, would it give more chances of evaluating the findings or would it only hide contemporary research? The more recent the paper, the fewer times it will have been cited, no matter how valuable it may be in terms of providing new knowledge.

3.7 SUMMARY OF THE FINDINGS OF THE LITERATURE REVIEW

In this chapter the findings of the literature review concerning the fundamental concepts and definitions will be briefly summarized and compared to the research questions set at the beginning of the review process. More findings of the literature review will also be presented in the chapters concerning each study to provide a theoretical background and state of the art for the topic in question.

3.7.1 Organization

In this thesis an organization is defined as a system of activities consisting of two or more persons, organizations or both. An organization has certain conscious and / or unconscious goals it is aiming to achieve. An organization is continuously and mostly – but not necessarily - consciously coordinated by the officially nominated or informally selected leader and the organization itself may be legally constituted or informal (Ichiishi, 1993), (Sicilia, et al., 2006). The goals of an organization can be social, economic, political or a combination. The activities can be either social or productive (Dietz, 2003). There are always certain relationships between the members of an organization (Sicilia, et al., 2006). The cooperative nature of the organization means that the survival of the organization is dependent on both the willingness and the ability of the members to cooperate and communicate (Barnard, 1968). Inside an organization (except the very small ones), there are always sub-organizations, both formal and informal (Ferber, et al., 2004). The activities and interactions that build the visible part of an organization are maintained by different roles (Wooldridge, et al., 2000). These roles are played by members (also called agents), who manifest a behavior according to their role (Ferber, et al., 2004). An organization may be born “by itself” if two potential members find it useful to cooperate, or it can be founded by a certain founder or founders.

The first part of research question 5 defined for the literature review in chapter 3.4.5 was: How is the organization defined in literature? The definition described above is a synthesis of the findings from the literature reported in more detail in chapter 3.5.1, and is an answer to this part of question.

3.7.2 Organizational culture

An organization is a small society with its own particular culture that affects the behavior of the members (Litwinenko & Cooper, 1994), which is a combination of the organization’s history and traditions, the founder’s and members’ personal history and traditions, assumptions and prejudices, both inherited and learned (Schein, 1995), the history, culture and traditions of the macrocultural area where the organization is located, and local legislation and rules. This inherent value system, called organizational culture, can be designed for a certain purpose or it may have grown up unconsciously (Atkinson, 1990). The weight of each component depends on the context where the culture is manifested.

Visible signs of organizational culture include organizational design, dress codes, graphic layouts, and status symbols (Buch & Wetzel, 2001). The invisible side of organizational culture consists of the values and beliefs to which the members of an organization conform, often unconscious of the impacts of this commitment (Acs, et al., 2010). The invisible part of culture gives a form to the visible (or audible) manifestations of the organizational culture (Al-Alawi, et al., 2007). Organizational culture can be managed but the impacts of forming and changing organizational culture have not been addressed (Lewis, 1996). The term "organizational culture" is used to describe the culture of all kind of organizations, whereas the terms "business culture" and "corporate culture" are commonly used to describe the culture, habits and ways to do things in business, firms, companies and corporations (Gorman, 1989), (Harrington & Guimaraes, 2005). Although the organizational culture is present and affects all organizations, it has historically played a relatively small role in IS research (Avison & Myers, 1995). The rise of the socio-technical approach from the late 1990s (see e.g. (Patnayakuni & Ruppel, 2010)) and the increased number of outsourcings and networked software production have enhanced the interest in organizational and cultural issues in software engineering and information technology (Jaakkola & Heimbürger, 2009). In spite of this, there is still only little literature and research on the topic, and, furthermore, most of it approaches cultural differences from the point of view of national and ethnic cultures.

The second part of research question 5 defined for the literature review in chapter 3.4.5 was: How are organizational culture, business culture, and corporate culture defined in the literature? The definition described above is a synthesis of the findings from the literature reported in more detail in chapters 3.5.2 and 3.5.3, and is an answer to this part of the question.

3.7.3 Classifying organizational culture

Classifying cultures in a simplified manner (e.g. "good" vs. "bad") as is sometimes seen, does not build a good basis for closer analysis. During the past decades, many approaches to classifying cultures have been presented, e.g. Harrison's typology of four aspects was designed to increase the understanding of the organizational culture (Harrison, 1972):

- **Power culture** has a certain source of power that spreads influence throughout the organization.
- **Role culture** is based on bureaucracy, logic, rationality and defined roles set to the members of an organization.
- **Task culture**, where the power is based on expertise, not on position or charisma, and where structurally, the task culture can be described as a network or matrix.
- **Person culture** pays a lot of attention to the development of human potential and well-being. This kind of culture is formed by a group of people deciding that it is in their own best interest to be organized on a collective basis instead of an individual

basis. Person culture can be described graphically as a cluster with no dominating individuals.

Deal and Kennedy also used a taxonomy of four generic cultural types, the tough-guy macho culture, the work hard/play hard culture, the bet-your-company culture and the process culture (Deal & Kennedy, 1983), whereas Scholz identified three typologies based on different cultural dimensions: The evolution dimension, the internal dimension, and the external dimension (Scholz, 1987). Quinn and McGrath divided organizational culture into four generic cultures: rational (Market), ideological (Adhocracy), consensual (Clan), and hierarchical (Hierarchy) (Quinn & McGrath, 1985). Philip Atkinson presents (Atkinson, 1990) a list of 25 factors thought to be important in indicating the predominant culture within a company.

The competing values framework, developed by Quinn et al., has been used by many researchers (Harrington & Guimaraes, 2005). It was, however, argued by ethnographic culture researchers, that the competing values framework simplifies the concept of culture (Harrington & Guimaraes, 2005). Hofstede et al. classified organizations by factors like *"Need for security," "Work Centrality,"* or *"Need for authority,"* and by the following attribute pairs:

- Process-Oriented versus Results-Oriented
- Employee-Oriented vs. Job-Oriented
- Parochial vs. Professional
- Open System vs. Closed system
- Loose Control vs. Tight Control
- Normative vs. Pragmatic

They also divided cultural differences into three levels: National, occupational, and organizational (Hofstede, et al., 1990). A slightly more exotic example of classification is the taxonomy used by Maurice B. Line. He compared different organizational cultures to animals like the lion or cow (Line, 1999).

As a brief conclusion, it can be said that each researcher has used a taxonomy of his/her own. It may have been founded on or derived from the work of some other researcher, or it was created ad hoc, to respond to a certain need. No common taxonomy or classification tool for organizational culture was found. This answers research question 4 in chapter 3.4.5 which was: How has business culture been classified and what type of criteria / measures have been used by other researchers? Furthermore, this also gives an answer to the evaluation of the classification used in the case study: Every researcher has in practice used a taxonomy of his/her own. If the model used works, it is acceptable.

3.7.4 Assessing organizational culture

The number of instruments planned to explore organizational culture is relatively large, but the majority were at a preliminary stage (Jung, et al., 2009). Dianne Lewis highlights the fact that most of these instruments include a study of behavior and states that behavior is not always a good indicator of values and assumptions (Lewis, 1996). Some methods will be presented as examples.

Buch and Wetzel (Buch & Wetzel, 2001) presented a process of three steps to analyze organizational culture. The process starts with learning and getting to know the mental model of culture. The second phase in this model is to observe the organization and to collect the artifacts and espoused values by going into the field. In the third phase, the collected material is analyzed. The Cultural Audit (Fletcher & Jones, 1992) is based on the use of different organizational culture types and dimensions. The relevant dimensions are first measured and scored with the help of these measurements. The organization will then be classified according to the scores. Hofstede et al. used interviews and questionnaires to assess values and practices. The questions in the questionnaires were targeted to assess work goals, general beliefs, perceived practices and the typical behavior of a member of the organization. The common scale used in questionnaires was a 5-point semantic differential scale (Hofstede, et al., 1990). Hopkins states that surveys are the predominant strategy for studying organizational cultures (Hopkins, 2006). It is typical of surveys that questionnaires are sent to individuals and data are then aggregated to the organizational level. According to Hopkins, the survey method is well suited to research individual attitudes and values as well as practices.

In an assessment tool based on Competing Values, the data collected consisted of base information (history, size, branch and structure, market areas etc) and the results of a survey conducted by the OCAI method. The OCAI method is a survey designed to identify the current culture of an organization (Cameron & Quinn, 1999). The basic form of OCAI includes 6 questions, each with four alternatives to choose from. The answers of each respondent are scored, the sum and average of the scores is calculated and a graph of the organization's profile is drawn (Igo & Skitmore, 2006), (Cameron & Quinn, 1999).

There are many kinds of sources available for assessments. The organizational world produces documents, artifacts, and behavior to be studied. Bali has listed examples of different documents and other information that could be combined to form a view of the organization's dominant culture. These include reports, letters, memos, emails, health & safety regulations and rulebooks, protocols, forms of addresses, stories and myths, jokes, rumors and speculations, dress codes and career paths (Bali, 2000). Also recordings, videos, photos, and other digital sources can be used.

The assessment tool used depends on the needs, aims of the study, the target organization, and the researcher's own knowledge. However, different types of questionnaires have

commonly been used. Other tools mentioned were forms and diaries for observations and interviews and forms for classifying the documents and other artifacts.

The tools used in the case study, Delphi-based study and open survey presented in later chapters were questionnaires. In the case study, protocols, diaries, correspondence, memos, and public material like annual reports were also used. The tools used to collect data in this research do not vary from those found in the literature.

3.7.5 Project success

In the literature on project management, many researchers and practitioners consider performance, effectiveness, and success as synonyms (Belout, 1998), (Belassi & Tukel, 1996). Project success has been evaluated in accordance with general cost (staying on budget), time (staying on schedule), and quality of product (Aloini, et al., 2007), (Narayanaswami, 2007), (Wateridge, 1995). Lyytinen and Hirschheim (Lyytinen & Hirschheim, 1987) categorized IT project success into the categories "Reaching planned objectives", "Reaching project goals," and "Matching user expectations" in addition to the classic project budget and schedule. Quality – or success – was assessed by obtaining the user's consensus on the differences. Also different kinds of checklists were recommended for use (Abe, et al., 1979) to ensure that the designed product "*would not fail*" or – in other words – that it would work as planned. Lyytinen & Hirschheim's work was developed by Al-Mashari et al. who formulated the categories of Lyytinen and Hirschheim (Lyytinen & Hirschheim, 1987) into four types of success (Al-Mashari, et al., 2003):

- *Correspondence success: There is a match between IT systems and the specific planned objectives*
- *Process success: IT project is completed within time and budget*
- *Interaction success: Users' attitudes towards IT are positive*
- *Expectation success: IT systems match users expectations*

Al-Mashari et al. also developed the results of Shang and Seddon (Shang & Seddon, 2000) and formulated five success criteria for ERP implementation:

- *"Operational: Cost reduction, cycle time reduction, productivity improvement, quality improvement and customer services improvement*
- *Managerial: Better resource management, improved decision making and planning and performance improvement*
- *Strategic: Supporting business growth, supporting business alliance, building business innovations, building cost leadership, generating product differentiation and building external linkages*
- *IT infrastructure: Building business flexibility, IT cost reduction and increased IT infrastructure capability*
- *Organizational: Supporting organizational changes, facilitating business learning, empowering and building common visions"*

The experienced success of a completed project can be in correlation with the experienced quality of the product (Linberg, 1999) or the criteria used in successful projects may differ from those used in failed projects: projects with success included criteria like *Meets user requirements, Happy users, Commercial success, Meets budget* and *Meets quality* whereas in failed projects the criteria used were *Meets user requirements, Meets budget, Achieves purpose, Meets timescales,* and *Happy users* (Wateridge, 1995). Many of the criteria are subjective and not necessarily understood in the same way by all of the participants.

Although cancellation is commonly understood as a synonym for failure, a cancelled project might have a positive result if there has been organizational learning during the project (Linberg, 1999).

It is also good to bear in mind that the participants may associate project success in different ways (Wateridge, 1998). The grass-root users appreciated better working conditions and easier use while the project managers were interested in official and perhaps more traditional goals. Also, Belout noted that the evaluation of success may vary depending on the type of rater. Referring to other writers like Freeman and Beale, he writes that project success could be measured from three points of view: Sponsor's, Project Manager's and Sponsor as Project Manager's view (Belout, 1998). Belout seems to forget the view of the grass-root user and furthermore, the criteria for success he presents is relatively traditional. A. Fowler and M. Walsh construct the definition of success on the basis of the hierarchical causal chain (Fowler & Walsh, 1999) where the elements are acceptance, use, improved performance, satisfaction, and organizational payoff. They note that the use (or usage) is a relevant measure if the use is voluntary, but if the use is forced, a more relevant measure could be user satisfaction. This, however, highlights the role of users and their individual perspectives in measuring success.

Generally, project success has been defined with traditional "hard" and objective measures like schedule, budget, goals of the project, and cancellation has been seen as failure. However, soft and more subjective measures can also be used. Examples of these are satisfaction of different stakeholders, acceptance, degree of usage, organizational payoff, or commercial success. To be able to evaluate the success of the project from the point of view of all the stakeholders we should collect and process both hard or objective and soft or subjective measures including the users' opinions and experiences.

Research question 3 defined for the literature review in chapter 3.4.5 was: How can the success of an IT project be defined and measured? As we have learnt from the literature reported in more detail in chapter 3.5.9, there are both traditional, "hard" signs of success or failure and "soft" or human ways to define whether the project is a success or not. In the case study, Delphi-based study, and open survey, signs and definitions belonging to both groups were used.

3.7.6 The matrix structure of the projectized organization

New forms of organization have been developed to respond to the challenges of the continuously changing world. Although these new forms, often called “hybrid organizations” (Lentz, 1996), can solve the inherent problems of traditional organizational structures, they will entail new risks that are not always recognized. A matrix organization can be seen as a hybrid organization, which consists of a vertical, functional dimension, and a horizontal dimension of e.g. product lines, marketing areas, or project(s). Sometimes the project forms a third dimension. The problems and risks of the matrix organization which have been reported during the past decades include a lack of balance between authority and responsibility, subordinates having several bosses, ambiguity and increased conflicts, slow decision making, searching for consensus, ambiguous reporting relationships, increased management and administration costs and increased resistance of change due to loss of status, authority and control (Sy & D'Annunzio, 2003), (Hax & Majluf, 1981), (Goold & Campbell, 2003). In matrix organizations there are always internal tensions (Arvidsson, 2009) and competition for resources (Lundin & Söderholm, 1995). Part of the available resources is expended on resolving conflicts (Whitford, 2006). These problems have a negative impact on success (Hovmark & Nordqvist, 1996).

Research question 2 defined for the literature review in chapter 3.4.5 was: Have other researchers reported connections between the structure of the organization and the success of an IT project? The problems of a matrix organizational structure, which in one way or another are generated when a project is implemented, were seen to be the biggest structural risk for a project. Although some of these problems can be traced back to national cultures, researchers have reported the same kind of trouble regardless of the macrocultural background of the organization. The findings from the literature are reported in more detail in chapters 3.5.8 and 6.4.

3.7.7 State of the art: The impact of organizational culture on ERP / IT / IS projects

The impact of culture on projects in common and on information systems projects in particular has been mainly researched in the contexts of international co-operation and national and ethnic cultures (Hofstede & Hofstede, 2005), (Kanungo, 2006). This is at least partly due to the increased outsourcing of software engineering to countries with a lower cost level, like India (Jaakkola & Heimbürger, 2009). Research on organizational culture and the cultural differences between partners located in the same macrocultural area as well as the research on the impacts of these differences on IT projects is still rare (Prifling, 2010), (Avison & Myers, 1995), (Wangler, et al., 2000). The reason for this has been said to be that in the past projects were considered as technical systems instead of behavioral (Belout, 1998).

Organizational culture has been found to be important for e.g. innovativeness (Ahmed, 1998), efficiency (Weber & Pliskin, 1996), safety ((Ruighaver, et al., 2007), organizational learning (Fiol & Lyles, 1985), and ethical issues (Sims & Brinkmann, 2003). Wangler et al. (2000) highlighted the recognition of cultural aspects also when starting an IT implementing project in order to predict the impact of cultures and their differences on an ongoing project. Baccarini et al. (2004) identified three risk factors in IT projects, which depend on organizational culture: Does the culture allow managerial support for the project, do the political games belonging to the organizational culture prohibit the executive support for the project, and are the requirements set for the project defined to advance the interests of just one stakeholder rather than the whole organization. It has also been found that the impact of the organizational culture on the other project variables is bidirectional (Prifling, 2010). Despite the base culture of the organization, project culture has mainly been found to be a task culture, and in IT projects task culture is often stronger than within other projects (Andersen, 2001).

Both the project management maturity model PMMM (Hillson, 2003) and capability maturity model CMM (Hefner, 2003) recognize the impact of culture and the fact that the current culture of the organization should be taken into account when implementing concepts like CMM or PMMM (Hefner, 2003). However, the impacts of cultural differences between customer and supplier have been paid only little attention in maturity model literature. This seems to be the mainstream in the literature on the cultural aspects in software engineering. The importance of culture is recognized, but the question is mainly approached from the point of view of the software engineering company and supplier. However, some exceptions can be found. For instance, Hefner (2003) states that one of the key problems between customer and supplier is the axiom “the customer is always right,” which is often used as permission to question the organizational terms that the customer is not ready to accept. Markus and Tanis (2000) note that one challenge of information system projects is that they involve parties from many different organizations, even competing ones, with different organizational cultures. Harrison (1972) wrote that the failure to understand differences between organizations may cause organizational conflicts. Bali (2000) highlighted the role of common models of behavior behind the organizational culture in building relationships with external interest groups like customers or suppliers and Blomqvist (2002) stated that differences in organizational cultures may have a negative impact on co-operation. Culture also impacts the ways and forms of communication inside an organization and between organizations (Brown & Starkey, 1994). If the ways and forms to communicate differ too much from the opposite party, understanding each other may be difficult. Different organizational cultures may create communication gaps, misunderstanding and distrust (Hyder & Eriksson, 2005), which may impact project success negatively.

Research question 1 defined for the literature review in chapter 3.4.5 was: Have other researchers reported connections between the differences in business cultures of supplier

and customer and the success of a common IT project and if so, what kind of impacting differences have they found? There are only a few studies approaching cultural differences from this point of view. Most of these few studies recognized the problem, stated that the differences had an effect but did not address the differences or impacts, and highlighted the need to study more. The findings concerning these issues are presented in more detail in chapters 3.5.4 and 3.5.5.

3.7.8 Conducted review and criteria for an acceptable literature review – evaluating the reliability and validity of findings

Table 5 presented the combined criteria for an acceptable literature review. According to these, one of the aims of the literature review is to demonstrate skills in library searching. In chapter 3.4, the review process and tools used in it were described and evaluated. The other aims are to show command of the subject area and understanding of the problem, to justify the research topic, design, and methodology, to advance collective understanding of the subject area and state of the art, and to form a base and context for ongoing and future research. These aims were achieved in chapters 3.5 and 3.7 and completed in the chapters presenting the theoretical background of each study.

The criteria presented for a well conducted literature review presented in the same Table 5 were as follows:

- Planned, tested, documented, and evaluated process.
    - Process was planned, tested, documented, and evaluated as stated in chapter 3.4.
- Selection of documents available for researcher, published and unpublished, on the topic
    - Inclusion and exclusion criteria are presented in chapter 3.4.6. A representative sample of papers on the topic, both published and unpublished, were collected and evaluated, and papers relevant for the ongoing research were included in the report.
- Contain information, ideas, data and evidence
    - Findings of the literature review contain both information concerning the base concepts of organizations, organizational culture and project success, and ideas how to assess cultural differences and their impacts.

Furthermore, the findings are reported and evaluated according to scientific traditions, with the purpose of providing a theoretical background for the ongoing study and to present the state of the art in the context of differences in business cultures between two companies in the same macrocultural area. The documents found were critically evaluated using the predefined criteria.

The internal validity of this research is dependent on the relative truth of the literature found by the search engine used , and also on the criteria used to evaluate the findings and to include the relevant papers. Using Google Scholar and the criteria presented in chapter 3.4.6 means that the research results obtained are internally validated, i.e. the tool used should not have affected the results. External validity answers the question: Can the findings be generalized? In this review the research questions presented in 3.4.5 are formed in such a way that the answers summarized in chapter 3.7 are naturally general but not exclusionary.

The reliability of the findings of the literature review depends not only on the tools and criteria used but also on the person who is searching. Were the included results selected objectively and without bias? In this case the aim was to collect different opinions and findings, and the research questions were formulated in general terms to avoid bias. One of the most relevant questions when evaluating the reliability of a literature review is: Have we succeeded in finding and picking up just those most relevant books from the point of view of our research? It is often recommended to evaluate this by checking if the findings are answers to the research questions. In this review, the questions were answered. However, it is worth bearing in mind that in a literature review many different or even opposite findings can be answers to the questions.

Further evaluation of validity and reliability would require a parallel review with another search engine and researcher, and even then there would be at least two problems: Firstly, the continuously increasing amount of literature, papers and research means that the base from which the sample is taken is not the same, and secondly, how long and in which cases should the reference chains be followed to have, at least in principle, all the literature available in our primary search.

4 CASE STUDY: BUSINESS CULTURE HAS SOMETHING TO DO WITH SUCCESS

During the last 29 years the author has been involved with 25 ERP projects as a specialist, project manager or in an equivalent position, mostly on the customer's side. He has also been able to observe 10 other projects very closely and was also aware of most of the systems built in the projects mentioned above throughout their entire lifecycle. The average live cycle of each system has been between five and seven years.

It was noticed very early that it was possible to forecast the success of the project relatively reliably, simply by observing the participants of the project: How they worked together, in which aspects they were similar and on the other hand, where the greatest differences were between the companies, and how the customer and supplier succeeded in communicating their needs and capabilities to each other. If the messages were not understood or were misunderstood on the other side, if the working styles differed a lot, for example if one side required everything to be documented according to certain standards and the other considered all kinds of documentation as unnecessary bureaucracy and a waste of time, or if the idea of working hours differed a lot, the probability of failure, perhaps not total but some kind of failure, was very high.

After working very hard and intensively over the past eight years on a project where everything seemed to happen according to Murphy's law, the author thought that it might be very interesting to take a deeper look at the correlations between differences in the customer's and supplier's organization cultures and the project outcome – that is: how the people involved in the project felt it had succeeded.

4.1 ORGANIZATION CULTURE

One basic element of this study was to define organization culture, and how to measure differences between two organizations and their cultures. Even if culture has been the target of many research studies in the past, the point of view in most of these studies has been ethnic or national aspects of culture, not that of companies or departments or smaller organizational units. Studies that have concentrated on business culture have focused on the managerial aspect. They have for example asked how to do business in different cultural environments, or how a company's own culture should be changed to achieve a certain target. The impact of two different business cultures on each other and on a common project has very rarely been studied.

There are some studies we can use as a basis for defining organization or business culture and considering how it could be described and measured. In the book “Exploring corporate strategy” (Johnson & Scholes, 1988), business culture is defined as an organization’s way to perform its business in normal and abnormal situations (“the way we do things around here”). It covers relationships between the organization and its environment on both the organizational level and personal level inside the organization and across organizational borders. Moreover, the most important level is the personal level. No matter how big or small the organization, the culture is always a sum of the values, capabilities, backgrounds and expectations of the founders, owners, workers, managers and leaders of each organization, and furthermore, also their families, ancestors, friends, and the whole social circle around each individual person.

This sum total, “the way we do things,” is continuously in reciprocal relation with that of other organizations. Each culture gives and gets impressions to and from its environment. The way a human organization works cannot be measured by absolute, quantitative methods or, at least, the result of measuring depends on the investigator, the moment, and the situation. The method of approach should be contextual (Järvinen & Järvinen, 1996, p. 64).

On the other hand, to be able to compare the customer’s and the supplier’s organization culture to each other, the culture should be described and classified so that the differences between them could be calculated and visualized. (Järvinen & Järvinen, 1996, p. 105). The other fact that should be noted in preparing a questionnaire and interpreting the results is that the researcher has no way of controlling whether the questions were understood in the way he had meant them to be understood. This means that questions should be made so that they are as unambiguous as possible.

4.2 CLASSIFYING BUSINESS CULTURES

In this work a model has been built, based on the experiences of the researcher, where different types of business cultures are broken down into parts that can easily be recognized. The final description of business culture is a combination of several parts. A company might be for example conservative, ambitious, and formal. By reading the descriptions of each part, everyone can get an impression of what kind of organization is in question. The classification used is shown in Table 16. It is neither official nor based on any former research. The aim was to create as descriptive and easily recognized features as possible to describe one’s own and another organization. Attempts were made to make the classes and descriptions as neutral as possible to avoid the situation where the respondents’ loyalty to their own organization would be questioned.

The features used in the questionnaire were collected and described during discussions with several colleagues working in Finnish companies, both customers and suppliers, with

many decades of experience. The empirical list of features (Table 16) is not meant to be complete, as a matter of fact, it cannot be complete, because as time passes by, new features may arise and some may become irrelevant. It must also be remembered that there are differences between continents and nations as well as between different religious and ethnic groups. If this study had been made in the USA, Brazil, China, Egypt, or South Africa, for example, the list might seem quite different. In this work, these features were found to be good enough to describe companies in Finland, their business cultures, and differences.

Table 16: Criteria to classify business cultures

Class	Description
Conservative	Hierarchic organization, clear and tightly described functions, the one-above approval principle in use with all decisions, orders and reports are sent strictly according to hierarchy, failures and mistakes are acceptable if given orders and directions have been followed. The worst one can do is to override one step in the hierarchy.
Democratic	Decisions are made through discussions and negotiations. However, ultimately making a firm decision is up to a small group's or single leader's interest in the matter. Information will be given routinely but getting the necessary and real facts is a problem.
Technocratic	Duties are strictly limited and instructed. Form of organization is matrix, hierarchy, or project. Information given and decisions are bound to the person's function; only the power and facts needed to finalize the task are given.
Ambitious	The end justifies the means. Only the goal is decisive, not the means to get it. There are no forbidden means, staff cover themselves, everything should be confirmed by someone else. Trust in colleagues and outsiders is minimized. Concealment and dealing misinformation is common. Risk is taken but mistakes and failures are not allowed.
Real entrepreneur	Goals will be reached even by tough means, but activities are all the time honest, respectable, and responsible. Duties will be done and everyone is expected to do their duty. Information is given with pleasure but it is very often overoptimistic and risks and limitations are forgotten. Risk is considered a normal part of business and failures are accepted. All kinds of hierarchy, systematized working and instructions are minimized and seen as restrictions to business.
Swedish	No decisions will be made unless there is complete consensus, but in the event of failure it is at least as important to find a scapegoat.
Fermentative state	Organization is using several operation / organization models at the same time. The same person belongs to many groups or teams. Each group or team has its own process owner and supervisor who are competing on results and fighting for resources and power.
Process-type	Company has introduced or is introducing a process model in its organization. Each person belongs to some process and each process has an owner.

Team Organization	Company has introduced or is introducing the teamwork model in its organization. Each person belongs to some team and each team has clear responsibilities and the resources needed to complete the task.
Project-type	Company has introduced or is introducing the project model in its organization. Each person has a certain goal and tasks in every project in which he is involved, and the resources needed to complete the task. A project manager has been named in every project and has been given the resources and power needed to finalize the projects.
Formal	Relationships between colleagues in the organization are formal and task-oriented. Employees meet each other only within working hours. Free discussions around the coffee table are rare and politically correct. In equality questions the laws and regulations are followed to avoid penalties.
Open	Personal relationships are open and spontaneous. There are lots of common events, also off-duty. Discussion is relaxed, sensitive cases can also be handled, differences between people, including between men and women, are accepted. Equality is self-evident and laws and directions concerning equality will be allowed to restrict social relations neither within working hours nor in free time.
Creative	Creativity is supported. New experimental ideas are encouraged and atmosphere inspirational. New ideas and ways to do things are welcome. Change is seen as an opportunity.
Stagnating	Things are as they have always been, tasks should be done as they have always been done. Change is seen as a threat. New ideas will be shot down by colleagues or by supervisors.
ISO 9000	Company has ISO 9000 or equivalent certification or is introducing it. Processes have been declared, described, and certified. Terminology, language, and ways of doing things follows the standard the certification refers to.
Balanced Scorecard	Company uses a BSC or an equivalent steering and control system. Every person knows what he is expected to achieve, its impacts and how it is controlled and reported.
Activity Based Control	Company has introduced or is introducing Activity Based Management, control, and calculation system in budgeting and controlling operations. Each employee knows what is reported concerning his duties and how and what he can affect.

Data used to qualify the features and differences of each customer-supplier pair was collected via a questionnaire. One or more persons from both the customer's and supplier's side were asked to compare their own and the opposite company regarding each of the definitions in Table 16, bearing in mind the situation during the project. The respondents valued each feature on a Likert scale from 1 – 5 (1 = agree, 5 = disagree) depending on the correlation between the description and the view they had concerning their own company and the opposing company. The neutral alternative 3 was not allowed, in order to force the respondents to take a stance.

To check the answers to the questionnaire described above, and also to get a better understanding of what had really happened during the project on both sides, each respondent answered 103 detailed questions such as “A project manager was named for this project” or “We have no internal instructions and we do not need them.” Additionally, these claims were valued on a Likert scale of 1 – 5, excluding alternative 3, and concerning both their own company and the other company (The whole questionnaire is available in Finnish at http://dspace.cc.tut.fi/dpub/handle/123456789/6448 (in the appendixes)) (Lilja, 2006).

In addition to the results of these questionnaires, the following features and details were collected concerning each project:

- Juridical form of participants
- Size of participant companies (Turnover, personnel)
- Ownership of participants
- Size of project
- Type of project: New system, update or replacement
- Type of system: Standard or tailor-made
- Experience in ERP projects
- Experience in projects generally
- Supplier’s experience in customer’s business area
- Customer’s business area
- Quality standards used
- Whether the delivery consisted of both hardware and software or only software

The data collected from the customer and supplier of each project was compared and customer – supplier pairs were classified according to the differences found into three categories: Only a few differences, some differences, and considerable differences.

The collected and classified data was combined with the results obtained in estimating the success of the project and analyzed by using cross-tabulation and radar figures.

4.3 PROJECT SUCCESS

The second important part of the study is to determine how to evaluate and measure the success of each project. The people involved in the project had, of course, their own view or feelings concerning the results. The project either succeeded or failed. This feeling is very subjective and in normal objective scientific research it would have been given minor importance. However, if we think of a normal ERP system used by ordinary persons at every level of the organization, we cannot simply omit their feelings concerning the implementation of the system and co-operation with the supplier. If the feelings are negative, the motivation to use the new system is not the best. Even if the project had been a success measured by objective factors, if the feelings among the users towards the

system are negative, the benefits captured by the project will not be obtained. From the customer's management point of view, feelings should be topmost among the means of monitoring an ERP project. In this work, each respondent estimated the project success he/she was involved with on the following scale:

- **0:** The project was a catastrophe, it was never finished, costs exceeded the budget by a considerable amount, supplier, customer, or both fell into serious trouble due to the project.
- **1.1:** The project was interrupted by one of the participants with considerable disagreement, and continuing the project is not likely - or
- **1.2:** The project was interrupted by agreement and there is consensus concerning the reasons for interrupting and the probability of continuing the project.
- **2:** The project was finalized at the eleventh hour, costs overrode the budget and / or the schedule overrun was considerable, basic functions are working, but there are significant failures and bugs to be corrected during the guarantee period.
- **3:** Satisfactory. The project ended almost within the timetable, costs are near the budget, and the functional aims have been achieved or nearly achieved. The system is working on the whole, but there are some failures and bugs that interfere with its operation that should be corrected during the guarantee period.
- **4:** Successful. The project ended within the timetable or before the deadline and costs are near the budget. Functional aims achieved, the system is working on the whole although there are some minor bugs that cause no problem and will be corrected within the guarantee period.
- **5:** Very successful. The project ended within the timetable or before the deadline, costs are within or under the budget. Functional aims achieved, system is working totally, and no bugs have been found.

During the analyzing process, these values were transferred to the final success value so that in projects where the answer was below three, the success was rated "Weak" and in projects where the answer value was three or above, the success was rated "Good."

To get a more objective view of the project success, the following details were collected from memos and protocols made during the project and valued on a scale of 0 – 5:

- How the project kept to the timetable (0 - Not at all, 5 - Ended before deadline)
- How the project followed the budget (0 - Not at all, 5 – Costs under, Profits over budget)
- Were the functional aims achieved? (0 - Not at all, 5 - Perfect)
- Quality of software (0 – Lots of failures and bugs, 5 - No bugs at all)
- Users adopted the system (0 - Not at all, 5 – Very well)
- Found bugs were corrected (0 - Never, 5 - Immediately)
- Updates (0 – endangered the whole system, 5 – Caused no problems)
- Within the project unforeseen changes were needed (0 – a lot, 5 – Not at all)

The average of these factors was calculated. If the average was 3 or above, the project success was rated “Good” and if it was below 3, the success was rated “Weak.”

One remarkable fact is that among the 25 projects there were only two projects where the first success value differed from the second one. One was estimated to be good when according to the documentation it was weak, and the other was estimated to be weak although the documentation said it went rather well. Another interesting observation was made when collecting the data, and although it is beyond the scope of this study, I feel it is worth flagging it up: In the projects that had weak success, the user’s dissatisfaction was readable even in very early memos and other documents. This highlights the importance of collecting, not just the cold facts, but also feelings, when managing and monitoring projects.

4.4 INTERVIEWS

In addition to the questionnaire, four key persons from the supplier and the customer side were interviewed face-to-face or via e-mail. The interview included free discussion and preformatted questions concerning projects and customers in general as well as certain projects and customers. In this part of the work, everyone expressed the opinion that there is little if any discussion inside the companies as well as with colleagues working for competitors and customers concerning different business cultures and their impact on co-operation. The overemphasized importance of standards has led to a situation where more and more working hours are used to prove that everything has been done according to the standards. But what if the partners are using different standards or the standards do not coincide? Good contacts between supplier and customer is precisely what can clear up problems caused by misunderstandings. If these contacts have been broken and buried by the need to document every word said during meetings, lost trust might be very difficult to get back. It was also pointed out that even if everything had been done and documented according to the standards there is still no guarantee that it had been done right or well.

In the answers to the questionnaire, the personal characteristics of the project manager and other key persons did not seem to have any correlation to the project result. In the interviews, the importance of the project manager’s personality and good relationships between partners came up in comments in which the interviewees said that they are continuously in contact with colleagues from past projects. However, this seemed to have only a weak correlation to project success.

The third point that arose during the interviews was that every one of the respondents had experienced difficulties in co-operating with a partner that was far bigger and stronger than his own company. Especially small customers had found that a strong company with standard contracts and legal attorneys of their own did not even listen to the customer if he tried to ask for some undesired characteristics or clear failures and bugs in the system to

be changed. The system was delivered exactly as it was described in the contract, and corrections were even handled as changes to the product, which should be described, ordered, and invoiced separately. On the other hand, supplier representatives had the opinion that the smaller the customer, the more likely it would try to shift all the responsibility to the supplier: "You are an expert in this, you should know how it works…" Both supplier and customer said that the best combination would be if the customer were big enough to have resources for defining, implementing and training staff in the system, and the supplier were strong enough to have all the knowledge and other resources needed to fulfill the contract but small enough that even the smallest customer would be considered important and worth listening to.

4.5 KEY RESULTS OF THE STUDY

4.5.1 "Hard" data

The first question that was set when beginning the research was: Is the very early finding that there might be a correlation between differences in companies and success of the project that these companies tried to carry out together really true, or was it only a view caused by some random factors? The answer this work gave (Table 17) is that there is no doubt that certain business partners co-operated together better than others.

Table 17: Differences in customer's and supplier's business cultures and their impact on project success:

Percentage of answers	Success		
Differences in cultures	Weak	Good	Total
Only a Few	0	7	7
Some	14	29	43
Considerable	29	21	50
Total	43	57	100

The cold facts that seemed to have a clear relationship with success in projects were differences in size, legal forms of business, ownership, and business branch. More than a minor correlation was also found in differing experience in projects and the usage of quality standards. If the partners were similar to each other in size (Table 18), or the supplier was smaller than the customer, the project was rated "good" almost twice as often as it was rated "weak," but if the customer was small, success was rated "weak" three times more often than "good." Partners of the same size respect and understand each other, they very often have the same value base and the same kind of ownership, management principles, and command language. What makes small companies such dangerous customers is their ownership. The smaller the company, the more likely it is to be owned by one person who is involved with everything that happens, watching the company's money as if it was his

own, which – as a matter of fact – it often is. This entrepreneur is an expert in his own branch but is very often unfamiliar with all kinds of administrative routines and project management and may even hate all kinds of bureaucracy.

Table 18: Customer's and supplier's size and project success.

		Success		
Size of customer	Size of supplier	Weak	Good	Total
Medium size	Medium size	2	4	6
	Small		2	2
	Big	2	1	3
Subtotal		4	7	11
Small	Medium size	8	3	11
	Small	1		1
Subtotal		9	3	12
Big	Medium size		1	1
	Big	1		1
Subtotal		1	1	2
Total		14	11	25

The ownership of the customer compared to the ownership of the supplier (Table 19) provides the same evidence: the same kind of ownership means a higher probability of good success in the project than quite a different background. Note that "Private persons" here does not mean only professionals but also companies, even very big ones, owned by a private person or group of private persons. One reason for this relationship between ownership and the project success might be the same type of language and methods used in management. Partners have more chance of understanding each other, they know that the pressure and demands that come from the owners and managers of the opposite party are – in a way – like the expectations they themselves meet from their own management.

Table 19: Ownership and project success

		Success		
Customer owned by	Supplier owned by	Weak	Good	Total
Corporation	Corporation	3	3	6
	Foreign company	1		1
	Private persons	2	1	3
Subtotal		6	4	10
Private persons	Corporation	3	1	4
	Private persons	5	6	11
Subtotal		8	7	15
Total		14	11	25

The customer's and supplier's legal status or company form seems (Table 20) to have a clear relationship with the project result. The same company form, here limited liability companies on both sides, failed in co-operation only 2 times out of 9. But if the opposite

partner, whether customer or supplier, was a public limited company, the project failed 7 times out of 8.

Two limited liability companies have the same laws to follow, the same, or at least the same kind of, administrative culture and an open atmosphere, so it is easy for both partners to understand each other. A public limited company has strict laws and governance regulations that it has to follow. This means for example that no meaningful information concerning new products, bugs found or contracts made are allowed to be given to a certain customer before the same information has been published and is available on the stock exchange. It can be very difficult to build a confidential relationship under these circumstances. Furthermore, public limited companies are mostly large companies that have got used to dictating their own terms, whether they are customers or suppliers. A smaller company might not be able to say that the relationship would be based on equality and trust.

Table 20: Legal status of partners

		Success		
Customer's legal status	Supplier's legal status	Weak	Good	Total
Limited partnership company	Limited liability company (LLC)	1		1
Subtotal		1		1
LLC	LLC	2	7	9
	Plc	5	1	6
	Professional worker		2	2
Subtotal		7	10	17
Plc	LLC	2		2
	Plc		1	1
Subtotal		2	1	3
Association	Professional worker	1		1
Subtotal		1		1
Professional worker	LLC	3		3
Subtotal		3		3
Total		14	11	25

The branch the customer works in (Table 21) seemed to be one of the most explanatory factors for the success of a project. The engineering industry is a branch where each construction will be planned separately. As a result, the customer has no standardized practices for doing things but development and evaluation are continuous. This places requirements on both the system and the project organization. The system must be flexible

to meet changing demands and the customer's own organization might not be able to work in the well-planned, organized and disciplined form that system implementation always requires. On the other hand, the building, rubber, and metal industries have long traditions in operation planning, using management and control methods, and working in a well-organized way. They will find the time and resources to do the work that implementation requires, and operations and processes have also very often been defined and described many times during the years so that it is much easier to define the system and see if it is suitable for this kind of business or not before starting the implementation.

Accountants in Finland are mostly small companies or professionals with all the risks of a small partner even if the branch itself is very much like the building, rubber and metal industries described above: well-standardized, legalized and controlled. Furthermore, accountants are often pedantic and tend to expect that everything will be exactly as it should be, but in system development and programming there should always be certain tolerances.

Table 21: Customer's branch and project success

	Success		
Customer's branch	Weak	Good	Total
Golf Club	1		1
Holding company	1		1
Engineering industry	4	1	5
Rubber industry		2	2
Metal industry	3	6	9
Building material ind.		1	1
Accounting	4		4
Wholesaler	1	1	2
Total	14	11	25

4.5.2 Soft factors

Among the soft value based factors, conservatism, the employer's attitude to employees, and the employees' attitude to work came up as the features in which the differences between customer and supplier seemed to have the most meaningful role with regard to the project success. This part of business culture was measured by the claims shown in

Table 16 plus 103 additional simple claims with answers on a scale of 1 – 5 corresponding to their accuracy (1 = true, 5 = false). Each respondent answered twice, first considering his own organization and then considering the opposite organization. Every project was answered by at least one, but mostly by two or three persons, from both sites.

Claims were analyzed by calculating how far from each other the average of each customer's answer vs. the average of each supplier's answer was set in good and weak

projects. 15 claims were taken for closer review. The averages of the answers to these 15 claims resulted in the following profile (Figure 22 and Figure 23):

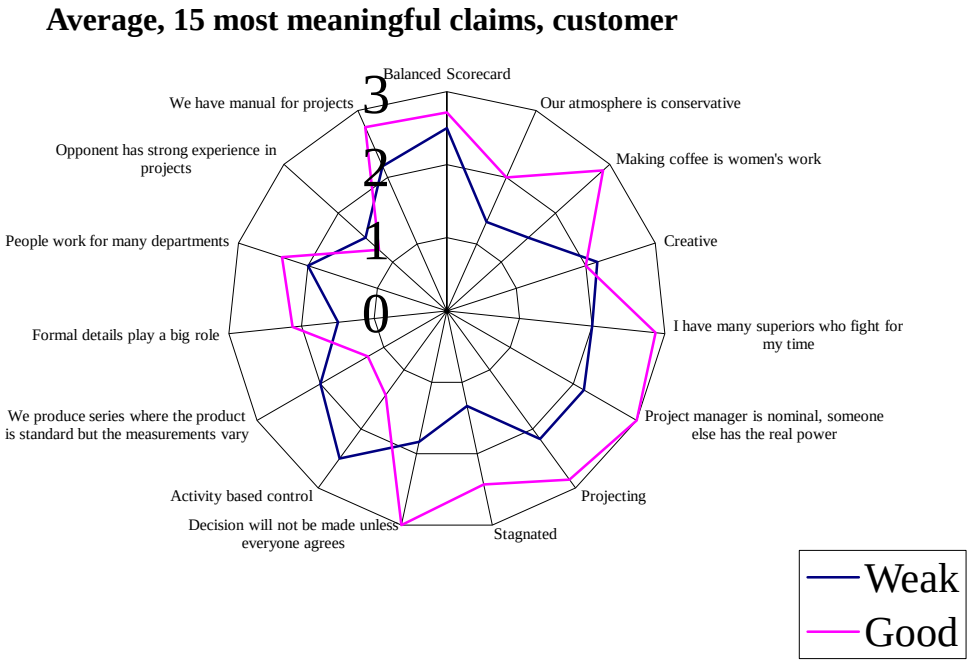

Figure 22: Customer (1 = agree with claim, 5 = claim is false)

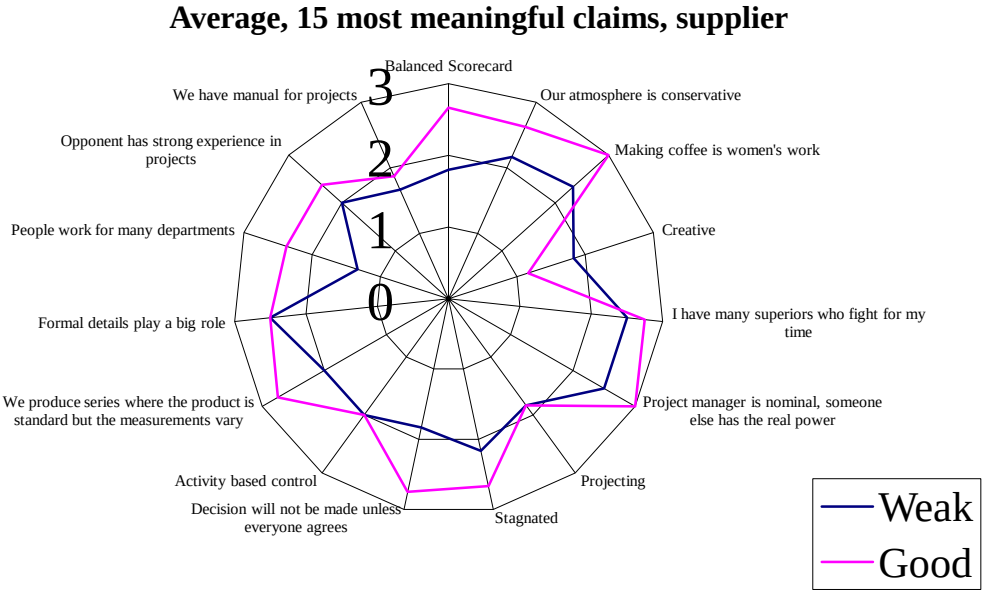

Figure 23: Supplier (1 = agree with claim, 5 = claim is false)

Even looking at the customer (Figure 22) or supplier (Figure 23) alone, we can see clear differences in the answers between good and weak projects. Putting the customer and supplier in the same picture (Figure 24 and Figure 25) shows that the figures in projects with good success are quite different to those in projects with weak success.

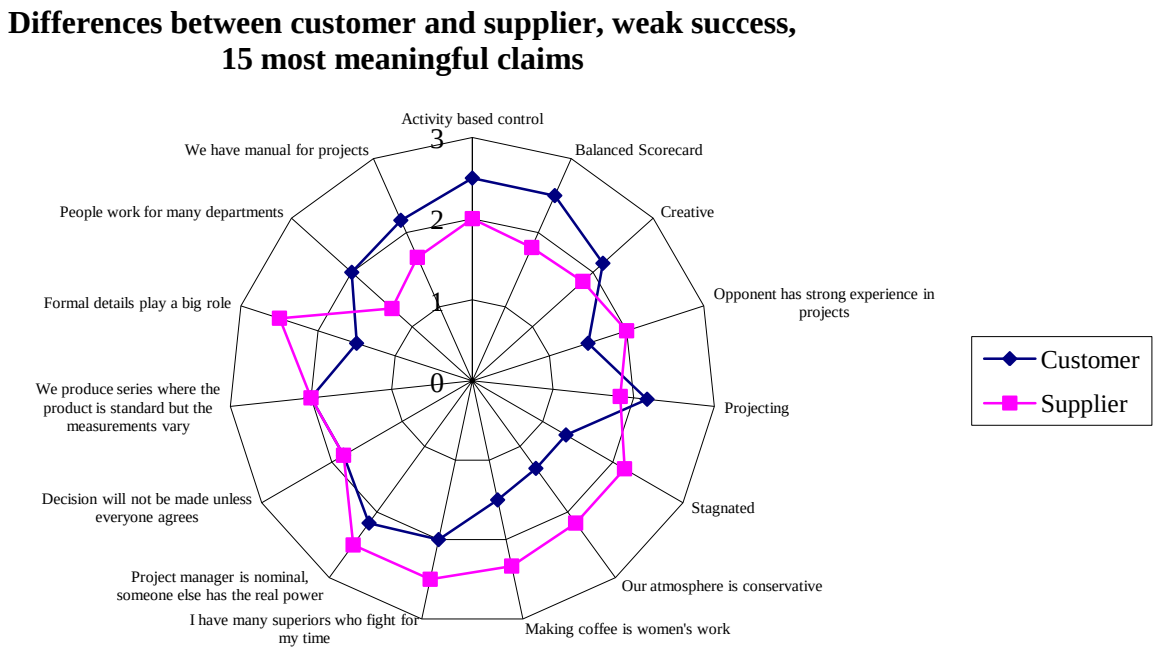

Figure 24: Differences between customer and supplier in weak projects (1 = agree with claim, 5 = claim is false)

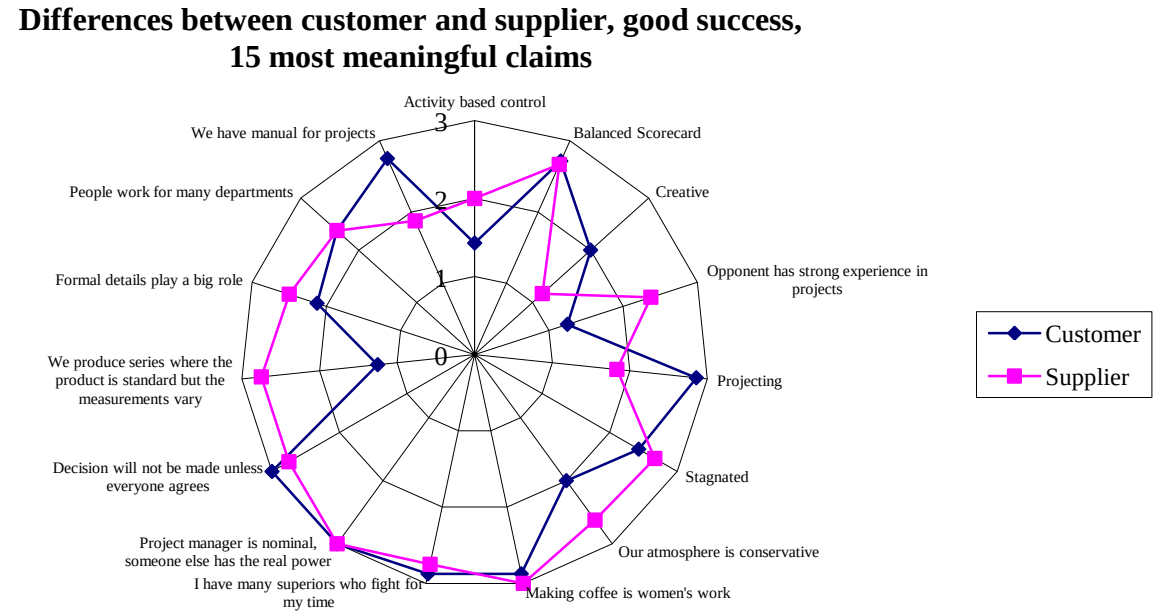

Figure 25: Differences between customer and supplier in good projects (1 = agree with claim, 5 = claim is false)

In both pairs of figures, the difference between projects with better and worse success is quite clear. The cultural attributes such as creative, project-type and stagnating, as well as certain individual questions like “Making coffee is women’s work” or “A decision will not be made unless everyone agrees with it” produces quite a different figure in both classes of success. For example, the question “Making coffee is women’s work” was disagreed with by both sides in successful projects but largely agreed with by customers in projects with poor success.

4.6 CRITICAL QUESTIONS AND CLAIMS

The second aim of this work was to find out if there were such kinds of claims and questions concerning the way organizations work, which could be used to forecast the risk of co-operation in a relatively reliable way. By testing the 15 claims shown in the figures (Figure 22 - Figure 25) with all the projects, we found that four questions gave a good indication of the risks concerning co-operation with a partner. These questions were:

- Making coffee is women’s work
- A decision will not be made unless everyone agrees with it
- Project manager is nominal, someone else has the real power
- People work for many departments

The four claims shown above were selected from the 15 most meaningful ones by calculating the differences in answers between good and weak projects in 5 different ways and comparing which claims got the topmost position in each calculation. Each claim was tested by forecasting the result by using answers from every project and comparing the forecast to the actual result. These four claims together obtained the most reliable result in forecasting calculated both by class (83.3 % correct answers) and by differences between customer and supplier (75 % correct answers). In both calculations, failed forecasts were estimated to have good success even though the success was actually weak.

A real surprise was that top among the claims came the question that was simply meant to check whether people were really reading the questions, “Making coffee is women’s work.” This was in a very correlative state especially among the customers. I believe that more important than the question itself are the values and behavior model it represents: Conservatism, machismo, the belief that certain jobs are more important than others, there is only one person who tells you what to do and others who do what they are told.

The other three in the top four also belong to the topic of management. The more the organization needed to have consensus in decisions, the worse it co-operated with a company with a totally opposite decision making style, especially in critical situations. If the project manager was only nominal without power and resources, the more likely the project was to fail, because even if the opposite side, usually the supplier, had a clear and operational project organization, discussion between the partners failed. If people have to

work for many superiors in many organizations, they very easily lack resources, are stressed, and even burnout was more common in such organizations than in other types. Even if there was a working project organization, people had no time to work properly on the project.

4.7 DISCUSSION

The number of projects included in this work was relatively small and the results of the study could be questioned due to the inadequate size of the sample. The projects involved in this work were done over a long time period, and during the projects there was no idea that the material would one day be used for scientific study. In addition to questionnaires and interviews made within the study, the historical data was collected from official protocols, contracts and memos as well as from people's personal diaries, notes and memories. Results obtained by the latter methods were equal to the results obtained by questionnaire and interviews. We believe that the bias caused by the large timescale and partly subjective data collection methods described above has remained within acceptable levels. The methods used to compare projects and separate the most meaningful claims were kept as simple as possible because of the qualitative nature of the material.

In the literature, differences in cultures have not been studied in this meaning. From studies concerning differences in ethnic, national and religious groups within the same international corporation, or the co-operation of companies with different ethnic, national or religious backgrounds, the same kind of results have been found concerning attitudes to work, power, time, and gender. Within the worldwide organization of IBM, they have made regular studies measuring nationalities and ethnic origins versus dimensions like Power, Individuality, Masculinity, and Uncertainty (Hofstede & Hofstede, 2005, p. 26). The original research was made and indexes listed with these four dimensions. Later, a fifth dimension, "Long-term versus short-term orientation," was found.

The impacts of these dimensions on the way workers, both white-collar and blue-collar, do their job, and differences in this, is quite similar to the way a customer and supplier with different organization cultures differ in their way to do things even if they come from the same cultural, religious and ethnic area. In his book, Hofstede describes the impact of Power Distance: In a large power distance situation, superiors and subordinates consider each other as existentially unequal… Subordinates expect to be told what to do (Hofstede & Hofstede, 2005, p. 55). In this research it was seen that a dominating leader – and therefore a large power distance – led to situations where everybody knew that something should be done but no one dared to take the initiative, and instead waited for an order from a superior who in turn had to wait for an order from his/her immediate superior and so on. This is a very efficient way to avoid responsibility and can be seen as avoidance of uncertainty. According to Hofstede, the need for laws and rules, a strictly structured environment and routines without any practical meaning are typical of cultures and

companies with strong uncertainty avoidance (Hofstede & Hofstede, 2005, p. 182). In this study there was for example one supplier company that was not able to deliver an update for a detected bug without an official signed order from the customer even though the project manager on the supplier's side insisted the update be delivered immediately.

The question which originally was meant simply as a joke and a wake-up point, "making coffee is women's work", but which proved to be very indicative in predicting the success of a project, can be seen as a sign of a masculine business culture. Hofstede lists in his book the key differences between masculine and feminine societies, and the list describing a masculine culture includes the point that men and women study different subjects and have different jobs (Hofstede & Hofstede, 2005, p. 142). Gender and work are tied together. Also, a dominating leader and strict rules with hard sanctions could be seen as a sign of strong masculinity, even if they were recognized as symptoms of Power Distance and Uncertainty Avoidance.

In his book, Hofstede describes countries, religions, and ethnic groups. What if the findings described above are due to a larger cultural background? Partly, in principle, that is true. In Hofstede's indexes, Finland is located at rank 66 in power distance (Hofstede & Hofstede, 2005, p. 44), ranked 48th-49th in uncertainty avoidance (Hofstede & Hofstede, 2005, p. 169), and ranked 68th in masculinity (Hofstede & Hofstede, 2005, p. 121). In other words, this could be described so that Finland as a cultural area is relatively feminine, in the middle stage in avoiding uncertainty, and with a very small power distance. The author compared suppliers and customers who were both in Finland, the workers were Finnish people, and the language used was Finnish. The differences between the parties arose from organizational factors rather than macrocultural ones. Furthermore, in my study there was a customer and supplier whose owner had changed between two projects and this had changed their way of working. There were also some project managers who changed their employer between different projects but success did not follow them. It seems as if the same cultural rules that work between different countries, religions and ethnic groups, also worked between organizations.

The unclear status of an employee who belongs to different organizations at the same time has been noted in several works concerning matrix and hybrid organizations. Mary Jo Hatch, for example, has brought this up in her comprehensive work on Organization Theory. The greatest difficulty in using the matrix design lies in managing the conflict built into the dual lines of authority to which employees working inside the matrix are subjected. Functional managers will expect their employees to meet the requirements of their specialty while project managers want the employees to give their energy to the projects they are responsible for (Hatch & Cunliffe, 2006, p. 302). This is the same problem, expressed in different words, as the one reported by both customer and supplier representatives in cases where the supplier's project managers belonged at the same time to a project organization and to an engineering and/or testing organization. In such

situations they were bound to divide their time not only between many customers, but also between different functions, each function competing with each other in effectiveness and results. In these cases, the quality of supplier and product was felt to be worse. Matrix organizations are very common in software engineering companies but not so common at all within their customers.

4.8 CONCLUSIONS

Even though the material used in this work was small, only 25 projects, proof was found to support the hypothesis that differences between business cultures have an impact on the project success and that certain types of organizations are more risky to co-operate with than other types. After the technical, economic and operational requirements of ERP implementation have been clarified, the organizational risks need examining. To ensure the success of the project, the customer and the supplier companies should be of equal size and have the same type of juridical form (e.g. ltd – ltd and plc – plc) and ownership. The supplier should be less conservative than the customer and the supplier's personnel should value their free time less than the customer's personnel do. Both should have simple organizations where a worker belongs to one team or department only and has one immediate superior only. Power and responsibilities should go hand in hand, and project managers should have enough power to complete the projects. The conditions listed above do not mean that we should give up if we find something that could endanger our project, but observing that there might be risks at the organizational level will help us to take this into account when making contracts, operating and project instructions and so on.

We also found that with only a few simple questions we could find out the possibility of risky differences in organization cultures. Whether the questions are exactly the ones described above, or whether we can find questions that are better and give a more accurate warning of existing risk, is another question. The concentration of the software industry into bigger suppliers and the increasing popularity of business enterprises leading to an increasing amount of small companies and entrepreneurs are bringing us to a situation where we will have only a few huge suppliers selling systems to a large number of small companies. Unless both supplier and customer recognize the risks caused by extremely different business cultures, they might find themselves in trouble. This is why we should continue researching the organizational and human dimensions of systems engineering. Future research using broader material and a more sophisticated range of statistical methods will give us better tools to recognize risky combinations in organization cultures and more means to solve problems so that co-operation is not endangered.

5 THE DIFFERENCES IN EQUALITY POLICIES AND THEIR IMPACT ON THE SUCCESS OF AN IT PROJECT

The aim of this study was to find out whether the finding presented in the chapter 4 that differences in the customer's and the supplier's equality policies might have an impact on the success of an ERP project could be confirmed simply by comparing answers to three elementary questions to the success of the project. 25 different projects over a period of 22 years were analyzed using the information available in notes and protocols. The available results of an earlier survey were used for 14 of the projects, and finally further information was collected by an e-mail interview with three elementary questions.

Although a masculine business culture seems to influence the success of an ERP project, the official and easy-to-see signs of company equality policies, like equal occupations for both men and women, the number of women within management and within the members of board of directors, did not give such reliable signals to be used alone to warn of potential risks in projects. However, when combined with questions concerning the real atmosphere in organizations, these signs might be useful in evaluating the risks. This was also recognized by Geert Hofstede who identified the masculinity-femininity dimension to be one of the effectual agents behind the behavior caused by cultural differences (Hofstede & Hofstede, 2005).

5.1 GENDER AND MASCULINITY

5.1.1 Definition of gender and masculinity

One basic element of this study is the definition of gender and masculinity. We normally use terms that divide human beings into man and woman, male and female, or masculine and feminine without considering the semantics and differences between these synonyms. However, when working with abstract terms they should first be defined to avoid ambiguity. The term "sex" is most commonly used when talking about biological differences, dividing people as men and women (Padavic & Reskin, 2002, p. 5), or more scientifically, male and female by their genitals. Gender is used when we are discussing the cultural aspect of sex, how different cultures give different meanings for being a man or woman, different taboos, restrictions, rights and obligations for both sexes. In all societies masculinity and femininity is understood in a different way. Masculinity and femininity can also be used to describe different ways of thinking and acting (Hofstede & Hofstede, 2005, p. 117). In this meaning we compare certain cultural habits and features – i.e. certain ways of doing things – to the ways, habits and features learnt in our own cultural base to be typical for men (masculine) or women (feminine), but that can also be seen in the behavior of the opposite sex. There are societies that are more masculine and societies that are less

masculine – or more feminine (Hofstede & Hofstede, 2005, p. 121). The most important thing to be kept in mind is that the basis for this comparison is always subjective.

The business culture of a company can also be described within the masculine – feminine axis. The best and clearest example of this can be found when comparing two companies belonging to the same corporation, operating in different countries (Hofstede & Hofstede, 2005, p. 143). But also companies with the same national or cultural background differ from each other in the masculinity –femininity dimension. However, there are very few pieces of research concerning the impact of gender or of different equality policies in companies on co-operation and relationships between two organizations in the same country or other ethnical cultural areas. Even if there are a lot of studies where gender has been noted, it has either been used as demographic background information or the interest of researchers has been focused more on relationships between different sexes or on relationships between men and women and organizations.

In supplier-chain management, research such as "*The Perceived Impact of Supply Chain Management on Organizational Effectiveness*" (Elmuti, 2002) or "*Competitive and Cooperative Positioning in Supply Chain Logistics Relationships*" (Klein, et al., 2007), gender is commonly used only to describe demographic background information together with age, race, education, and occupation. In some organizational research studies with a focus on international trade, gender is mentioned via Geert Hofstede's masculinity-femininity dimension (Hofstede & Hofstede, 2005, p. 118). One example of this is "*A Multi-agent Model of Deceit and Trust in Intercultural Trade*" (Nguyen, et al., 2009), in which the writers assume that behavior, which according to Geert Hofstede is typical for national cultures in the masculinity-femininity axis, can also be seen in smaller societies originating from different national cultures and could impact at supplier-customer level. According to the authors, the following is typical for this dimension: *"On the masculine extreme of the dimension are competitive, performance-oriented societies; on the other are cooperation-oriented societies. A cooperation-oriented trader is interested in the relationship. Building trust is important. In principle, the cooperation-oriented trader does not trace, since in his mind this would constitute ostentation of distrust. If conned, then the cooperation-oriented trader will avoid the conman if possible, or give him one more chance*." (Nguyen, et al., 2009) In other words, the feminine style has more patience and companies on the feminine side of the dimension pay more attention to cooperation and their co-operative partners.

There are also writers who note that one part of organizational culture is management's personal attitudes and prejudices concerning race, gender, religion or past experiences concerning their opposite partners and their staff (Ramsay, 2005).

Within the field of total quality management, research has been carried out that has shown that communication and shared values, including social values, play a major role in the building of trust and commitment between partners (Zineldin & Jonsson, 2000). The

attitudes concerning gender, race and ethnicity can be considered to belong to social values.

5.1.2 Impact of gender on networking and co-operation

The impact of gender on networking and co-operation has been researched for example by Veronique Schutjens and Erik Stam (Schutjens & Stam, 2003). Schutjens and Stam found some interesting connections between gender and cooperative relationships. Male entrepreneurs seemed to have (business-oriented) cooperative relationships more often than female entrepreneurs (29 per cent and 14 per cent respectively). This gender effect persisted after checking by industry type. They also pointed out that: "*With respect to personal characteristics it is argued that female entrepreneurs make more use of relationships that are social in source than male entrepreneurs, since they are yet to be recognized as equals to men as independent entrepreneurs and will therefore have less access to institutional support: a gender effect*" (Schutjens & Stam, 2003). And thirdly, they traced a persistent effect of gender on the number of cooperative strategies.

Many feminist-oriented researchers base their work and theories concerning relationships between gender and organization on the theory of five sets of gendered processes that occur in organizations presented first by Joan Acker (Acker, 1990). In her theory, she presents five processes which are: the construction of gender processes; the creation of symbols, images and forms of consciousness; the interactions between women and men; the construction of gendered components of the identity; and the production of an organizational logic. Later in 1992, Acker omitted one of these processes, but e.g. Päivi Korvajärvi has based her research (Korvajarvi, 2002) concerning Gender Neutrality in Finnish workplaces on Acker's original paper. Even if Korvajärvi's research – like many others in the area of gender research – concentrates on relationships between the sexes in one organization rather than the impact of gendering on relationships between organizations, it is interesting because she takes organizational culture as a description of gendering and refers to Mills' work, while the main trend in the feminist field of research seems to take the organizational culture not just as a manifestation of male power but also as the original reason for gendering and inequality. G. Coates, for instance, says that "*the organizational conditions that currently spawn corporate culture can be regarded as dehumanizing and antiethical to the true interests of any individual, especially women*" (Coates, 1998). Albert J Mills noted in 1988 in his work "*Organization, Gender and Culture*" (Mills, 1988), that the aspect of gender has been forgotten in organizational research and noted that there were at that time very few studies analyzing the relationship of gender to organizational behavior. He also claimed that some of the rare studies concentrated on individual aspects or relationships between the two sexes inside one organization (Mills, 1988).

5.1.3 Impact of gender on leadership style

One interesting question concerns the impact of gender on leadership style. There are two opposite opinions (Marshall, 2001): The first, based on the work of Eagly and Johnson, Astin and Leland, and Aberdene and Naisbitt, posits that the female style of leading is democratic, participating, empowering, transformational, and co-operational. The other, based on the work of Nieva and Gutek, Kanter, Bartol and Martin, and Bass, states that instead of gender, the style of leadership is dependent on organizational roles, situations, and individual attributes. Suzanne Marshall studied the leadership styles of women who were company presidents (Marshall, 2001). The size of the sample was very small and there was no control group of men at the same position in similar companies. Her findings seem to support partially both opinions, although more weight has been placed on the democratic, participating, and co-operational aspects of her findings. The most interesting finding concerning the aspect of this paper was that in external relationships, women corporate presidents seemed to concentrate on co-operation both with their customers and with their suppliers. On the other hand, the same kind of research with a greater sample size made in Great Britain by Titus Oshagbemi and Roger Gill came to the conclusion that there were no significant statistical differences in the overall leadership style between men and women (Oshagbemi & Gill, 2003). However, in this research only internal actions were investigated. In an Australian study by Rod Farr-Wharton and Yvonne Brunetto, the researchers interviewed 48 female entrepreneurs (Farr-Wharton & Brunetto, 2009). Their conclusion was that these female entrepreneurs used a relationship-based management strategy, communicated their ideas and visions during meetings and informal gatherings, but on the other hand listened less to ideas from their employees. Instead of searching for new business opportunities, these female entrepreneurs were interested in coping with the problems at hand.

Susan Cartwright and Anders Gale have researched sex and gender in projects and particularly women in project management (Cartwright & Gale, 1995), (Gale & Cartwright, 1995). They argue that women encounter problems in gaining entry and acceptance in the project environment because the culture of traditional project-based industries like construction and engineering is “masculine” in orientation. They divide industry into traditional and non-traditional. They include finance, health, training, research and development, information technology, and consultancy in non-traditional industries (Cartwright & Gale, 1995). These are organizations where the majority of staff are more likely to be women (Gale & Cartwright, 1995) and where project management techniques and project teams are used just as tools (Cartwright & Gale, 1995) to reach a goal, not as part of the hierarchy and organization. According to Cartwright and Gale, the organization culture in traditional industries like construction and engineering is more masculine than in non-traditional, and women who have made a career in those companies have adapted this masculine culture (Cartwright & Gale, 1995), (Gale & Cartwright, 1995).

Does gender or gender demography have an impact on organization performance? According to Frink et al. (Frink, et al., 2003), a balance between genders in an organization produces better performance than a hegemony of one sex or the other. The result is comparable to the results of research concerning race, age, ethnical and gender diversity in firms (Frink, et al., 2003). Another interesting approach to gender and organizations – and one of the few research studies involving the information technology branch - is the study of Malu Roldan, Louise Soe, and Elaine K. Yakura (Roldan, et al., 2004). They asked why the number of women in the IT sector has been low and has even decreased within recent years (the study was published in 2004). Firstly, they note that the impact of gender in IT has mainly concentrated on the use of technology, games, hacker culture, and education and learning of IT skills. IT as an occupational chance for women or gender as part of the organizational culture in IT firms has not interested researchers. Secondly, they note that the literature suggests that the male-dominated IT subculture is inhospitable to women. On the other hand, they also found that "*at the managerial level, women's roles may be executives, managers, or technical leads. At the technical level, typical women's roles may include that of programmers, software engineers, or network administrators. At the support level, women's roles may be located in computer operations, at the helpdesk, or sometimes in support centers*." (Haas & Hwang, 2007) The reason for their findings may partly lie in the early history of the IT sector and its ties to male-dominated technical education.

As a conclusion of this brief review, a weak connection could be found between the gender of leaders and managers, the equality policy of the company and the company's ability to co-operate with its suppliers and customers. However, the individual differences between leaders and managers as well as the strategies of different companies have their own impacts, and therefore there is a need for further research on this topic.

5.2 FORMAL EQUALITY POLICIES AND PROJECT SUCCESS

In this part of the research, the author wished to test the findings of the case study described above. Unfortunately, these kinds of differences in business cultures were not uppermost in mind when conducting the questionnaires, so information concerning the equality policies of the companies had not been collected. The notes and protocols included – in the best cases – organization charts, nothing more. In companies where the author had been a member of the management group or secretary to the Board of Directors, the situation was known but for the other companies the information had to be collected afterwards. Public limited companies had their annual reports on the Internet or otherwise available, with a statement of equality and a list of managers and members of the Board of Directors. Companies whose information was not available were sent an e-mail with three questions emphasizing that the answer should cover the situation within the period of projects involved in the previous study:

1) Were the occupations of employees gender-dependent?
2) Were there any women in the executive management group of the company? i.e. group of managers reporting directly to the CEO
3) Were there any women on the Board of Directors?

The result of this inquiry is shown in the Table 22. The answers have been converted to numerical form so that 0 = no, 1 = yes when answering the claim in the title.

Table 22: Equality situation in companies involved in projects

Project #	Occupations are not gender-dependent		One or more women in executive management group		One or more women on the Board of Directors		Sum of equality points		Project success (earlier work)
	Customer	Supplier	Customer	Supplier	Customer	Supplier	Customer	Supplier	
1	0	1	0	1	0	1	0	3	0
2	0	1	0	1	0	1	0	3	3.625
3	0	0	0	1	0	0	0	1	3.5
4	0	1	0	1	0	0	0	2	3.375
5	0	1	0	1	0	0	0	2	2.625
6	0	1	0	1	0	0	0	2	3.875
7	1	1	1	1	0	0	2	2	4
8	0	1	0	1	0	0	0	2	3
9	0	1	0	1	0	0	0	2	3
10	1	1	1	1	1	1	3	3	3.25
11	1	1	1	1	1	0	3	2	2.375
12	0	1	0	1	1	0	1	2	2
13	0	1	0	1	0	0	0	2	2.875
14	1	1	1	1	0	0	2	2	2
15	1	1	1	1	0	0	2	2	2
16	1	1	1	1	1	0	3	2	3
17	1	1	1	1	1	0	3	2	2
18	0	1	0	1	0	0	0	2	2
19	1	1	0	1	0	0	1	2	2
20	1	1	0	1	0	0	1	2	2
21	1	1	1	0	1	0	3	1	2.5
22	0	1	0	0	0	0	0	1	3.75
23	0	1	0	0	0	0	0	1	3.75
24	0	1	0	1	0	1	0	3	2.5
25	0	1	0	1	0	1	0	3	2

It is easy to see – just by looking at the table – that the average customer had more work to do to reach equality than the average supplier. The culture of the customers seems to be more masculine than the culture of the suppliers if we believe like Padavic and Reskin that a masculine business culture tends to segregate occupations depending on gender (Padavic & Reskin, 2002, p. 5). The number of companies having women among the managers and as members of the Board of Directors is also greater among the suppliers.

Answers grouped by customer vs. supplier and question produces Figure 26, which proves that there is a significant difference between customer and supplier, especially in terms of the first two questions.

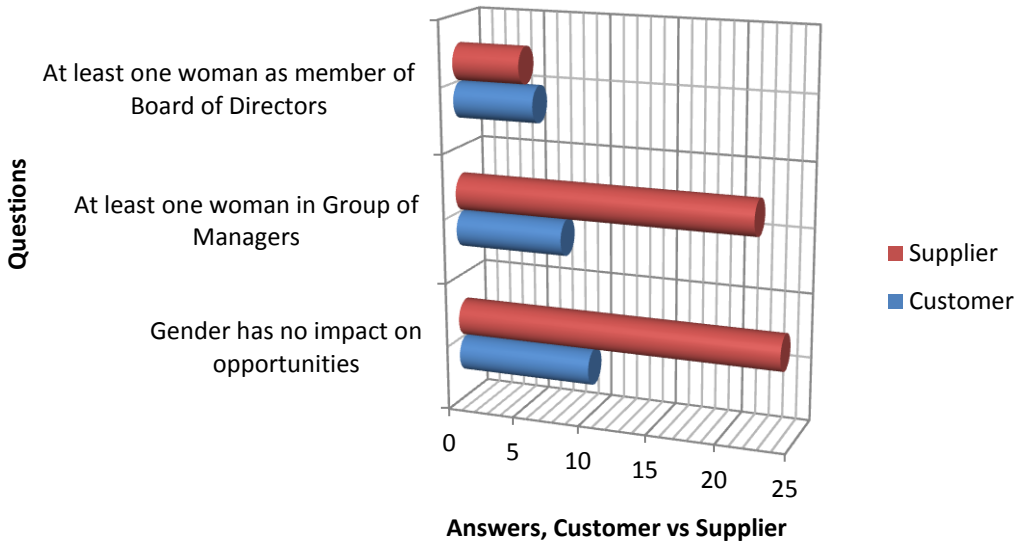

Figure 26: Equality status - customer vs. supplier

Plotting the graph in relation to success reveals that the variation between companies is considerable and that differences between separate projects are huge (Figure 27). However, it can be seen that customers and suppliers are at a different level in terms of equality.

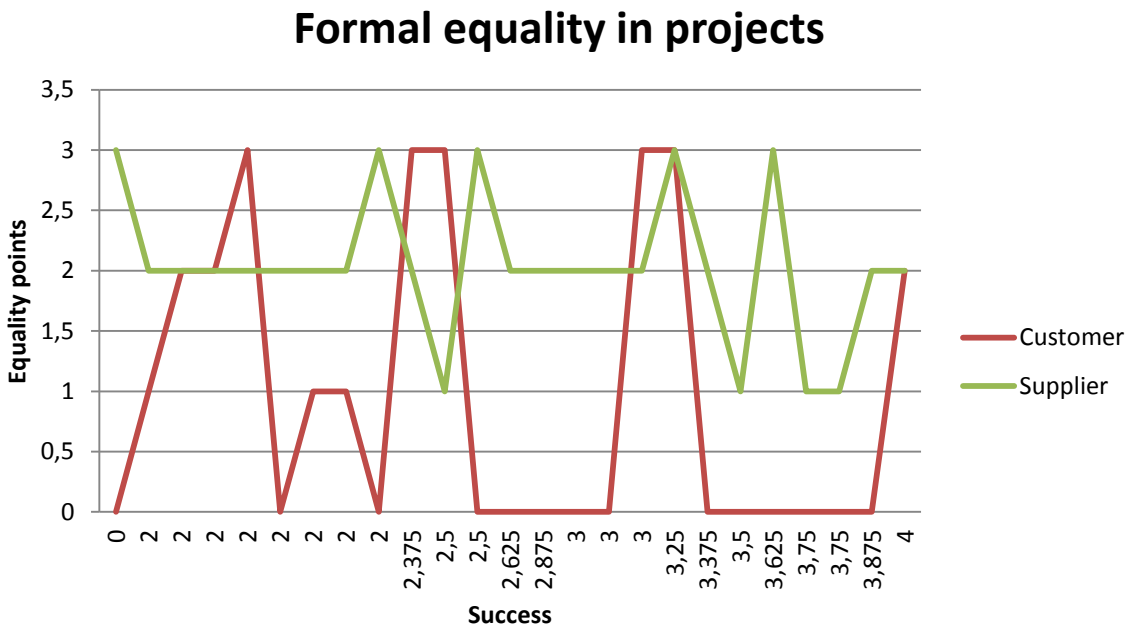

Figure 27: Formal equality situation of customer and supplier in projects

The average columns and the averages of equality points for the three groups have been inserted in Table 23, success up to 2.5, success from 2.5 to 3.375, and success from 3.625 to 4. This gives the following:

Table 23: Averages by classes

Project success	Customer	Supplier	Difference	Avg (Cust.)	Avg (Supp.)	Avg (Diff.)
0	0	3	3	1.333333	2.166667	0.833333
2	1	2	1	1.333333	2.166667	0.833333
2	2	2	0	1.333333	2.166667	0.833333
2	2	2	0	1.333333	2.166667	0.833333
2	3	2	-1	1.333333	2.166667	0.833333
2	0	2	2	1.333333	2.166667	0.833333
2	1	2	1	1.333333	2.166667	0.833333
2	1	2	1	1.333333	2.166667	0.833333
2	0	3	3	1.333333	2.166667	0.833333
2.375	3	2	-1	1.333333	2.166667	0.833333
2.5	3	1	-2	1.333333	2.166667	0.833333
2.5	0	3	3	1.333333	2.166667	0.833333
2.625	0	2	2	0.75	2	1.25
2.875	0	2	2	0.75	2	1.25
3	0	2	2	0.75	2	1.25
3	0	2	2	0.75	2	1.25
3	3	2	-1	0.75	2	1.25
3.25	3	3	0	0.75	2	1.25
3.375	0	2	2	0.75	2	1.25
3.5	0	1	1	0.75	2	1.25
3.625	0	3	3	0.4	1.8	1.4
3.75	0	1	1	0.4	1.8	1.4
3.75	0	1	1	0.4	1.8	1.4
3.875	0	2	2	0.4	1.8	1.4
4	2	2	0	0.4	1.8	1.4
Average total	0.96	2.04	1.08			

It can be seen that the better the project success, the bigger the difference in averages between customer and supplier (Figure 28). This confirms the finding in the first study that the customer should be more conservative than the supplier – if it is agreed that a conservative culture prefers keeping power structures filled by men. However, the claim that a very masculine and competitive business culture on the customer's side endangers the project could not be confirmed in this analysis. Rather it seems that the more equality points the supplier and customer had, the higher the probability of the project failing.

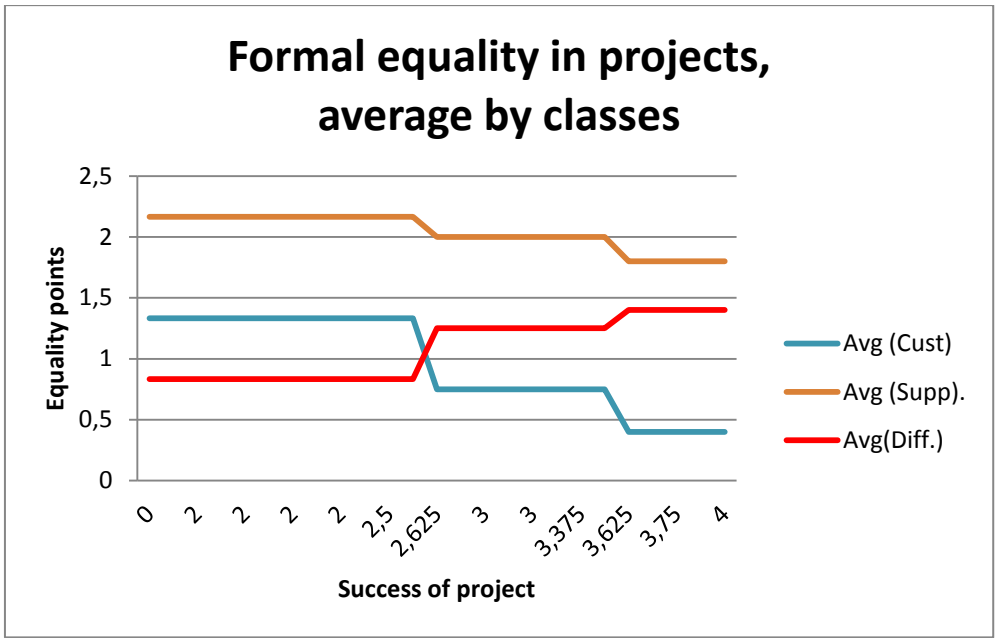

Figure 28: Formal equality in projects, average by classes

To evaluate the results, the qualification method of the material was changed. In the tables above, the answers were coded so that in cases where certain jobs were reserved either for men or women, there were no women in management and no women on the Board of Directors, the code was 0, and if the opposite was true, the code was 1. When discussing the research with an experienced researcher he commented that the difference between two opposite situations might become clearer if the code of the second pole was changed to negative. Zero, he pointed out, has a relatively neutral nature in figures as well as when calculating averages. Thus, in the following Table 24 and Figure 29 and Figure 30, the answers coded earlier with 0 are now coded -1:

Table 24: Sums and averages by classes, coded by -1 and 1

Project success	Customer	Supplier	Difference	Avg (Cust.)	Avg (Supp.)	Avg (Diff.)
0	-3	3	6	-1.5	1.333333	2.833333
2	-3	3	6	-1.5	1.333333	2.833333
2	-3	-1	2	-1.5	1.333333	2.833333
2	-3	1	4	-1.5	1.333333	2.833333
2	-3	1	4	-1.5	1.333333	2.833333
2	-3	1	4	-1.5	1.333333	2.833333
2	1	1	0	-1.5	1.333333	2.833333
2	-3	1	4	-1.5	1.333333	2.833333
2	-3	1	4	-1.5	1.333333	2.833333
2.375	3	3	0	-1.5	1.333333	2.833333
2.5	3	1	-2	-1.5	1.333333	2.833333
2.5	-1	1	2	-1.5	1.333333	2.833333
2.625	-3	1	4	0	1	1
2.875	1	1	0	0	1	1
3	1	1	0	0	1	1
3	3	1	-2	0	1	1
3	3	1	-2	0	1	1
3.25	-3	1	4	0	1	1
3.375	-1	1	2	0	1	1
3.5	-1	1	2	0	1	1
3.625	3	-1	-4	-1.8	0.6	2.4
3.75	-3	-1	2	-1.8	0.6	2.4
3.75	-3	-1	2	-1.8	0.6	2.4
3.875	-3	3	6	-1.8	0.6	2.4
4	-3	3	6	-1.8	0.6	2.4
Average, Total	-1.08	1.08	2.16			

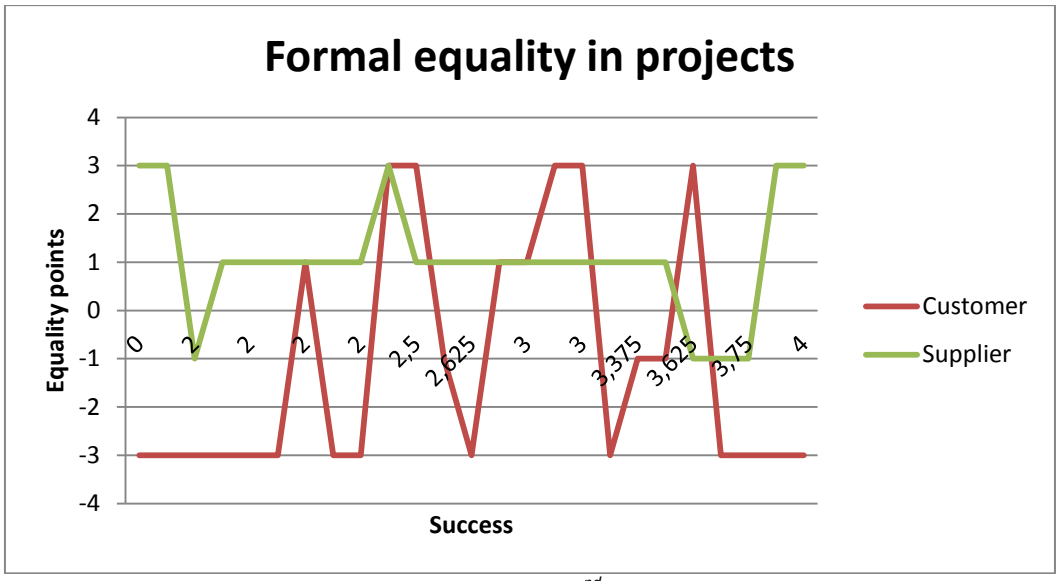

Figure 29: Customer's and Supplier's equality state, 2nd coding method

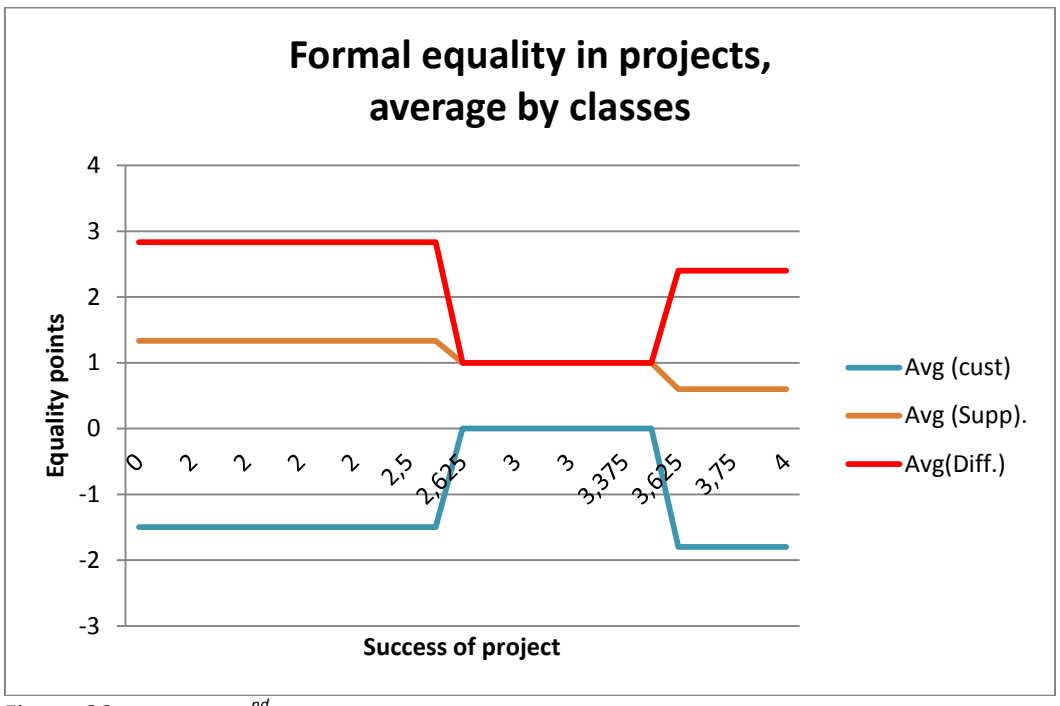

Figure 30: Averages, 2nd coding method

Now it can be observed that the difference between the customer and supplier is at its greatest in projects with the worst success, narrows in projects with a success rating between 2.625 and 3.375, and increases again in the best projects (Figure 30). The variation between individual projects is still considerable (Figure 29). An interesting detail is that the total average is now -1.08 for customers and 1.08 for suppliers (Table 24). The masculinity of customer cultures seems to be clear both in the worst projects (e.g. "Making coffee is women's work" in the earlier case study) and in the best projects (e.g. "Our atmosphere is conservative" in the earlier case study).

5.3 DISCUSSION

The number of projects included in this work was relatively small and the results of the study could be questioned due to the inadequate size of the sample. The projects involved in this work were done over a long time period, and during the projects there was no idea that the material would one day be used for scientific study. In addition to questionnaires and interviews made within the study, historical data was collected from official protocols, contracts and memos as well as from people's personal diaries, notes and memories. The three questions presented in this work were not asked within the original study but the data was collected afterwards. The results obtained in the latter study were equal to the results obtained in the original study. We believe that the bias caused by the large timescale, subsequently collected data, and partly subjective data collection methods described above has remained within acceptable levels. The methods used to compare projects were kept as simple as possible because of the qualitative nature of the material.

In the literature, equality and differences in business cultures have not been studied in this context. In studies concerning equality and gender at work, the major focus of interest has been placed on differences in occupations, payment, and salary policies, sexual harassment, and opportunities to create a career – known as the glass ceiling. This is partly due to the feminist trend of scientists studying gender and its different forms and partly to deep rooted signs of Taylorism in our societal and managerial thinking: Beliefs that problems can be overridden by laws, manuals, contracts, instructions and standards and thus there is no need to take into account the fact that someone might think or act differently than someone else. The second notable point considering the literature is that it is mostly written based on Anglo-American societies and traditions and is not completely valid in societies with a different cultural and legal context.

Geert Hofstede conducted regular studies within the worldwide organization of IBM, measuring nationalities and ethnic origins versus dimensions like Power, Individuality, Masculinity, and Uncertainty (Hofstede & Hofstede, 2005). The original research was made and indexes listed with these four dimensions. Later, a fifth dimension, "Long-term versus short-term orientation," was identified. The question in the first study (Lilja & Jaakkola, 2010), which was originally meant simply as a joke and a wake-up point, "Making coffee is women's work", but which proved to be very indicative in predicting the success of a project, can be seen as a sign of a masculine business culture. Hofstede lists the key differences between masculine and feminine societies, and the list describing a masculine culture includes the point that men and women study different subjects and have different jobs (Hofstede & Hofstede, 2005, pp. 132, 142). Gender and work are tied together.

A dominating leader and strict rules with hard sanctions could also be seen as a sign of strong masculinity as well as attempts to protect male dominance by preventing women from working at jobs traditionally thought to be men's occupations (Padavic & Reskin, 2002, p. 44) or by stopping their career at a certain level (Padavic & Reskin, 2002, pp. 107-112). Bearing this in mind, it could be reasonable to assume that the three additional questions set in the second study are good enough to describe the masculinity of the company business culture. But is it so or are we in danger of creating extra bias in our study by forgetting the context of the time in which the projects were run; the context of companies involved in the study and the context of the time when the questions were set? Let us evaluate this question by question.

Question 1 was: Did the gender of the employee have an impact on positions he/she could be hired for? Officially most companies now answer that gender has no impact on an employee's opportunities. However, in the 1980s, the situation was more polarized. In Finland there were companies where jobs were strictly divided by gender, so that women were hired for administrative and service departments but not for sales, design and engineering nor production. This was partly due to the shutdown of the textile industry during the 70s that led to the disappearance of women's occupations in industry (www.ek.fi, 2010). On the other hand, we had modern, "next generation" companies where only knowledge and capabilities were valued. IT and ERP providers mostly belonged to this group. Furthermore there is one reason, independent of companies, which supported polarization. Girls chose administrative, accountants and service subjects to study and boys were more likely to study technical and managerial subjects (www.kotaplus.csc.fi, 2010), (www.amkota2.csc.fi, 2010). When the IT revolution began, education in data processing and information technology was started in schools, institutes and Schools of Economics as well as in schools, institutes and Universities of Technology. Both girls and boys got equal opportunities to learn the new technology (Kangasniemi, 2003, pp. 172-177), (Kuusi, et al., 2009, pp. 39-40), (www.ktl.jyu.fi, 2010). Those who utilized this opportunity were employed by companies producing and selling new information technology. This supports the finding that gender had less impact on occupations among the suppliers than among the customers. Furthermore, if the question were answered in the politically correct way, we can assume that there was no significant differentiation at all between customer and supplier. There are also findings from other countries that support this result. In the book "Myths at Work" (Bradley, et al., 2000, pp. 72-77), Bradley et al. report studies that say that women and men compete at the same level in employment markets, in terms of expert and managerial jobs.

The second question asked if there were one or more women among the management group (group of managers directly reporting to the CEO). In the 1980s, it was no longer rare for women to work as a CFO and member of the management group. This was due to the fact mentioned above that women had studied economics and worked in administrative jobs so they had the knowledge and experience needed to manage a finance department.

The number of women in this kind of occupation has been rising all the time. IT and ERP suppliers were new companies who found it easier to hire women also for managerial positions (there were no former managers when starting from a tabula rasa). This also supports the finding that suppliers were more equal in their employment policy.

The third question wanted to know if there were any women on the Board of Directors. This question is slightly more complicated. The companies in the survey were partly owned by one person or a small group of owners, and partly public limited companies, listed on the Helsinki, Stockholm, and New York stock exchanges. In Finland it is normal that a company owned by only a few private persons forms its Board of Directors from the owners rather than professional directors or directors outside the company. This leads to the situation where the gender distribution of the Board of Directors describes the gender trend of the owners. In public limited companies, in contrast, the Board of Directors is – or at least should be – formed of external people having the best available knowledge and experience of their area. Furthermore, companies listed on the stock markets must follow the regulations and laws of the country where the markets are located, also in questions concerning equality and discrimination. Thus it can be assumed that the answers in this question are correct but they might describe more the juridical form and ownership of the company than the actual equality policy.

When discussing the role of gender in IT and especially in ERP projects, the implementation process of an ERP system must be considered, including sales, defining, manufacturing, training, delivery, and support. Many of these e.g. defining, training and support require not just technical knowledge but also the capability to listen to the customer and understand what he is saying. This capability is called emotional capability and is said to be a typical feminine quality, i.e. a trait of most women (Bradley, et al., 2000) (Noon & Blyton, 2002, p. 196). Assuming that the end-users of ERP systems on the customer's side are mostly women: bookkeepers, accountants, sales secretaries, order processers and so on, it is important to ask: Do they communicate better with a contact person of the same sex? For a very masculine person it could be very difficult to admit that he does not know something, and to admit this to a woman might be very embarrassing (Connel, 1995, pp. 3-4).

There is also another thought-provoking aspect: How is the decision making done at customer companies with a masculine culture? Are end-users listened to at all and if so, by whom? If the end-users have no chance of voicing their opinions on tools they are bound to use and live with for the next few years, and if they have a feeling that they were not valued and listened to, how motivated would they be to train and use the new systems? Moreover, if the defining process proceeds without real end-users and without actual business cases, how well does the implemented software respond to the real needs?

5.4 CONCLUSIONS

Even though the quantity of material used in this work was small, only 25 projects, proof was found to support the hypothesis that differences between equality policies do have an impact on the project success and that certain types of organizations are more risky to co-operate with than other types. After the technical, economic, and operational requirements of ERP implementation have been clarified, the organizational risks including those caused by equality policies should be checked.

On the other hand, it was also found that the answers to three questions concerning the official equality status at companies do not tell the whole truth and are not capable alone of predicting success. However, we should include the answers to these questions to try to get more information concerning the contexts and backgrounds of the companies, such as ownership, juridical form, organization structure, and the real level of masculinity and conservatism within the organization.

6 THE EXPERIENCES OF EXPERTS – A DELPHI-BASED STUDY

After the case study was conducted and reported (Lilja, 2006) (Lilja & Jaakkola, 2010), it was clear that the findings of it needed further research. Had the other people involved in projects found same phenomena and if, how would they manage the risks cultural differences might cause for the project. People who most probably might be able to answer the question, are those experts who have long experience in projects. With these definitions it was found that an application of the Delphi process would be suitable to gain the information needed.

6.1 DELPHI METHOD

Delphi (or Delphoi, as it is often called) is a method in which the experiences, knowledge, and presumptions of expert panelists on an issue or development process under study are collected in an interactive process, normally by interview or survey. Although it has been known from the late 1950s, it has been used mainly among the social and medical disciplines, military, and futurology. As a tool for technical research Delphi has a relative short history. Delphi can also be modified in many ways and that is why we start with a brief presentation of the base method.

As a data collection method, the Delphi can fall both in the category of both a quantitative and qualitative study. It is useful when the phenomenon under study is complex or when the topic is somehow delicate – difficult to define, awkward to talk about, politically delicate, etc – or the number of members in focus group is relatively small (Laakso, et al., 2010).

The method got its name from Delphoi, Greece, where the priestess, Pythia, also called the Oracle, brought messages from the ancient god Apollo and answered people's questions. These virgin priestesses became famous for their ability to see the future and forecast it. Forecasts were told by muttered mumbling and in a lyrical form, and only the priests of Apollo had the right to interpret the answers (Laakso, et al., 2010).

As a scientific method for data collection, the method was developed and first used by Olaf Helmer in the USA in the 1950s and 1960s (Gordon & Helmer, 1964). At first the method was used as a tool in creating strategies for the army. The Delphi process was originally meant to define the future of a certain phenomenon with the help of experts. The goal was to gain experts' unanimity on how they saw the future of the issue in question. Consensus was the ultimate target, and it was reached by iterating the opinions and their

grounds among the experts so many times that it was reached – everybody agreed to think in the same way at the end (Laakso, et al., 2010) (Bell, 1997).

Due to the topic of the first notable Delphi study, it took time to bring Delphi to the attention of individuals outside the Army and defense industries. Finally, the "Report on a Long-Range Forecasting Study," by (Gordon & Helmer, 1964), was published as a “Rand paper” in 1964 (Linstone, et al., (eds), 2002). At the beginning, the Delphi method was received very positively, but over time the results started to arouse doubts and criticism, especially for gaining too simple results (Bell, 1997). Consensus in itself, particularly a forced one, is strange to futures studies, where one of the main principles of the field of science is that no one can have certain knowledge of what the future will be. Secondly, consensus as a goal leads to the idea of there being just one possible future. The second principle of futures studies is that there are many equally possible futures, among which one will become true. Instead, we can only study possibilities and with certain methods, establish the different levels of probabilities to those plausible future states (Laakso, et al., 2010).

The heavy criticism caused the Delphi method to be forgotten for close to 20 years. In the 1980s, some researchers returned to the method and started to develop it. Their question was: How could it give better answers to the needs of a rapidly changing society? Especially thanks to the work of U.S. researchers Harold Linstone and Murray Turoff (1975, 2002), the method’s reputation was rehabilitated (Linstone & Turoff, (eds.), 2002), (Mitroff & Turoff, 2002), (Turoff & Lindsay, 1975). One of the new developers of the method was Dr. Osmo Kuusi from Finland (Laakso, et al., 2010), (Kuusi, 1999).

Instead of aiming at consensus, the new Delphi concentrates on new and different knowledge, especially tacit knowledge, and the target is to bring this knowledge under the evaluation and comments of other experts. The new Delphi, argumentative or policy Delphi, as it is often called in contrast to the older version, consensus Delphi, is democratic and equal by its nature. Young, unconventional, unknown in their field of expertise, or somehow and in some other way suppressed experts can also raise their opinions and thoughts and because of the anonymity principle of the new Delphi, no one knows who is behind which answer. All the arguments and points are treated objectively and on an equal basis. Another richness of the new Delphi is its ability to reveal and utilize tacit knowledge (Laakso, et al., 2010).

The keywords of Delphi as a method are experts, (small) focus groups or panels, anonymity and iteration (www.millennium-project.org, 2009). The next chapters will discuss all of these elements in more detail.

6.1.1 Experts

The Delphi method can be seen at its best as an expert method. The most knowledgeable people on account of expertise are often also thought to be ahead of the others in their ideas about the future because of their exceptional understanding concerning the technical, sociological, medical, political development etc., or, at least, their potential capability to imagine it.

An expert fit for a Delphi panel should be (Kuusi, 1999):

1. At the top of her/his field of technical or scientific knowledge;
2. Interested in a wide range of knowledge, not only in her/his own field but everything around it;
3. Able to see connections between national and international, present and future development as well as connections between different fields of science;
4. Able to disregard the traditional viewpoints and regard problems not only from the known and safe but also from unconventional angles;
5. Interested in creating something new.

This viewpoint of the requirements of a good panelist also reflects the modern idea of expertise (Laakso, et al., 2010). Furthermore, the experts selected for the panel should be able to express their ideas and visions in such a manner that the others, not specialized as such in this field, are able to pick up their ideas for upgrading. They should also be motivated and committed to be a member of the panel.

6.1.2 Panel

The panel consists of a group of selected experts. Delphi as a method does not set limits to the size of the focus group. The main task is to include in the group people who have the greatest knowledge and / or experience in the area of science / technology. Due to this, the size of the group remains in most cases small. Interactivity and recursivity, which are elementary features of the process, might suffer if the group grows too much. The final size of the panel group is always a compromise between practical needs and the requirements set by reliability and scientific principles.

6.1.3 Anonymity

The anonymity of the panelists is essential for the Delphi method. Anonymity supports independence by avoiding the limits and problems of expression and listening to one another, which are always present in face-to-face expert groups. The official position or unofficial status of a panelist does not affect the opinion or its formation and expression. Also, a member of the panel can be free from the fear of losing face, even if she/he gives an answer or comment that others might find to be wrong or inaccurate. A panelist also does not need to be wary of attitudes, which her/his employer might find inappropriate to be

stated in public. In interest or value conflicts, issues do not become personalized in the same way as in face-to-face communication (Laakso, et al., 2010). Avoiding face-to-face communication between the members of the group also avoids impacts of mimicking and other forms of inarticulate communication that occurs as a problem in other kind of focus group methods (Linstone, et al., (eds), 2002). Furthermore, anonymity provides safety for panelists in cases where the panelists or their employers are competitors, especially if some or all of the panelists come from the business world. Anonymity also gives safety to focus groups when the subjects studied are experienced as "hot" politically or incorrect in some other way. In short, anonymity guarantees more objective answers and results.

There might also be cases where anonymity is not necessary, or where it can even be an obstacle to potential results (Tapio, 2002), (Tapio, 2003), (Tapio, et al., 2009). In studies where expert panelists are needed as representatives of their specific group of interest, or where a group of experts is combined by consensus on the development of the study subject, anonymity might encourage the panelists to give personal opinions, while the aim is to get knowledge of their specific background group. Delphi of this kind is called Disaggregative Policy Delphi. It is used in societies which are largely institutionalized and structurized and in which it is possible to nominate a representative group for each relevant line of thinking. Then the tacit and/or social knowledge is brought to light and presented to the others – to wait for their comments. Each information producer is set at the same level from the point of view of the study. (Laakso, et al., 2010)

6.1.4 Iteration and feedback

The fundamental difference between ordinary surveys and the Delphi method is the iteration and feedback used in Delphi. In contrast to Gallup-type surveys, opinions are not only collected for analysis, but information on the answers will be fed back to the panelists for comments and / or as a basis for the next round. With the help of this feedback, the respondents are obliged to give grounds for their choices. The building up of information proceeds round by round so that the previous round forms the basis for the next one, which is essential for the Delphi process. (Laakso, et al., 2010)

The Delphi process normally consists of four phases (Linstone, et al., (eds), 2002). The first round questionnaire starts the study process by orientating the panelists to position themselves regarding the Delphi process, the subject, and each other (Laakso, et al., 2010). In the first phase, each participant contributes the additional information he/she feels is pertinent to the issue (Linstone, et al., (eds), 2002). The next phase involves reaching an understanding of how the group sees the issue, where the members agree or disagree, and what kind of meaning they give to relative terms such as importance, desirability, or feasibility. If there is any significant disagreement, it will be explored in the third phase to bring out the underlying reasons for the differences and possibly to evaluate them (Linstone, et al., (eds), 2002). During the commenting and arguing of the second and third rounds, the panelists clarify their opinions and views and try to convince the others

(Laakso, et al., 2010). The panelists are able to clarify their answers and comments during the phases. If this happens, it is a positive signal of listening and ongoing dialogue. Between the phases, the manager (researcher) analyzes the results and formulates the arguments given as new claims for the panel to vote on in the next round (Laakso, et al., 2010).

In Internet-based Delphi, there is an opportunity for synchronic dialogue between the participants. It is vitally important to promote communication and problem solving in the focus group. The panelists do not necessarily have to answer all the claims, only those about which they feel they have something relevant to say. The expert evaluations have been shown to improve when the panelists are able to reflect on the credibility of their answer (Laakso, et al., 2010), (Turoff & Starr, 1996).

6.1.5 Reliability and validity of the results of the Delphi process

The Delphi process differs from traditional surveys in two ways: Firstly, the respondents are not picked randomly but are selected because of their knowledge and experience – that is: due to their expertise (Loo, 2002). Secondly, the number of respondents can be much smaller than what is traditionally thought to be sufficient to guarantee the reliability of a survey (Loo, 2002). This is why there has been a lot of discussion, occasionally even strong disagreement, on the scientific reliability of the results assessed by Delphi. The critics argue that the number of respondents in an average Delphi research study is too small to guarantee the reliability of the work (Loo, 2002), (Powell, 2003). The second argument presented by critics is that the method by which the respondents are selected for the Delphi panel is not objective or based on probability, and therefore the answers cannot be thought to be reliable in the scientific meaning (Loo, 2002), (Powell, 2003). The fact that results obtained from different panels may differ from each other has also been seen as a sign of the unreliability of the Delphi method (Loo, 2002).

There are many sampling methods available in traditional research surveys, and not all of them are based on probability. For example, in small populations the whole population may be a sample (Sapsford, 1999, pp. 49-100). Other non-randomized sampling methods are for example quota-sampling and haphazard methods (Sapsford, 1999, pp. 49-100). We must also remember that in surveys, even if we used a randomized sampling method, the research questions always limit the population to a target group from which the sample is picked (Sapsford, 1999, pp. 1-48). The size of the sample in traditional surveys is in many cases large. However, the size itself is not significant for reliability but the representativeness of the sample is – how well it represents the whole population (Sapsford, 1999, pp. 1-48). A greater sample reduces sampling error and enhances representativeness, but does not guarantee it (Sapsford, 1999, pp. 49-100).

Delphi is an expert method. This is a fact accepted by many writers, e.g. (Loo, 2002), (Powell, 2003). It is a method used to collect experts' opinions, knowledge, and experiences concerning a certain limited problem or research question. The reliability of this kind of

method is condensed into three items: selection of experts, size of panels, and conducting of the process including setting the questions and reaching consensus – if consensus is a goal.

For example, during an advanced course on the scientific methods in fall 2010, the principles of the Delphi process were illustrated with a half-hour study among the students. The aim of that lesson was to get the students themselves to think how many experts could guarantee reliable results, and who would be a good expert. Participants in the course were both experienced researchers (6 persons) and novices (4 persons). The research started with two questions: “How many experts should there be for you to believe their answer?” and “Who is a good expert?” The answers to the first question varied from 1 to 9 experts needed and a good expert was defined as a person who has sufficient knowledge of the branch and enough experience. In the second phase, the panel members were instructed to evaluate their answers and one additional question was set: “Who should define the expertise of candidates?” The number of experts needed was evaluated at 3 – 9. It was suggested that even numbers be omitted to avoid a 50/50 result. The definition of an expert was “someone with years of the experience needed.” The expertise of the panelist should be recognized by someone other than the researcher. In the third round, participants evaluated their answers and the final questions were refined. Although none of them knew at that moment that consensus could be the best situation achieved, the answers came closer to each other and the results of this small Delphi work achieved the following form:

> “*To guarantee a reliable result, an expert panel should consist of 3-9 members as a minimum, even numbers should be allowed, experts should have sufficient knowledge of the discipline gathered via education and / or experience, and their expertise should be recognized by colleagues or some third party with the capability of evaluating expertise in this field.”*

It should be remembered that – although all of them knew some research methods - none of these students had earlier knowledge or experience of Delphi, and even so, the answers are quite similar to the ones found in the literature, with one exception: In the literature, no one has been afraid of an even number of participants and the possibility of a dead heat.

In the literature, the number of panelists is mostly set at between 15 and 30 (e.g. (Loo, 2002)), the minimum is said to be 13 (Buriak & Shinn, 1989), but also smaller and bigger panels have been seen (Powell, 2003), (Dagenais, 1978). An expert is defined – as described above – as a person with excellent and recognized knowledge in the field, a wide interest in knowledge outside his own discipline, long experience in the branch and willingness to create something new without being tied to traditional viewpoints (Laakso, et al., 2010), (Powell, 2003). It is also recommended that a panel should be as heterogeneous as possible (Powell, 2003) to ensure discourse and a real achievement of consensus – if that is the goal. In homogenous groups there is the risk of axiomatic consensus: People with the same

background, education and experience seldom find new approaches or solutions to a problem.

Key qualities ensuring the features of the Delphi method are anonymity (Goodman, 1987) and the recursive and iterative nature (Dietz, 1987) of the Delphi process with the possibility of bringing up new ideas, perhaps not so politically correct, and the possibility of evaluating and comparing one's own knowledge, opinions and answers to those of others.

The validity of the answers and results is mostly seen to be in the researcher's hands. How well the questions have been formed and set, does the panel consists of precisely those experts who have the best knowledge and experience, and are the answers correctly collected and analyzed? Ensuring this requires careful planning and testing of research settings (Hasson, et al., 2000).

6.2 DELPHI PROCESS USED IN THE RESEARCH

The aim of this research was to collect the experiences of experienced project managers concerning cultural differences and their impacts. The purpose of the research was to evaluate the findings of an earlier case study (Lilja & Jaakkola, 2010), and to find more accurate questions and means of becoming aware of risky cultural differences. The Delphi-based research with 35 respondents and 5 phases was conducted during 2010.

6.2.1 Selecting the panelists

Before the process could be started, it had to be determined that what was meant by expertise, i.e. who the experts are in this case. We wanted to find out if people involved with other projects than those investigated in the study named above, had similar experiences. This meant that suitable persons should have been working in several projects as project manager on the customer's or supplier's side or as consultant and that they should have such an education, either formal or informal, that they were able to answer the questions. Respondents to this study were selected from multinational IT suppliers, consultants and their Finnish customers so that in most firms company named a person whose experience and knowledge was at a level that could be called expert. In some cases researcher directly contacted a person who was in such an occupational position that he/she must be both experienced and expertized. The average experience of the respondents was estimated to be near 20 years, and the oldest had been in the business since the early 70s. The education level of most of the participants varied from Bachelor's degree to Master of Sciences, and their disciplines were Technology, Information Technology or Financial / Economic Science. Suppliers' and consultants' representatives were project managers and customers' representatives either CFOs or CEOs with responsibility for IT projects or CIOs.

6.2.2 Conducting the study

The study consisted of five phases described in Figure 31. The results of each phase were reported to panelists and they were asked to comment on the results and their own answer if needed.

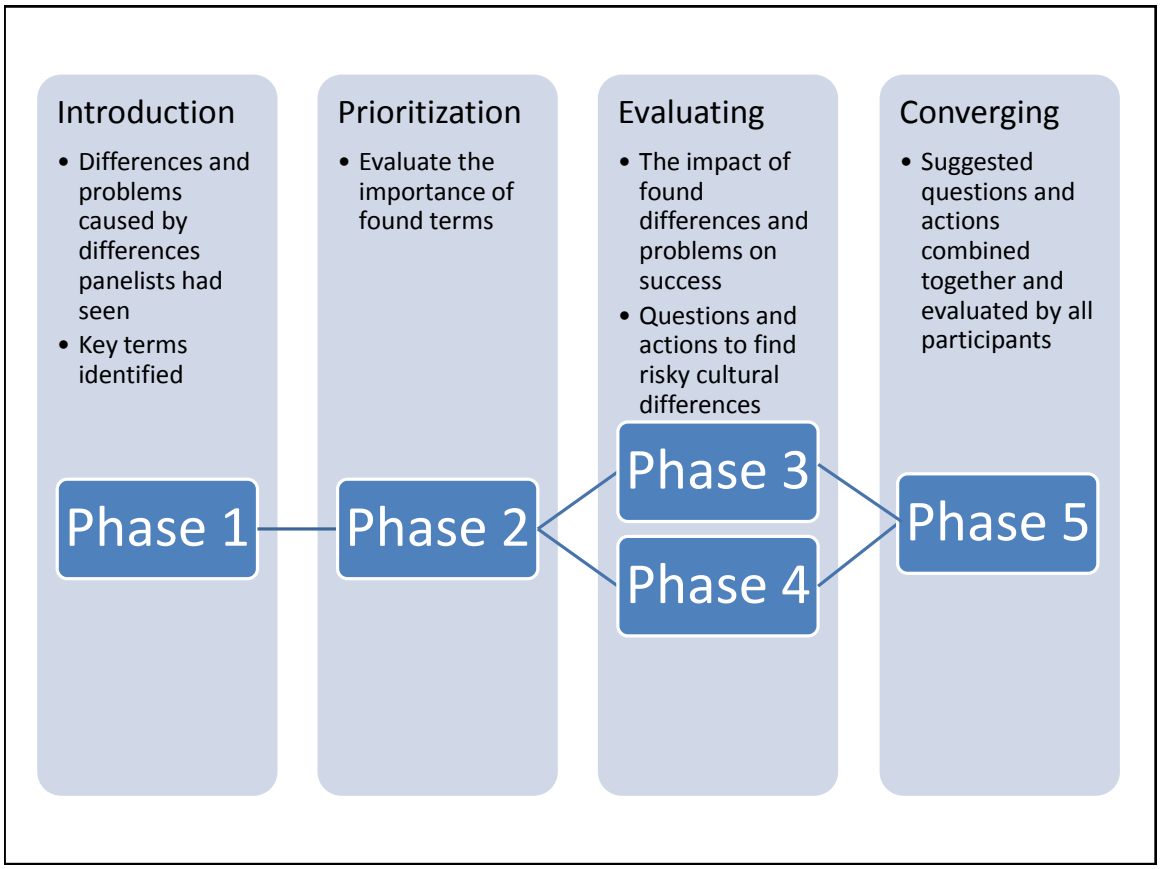

Figure 31: The phases of the study

The panelists were at first asked to tell with their own words what kinds of problems caused by the differences in customer and supplier business culture they had met during their career. From their answers the keywords were elicited and standardized. The most common keyword was “Requirements assessment.” Together with that, the term “Language” was very often found in the meaning that the opposite sides did not have a common language. The total number of different terms found in the answers was 110 terms occurring 220 times.

The next step in the study was to find out the priority of the terms. A report concerning the results of the first questionnaire was delivered to the respondents who were allowed to comment on the results and/or their own answers. The findings of the first round were formulated into new questions in other words. For example, the question concerning the relation between requirements assessment and a common language was formulated as follows: Is it difficult to find common terms /language within the requirements assessment process? The alternative answers were: “It is difficult”, “It is not difficult” and “Cannot say.”

The members of the panel commented on the findings of the first round with expressions like “This is what I have seen all the time but have not been able to describe”, “The soft aspects in projects are underestimated by engineers” and so on.

In the third round, where the results of the second phase were published, comments on the questions were that it might have been a good idea to have more alternatives, for example in levels “very difficult”, “difficult”, “a little difficult” and “not difficult at all”. With hindsight it must be agreed that these comments were right. On the other hand, there were experiences from earlier studies that if a Finnish person is allowed to answer in a neutral way, he will do so, and the clear divisions were selected advisedly. The second round received more criticism from the panelists than the other phases due to its length. The number of terms in the first round was greater, and although single terms meaning the same were combined if possible, the questionnaire was long.

The aims of the third and fourth rounds were to find out what kind of impact the cultural differences and problems identified within the first two rounds had had, according to the respondents’ experience, and how they had tried to manage, avoid and/or cope with these impacts. Questions were now divided into two groups between the third and fourth rounds depending on their subject. The respondents were also asked to suggest questions they would set to find out cultural differences that might cause problems during a project. The possibility to evaluate one’s own answers and comment on others was maintained all the time.

The fifth round was a converging phase. The questions and means presented in the third and fourth rounds were grouped according to their subject into 4 groups and respondents were told to select 2-4 items from each group, which they would ask or check before a project to assess risky cultural differences. In addition to this, the respondents were told to evaluate the impact of differences between customer and supplier in the subjects gathered within the first round on a common IT project.

35 persons were invited to join the panel. All of them accepted the invitation. The number of participants that answered in each round was (Table 25):

Table 25: The number of participants in each phase of Delphi

	Number of participants
First round	35
Second round	20
Third round	19
Fourth round	17
Fifth round	17

It is easy to see that after the first round those who remained involved were interested in the subject. The biggest loss of respondents was after the first round. The number of active respondents stayed at over 15, and all of them answered all the questions. It is difficult to evaluate the impact of the decreased number of respondents on the results of the study, but in common it can be said that from the answers it was not possible to notice that someone was missing. If all the missing respondents had been e.g. customers, suppliers or the third party, the answers could have been biased.

The environment with which the work was conducted was Webropol, a www-based questionnaire tool with possibilities to log the users, identify them and give immediate feedback and send e-mails to all panelists at once. Due to the fact that the respondents were each other's customers, competitors and suppliers, we had to guarantee complete anonymity to the respondents, meaning that no one was able to recognize an individual respondent. Complete anonymity also means that Webropol's logging, identifying, and feedback functions were not used, which made it impossible to trace who answered and who did not. This also meant that the feedback had to be sent manually via e-mail.

The environment, questions, and questionnaires were tested before the first round with a smaller test group, and the errors found were corrected before the research started. However, the diversity of Internet browsers and Webropol's own update during the fifth phase caused a small problem: Two questions with radio buttons were not working correctly. Luckily, this was found out after just two respondents had answered, and was corrected at once.

The validity of the questions and answers could at that point be evaluated via comments given on the feedback sent to the respondents after each phase. The feedback consisted of summary results and conclusions of the latest completed round. The results were seen to be useful in the respondents' daily projects, accurate and exactly what had been needed but not received until this point. Critical opinions wished for a deeper approach to the questions, more alternative answers, and also shorter questionnaires. One third-party representative also wondered if any work of this kind – no matter how good it is – could lead in practice to any usable conclusions.

The reliability of the results can be assessed from the number of panelists and respondents, their expertise and commitment. The number of panelists that answered all the questions was 17, whereas some kind of minimum is thought to be 15 (Loo, 2002). The expertise was estimated by each respondent's superior or colleague, i.e. someone other than the researcher. All the panelists had long experience in IT projects and all of those who answered all the questions seemed to have a strong commitment to research. We wanted to get information about problems caused by collisions between different cultures. Every one of the respondents had experiences of their own, and told them openly in their answers to open questions trusting the anonymity, and they also answered the structured questions. There were no signs of manipulation or hiding the facts in answers. From

comments given to the feedback of earlier rounds it could be seen that problems were quite common but people working with them do not necessarily see them until someone speaks about them openly. This is the way that the Delphi process helps bring tacit knowledge into the spotlight.

6.2.3 Experiences and ideas obtained while conducting the Delphi-based process

The introductive interviews proved here at least to be a good way to get panelists committed to the whole Delphi process; the fact that the employers selected the people to participate in the panel did not guarantee commitment. In this research, out of the 35 panelists taking part in the first phase, only 17 were involved with all 5 phases. Due to the guaranteed anonymity, we were not able to study the reasons for this, but thanks to the messages sent to the researcher at least three different reasons are known: Firstly, many of the panelists were working with customers and/ or plants located both in Finland and abroad. The strikes at airports in Finland and the volcanic ash clouds from Iceland in 2010 disturbed travel during the second, third and fourth phase so that people were overworked and gave up everything that did not directly belong to their job. Only those who were personally interested in the subjects of the research remained. Secondly, although people were told before being asked for their approval that the research had 5 different phases and that it would last from February to November, some panelists who gave their acceptance had not realized this. And thirdly, some of the participants found that the second phase was much harder than expected. The advance information could have been more accurate and direct. A face-to-face meeting with each panelist might have clarified the situation and increased commitment. However, for reasons of force majeure, it might still not have been possible to eliminate dropouts.

In their comments many of the panelists said that these subjects were so mundane that they had no idea that there might be aspects they had never recognized, heard of, or thought about until someone else spoke out about them. This is the way that the Delphi process helps us to gather tacit or hidden knowledge. Each expert has knowledge and experience of his/her own. This intellectual property may in some cases even be a critical part of his/her business, a competitive advantage, which must not be given to competitors. In the safety of anonymity, it is easier to express opinions and share experiences and lessons gained over the years. Experts are motivated to participate when realizing that they might not only share their own knowledge but also learn from the experiences of others, even their competitors. To maximize this, the Delphi panel should be as heterogeneous as possible.

The capability of the Delphi process to gather complex and qualitative data, tacit knowledge and experiences as well as ideas and opinions about the future makes it very usable in many areas. Until now it has been mostly used in futurology, where it was first applied, and in social, health and medical disciplines. In management and technological disciplines, its use is continuously growing. According to our experience, it is well suited to

studies where the population and / or sample is relatively small, and giving the information the researchers wish to collect would require expert knowledge and experience. These kinds of settings occur increasingly in technical sciences and software engineering. The bias caused by a small sample is minimized by the iteration and anonymity of the respondents.

In Delphi studies, the biggest probability of bias comes from issues that the researcher has a major impact on. For instance, how well the criteria for panelists are defined and prepared. How well the panelists are selected and familiarized with the technique. How well the questions are set and written and how well the questionnaire and the technical solution to conduct the study are tested. And finally, how well the analyzing methods are planned and tested. Thus advance defining, planning and testing are the keys to reliable and valid results. In some cases, like in this study, the technique deployed may lead to situations where we are bound to act ad hoc. In such a situation good advance planning is even more important. We cannot test everything but we should be prepared for anything.

The reliability of the study presented is based on four arguments:

1. The number of panelists is adequate (minimum of 17) vs. minimum presented in the literature that varies from 10 to 15 panelists.
2. The iterative nature of the method – each panelist had the possibility to evaluate his answer and to comment on a summary of answers of each phase.
3. The anonymity of the method – none of the panelists knew who had said what. There was no fear of losing face, being laughed at or being identified as a representative of a certain stakeholder or company.
4. The quality of the panelists. In this study, most of the panelists were nominated by their employer or colleague according to experience and knowledge.

The validity of the research can be assessed by evaluating the answers and results: Do the answers really answer the question, are they logical and well-formed, are the results logical, do they answer the research question and are they applicable in practice? In this study, the logic and the applicability of the answers were recognized by the panelists. The results answered the research question but also produced a lot more information and data.

6.2.4 Conclusions concerning the Delphi-based method used

Although mainly used in futurology and social, health, and medical disciplines, the Delphi method can be applied to certain types of research in technical sciences, software engineering, and related disciplines as well. In studies where the aim of the method is to collect qualitative data and information from a limited group of specialists or group of people that can be seen to be expert because of their knowledge and / or experience, some variation of the Delphi method is one alternative for the researcher to consider. As inbuilt properties, it has iteration and (in most versions) anonymity, which help guarantee reliability even with small samples.

However, the researcher has a great impact on the quality of the results. By planning the work carefully, letting an external evaluator evaluate the expertise when choosing the panelists and testing the environment, advice, questions, and questionnaires with an external testing group will help avoid bias and improve the reliability of the results. While testing the questionnaires and questions it could be a good practice to compare them with the research question: Do the results obtained via the questionnaire really answer the research question and are the results usable in the rest of the research or in practice? If the answer to these questions is "yes," the results are more likely to be valid enough to conduct the study.

There are certain circumstances for which the Delphi methods proved very practicable. Tacit and hidden knowledge, sensitive information, undocumented practices, and facts and opinions that were thought to be incorrect to utter were made known from the safety of anonymity. Anonymity also seemed to make it easier for the panelists to evaluate both their own and other participants' answers and comments. Due to the features described above, some variation of the Delphi process might be a good data gathering tool for purposes like collecting requirements for a new system, defining and improving business processes, and defining and improving software engineering processes.

6.3 THE LACK OF COMMON LANGUAGE

6.3.1 Common language

Collecting and defining the requirements set by the customer for a new system is one of the most important communication processes between the customer and the supplier during a common ERP project. The analyst on the supplier's side is like a translator who has to understand what both the users and other stakeholders are saying (Robertson & Robertson, 2007, p. 94). Transforming free speech into formal exact technical specifications and descriptions of the required functionality is challenging, even within the same organization (Kilov & Sack, 2007), and a host of extra challenges are met when stakeholders belong to another organization operating in a different branch, with their own jargon and vocabulary. However, the majority of the literature seems to approach the problem from the technical aspects, exploring how to translate the customer's verbal requirements into a formal definition language like UML, developing new description languages and methods or evaluating existing ones. There are only a few writers who are concerned about the customer and supplier really understanding each other during the collection of requirements, and elicitation and prioritization of processes. On the other hand, researchers who are studying the possibilities of automating requirement assessment and eliciting processes and researchers with an interest in studying and developing different types of modeling languages are also continuously picking up on the ambiguity and inaccuracy of natural language (see e.g. (Hansen, et al., 2009), (Melchisedech, 1998), (Popescu et al., 2008)). In these discussions, the problem is mainly seen as the result of the

different domains the stakeholders have (Fliedl, et al., 2000) or as a mark of either the customer's insufficient competence in requirements engineering or the supplier's insufficient knowledge of the customer's business, or of the domain the application should be applied to (Gorschek & Svahnberg, 2005). The cultural and social aspect of language seems almost to have been forgotten in research work in the domain of software engineering.

Language should not be considered just as a technical problem or as proof of the partner's deficient or excellent competence in a branch or technique. Language is always a part of each organization's culture and identity exactly as it is a part of each nation's identity. Opposite partners using quite different terminologies and jargons may indicate that there could be other cultural differences between the organizations, which may cause several problems for the project. The impact of a different language within an IT project and especially within requirements management processes has not been overemphasized but rather underestimated.

6.3.1.1 Common language in literature

When preparing the paper this chapter is based on, a brief review of research and papers concerning the topics was made. 11 academic libraries + Google Scholar were searched using the following query terms:

- "Language" + "requirements defining"
- "Language" AND Requirements
- "Language" AND "Requirements" AND Customer AND Supplier
- "Language" AND "Requirements" AND Customer AND Supplier; Years 2000 - 2010
- "Language" and "create" and "togetherness"
- "Language" and "create" and "togetherness";Years 2000-2010;
- "Language" and "togetherness"
- "Natural language" and "requirement defining"
- "Occupational language" AND togetherness

The libraries searched were CRC-netBASE, ScienceDirect, Gale Virtual Reference Library, Knovel, McGraw-Hill, National Academies Press, O'Reilly, Palgrave, Referex, Springerlink, and UC Press. If libraries insisted that the query select a branch, the following branches were selected when available: Information technology, IT, Business Management, Social sciences, Computer science, Computing & information technology and/or Technology. The queries were run during fall 2010. All the queries together gave 32756 unique hits. Out of these hits, 189 papers, books, and articles were selected for closer inspection in accordance with their relevance as concluded from titles and abstracts. The experiences gathered from this test review were found helpful when conducting the main review as described in chapter 3.

There are numerous research studies concerning language and the use of common language. Unfortunately, their focus is mostly on teaching a certain language, measuring language skills, developing and using description languages like UML for different purposes, or developing and using programming languages. The focus is also on topics like computer-aided interpreting, differences between male and female languages, regional or racial differences in a certain language, mostly English, or the language used by professional practitioners with their colleagues and respectively with their customers. It was very difficult to find research concerning the impact of differing languages and terminologies between customer and supplier on a common project and especially on the requirements assessment process.

Management sciences, especially marketing management and supply chain management, have noted the importance of a common language in negotiations between partners who have a different native language. Some of the writers concentrating on market failures have also pointed out that "*As compared with the study of market failures, the analysis of the sources and consequences of internal organizational failures is at a very primitive stage of development*" (Williamson, 1973). One of the sources of internal organizational failures – as well as a source of external market failures – is said to be the lack of common contracting terms that all stakeholders could understand in the same way (Williamson, 1973). In his study concerning the supply chain operations model (SCOR), Gordon Stewart mentions the lack of a common language as one reason to utilize SCOR, which makes it possible to "*Evaluate and communicate more effectively internally across functions, and externally with suppliers and distributors, via a common language and process definitions*." (Stewart, 1997)

In the research conducted by E. Lesser and J. Storck (Lesser & Storck, 2001), a common language was named as one of the main factors behind organizational performance. They also noted that a common language is important in gaining access to people and their information, which plays a significant role in the requirements assessment process. Robert M. Grant (Grant, 1996) lists the factors that are important in determining the efficiency with which a firm integrates the specialized knowledge available within it. One of the three factors is the level of common knowledge. Grant says "*If specialized knowledge must be reduced to common knowledge in order to communicate it, there is inevitably substantial information loss. The size of this loss depends upon the level and sophistication of common knowledge. A basic prerequisite is a common language*" (Grant, 1996). The same theme was taken up by Paul R. Carlile, who describes how a group of engineers co-operating with other groups had to develop a common terminology to make sure that everyone used the same terms in the same way, and in that way improved efficiency and safety (Carlile, 2004).

Yadong Luo and Oded Shenkar's study (Luo & Shenkar, 2006) addresses how multinational companies design language systems to meet strategic and organizational requirements for coordination, integration, and expansion. Luo and Shenkar note that language is a key ingredient in the internal knowledge flow, which can shape organizational change

processes, information exchange, competitive activities, global coordination, and intra-corporate value creation. Although this study concerns global corporations the conclusions can be taken to be valid also in information exchange between organizations that do not belong to the same corporation. The conclusions of another study that concentrated on multinational corporations and the use of common language (Fredriksson, et al., 2006) are more ambiguous. Even though the researchers noted the importance of a common language, they also saw the diversity of languages as a positive value. However, the importance of a common language is emphasized by Jacques Crémer, Luis Garicano and Andrea Prat in their study where they present an example of how a lack of common language and terminology between groups operating together can lead to fatal mistakes (Crémer, et al., 2007).

In their study, Thomas W. Malone and Kevin Crowston present (Malone & Crowston, 1990) the processes that are needed to create a successful co-operational relationship. One of these processes at the communication level is establishing a common language. They note "*communication requires that some form of "messages" be transported from senders to receivers in a language that is understandable to both. Finally, the establishment of this common language and the transportation of messages depends, ultimately, on the ability of actors to perceive common objects*" (Malone & Crowston, 1990). In his research concerning individual and social barriers in knowledge sharing (Disterer, 2001), G. Disterer noted that one of the social barriers in utilizing knowledge is the lack of a common language.

The ontological aspect of the need for a common language is raised by D.E O'Leary, who argues why we should have a common language in his article (O'Leary, 2000). He points out that a common language is necessary in knowledge organization, navigation, and usage. Referring to Price Waterhouse's research, O'Leary says that "*Even within the same company, different divisions cannot compare processes when they lack a common language to describe what they do. The challenge becomes even greater when executives attempt to compare separate companies in the same industry or across different industries*" (O'Leary, 2000).

Some writers have looked at the generation of a common language and its impacts on other social skills of groups. Tuija Lehesvirta points out that interpreting at group level is a social activity that creates a common language, shared meaning, and understanding (Lehesvirta & T., 2004). Lauring and Selmer (Lauring & Selmer, 2010) define a common language as a shared vehicle for communication, which allows parties to participate in co-operation. According to these authors, defining and using the common language increases and strengthens group cohesiveness, involvement, and trust.

One particular example of a common language is occupational language. In her study, Nancy Quam-Wickham describes (Quam-Wickham, 1999) how occupational language has two purposes: Firstly, it defines the terms, tools and objects needed in specialized work, and secondly, it creates a sense of togetherness, imparts and amplifies attitudes and

beliefs, and forms a basis for a collective identity. A little different approach is the research by Chisalita et al. (Chisalita, et al., 2005), where occupational culture is seen as a subculture and occupational language is formed based on the expertise of different occupations. They also noted that language and strange terms used caused at least a significant part of the problems between experts and users. David L. Bahn sees occupational language as another significant cultural form that lets the members of a subculture communicate with each other using a special lexicon (Bahn, 1995). Damian Hodgson has researched project management, and he says that within the Project Management discipline an occupational language has a fundamental importance in identity construction (Hodgson & D., 2002).

A common language can also tell us about the maturity of an organization. In the study by Adaba, Rusu and El-Mekawy (Adaba, et al., 2010), it is emphasized that use of a common language in sharing information between different organizations (in this case between IT and business) is a mark of mature communication.

In conclusion of this brief review I would like to stress the following points: A common language is important for the success of co-operation. It enables mutual understanding and improves the performance of the collaborative participants. Language is a part of identity and occupational language is a basis for the occupational identity of a certain group. Occupational jargon as a common language strengthens a sense of togetherness and improves involvement and trust inside the group and between collaborative groups.

6.3.2 Results of a study

A Delphi-based research study with 35 respondents and 5 phases was conducted during 2010. The respondents to this study were selected from multinational IT suppliers, consultants and their Finnish customers so that each company nominated a person whose experience and knowledge was at a level that could be called expert. The average experience of the respondents was estimated to be nearly 20 years, and the oldest had been in the business since the early 70s. They were first asked to describe in their own words what kinds of problems they had met during their career caused by differences between customer and supplier business cultures. From their answers the keywords were elicited and standardized. The most common keyword was “Requirements assessment.” Together with that the term “Language” was very often found, in the meaning that the opposite sides did not have a common language. The ten most commonly mentioned terms and their proportion out of all the terms found are shown in Figure 32.

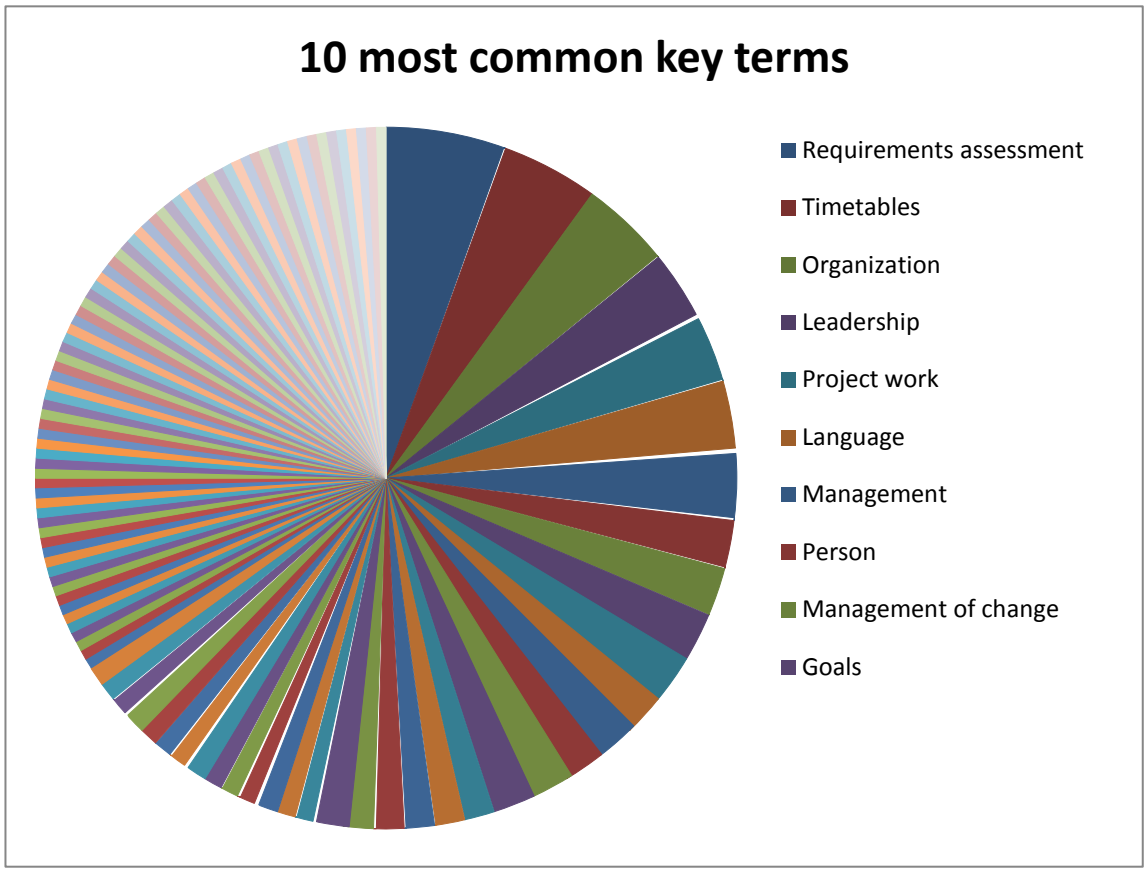

Figure 32: The most common keywords in the answers of the first round.

The total count of different terms found in the answers was 110 terms, occurring 220 times.

The next step in the study was to find out the priority of the terms. A report concerning the results of the first questionnaire was delivered to the respondents who were allowed to comment on the results and/or their own answers. The findings of the first round were reformulated with new questions in other words. The question concerning the relation between requirements assessment and a common language was formed as follows: Is it difficult to find common terms / language within the requirements assessment process? The alternative answers were: “It is difficult”, “It is not difficult” and “Cannot say.” As shown in Figure 33, 70 % of the respondents had the opinion that it was difficult to find a common language. The respondents with a customer or supplier background were even more convinced there was a problem; 74 % of them answered that it was difficult while consultants did not see the problem to be as big as the others did.

In the third round, where among others, the results of this question were published, comments on the question were that it might have been a good idea to have more alternatives, for example, “very difficult”, “difficult”, “a little difficult” and “not difficult at all”. Looking at the case with hindsight, I must agree that these comments were absolutely right.

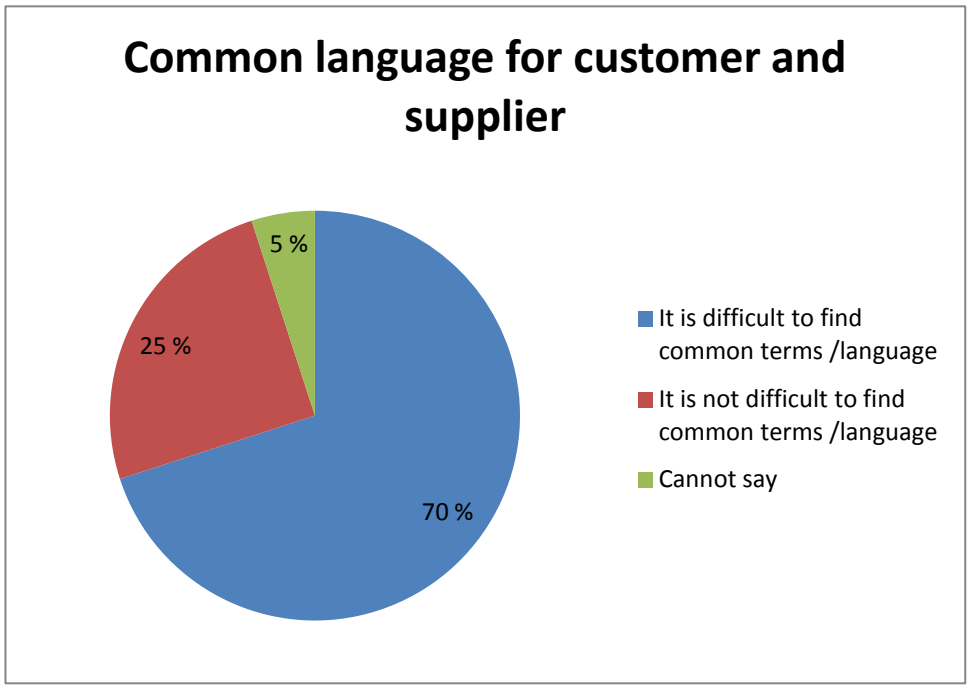

Figure 33: Is it difficult to find a common language for customer and supplier?

The aim of the third and fourth round was to find out what kind of impacts the identified cultural differences and problems had had in the respondents' experience and how they had tried to manage, avoid, and/or cope with them. The questions were now divided into two groups between the third and fourth round depending on the subject, and language-related questions were placed in the fourth round. The respondents were asked to describe how they saw the significance of a common language within the project (Figure 34) and to say how they would make sure that parties to the project would understand each other with sufficient precision (Figure 35). The most remarkable finding is that in both items the answers highlighted the importance of continuous communication at all organization levels, in both official and unofficial forms like meetings and coffee breaks, as well as the need to create a common project glossary for each project. What came as a small surprise was that almost all of the participants were ready to leave the major responsibility of finding the common language to the supplier.

The respondents were also asked to suggest questions they would ask to find out the cultural differences that might cause problems during the project. Questions concerning language and terminology formed the biggest sector (Figure 36).

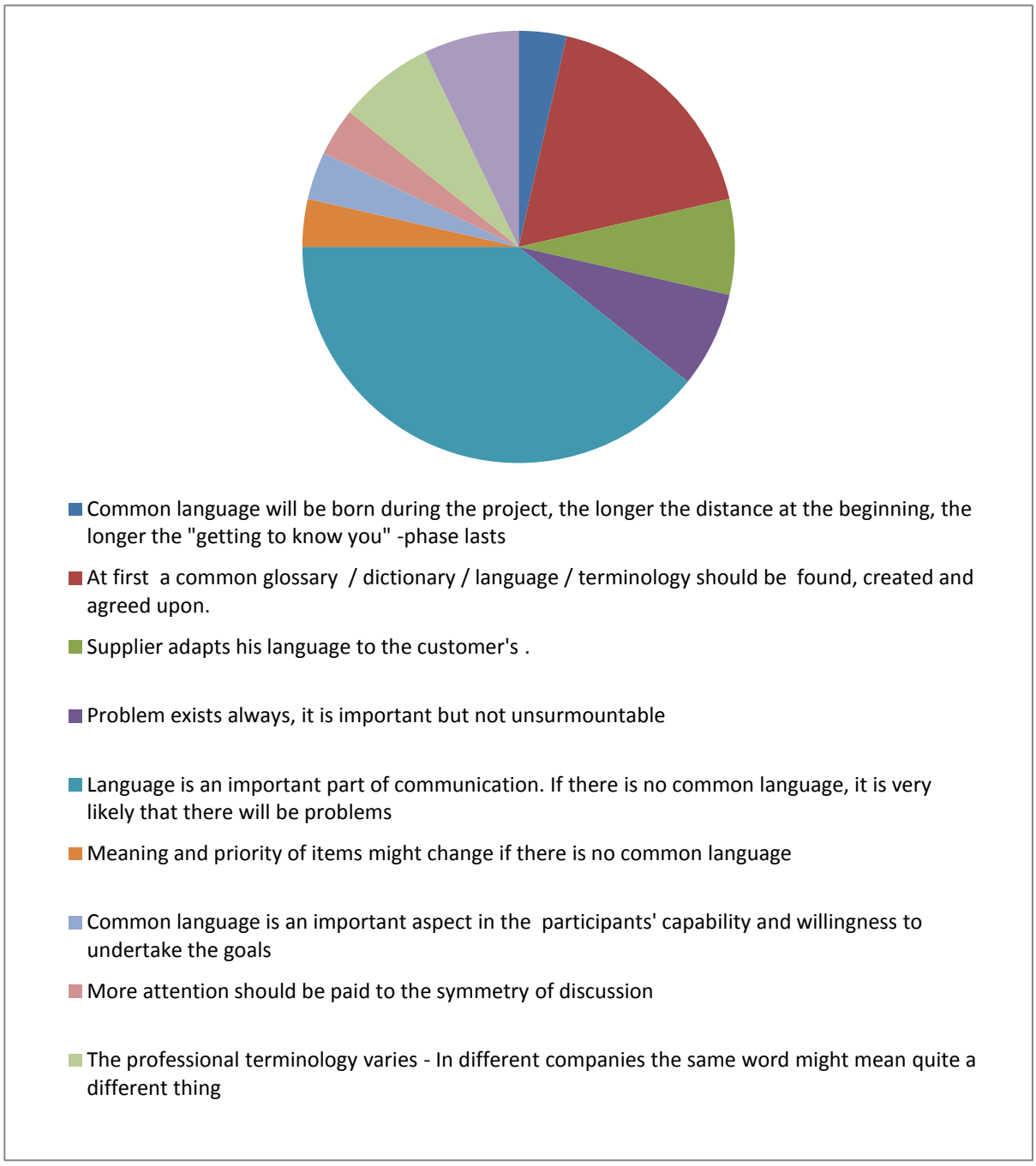

Figure 34: Importance of a common language for the project.

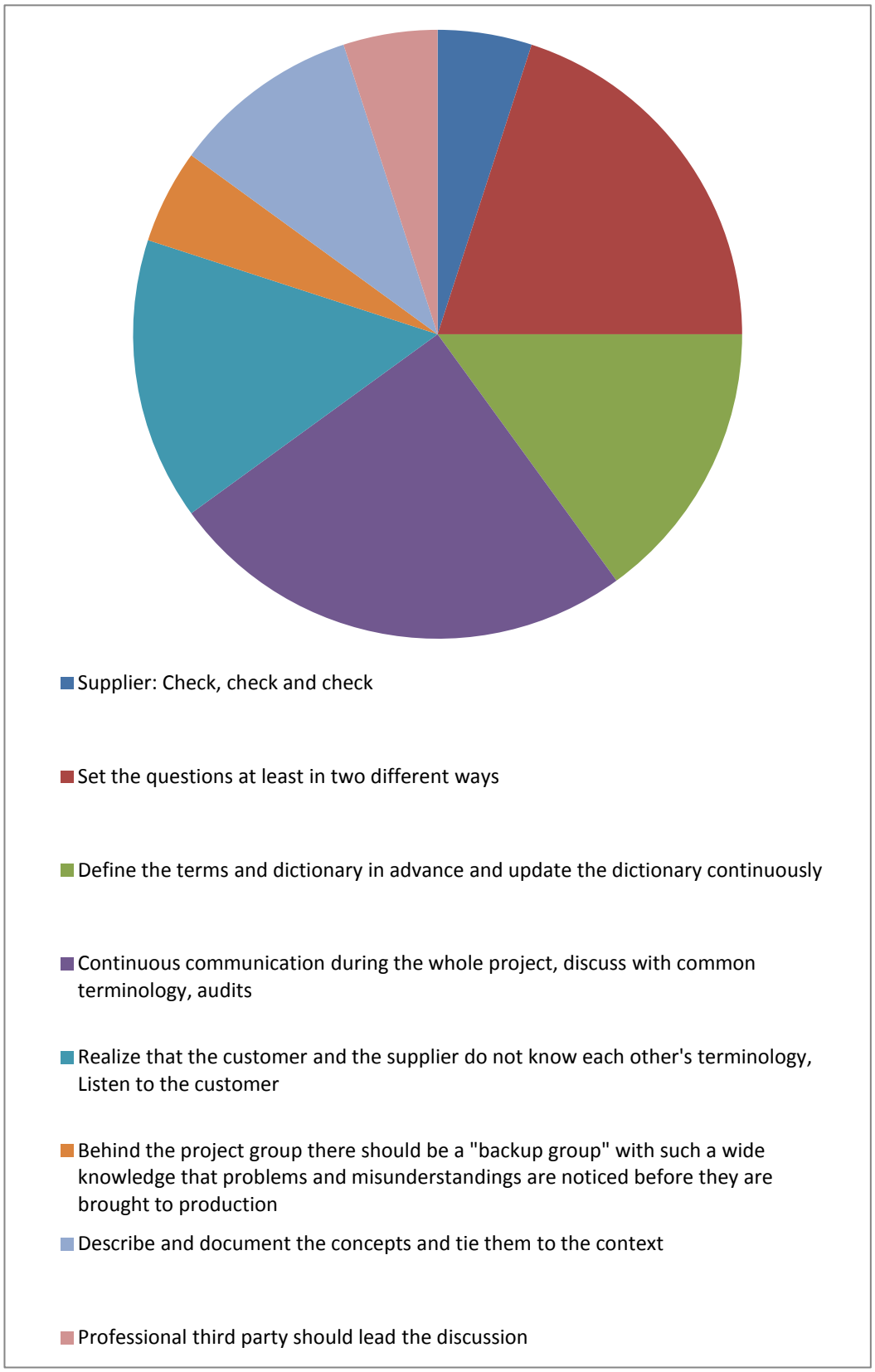

Figure 35: How to avoid problems caused by the lack of a common language.

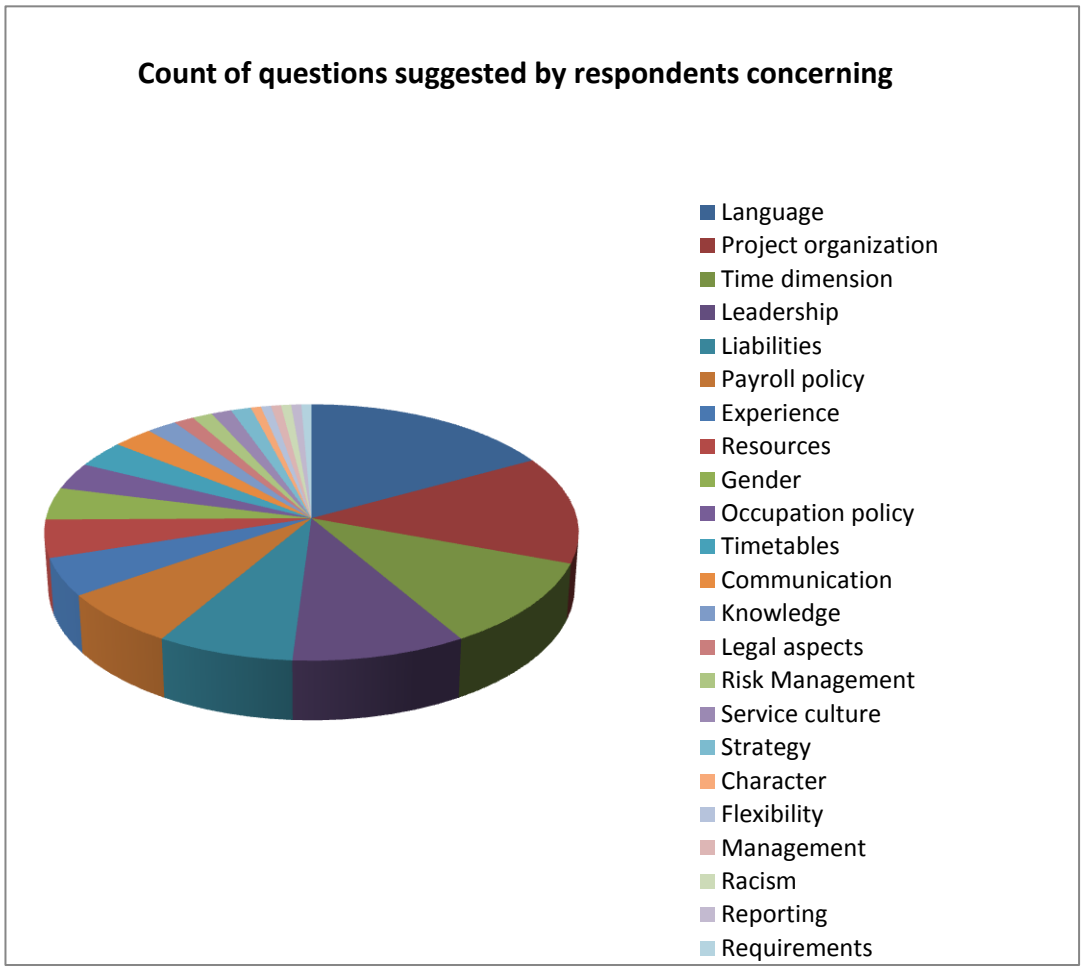

Figure 36: Suggested questions sorted according to subject area.

In the fifth phase of the study the respondents were asked to select 2- 4 questions they thought might be the most significant in each subject area from the questions suggested within the previous phases. On the area of language and communication (Figure 37) the top five questions were:

1. Do you understand the content of our request / offer?
2. What kind of reporting and meeting practices do you suggest using during our project?
3. Do you use terms or words that differ in meaning from common usage / usage in the industry?
4. Do you know our industry?
5. Are you able to create a glossary of terms used in your business?

The second question is linked to communication practices but all the others are trying in one way or another to evaluate and ensure that the terms and words used in communication, documents, and protocols will be correctly understood. Furthermore, questions 3 and 4 above seem to have an interesting link to cultural differences in terms of knowing the industry and differing from the normal practices in the industry. Furthermore,

if we calculate together the 5th and 6th items, which have almost the same meaning, the request to form a dictionary or glossary has as many votes as asking if we understand each other.

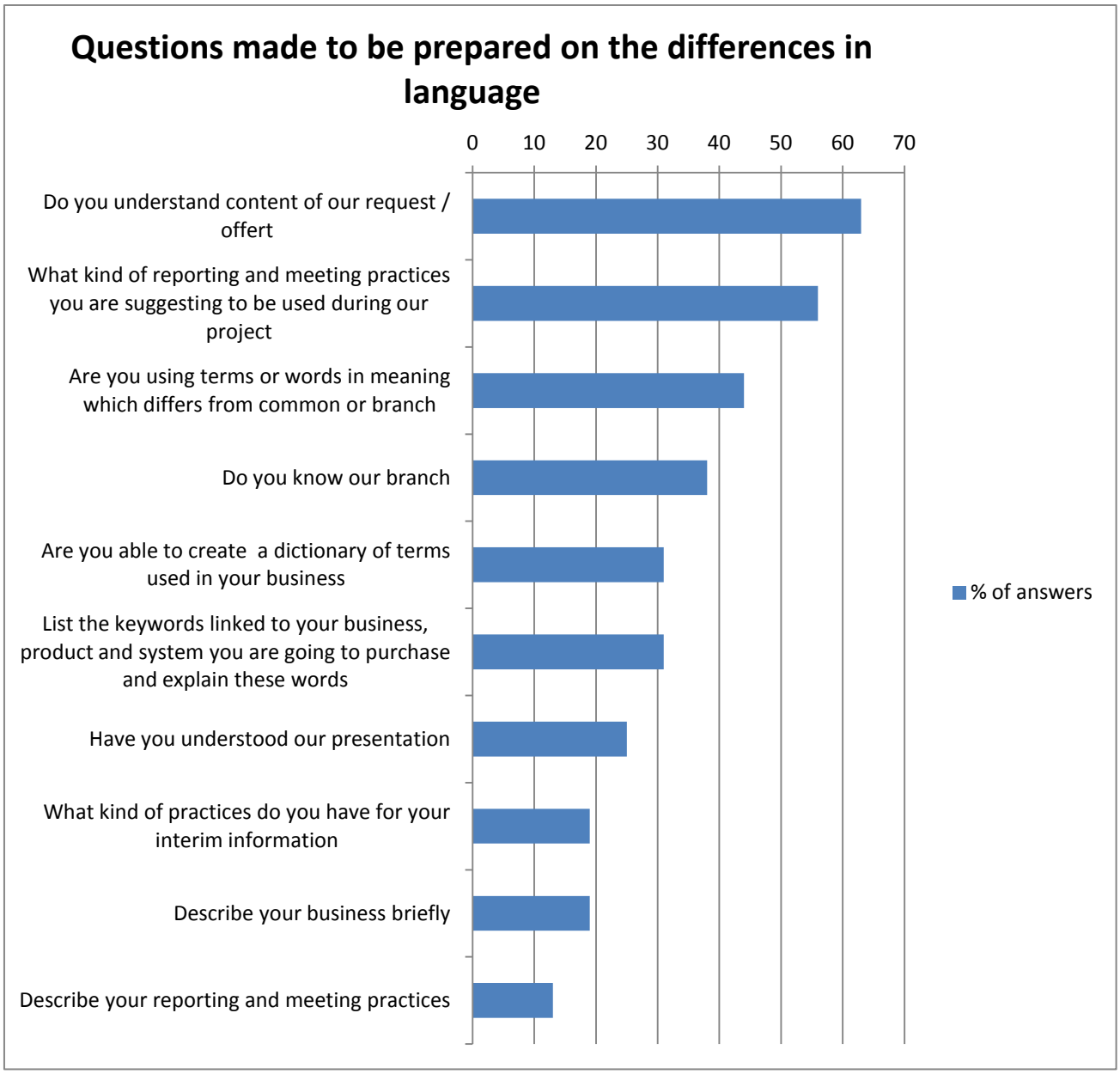

Figure 37: The 10 most significant questions concerning language and communication.

6.3.3 Reliability and validity of the findings

The average experience of the panelists was estimated to be around 20 years, and the oldest had been in the business since the early 1970s. The education level of most of the participants varied from Bachelor degree to Master of Sciences, and the disciplines were Technology, Information Technology, or Financial / Economic Science. The suppliers' and consultants' representatives were project managers and customers' representatives either CFOs or CEOs with responsibility for IT projects, or CIOs. The number of panelists involved in this work was 35, and 17 of them answered each phase. The 17 who answered all of the

phases were deeply involved with research. In the literature the minimum number of panelists to guarantee the reliability of results varies from 10 to 13, and 15 is thought to be desirable (Loo, 2002). The quality of panelists is also seen to be significant for reliability (Laakso, et al., 2010), (Powell, 2003). In this panel, IT suppliers, customers, and consulting companies were asked to select persons that had a sound knowledge and long experience of IT projects, which they obviously did carefully.

One possible reason for bias in this kind of research comes from the respondents' willingness to answer in the way they assume they are expected to answer. To avoid this situation, the participants were not told that one aim of this study was to confirm or reject the results of earlier work. Instead, it was emphasized that the most important target was to discover their experiences: Were there cultural differences and, if so, what kinds of impacts did these differences have on the project? However, at least one of the respondents had found the report (Lilja, 2006) written from the earlier work. In that report the impact of different terminology was not emphasized and in fact had not been raised at all. Regarding language, any conceivable bias caused by this unexpected action of the panelists plays a minor role.

The findings of the study concerning the lack of a common language are similar to those from other studies and the literature. The problem exists and is recognized but has only been discussed or researched a little, e.g. (Fliedl, et al., 2000), (Gorschek & Svahnberg, 2005), (Hansen, et al., 2009), (Kilov & Sack, 2007), (Popescu et al., 2008). The research concentrates mainly on technical solutions: improving existing and developing new description languages, automating data collecting processes and computer-assisted word-recognition systems, e.g. (Hansen, et al., 2009), (Melchisedech, 1998), (Popescu et al., 2008). Only a few researchers and writers with a technical background have focused on the cultural aspects of language and its impacts on organizational co-operation, although the connection between language and identity, e.g. (Norton, 1997), (Warschauer, 2000), (Alvermann, et al., 1998), and the significance of language in forming, transforming and changing the organizational culture and identity, e.g. (Fiol, 2002), (Dutton & Dukerich, 1991), (lvesson & Willmott, 2002), are well known and recognized especially within the administrative and psychological disciplines.

The checklist and questions proposed by the panelists are similar to the glossaries and checklist presented by researchers working with quality, description languages and NLP processors, e.g. (Kamsties, 2005), (Ambriola & Gervasi, 1997) and (Verma & Kass, 2008), although simplified and compiled for business purposes.

6.4 DIFFERENCES IN ORGANIZATIONAL STRUCTURE AND THEIR IMPACT ON SUCCESS

The (hierarchical) structure of the organization has a two-dimensional nature: it both reflects the dominant organization culture in the organization and impacts the current business culture. This bidirectionality poses a challenge, both to those who plan organizations inside a company and other organizations, as well as to those who research the organizational aspects of cultures and the cultural aspects of organizations. In the literature there are countless numbers of research studies, opinions and instructions on how to build an organization. The aspects used in these works vary from economic efficiency, using and delegating power, quality management, security policy, and information, to self-learning organizations. However, work concerning the impact of the organizational structure on the organizational culture and especially on co-operation with an organization having either the same or a different type of structure is conspicuous by its absence. Only a few researchers have approached the organizational structure from this point of view.

6.4.1 Organizational structures in literature

Out of a total of 780 909 results of literature review queries conducted during the period of 2009-2012, 1816 papers were selected for more detailed review. 222 papers out of those 1816 papers were identified as dealing with organizational structures. Among them, as well as classics like Schein, Weber or Clegg, there were some contemporary researchers who based their research on the findings of the above and applied them to modern business and societies, but only a few of them approached the subject in the context of co-operation. In this chapter, these earlier pieces of research concerning the design and birth of organizational structure, the impact of this structure on organizations doing business, and the influence of differences in organizational structure between participants in projects will be presented. In the case of reference chains, only the latest paper is presented and earlier authors are mentioned in the text if possible. The literature review conducted for this paper is a part of a wide literature review researching the state of the art concerning the impacts of differences in business cultures of customer and supplier on common IT projects. The review was conducted during the period 2009-2012, and the whole process is presented in chapter 3. In the review, the creation and impact of organizational structures was one of the research questions to be answered by the results of the review.

Every group and even every pair of human beings have their own organization according to which tasks, responsibilities, and entitlements are delegated (Hax & Majluf, 1981). This organization may be conscious or unconscious, visible or invisible, formal or informal, described on paper or just existing in practice. An official formal organization very often has an unofficial parallel organization, which may reflect the values and hierarchy of a certain group of employees, department or – in some cases – the real values, hierarchy and

organization of the company supported by the owners and / or directors, in contrary to the official one which may have been created only to fulfill the rules of legislation and / or political correctness (Robbins & Judge, 2012), (Robbins, et al., 2010), (Buchanan, et al., 2010), (Martin, 1998).

Although tacit organizational structures and shadow organizations are not the subject of this research, it is worth keeping in mind that the existence of two structural manifestations in the same organization may cause severe tensions in the organization. We should also realize the difficulty of identifying the role in which the actor expresses his opinions, prejudices, and experiences. A person may imbibe the values and roles of both the official and tacit organization and combine both roles unconsciously.

In this chapter, the term “organizational structure” is used in the meaning of the official structure of the formal organization, defined by the founder and/or manager of the organization, describing the hierarchy and command chain of the organization. As Tomer puts it: “*Organizational structure is the arrangement of relationships among the different parts of the organization”* (Tomer, 1995). A. C. Hax and N. S. Majluf for their part use a longer definition and state (citing Jackson and Morgan, 1978) that the organizational structure could be defined as "*the relatively enduring allocation of work roles and administrative mechanisms that creates a pattern of interrelated work activities, and allows the organization to conduct, coordinate, and control its work activities*" (Hax & Majluf, 1981). In this chapter a brief look will be taken at some of the possible organization formats, concentrating on the findings and notes the authors have made on situations when one organization meets another.

An organization always has some kind of structure (Hax & Majluf, 1981). The structure can be based on hierarchy, functionality, product line, or on business processes (Martin, 1998, pp. 270-280) pp. 270-280, or it can be a combination of two or more architectures. In the latter case, the organization is often called a hybrid organization (Lentz, 1996), although the term “hybrid organization” is also used in other meanings, for example describing a joint venture between a public and private organization (Thomasson, 2009). Examples of hybrid organizations in structural terms are matrix and project organizations.

The hierarchical, functional, line, and process organizations have or should have a clear hierarchy with a chain of command, defined supervisory and subordinate positions, and upward and downward directed command, information and reporting paths. In this kind of organization, what to do and how to do it are dependent on the orders given by the supervisors of each stage. On the other hand, supervisors, including the managers and directors of the organization, are reliant on the information given by both the subordinates and their supervisors. If information is not received in time or at all, or is incorrect, decision making is based on inadequate information or disinformation.

Hybrid organizations have two or more structures combined in one organization. One example of this kind of structure is a matrix organization. R. C. Ford and W. A. Randolph (Ford & Randolph, 1992) define the matrix as "*any organization that employs a multiple command system that includes not only a multiple command structure but also related support mechanisms and an associated organizational culture and behavior patterns*." On the one hand, there is a traditional structure with command paths and direct vertical information channels, while on the other hand, there is a horizontal structure based e.g. on product lines, product life cycles, functionalities, or projects (Ford & Randolph, 1992). In some cases a project is defined as the third dimension. As a result, each member of the organization belongs to two or more organizational elements, having more than one supervisor and so, two or more stakeholders are competing for the resources of each employer (Ford & Randolph, 1992). Each supervisor, for his part, has to reach the set or agreed goals with the resources shared with some other, who may have contrary goals (Lentz, 1996). In practice, this means surviving in circumstances of uncertainty, in conditions that might be extremely stressful. Only a few managers have found it comfortable to work in matrix structures. Most have struggled with unclear responsibilities, been slowed down by the search for consensus decisions, and had difficulty with ambiguous hierarchical reporting relationships (Goold & Campbell, 2003).

An organization has at least two dimensions: height and width. The height indicates how many levels there are between the top and the lowest level of the organization (Dalton, et al., 1980). The width describes the number of independent units at the same level. Discussion about the impact of height on organizational efficiency emerged in the 1960s and some research was then made regarding this issue. According to R. Carzo, Jr. and J. N. Yanouzas (Carzo Jr & Yanouzas, 1969), both flat and tall organizations utilized organizational learning equally well and made decisions equally fast, but the *structure did have a significant effect on performance as measured by profits and rate of return on sales revenue. Groups under the tall structure showed significantly better performance than groups under the flat structure* (Carzo Jr & Yanouzas, 1969). At the beginning of the 1970s, J. Child stated that there is a correlation between the size of the company (measured by the number of employees) and both the number of levels (height) and number of divisions (width) of the organization (Child, 1973). The second finding of his research was that the bigger the company, the more complex and the more bureaucratic the organizational structure. In 1969, R.G. Gorwin tested the hypothesis that certain organizational variables may feed or inhibit conflicts inside an organization and between organizations. He found that *for example, organizational size, specialization, hierarchy, complexity, staff additions, and heterogeneity seemed to contribute to organizational strain* (Corwin, 1969). Mark Hirschey connected the rapid growth in size of organizations in the last half of the 19th century with the emerging need for a hierarchical organization structure (Hirschey, 2003) that provided the means for coordination in a large-scale enterprise.

The impact of ownership on the organization structure was researched for example by G. Geeraerts in 1984. He also found a connection between size and organization structure. His second finding was that *the educational and professional careers of professional managers probably socializes them to adapt, more than owners, to bureaucratic practice and theory* (Geeraerts, 1984). This could also be put in other words: in an organization managed by an owner-manager, there is probably less bureaucracy and fewer levels.

Since then, the traditional hierarchical organization structures have been challenged by teams, stars, and network organizations, to name some examples. J. W. Dahlgren and M. S. Cokus (Dahlgren & Cokus, 2007) state that the traditional hierarchical structures worked rather well when everyone had clearly defined tasks, were well trained in their tasks, and the work environment was somewhat predictable. Each group needed to be able to trust the other group to do their job to the level of competency needed. A key factor was discipline at each level. But the world has changed and the invasion of IT, modern communication technology, and globalization have brought about new forms of organizations. These new structures are mainly based on different networking models and thus face the same risks as the physical network topologies they are using (Dahlgren & Cokus, 2007): Failures to synergize the capabilities of people, curbs on using the synergized capabilities, failures to optimize connectivity between people, external or internal attacks and interruptions, etc. These risks can have the same impact on organizational networks as on physical networks: they can disconnect an organization whose behavior is outside the required standards. According to M. Goold and A. Campbell, the danger in networked organizations is that the network ends up with a lack of co-operation between SBUs, together with the excessive complexity and ambiguity of the matrix (Goold & Campbell, 2003).

Hirschey also notes that traditional organization structures are poorly suited for modern enterprises. Quoting Lei and Slocum, he states that the growing importance of knowledge and rising importance of information costs are defining how firms rethink their strategies and organization structures (Hirschey, 2003). According to Hirschey, the biggest challenges in forming a modern organization structure are transaction costs and agency problems, which he sees as the source of conflicts in firms. He does not recommend any special organization model but points out that rules of good governance, including controlling, advising and acting, bearing in mind the balance between empowerment and responsibilities, justice and equality in hiring and salary policies, and overall clarity and transparency in organization and governance will help avoid conflicts.

A. B. Whitford has compared different types of organizations from the point of view of resolving conflicts within the organization. He found that functional structures limit the type of conflicts referred to, and product-line structures expand the type, but that the number of conflicts did not vary. Matrix organizations, for their part, increase the amount and variety of conflicts that reach the highest hierarchical levels of the organization. In

matrix organizations it is also possible that no conflict is resolved at the lowest levels of the hierarchy. Other problems in matrix organizations are the limited authority of the project manager, and the role of dual supervision where the role of vertical control from a formal hierarchy is minimized and horizontal control maximized. Network organizations are said to be similar to matrix organizations in lacking the unity of a command structure (Whitford, 2006).

The organizational structure of one organization is reflected in the structure of another organization (Fombrun, 1986). As well as people being conscious of each other, organizations are aware of the existence and properties of other organizations. This awareness is not the property of an organization, but it is the sum of experiences, attitudes and thoughts of the members of the organization. C. J. Fombrun writes about three dimensions of organizational structure, superstructure, sociostructure, and infrastructure, each of them communicating not only with each other inside the organization, but also with the respective stage of another organization. If there are contradictions or failures in the communication inside the organization, problems may also emerge in relationships with other organizations (Fombrun, 1986). This has also been noted also M. Hobday, who states that with a project-based organization model, the conflicts with clients that emerge in matrix and functional organizations could be avoided, for example (Hobday, 2000). He sees the biggest advantages of a project-based organization model as its ability to give the project manager enough power and responsibility for team building, meeting the client's needs, dealing with technological uncertainties, and making a success out of the project. On the other hand, because the approach of the organization is project-oriented, comprehensive business thinking may be forgotten, which may have both financial and organizational impacts.

D. P. van Donk and E. Molloy have identified several types of projects in project organizations and named them *Simple Project, Bureaucratic Project, Divisionalized Project, Professional Project, and Adhocracy Structure.* They state that especially when there is a lot of pressure from outside the organization – the power is external – the project is driven towards the Simple or Bureaucratic project model. Also, a project that aims to bring together professional experts may be changed into a simple structure due to either an overly ambitious project leader or external pressure and hostility. The bureaucratic project was found to be vulnerable, as all parts are interdependent in specific ways and any deviation from the detailed plans will cause other parts of the project to be behind schedule as well. This is one reason that even the simplest rebuilding project is likely to be late. The divisionalized project is typical e.g. in the implementation of ERP systems. One of the risks associated with the divisionalized project structure is that the middle managers aim to separate their own part of the organization, which may lead to the creation of a new, independent organization, taking the clients with them. This, in turn, results in a loss of synergy, loss of project management and less value for customers (van Donk & Molloy, 2008).

George P Huber draws a connection between the growing and increasing complexity of modern, post-industrial societies and the increasing complexity of modern organization structures (Huber, 1990). To avoid conflicts inside and between organizations, an organization should be open to change, flexible, and capable of acquiring and distributing information.

The importance of the capability to communicate inside the organization and especially across organizational borders is highlighted in Muller's paper (Müller, 2003). Although the paper emphasizes the project manager's role in communicating, the capability to communicate is described as above all an organizational property.

The study of J. van der Meer-Kooistra and R. W. Scapens highlights the aim of firms to make their organizations flatter. Stripping out various levels of management requires a greater amount of horizontal co-ordination and control. Van der Meer-Kooistra and Scapens have researched the impacts this trend has on the governance of both internal and external relations (van der Meer-Kooistra & Scapens, 2008). They argue that lateral relations between and within organizations have both similar and different features. Relations between organizations in a long-term project were found to have the following features: exchange of knowledge between all the parties, need to secure co-operation for maintaining a competitive relationship, need for flexibility, but with standardization over time of both the activities and the technical interfaces, and finally, changes in the leadership of the project (van der Meer-Kooistra & Scapens, 2008).

The research studies reported above are a minority of all the studies conducted on different organization structures and their benefits and disadvantages. They were picked as examples of different points of view surrounding organizational designs and the impacts of different designs. However, hardly any of them included a direct answer to the question: How does the organizational structure used impact the co-operation with another organization having a different – or similar – organizational structure. If we approach an IT or ERP project as a strategic alliance with participants like customer, supplier and, in some cases, consultants, and extend the search to research on strategic alliances, we find more answers to the question. N. Pangarkar and S. Klein have approached the subject by researching the effects of the similarity of business cultures on alliance governance and found that in equity alliances, *the risk of opportunistic behavior in a collaborative agreement may be substantial, thus raising transaction costs. Firms might choose safer organizational modes to counter these high transaction costs* (Pangarkar & Klein, 2001). In alliances with a clear division of tasks, the risks of opportunism were smaller. They note that cultural differences should always be considered when entering into an alliance. Non-equity alliances based on strict contracts are less sensitive to cultural differences.

Andrew Taylor has studied strategic alliances in software engineering. He searched for the factors that are the most significant determinants of success in strategic alliances. In the results he highlighted trust, adaptability, and the openness of the participants. After these

came the readiness of the partners to learn from each other. According to this case study, problems occurred if one or more of the partners were more bureaucratic and the others represented modern and innovative organizations (Taylor, 2005).

Das and Teng note in their article that one characteristic of strategic alliances is *the remarkable variety in their governance structures, which include joint ventures, direct equity investment, joint R&D, joint manufacturing and marketing, shared distribution, research consortia, licensing, and others* (Das & Teng, 2001). They state that in strategic alliances there are two types of risks: relational risks and performance risks. Alliance performance refers to the degree to which partner firms' objectives are achieved in an alliance. Relational risk is concerned with the probability and consequences that a partner firm does not commit itself to the alliance in the desired manner (Das & Teng, 2001). According to them, performance risk is common to all strategic decisions, but relational risk is unique to strategic alliances. Das and Ten also approach the asymmetry of alliance partners. Alliances between equally strong, equally weak, or unequal partners can be dramatically different in their alliance motives and structuring process, they write. Borrowing from Oliver they continue: *Partner asymmetry – which allows one partner to exercise power and control over another partner – is one of the key alliance motives*. In this kind of situation, a small partner firm is more vulnerable than a larger firm (Das & Teng, 2001).

Those who research supply chains have also met the same kind of questions as those researching strategic alliances. Supply chain strategy requires integration, cooperation and collaboration, which in turn demands aligned objectives, open communication, sharing of resources, risks and rewards (Soosay, et al., 2008). Applying supply chain strategy means that inter-organizational relationships become increasingly important in ensuring business success and a competitive advantage (Soosay, et al., 2008).

As a brief summary of the literature, it can be noted that from those rare studies that approach differences in organizational structures from the point of view of how these differences impact on co-operation, three main conclusions can be drawn: The first finding is that conflicts inside the organization are never invisible to the partner. The more severe the contradiction e.g. between the project organization and the line organization, the more likely it is to be reflected in the quality and timetable of the project. Secondly, successful co-operation always requires predictability. Partners must be able to trust that contracts and promises will be kept and responses to upcoming situations and deviations will be in line with each other and the severity of the case. The matrix and hybrid organizations were seen as having more risks in this aspect than traditional functional and hierarchical organizations. Some of the authors pointed out that projecting the organizational structure through the whole organization would eliminate this kind of risk. And thirdly, the more the persons involved in the project are stressed by competing supervisors and managers, the more probable it is that the turnover of people involved in the project will grow – and also the need to perform extra operations to ensure that all the information collected, created

and received is transferred to new workers and clerical staff. The risks caused by competing supervisors and managers are also more likely in matrix and hybrid organizations.

6.4.2 Findings of the study concerning differences in structures

The aim of the overall research was to evaluate the findings of the case study. A Delphi-based study with 35 respondents and 5 phases was conducted during 2010. The arrangements were described in an earlier chapter.

In the first phase, the respondents were asked to describe in their own words the problems they had seen and experienced caused by cultural differences between customer and supplier. The keywords elicited from the answers were grouped by the subjects they concerned: the first grouping was formed by the semantics of the word and its immediate environment, and the second grouping was formed by the semantics of the sentence or story in which the word occurred. Organization was found to be the 5th most commonly occurring theme (Figure 38 right), and in the context "Leadership," it was the third in the list of most frequent keywords (Figure 38 left).

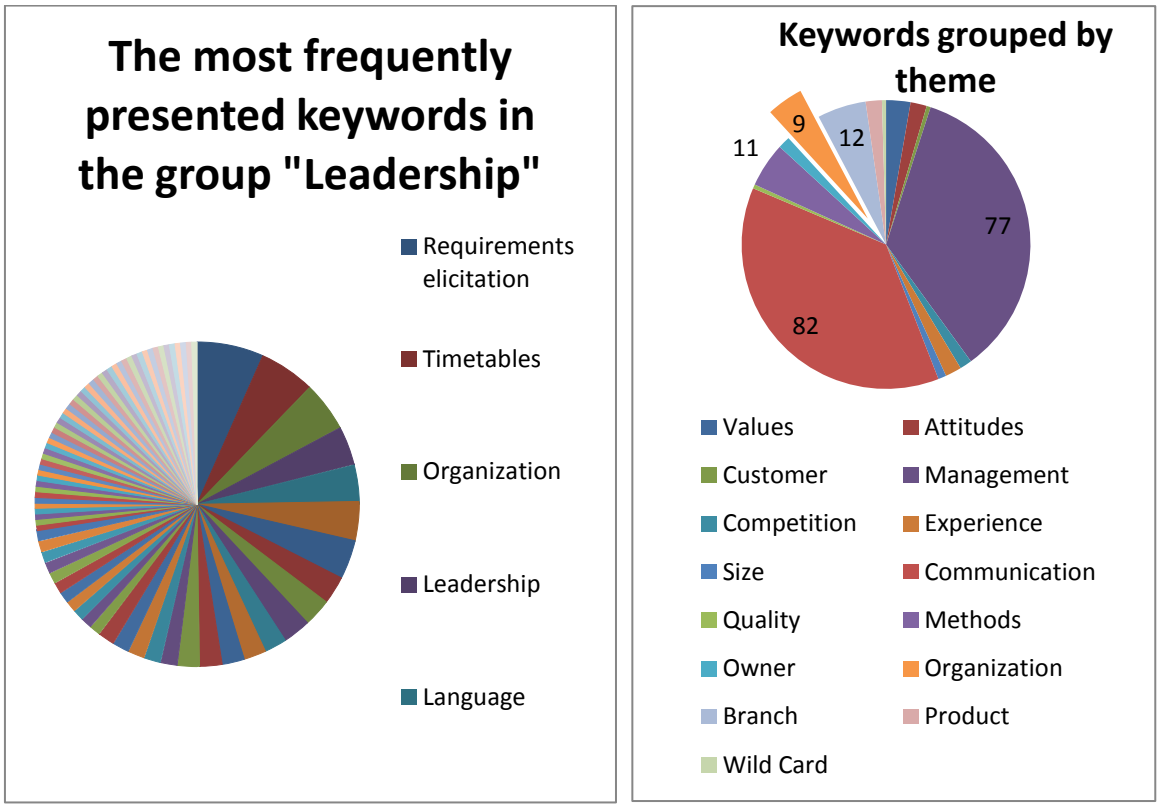

Figure 38: Keywords in context "Leadership" and Keywords grouped by theme

In the next phase, the comments concerning organization were split and written out into separate questions. Questions concerning the impacts of organizational structure were:

1. Do differences in size between customer and supplier have an impact on project success?

- 55 per cent of the respondents had seen size differences having impacts, 45 per cent answered that size had no impact.

2. Does a different juridical form of supplier and customer have an impact on project success?
    - 25 per cent of respondents said that a different juridical form has impacts on the project, 75 per cent answered that different juridical forms do not impact success.
3. Do the differences in the height of the organization (number of levels in the organization), width of the organization (number of units at the same level), or structure of the organization (functional, hierarchical matrix etc.) between customer and supplier impact project success and if so, how?
    - 5 per cent of respondents answered that the impact is positive, 25 per cent of respondents had experienced negative impacts and 70 per cent of the respondents had seen no impacts at all.
4. Do differences in ownership of the customer and supplier (Owned by one man, some owners, part of a corporation, listed company, etc.) have an impact on the success of the project?
    - 50 per cent of respondents had experienced some impacts, 50 per cent found no impacts.

The most significant result of phase 2 was that respondents representing customers had seen more impacts and even more negative impacts in questions concerning size and structure than those representing the supplier. Suppliers for their part had seen more impacts in questions concerning the juridical form and ownership but those who represented third parties (consultants etc) had seen only little impact, if any, in all of the subjects.

In the third phase, respondents were asked to describe the ideal organizational structure of customer and supplier to guarantee the best possible co-operation. According to customer representatives, the customer should have a project or hybrid organization and the supplier should have a project organization. Only 25 per cent of respondents accepted the hybrid structure for a supplier, and the same amount of respondents said that the customer's organizational structure does not matter. Supplier representatives were ready to accept all kinds of organizational structure for both customer and supplier although project organization was the most popular for both customer and supplier. Third parties also found in this question that the kind of organization each party had did not matter. Both customer and supplier representatives found the height and width of the organizational structure to have an impact on success when each dimension was asked separately, but most third parties had found that height had no impact (80 %), although more of them had found that width had an impact on success (40 %).

In the third and fourth phases, the respondents were also asked to suggest questions with which they would check the compatibility of the customer's / supplier's business culture to guarantee the best possible co-operation within the project. In the fifth phase, the suggested questions were evaluated. The following questions concerning the organizational structure were voted to be included in the set of questions (each respondent was allowed to vote for more than one question):

1. Has the highest management of the firm understood the goals of the project and the changes it will bring to business processes? – 50 per cent of respondents voted for this.
2. Is the Board of Directors behind the project? – 50 per cent
3. Will the highest management of the firm allow the project to change business processes – or does it insist on that? – 44 per cent
4. At what level of the organization were the decisions concerning this project made – or will they be made? – 25 per cent.
5. How many levels are there in your organization including ordinary workers and the Board of Directors? – 6 per cent
6. How many units are there maximum at the same level? – 6 per cent.

6.4.3 Evaluation of the findings

The findings presented above have also been noted in the literature, although not necessarily in the context of collaboration on IT projects. Huber draws a connection between growing size and increasing complexity (Huber, 1990), Child stated that the bigger the company, the more complex and the more bureaucratic the organization (Child, 1973), and according to Geeraerts in an organization managed by an owner-manager, there is probably less bureaucracy and fewer levels (Geeraerts, 1984). Whitford compared different types of organizations in terms of resolving conflicts within the organization. He found that functional structures limit the type of conflicts referred to, and product-line structures expand the type, but the number of conflicts did not vary. Matrix organizations, on the other hand, increase the amount and variety of conflicts that reach the highest hierarchical levels of the organization and it is also possible that no conflict is resolved at the lowest levels of the hierarchy. Also, the limited authority of the project manager, the role of dual supervision and the minimized role of vertical control from a formal hierarchy and maximized horizontal control are said to be problems in matrix organizations. Network organizations were seen to be similar to matrix organizations, in lacking the unity of command structure (Whitford, 2006). Both Fombrun and Hobday noted that interorganizational stress in one organization may be reflected in another, co-operative organization. Hobday stated that, with a project-based organization model, conflicts could be avoided with clients in matrix and functional organizations (Hobday, 2000) (Fombrun, 1986).

The material used in this research study was relatively small and geographically limited to Finland, but the phenomena behind the findings have been recognized by other researchers and in different cultural environments. It is obvious that differences in organizational structures between the organizations impact on the results of IT projects.

Conflicts inside the organization are never invisible to the partner (Fombrun, 1986). In this study, the panelists listed the organizational factors that have an impact on the results of an IT project. Among these organizational factors, differences in size and ownership, organizational structure, height and width were highlighted. In most cases where an effect had been experienced, the impact on results had been negative.

6.5 THE USE OF POWER: DIFFERENCES BETWEEN SUPPLIER AND CUSTOMER AND THEIR IMPACT ON SUCCESS

The use and distribution of power varies widely among companies. Power may be concentrated in one person's hands or it may be delegated all over the organization. If a supplier or customer with a very strict chain of command has business or a common project with a partner who represents a delegating and participating type of organization culture, disastrous misunderstandings may occur due to the fact that participants do not understand each other's style of decision making. In this chapter, a comparison is made of the experiences of project managers of customers and suppliers and consultants concerning the differences in power structures in different organizations and their impacts on success.

A major IT project is always a strategic initiative that binds a lot of resources of all of the enterprises involved. Apart from the funds required to disburse the investment and costs of implementing and training for the new systems, a project commits personnel during the whole life cycle, from the early design stages of the new project, during the implementation and usage of the system, up to the launch of the planning of the new replacement investment. Failures in IT projects are common and they may also be disastrous for the participants involved in a failed IT project. According to "A socio-technical approach to improving the systems development process" by (Patnayakuni & Ruppel, 2010), of the $2.5 trillion spent on information technology during 1997–2001, nearly $1 trillion was spent on underperforming IS projects (Benko & McFarlan, 2003). A significant proportion of these kinds of projects eventually fail, costing US firms more than $78 billion each year (Levinson, 2001).

The reasons for the failures of IT projects have been researched under the topics of project management, risk management, quality management, and software engineering. Due to the different points of view, the approach to the subject has been either commercial or business-oriented, technical tools-oriented, software process improvement-oriented or

methodology-oriented with special interest on, for example, agility or scrum methods. This diversity was the reason for highlighting different aspects of IT project failure in each study. One of the most comprehensive lists of the risks an IT project – or software project – may meet is given by Tom Addison and Seema Vallabh in their paper "Controlling software project risks: an empirical study of methods used by experienced project managers" (Addison & Vallabh, 2002):

1. Unclear or misunderstood scope/objectives
2. Unrealistic schedules and budgets
3. Lack of senior management commitment to the project
4. Failure to gain user involvement
5. Inadequate knowledge/skills
6. Lack of effective project management methodology
7. Misunderstanding the requirements
8. Gold plating
9. Continuous requirement changes
10. Developing the wrong software functions
11. Subcontracting
12. Resource usage and performance
13. Introduction of new technology
14. Failure to manage end user expectations

To cover IT projects that concentrate on technology, equipment and infrastructure, the list should be completed with political, legal, technological, and environmental risks due to the usage of new technology we are not accustomed to installing, using, and controlling (Laakso, et al., 2010).

6.5.1 Use of Power in the literature

Out of a total 780 909 results from literature review queries conducted during 2009-2012, 73 papers of the 1816 papers selected for more detailed review were identified as dealing with the use of power in one way or another in the context of co-operation. Among these, as well as classics like Schein, Weber, or Clegg, there were some contemporary researchers who based their research on the findings of the classics and applied them to modern business and societies. In this chapter these will be presented from the aspect of the impact of different ways of using power on co-operation. In the case of reference chains, only the latest paper is presented and earlier authors are mentioned in the text if possible.

The use of power is a very popular subject in research within disciplines such as Business Management, Project Management, or Business Administration. Also, the social and humanistic sciences have researched power, use of power, and policies of delegation or centralization of power. The discussion has varied from the weaknesses or benefits of democracy and the strengths or dangers of dictatorial management to a feminist-oriented

debate of gendered power structures. Nevertheless, there are only a few studies concerning the impact of differences in the power policy of a customer and supplier on a common project, and especially on a common IT project. There are some researchers like Geert Hofstede, who have studied power among other cultural differences and the impact of these differences on behavior, and also on organizational behavior. To describe these differences and impacts, Geert Hofstede created a concept of cultural distances (Hofstede & Hofstede, 2005). One of these is the ”power distance” that Hofstede uses to measure and describe the relationships between superiors and subordinates in different national and ethnic cultures. He found that, in Western countries, power distances are normally shorter and superiors and subordinates find it easier to communicate bidirectionally than in Eastern countries. The same phenomenon was also seen in the north – south direction: In northern countries, the hierarchy was flatter and communication between the different levels easier than in southern countries. But Hofstede also points out that this is a simplified map of the situation. There were differences between the countries in the east, west, south, and north, and even the areas inside a country had differences depending on the religious or ethnic background of the people – or of the companies. In addition to this, Hofstede also notes that social class, educational level, and occupation can be seen as both the cause and manifestation of the power distance.

Although Hofstede concentrated on measuring the cultural dimensions between countries, his findings can be applied to company level. Some of these findings are also interesting from the point of view of this research. Hofstede found that the larger the power distance, the more likely that some kind of corruption could be found. In addition, centralization, strict hierarchy, and formal rules, wide salary range, and inequality are more common in a culture or organization with a larger power distance. At the beginning of his book, Hofstede says that working with a partner (company or person) from quite a different culture may be difficult or even impossible if one does not understand the reasons for their behavior (Hofstede & Hofstede, 2005, pp. 1-2).

B. L. Bechtold (Bechtold, 1997) writes that the usage of power and management style are linked to a company’s performance and financial success. Borrowing the research of Kotter and Heskett, she says that in low performance cultures, management is arrogant, customers, owners, and employees are not valued, and the atmosphere is hostile toward leadership and change values. In high performance cultures, on the other hand, the atmosphere is adaptive, managers care about customers, employees, and stockholders, and value people and processes that create useful change. According to Bechtold, the usage of power is one of the base elements in organizational culture and she seems to believe that a participative culture with democratic principles and balanced power distribution are the way to improve co-operation between customer and supplier. This is why the focus should be turned from the hierarchy to the customer. As an example, she cites Retailer Financial Services, a GE Capital business, where each associate has the same authority as the service center leader to resolve customer problems.

Massimo G. Colombo and Marco Delmastro (Colombo & Delmastro, 2004) summarize the results of many researchers when listing the reasons to decentralize decision making and delegate power: Better flow of information, faster reaction to changes in local conditions and business environment, more motivated local managers whose superiors have more resources for strategic decisions, and even more motivated clerical staff and workers. Focusing on the business instead of on the hierarchy improves the efficiency of the business and modern networks have made it easier for managers to control subsidiaries and plants, thus enabling decentralization. In decentralized multi-plant corporations, the assumed improvement of communication between the plants was confirmed only in part.

David Courpasson (Courpasson, 2000) sets Weber's idea of bureaucratic organizations and structures of domination against Grozier's structure of the game, proposing that the concept of soft bureaucracy is the key to understanding the evolution of organizations towards an ambivalent structure of governance, in which both the need for sharper control and the need for delegated power are satisfied. In relationships outside the organization – related to other organizations, customers, owners etc. – sovereignty takes place and thus, each organization needs to produce a center of legitimacy.

Anupam Ghosh and Jane Fedorowicz proved in their article (Ghosh & Fedorowicz, 2008) that each participant of a strategic alliance, e.g. supply chain, must agree on a common governance structure that will direct their relationship and reduce opportunism. Governance is the structure that guarantees such decisions being made that lead to long-term, sustainable value for a formal collaboration between multiple organizations. If the governance of one partner does not follow the common rules it may endanger the whole chain or at least reduce the performance of the alliance. Ghosh and Fedorowicz used the term "bargaining power" to describe the power some of the members of an alliance had over the other partners, due to something only this partner had, whether material or immaterial. The approach of symbolic power presented by T. Hallett (Hallett, 2003) may at first sight look like a synonym for that, but it must be understood in a wider context: It binds the organizational culture, governance practices, and participants' internal ways of using power to their external expression, which forms the public existence of the organization's culture. Hallett describes how different types of cultures expressed by different ways of using power raised conflicts between two independent expert organizations belonging to the same corporation and having the same customers. These problems for their part contributed to failures in their auditing assignments, which ultimately ended in the bankruptcy of the customer.

T. R. Zenger and W. S. Hesterly note in their article that although there is a tendency to flatten organizations and to decrease hierarchy, in marketing operations strategic alliances may at least in some cases even increase the hierarchy in the markets. In some cases, they write, quoting Stinchcombe, contracts give a firm the right to use traditional hierarchical

means such as performance measurement and incentive systems for employees in other firms (Zenger & Hesterly, 1997).

Tarja Niemelä bases her research on interfirm cooperation capability and the role of power (Niemelä, 2004) on Pfeffer's idea that "*resource dependence is more concerned with the power and politics both within the firm and between firms, so that power maintenance and power acquisition are important."* According to Niemelä, Pfeffer says "*structural autonomy and freedom from external constraints and the ability to affect other firms motivate the various cooperative strategies used by firms."* When defining power she refers to Weber, Blau, and Etzioni, stating that power can be defined as a particular actor's capacity to overcome opposition or as the probability with which one actor within a social relationship will be in such a position that he/she is able to carry out his or her own will despite resistance. Niemelä regenerates the definition by dividing power into institutional and individual power. Individual power, she writes, quoting French and Raven, has five bases: reward power, punishment power, expert power, legitimate power, and referent power. The disagreement among the earlier authors appears to concern the conditions associated with the usage of power: The role of power seems to depend on the context, to be relationship-specific, or to depend on the importance of managers' and sub-units' contributions to the organization's survival and success. As a synthesis and conclusion of both the literature review and empirical study, Niemelä states that the role of power combines the affective, cognative, and cognitive capabilities of managers who have learned how to use their personal and institutional power in the decision-making process of the joint venture. The usage of personal and institutional power impacts on interfirm cooperation capability. According to Niemelä, "*power combines both the socio-psychological and economic dimensions combining the legal, economic, and behavioral approaches of individuals and firms."* She sees the role of power as associated with interfirm co-operation capability in the context of a family business as: 1) Capability of using power to create trust, value, and knowledge in a networking process, 2) Capability of using power to control the interfirm relationships, uncertainty, and network positions, and 3) Capability of using power to cope with the changes in the operating environment of the networking process of family firms. Furthermore, she agrees both with Foucault's and Pfeffer's ideas of power as a name given to a complex strategic relationship in a given organization. This structural phenomenon has an impact on the co-operation between two organizations (Niemelä, 2004).

Ranson et al., for their part, define power as something that enables a member of an organization to constitute and recreate organizational structures. An organization, they say, is an instrument of power (Ranson, et al., 1980). The members of the organization are powerful because they have the possibility to control and manipulate resources. Power is said to be issue-, time- and context-related but Ranson et al. also highlight opinions that power is most powerful when it is invisible or when issues requiring decision making do not arise. The Foucaultian view of organization as a result of discursion, which directs power

toward different forms of empowerment, authority, and dominance, seen in the article of Ranson et al, is even more evident in Sally Riad's paper (Riad, 2005). According to Riad, the organizational culture is a discursive formation including its regime of truth, power relations, and players playing different roles. All this is bound together with the organization's own language, "jargon." To guarantee the success of a merger, each organization involved in the process should direct the organizational discursion to gain the same regime of truth. It is not necessary to force cultures to be similar to each other; diversity can even help the new organization in its discursion. We must remember that culture is more powerful than anything else in the organization (Schneider, 2000).

In many organizations, especially in those undergoing change, information is seen as a source of power, as stated by L. Robbins (Robbins, 1992). This power is often used in the form of stories (Wilkins, 1984). A well-formatted story remains alive for years, teaching the new members and the collaboration partners of an organization its organizational culture, roles, values, and rules. The information can also be used as (destructive) power against the organization itself or against some undesirable practices. Good examples of this are, for example, the campaign against Nestle years ago, or the contemporary Wikileaks and Facebook campaigns.

Steve Paton, Damian Hodgson, and Svetlana Cicmil (Paton, et al., 2010) take the discussion to the project level, proving in their research that one of the problems suffered by project managers is the lack of actual power to affect ongoing work. This may have a fatal impact on the project and relationships with customer or supplier, especially if the project fails or is late due to the lack of empowerment of persons responsible on the project.

In their article, Christine Räisänen and Anneli Linde describe (Räisänen & Linde, 2004) the Project Management Model (PMM) as a powerful but little researched discursive tool for managing the processes of multi-projecting organizations. They note that one dilemma of modern project management is the contradiction between the need to control and the tendency to delegate and build flat organizations. According to their research, many project managers suffer from a lack of power, at least the lack of the kind of power that a project organization or customer expects them to have. Based on the critical discourse analysis (CDA) and actor-network theory (ANT), they attempt to explain the relationships between social structures, social practices, power distribution, and texts, without forgetting the language that they believe shapes the institutional culture. In conclusion, they say *"it is now seen more as a strategic standard for all the project-oriented activities of the organization. In order to achieve this, emphasis has shifted from the operational level, which has almost completely disappeared from the model, to the control level, e.g. issues of accountability and power distribution"* (Räisänen & Linde, 2004).

Hulya Julie Yazici proved in her research concerning the PMM maturity model (Yazici, 2009) that increased employee empowerment, participation and involvement of teams, more cross-functional teamwork, more horizontal communication, a more caring climate, and

more recognition for employees have a positive influence on how projects are successfully completed and how organizations place themselves in a better competitive situation. The same research found a significant relationship between project performance and organizational culture, as well as internal and external business performance and organizational culture. Organizational culture should be less hierarchical and more adhocracy-, clan- and market-oriented, in terms of Cameron and Quinn's Competing Values Framework, in order to gain better performance. "*Clan culture focuses on internal maintenance with flexibility, concern for people, and sensitivity for customers, while market culture focuses on external positioning with a need for stability and control. This study showed that, in order to be successful, both of these cultures need to be dominant"* (Yazici, 2009).

A. J. Shenhar found in his research (Shenhar, 2004) that successful business results seem to depend on having a strategic mindset during the project planning and execution periods. He found that some project managers were constantly focused on customer needs and business results, and that others adhered to the more traditional aspects of meeting time and budget goals. He specified two project management mindsets – strategic and operational – and presented a Strategic Project Leadership (SPL) model as a continuum for the PMM model.

Robert Newcombe writes in his article that while the problems of matrix organizations are well known, the problems of exercising power in multi-organizational environments have been neglected. He bases his power paradigms on Weber, presenting the traditional system and the construction management form. Newcombe notes that "*for clients, the selection criteria normally used to select a project management approach and the form of contract may be less important than the realization that different approaches create different power structures, which can dramatically effect the ultimate success or failure of the project"* (Newcombe, 1996).

As a brief summary, it can be concluded that the way to use power is deeply culture-dependent. It is formed by interaction between national, ethnic, and organizational cultures, different governmental codes such as laws and regulations, the leadership, management style and personal attributes of those who use power, as well as those who are the targets of its usage. Power can be seen as a granted or gained characteristic of the person or organization that uses it or just as a name given to a complex strategic relationship in a given organization. The impact of different power policies and ways of showing and using power in co-operation has been discussed only a little in the literature. It can be seen as a tacit theme in the background of discussions concerning organization design and business process re-engineering, especially in customer, supplier and project-related processes, project management and PMM and SPl models, but only a few writers have highlighted the encounter of different cultures. From these rare writings, we can conclude that clashes between organizations with different ways of using power are

common, but that the power-dependent reason for them is seldom recognized. The concrete reasons for these clashes may be for example that a person in the opposite organization does not have the authority and empowerment that the member of the other organization assumes, decision making in the other organization may take such a long time that "the train has already passed by", hard decisions, no matter how urgent, are not made, or the information needed in the co-operation is dealt with in different ways. Situations like these could be avoided by flatter organization structures, more empowered employees, and advanced project business processes.

6.5.2 Findings of a study concerning the use of power

In the first phase, the respondents were asked to say in their own words what kinds of problems or phenomena caused by different business cultures they had seen during their career. The keywords of these texts were elicited and classified by the themes of the text in which it was presented. The method used for eliciting as well as the statistics and figures were presented in chapter 6.4.

In phase 2 the phenomena found in the results of phase 1 were written in the form of direct questions. Questions on the use of power in the organization and the project and the answers to them are presented in Figure 25. According to these answers, in almost every project participants tried to agree on common practices for meetings (i.e. How the agendas and protocols are written, when and by whom, to whom they are delivered, who convenes the meeting, who presides over it etc.), only half of the suppliers' project managers and 40 per cent of the customers' project managers had enough empowerment, both the supplier's and customer's management style affected the project, and both parties had difficulties in getting the goal of the project understood and accepted by the shop floor, although this was more difficult for the customer than for the supplier. The differences in personnel and payroll policies also impacted the success of the project. The only question where the answer differed from the results of the first study presented at PICMET 2010 (Lilja & Jaakkola, 2010), was "Does a different juridical form impact the success of the project?" In the case study presented at PICMET 2010 the juridical form was seen to be one impacting factor, but only 25 per cent of the panelists who answered this question agreed with this.

The panelists were also asked if the parties agreed on common principles and practices in controlling and reporting the projects, and whether they were followed, and what was both parties' knowledge of change management. Most of the respondents answered that common practices were agreed and followed although there were fewer organizations that followed common practices. Both customer and supplier were thought to have insufficient knowledge of change management (Figure 39).

The customer's and supplier's quality system was thought to have a positive impact or no impact at all on the success of an IT project. Although the panelists said that common

control and reporting practices were agreed and followed (Figure 40), the lack of common meeting, control and reporting practices, weaknesses in change management, and differences in power distance were seen to impact negatively on the success of a common project, but the differences in attitudes to human dignity were said to have no effect (Figure 41).

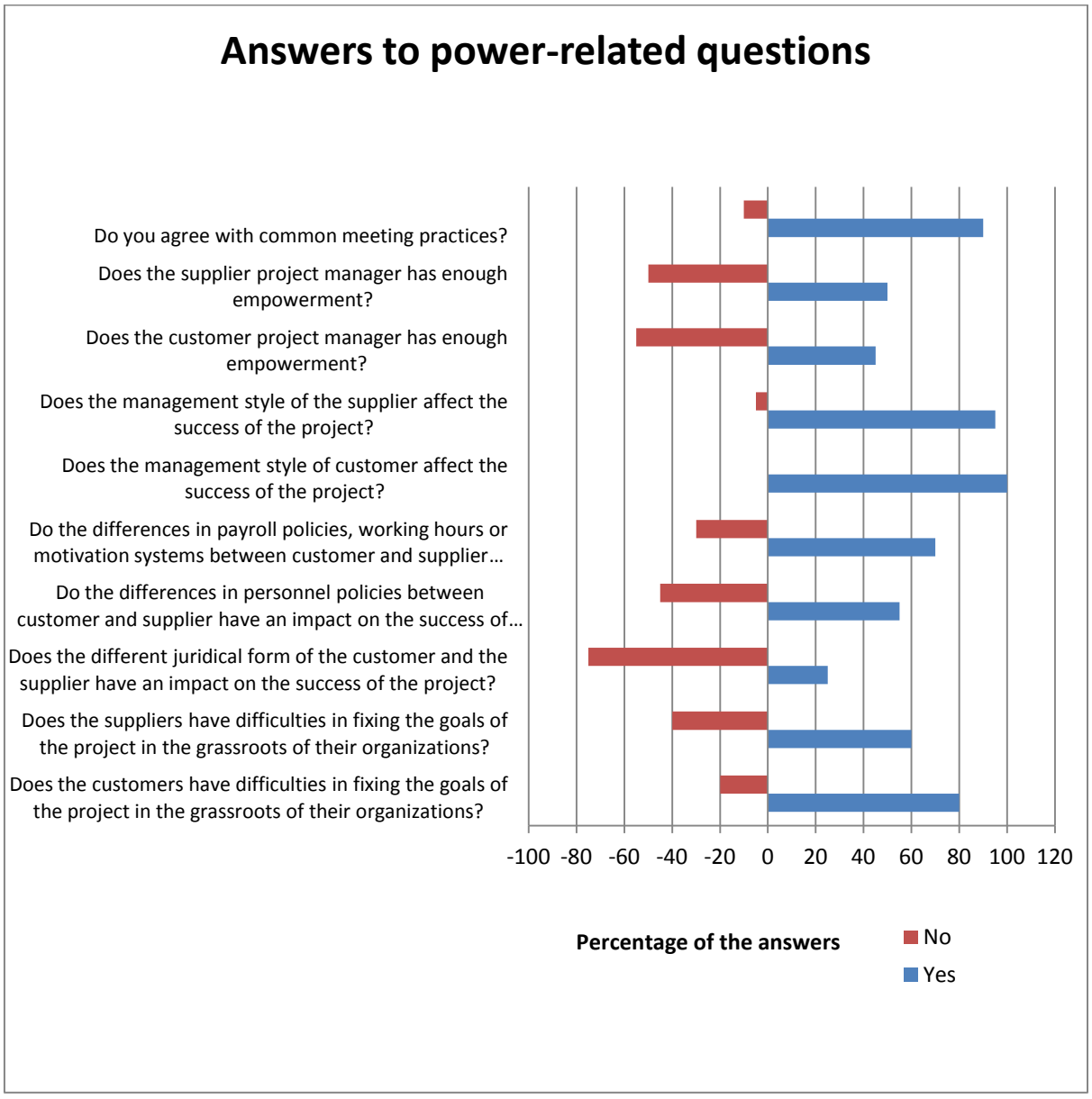

Figure 39: Power-related questions in phase 2 and answers.

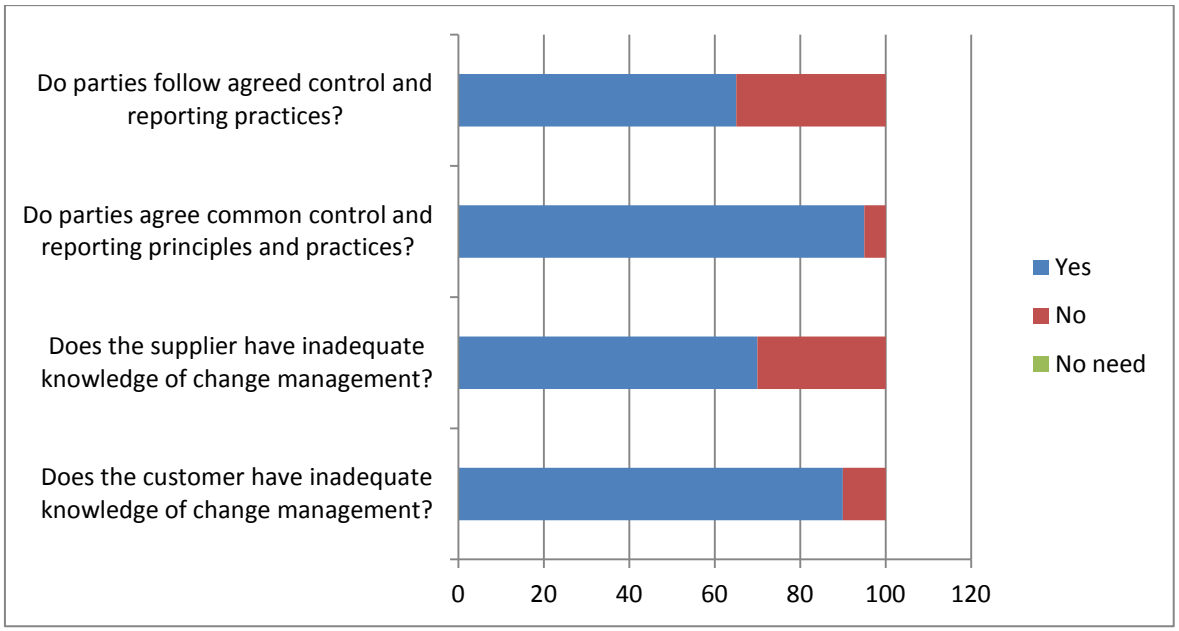

Figure 40: Status of control and reporting practices and change management.

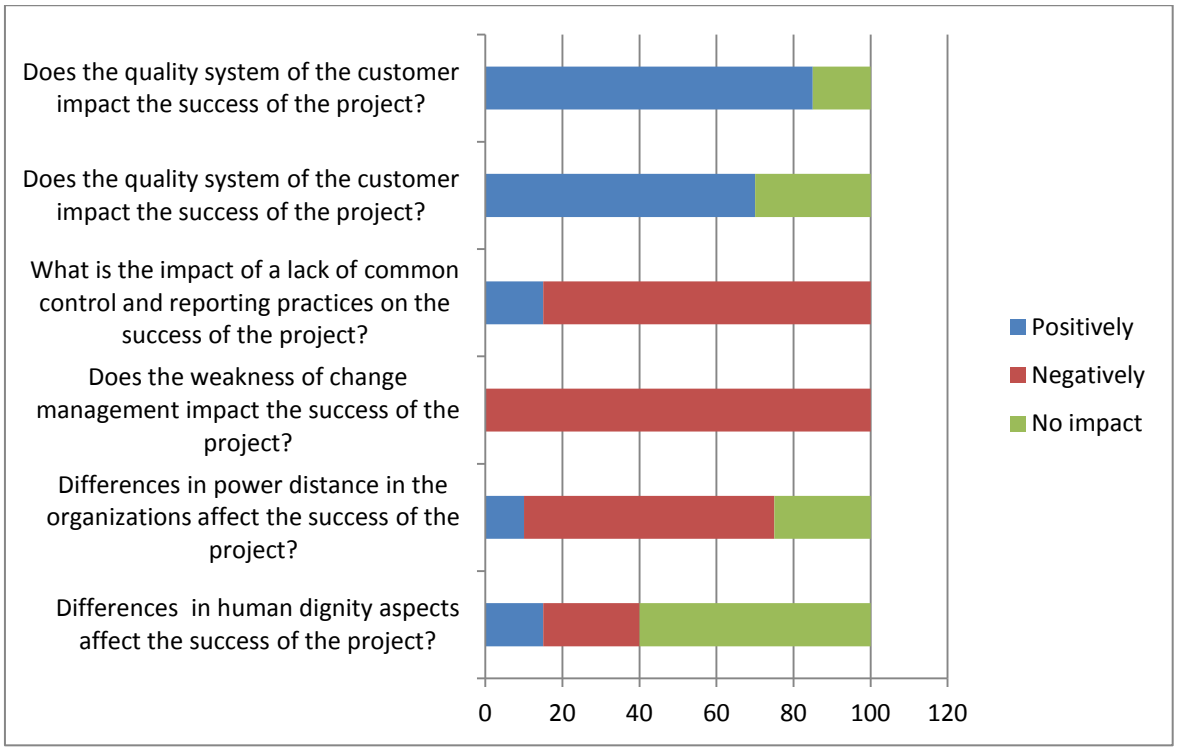

Figure 41: The impacts of some differences on common IT projects.

In the verbal comments given to the feedback of phase 2, the respondents also pointed out that the personal characteristics of the project manager, both customer's and supplier's, affect the success of the project. One respondent highlighted the resources the customer allocated to the project, especially in the requirements elicitation and testing and training phases, and said that in his/her experience this had caused delays in many projects simply because the customer's top managers did not pay enough attention to the project.

In the next phase the respondents were asked to describe the desired management style for customer and supplier to guarantee the success of a common IT project. According to their answers the management style of the customer should be comprehensive and participative, tasks and responsibilities should be delegated, and the organization should have the knowledge required for the tasks. Business goals should be clearly defined and an understanding of how the IT or ERP project supports these goals must be clarified and shared. The management should be determined and "there must be leadership skills" as one of the participants wrote. Also, the commitment of top managers and leaders to the ongoing project, a common understanding of business processes, responsibilities, and authority, honest awareness of the risks, skills in networking and co-operation were seen to be necessary for the customer. Competence in change management, courage to make hard decisions if needed, and discipline in both the business and project organization were also highlighted, as well as respect for the opposite party. One of the respondents argued that project management should be controlling, ever alert, and intervene in all the anomalies in the project. However, this was not commonly agreed on, and the overall opinion was that only substantial issues require attention and that irrelevant details should be ignored. This means that the project manager should be an experienced person who has an understanding of the customer's business.

The supplier's desired management style was described in almost the same way as the customer's, but the following differences were highlighted: The organization shown to the customer must be clear. There should be only one contact person who controls the communication with the customer. The management style should be deterministic and analytical, communicative, and respectful of the customer. Inside the supplier's organization all the issues can be discussed without seeking to apportion blame. Open and honest information is required in problem situations. Bad news is handled immediately and, if necessary, the customer is informed immediately. The whole organization should be committed to keep promises, and knowledge of change management is even more important than in the customer's organization because the customer often needs special advice in this area.

In the final phases, the respondents were first asked to suggest questions with which they would check the compatibility of the customer's and supplier's management culture, and then to vote for the most useful questions to evaluate the compatibility of two organizations. Each respondent could vote for more than just one question. The total number of suggested questions in the areas of Leadership/Management and Personnel was 38, and the most votes were given to the question "What is the practice in your company if there is something that has to be done just in time?" The top twelve questions are presented in Table 26.

Table 26: Power-related questions voted for by respondents

Question	**Vote percentage of respondents**
What is the practice in your company if there is something that has to be done just in time?	56.3 %
How much is your organization ready to commit to staying on schedule?	50.0 %
Is the board of directors / are the managers behind the project?	50.0 %
Has the board of directors / have the managers understood the goals of the project and changes it will bring to the business processes?	50.0 %
Will the board of directors / will the managers allow the project to change your business processes?	43.8 %
How are you controlling the project?	43.8 %
How are you going to react to anomalies and possible negligence in the project?	43.8 %
How do you treat timetables and schedules?	43.8 %
Describe the strategy of your company and say how this project will support it.	31.3 %
What kind of incidents might override our project?	25.0 %
What is the normal working-hours practice in your company?	25.0 %
What is the relationship between knowledge and suitability when you are hiring a new person?	25.0 %

In conclusion, the respondents were asked to evaluate the impact of different cultural differences on the success of the project on a scale of 1 to 6, where 1 means “no impact at all”, and 6 means “essential impact”. The power-related aspects and their evaluations are presented in Figure 42. The respondents also evaluated the direction of the impact. The results of this evaluation are presented in Figure 43. The most interesting finding when looking at Figure 42 and Figure 43 is that the majority of the respondents had experienced that the differences named have at least a low impact on the success of the project, and that the impact either weakened, or weakened or improved, but did not only improve the success of the project.

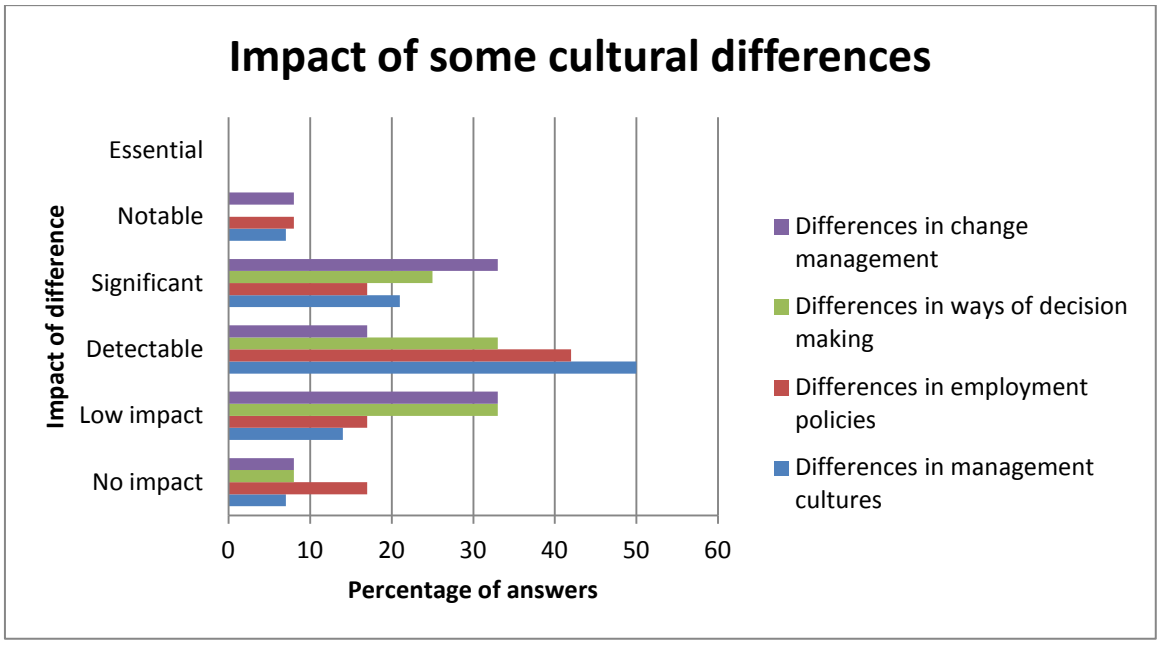

Figure 42: The impact of differences

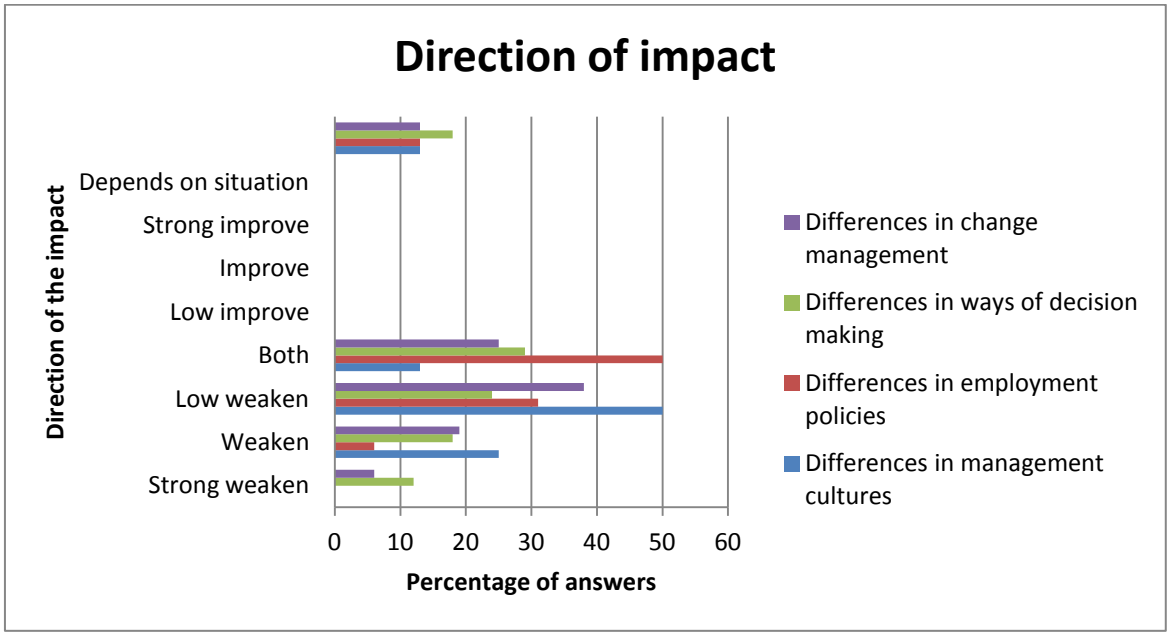

Figure 43: The direction of the impact

6.5.3 Evaluation of the findings

Findings obtained by earlier researchers and reported in the literature support the findings of this research. Hofstede says that working with a partner (company or person) from quite a different culture may be difficult or even impossible if we do not understand the reasons for certain behavior (Hofstede & Hofstede, 2005) and the dimension he calls “Power distance” is one of these. In study 1, the finding was that differences in power distances were seen to have a mainly negative impact on the success of the IT project (Figure 41). Anupam Ghosh and Jane Fedorowicz proved in their article (Ghosh & Fedorowicz, 2008)

that each participant of a strategic alliance, e.g. supply chain, must agree on a common governance structure that will direct their relationship and reduce opportunism. In these results the cultural differences in subjects concerning the governance and use of power had commonly been experienced to have an impact on success, but this impact was mostly negative (Figure 42 and Figure 43). Of course, whether or not an information technology project can be seen as a strategic alliance is debatable. Partly it depends on the situation, but very often in IT projects the customer and supplier, when signing the contract, are committing themselves to long-term co-operation, openness, and trusting each other, i.e. all the significant signs of a strategic alliance.

Newcombe wrote that while problems of matrix organizations are well known, the problems of exercising power in multi-organizational environments have been neglected. He noted that for customers the criteria normally used to select a project management approach and form of contract may be less important than the realization that different approaches create different power structures, which can have dramatic impacts on the ultimate success or failure of the project (Newcombe, 1996). In this research, both the lack of a common control and reporting system and lack of knowledge of change management were seen to have a negative impact on the success of the project. In many organizations, especially in those under change, information is seen as a source of power as stated by L. Robbins (Robbins, 1992). The common lack of knowledge of change management in IT projects has been recognized by many authors, (see for example (Jarrar, et al., 2000)).

Paton, Hodgson, and Cicmil (Paton, et al., 2010) argue that that one of the problems project managers suffer is the lack of real power to affect the ongoing work. This can have a fatal impact on the project and relationships with the customer or supplier, especially if the project fails or is late due to the lack of empowerment of those responsible for the project. According to the answers to the questions in the 2nd phase of this study (Figure 39), about half of the respondents had experienced that neither customer's nor supplier's project managers had enough empowerment.

6.6 MISCELLANEOUS FINDINGS

During the study questions concerning differences in appreciating different occupations, differences in equality policy, differences in respecting the off-duty time of employees, employees' preparedness to be flexible on working hours, and differences in compensation and rewarding policies were also discussed. These topics were commonly said to be each company's own business and none of anyone else's concern. It was also highlighted that the differences in these issues are difficult to see and they are considered to be so sensitive that starting a discussion with the customer or supplier concerning these issues would not be politically correct. However, some customers noted that if a supplier's key person could not be reached in emergency cases due to his /her vacation or bureaucratic 8-hour workday, the consequences for the project might be fatal.

There were also other exceptions in this common “not my business” approach. 25 per cent of customer and supplier and 60 per cent of third party representatives had experienced that differences in equality policy had impacted negatively on the success of the project. Although there has been some research on gender and projects (see e.g. (Cartwright & Gale, 1995), (Gale & Cartwright, 1995) (Coates, 1998)), no research on gender and equality policy issues in terms of the impact of differences between supplier and customer on an IT project or any project was found. However, the impacts could be approached from the aspect of the tensions the differences raise inside the organization and between the organizations. Tensions inside organizations affect co-operation, causing tensions between organizations (Blomqvist, 2002), (Arvidsson, 2009).

A different understanding of time was thought to have at least a slightly negative affect on projects (100 % of customers, 100 % of suppliers, and 100 % of third party representatives). This is understandable because staying on schedule requires that both parties understand time in the same way and respect the agreed schedule.

Employees’ willingness to be flexible regarding working hours received a more positive judgment: 75 per cent of customers’, 62.5 per cent of suppliers’ and 60 per cent of third party representatives had experienced that it had a positive impact on success. Flexibility on working hours is also at least partly connected to staying on schedule. If there is no flexibility in the case of an unexpected delay or problems, no matter on which side, the project will be delayed, and staying on schedule is one of the traditional criteria of project success (Aloini, et al., 2007), (Wateridge, 1995).

The involvement of top management in daily work was seen by customers’ representatives (75 %) and third party representatives (100 %) to have a positive impact on the success of the project, whereas the majority of suppliers’ representatives had experienced negative effects (62.5 %). The support and involvement of top management has been reported in the literature to be one of the factors of success (e.g. (Bakker, et al., 2010), (Belassi & Tukel, 1996), (Belout, 1998)). Although in this case the discussion concerned daily work and not only involvement in the project, the positive effect comes from the same points: Management knows what is going on, is committed to the decisions made, and supports the actions. Furthermore, if the top management is involved in the daily work, it is also aware of the problems and needs of the organization.

Concerning the differences in compensation and rewarding policy, some of the customers’ and suppliers’ representatives (25 %) and third party representatives (40 %) had seen negative impacts. Traditionally, compensation and reward is used in the project business for salesmen and those responsible for the financial success of the project (Eisenhardt, 1985). However, it has been stated that an existing reward system could motivate employees to share their knowledge (Al-Alawi, et al., 2007), which is important in IS projects. The importance of compensation in motivating and controlling both management and employees has been discussed a lot in the literature, e.g. (Ortín-Ángel & Salas-Fumás,

2002), (Meyer, 1995) (Mahaney & Lederer, 2006). The differences in rewarding systems may cause tensions between organizations if for example the compensation system of the customer does not take into account the impacts of the ongoing IS project and daily work and endangers the basis of the compensation, or if the project causes extra work which is not compensated.

The role of change management and especially customers' willingness to change their processes and suppliers' ability to support the change process and the knowledge of project managers of both parties was highlighted in some of the free comments and is worth mentioning. Even if the knowledge and skills of project managers are not within the scope of this study, fear of the new, readiness for change, and resistance to change are strong organizational attributes that affect the whole organization.

6.7 CONCLUSIONS CONCERNING THE RESULTS OF THE DELPHI-BASED STUDY

Although the material used in these studies was relatively small and geographically restricted to one country, Finland, the phenomena behind the findings have also been recognized by other researchers and in different cultural environments.

6.7.1 Common language

The lack of a common language between the partners of an ICT project is a reality. The impact of this factor starts from making a call for tenders or, on the private side, writing and sending requests for quotations. It complicates the requirements management processes and causes unnecessary extraordinary costs for every participant. At its worst it may endanger the whole investment. The problem is recognized but not widely discussed within the profession. Practitioners have developed some ad-hoc means to manage the problems they have met, for example:

- Creating a project glossary from the terms and words used by the customer and supplier that might be unfamiliar to other participants.
- Making sure that people understand the customer's branch / business. If not, finding out about it.
- Making sure that each participant understands both their own requirements and needs and those of the opposite party, the latter especially if the opposite party is the customer.
- Making sure that each participant understands the documents and notes regardless of who created them.

- Setting and agreeing common practices and forms for agendas, meetings, protocols, reports, and other documents produced and needed during the project.

The questions suggested for the getting-to-know-you phase were:

- Do you understand the content of our request / offer?
- What kind of reporting and meeting practices do you suggest using during our project?
- Do you use terms or words that differ in meaning from common usage / usage in the industry?
- Do you know our industry?
- Are you able to create a glossary of terms used in your business?

It should be remembered that language, however odd it seems, is a part of an organization's identity. Heavy-handed attempts to reform it may lead to long-lasting conflicts and strong resistance to change. Anticipating the possibility of meeting problems and opening discussion on the differences between terms and words as well as cultures and practices is the best way to avoid problems. It is also important to listen to all the participants and stakeholders of the project. The meetings should be regular and well prepared, but at least as important are the casual and free-form discussions during coffee breaks, lunches, and so on.

6.7.2 Organizational structure

The most suitable organizational design for the supplier was found to be the project organization, and while the project organization was recommended, other designs were also felt to be possible. This can be reflected in what Donk found: The more severe the contradiction e.g. between the project organization and the line organization, the more likely it is to be reflected in the quality and timetable of the project (van Donk & Molloy, 2008). In the literature, matrix organizations in particular were found to be a risk to the success of the project, due to their ambiguous management and having more than one superior.

Both the height and width of the organizations of supplier and customer had also been experienced as having an impact on the result of a common project. In the literature, Child (Child, 1973) found a correlation between size, height, width, and bureaucracy: the bigger the company, the more units, levels, and bureaucracy it had. Geeraerts found a connection between ownership and structure, saying that in an organization managed by an owner-manager there is probably less bureaucracy and fewer levels (Geeraerts, 1984). Height and increased bureaucracy may cause delayed decision making, and width, for its part, makes it difficult to commit all the necessary staff, to compile all the necessary requirements and / or knowledge because there are more superiors and managers involved in the project.

The questions recommended for checking the compatibility of organizations were:

- Has the highest management of the firm understood the goals of the project and the changes it will bring to business processes?
- Is the Board of Directors behind the project?
- Will the highest management of the firm allow the project to change the business processes – or does it insist on that?
- At what level of the organization were the decisions concerning this project made – or will they be made?
- How many levels are there in your organization, including ordinary workers and the Board of Directors?
- How many units are there maximum at the same level?

The results of the study proved that the organizational structure and differences in structures between supplier and customer have an impact on the success of the project. However, more research is needed to find out why, for example, the matrix and hybrid organization of the supplier is a risk factor in an IT project or what the human and organizational factors are behind these findings.

6.7.3 Use of power

It is clear that the different ways of using power inside the organizations as well as between organizations impact the results of IT projects. In study 1, almost every one of the respondents had experienced that different management styles affect the result of the project. The direction of impact depends both on the ways of using power, and on the nature of the project, but mostly the differences in the ways of using power have a detrimental impact on the success of the project.

From the literature, we learned that ambiguous command paths and hierarchies with more than one superior and unclear authority made the power relations unclear and added confusion and conflict inside the organization (Newcombe, 1996). The project manager in such an organization may be in a situation where empowerment and responsibility do not correspond. These kinds of contradictions are reflected outside the organization and in co-operation partners, causing risks for ongoing projects. This was also found in study 1, where 50 per cent of the respondents had experienced that both the customer's and supplier's project manager did not have enough power.

The support of top management was found to be absolutely essential for a successful IT project. If a project has the support of the board of directors behind it, people involved in the project should have enough power to make the decisions needed and change the business processes if necessary to reach the goals the project was set up for. But empowerment is not enough. Both organizations should also have knowledge, not just technical, financial, and managerial, but also prior knowledge of managing change. Each

information technology project brings changes, and to coach and conduct people to meet and accept these changes was found to be an essential task from the point of view of project success. In this study, the majority of the panelists said that both customer and supplier lacked knowledge of change management.

The questions suggested for the getting-to-know-you phase were:

- Is the board of directors / are the managers behind the project?
- Has the board of directors / have the managers understood the goals of the project and changes it will bring to the business processes?
- Will the board of directors / will the managers allow the project to change your business processes?
- How are you controlling the project?
- How are you going to react to anomalies and possible negligence in the project?
- Describe the strategy of your company and say how this project will support it.
- What kind of incidents might override our project?

6.7.4 Other findings

Differences in appreciating different occupations, differences in equality policy, differences in respecting the off-duty time of employees, differences in the flexibility of working hours, and differences in compensation and rewarding policy were also found to have their effect on common IS projects. These issues are, however, in most cases considered sensitive and opening a discussion on these topics may be thought to be politically incorrect. Despite that, there are some questions that it was suggested to present during the getting-to-know-you phase:

- What is the normal working-hours practice in your company?
- What is the practice in your company if there is something that has to be done just in time?
- How do you treat timetables and schedules?
- How much is your organization ready to commit to staying on schedule?
- What is the relationship between knowledge and suitability when you are hiring a new person?

7 EXPERIENCES FROM GRASS-ROOT LEVEL OPEN SURVEY

The fourth part of the research collected the experiences of grass-root level users, who in their daily work were more or less randomly involved in IT projects or whose working conditions the ongoing IT project had impacted. The study was conducted as a web-based survey with the help of Webropol survey software during the spring, summer, and autumn 2011. The aim of this study was to gather comparative material to be compared to results gained from the earlier case study and Delphi-based study that collected experiences of experienced project experts. The research was started by planning the questions and questionnaire. The questionnaire was tested and some modifications were made according to comments given by test respondents, who were chosen from groups that were thought to be the target groups of the survey: ordinary clerical staff, doctors, teachers, workers etc.

After the modifications were made, the final version of the questionnaire was published and respondents were invited to answer it. The invitation was published on the web pages of Kauppalehti, the biggest economic newspaper in Finland, and also on the website of IT-Viikko, a journal concentrating on IT. In addition, the link to the questionnaire was distributed with the help of personal contacts and networks.

7.1 USERS IN THE LITERATURE

Human and management issues have an important role in the ability of an organization to gain success in technology projects (Vadapalli & Mone, 2000).

According to a survey conducted by the financial services company Deloitte & Touche, when problems occur before an ERP project goes live, 62 per cent of them are due to people obstacles, 16 per cent are due to business process issues, and 12 per cent due to technical issues. The remaining 10 per cent covered many other reasons (Deloitte & Touche, 1999). Thus, people, and especially the users, are an important part of an IT project.

During the first decades of the history of software engineering and information technology projects, the interest was directed to technological aspects like operating systems, programming tools and methods, computers and connections, protocols and equipment. The users were – especially at beginning of this era – technicians simply trained to punch cards and feed them into machine brains, and translate the responses given into human language. The project was successful if the new system did what it was supposed to do. As time passed by, white- and blue-collar workers became step by step more involved in

information technology as users (Kettinger & Lee, 2002). First generations of users at grass-root level did not have expectations or requirements concerning technology or systems. Their only target was to avoid mistakes. Information technology became a part of everyday life, which in turn, gave users more knowledge and understanding of new technology.

The role of users in the success of IT projects became highlighted in SWE research in the 1990s, when the awareness of usability, user requirements and expectations, and their impacts on the effectiveness of information technology grew and also the organizational culture of organizations was purported to promote user participation (Damodaran, 1996). In addition to increased participation, the role of users in the development phase has changed from the source of information and test cases towards full members of the development team (Damodaran, 1996). Damodaran notes that "*effective involvement in system design yields the following benefits:*

1. *Improved quality of the system arising from more accurate user requirements.*
2. *Avoiding costly system features that the user did not want or cannot use.*
3. *Improved levels of acceptance of the system.*
4. *Greater understanding of the system by the user resulting in more effective use.*
5. *Increased participation in decision making in the organization".*

A. Fowler and M. Walsh construct the definition of success on the basis of the hierarchical causal chain first presented by Lucas (Fowler & Walsh, 1999). In this chain the elements are acceptance, use, improved performance, satisfaction, and organizational payoff. Fowler and Walsh emphasize the dilemma contained in the definition of Lucas: Use (or usage) is a relevant measure if the use is voluntary, but if the use is forced, a more relevant measure could be user satisfaction. This, however, highlights the role of users and their individual perspectives in measuring success. However, this is not all. Fowler and Walsh note that a business company is at least as sensitive to political games as any other organization. Involving the users by participating might reduce the negative impacts of organizational games and lead to easier implementations and more effective usage, but the price for successful participation may be that the development process takes longer (Fowler & Walsh, 1999).

One of the most important factors in the users' role to ensure IT project success is user involvement (Aloini, et al., 2007). Key users should believe in the superiority of the new system. They must also be confident and have the expertise to be able to assist future users in training sessions. User commitment and a positive attitude to projects in general and especially to project goals are useful in the early stages of the project and during the implementation phase and most valuable in the case of unexpected problems.

Vadapalli and Mone state that although *several contingency variables* (have been identified) *influencing the relationship between user participation and system success, with success usually defined in the context of user satisfaction… user participation by itself does*

not seem to lead to satisfactory project outcomes (Vadapalli & Mone, 2000). They describe a model in which five separate factors are required to ensure user satisfaction as a result of participation. These factors are Composition, Empowerment, Evaluation and rewards, Growth and development, and Training. “Evaluation and rewards” and “Growth and development” were seen as important on a team level but their importance must not be underestimated either in recognizing individual ability and achievements.

The role of management is at least as important as the role of users from the point of view of project success (Aloini, et al., 2007). Herb Krasner states that most of the failures in ERP projects reported in the press and open literature stem from problems in management (Krasner, 2000). The importance of the support and involvement of top management in information technology projects has been emphasized by many observers (Fowler & Walsh, 1999). The role of management is important during the project but is highlighted in the planning and launching phase, where clear business goals and well defined targets of the project that are understandable to both users and supplier make it easier to access the requirements, to set measurable milestones and indicators to evaluate success, and – most importantly – to tell people why this project has been set up. Secondly, the role of management becomes highlighted when involving the users. According to Damodaran, the management has important tasks through which it can steer the success of the project in a positive direction. These tasks are (Damodaran, 1996):

1. Promoting positive attitudes to IT
2. Starting the user involvement process
3. Empowering the users

Damodaran notes that particularly the top management should take the steps needed to involve users in the project. Third, and perhaps most important although not such a desirable situation when the role of management is particularly emphasized, is the moment when the project is found to be in danger of failing (Man & Chan, 2008).

A successful project requires a well defined and described business vision that is the basis for both the business model and the goals behind the project (Holland & Light, 1999). A project should have clear goals and objectives (Ang, et al., 1995) that indicate the general directions of the project (Cleland & Ireland, 2000). These goals should remain clear throughout the whole organization. Good management also improves user expectations (Ginzberg, 1981) and helps in planning the training of people in the use of the finished system (Hoffer, et al., 2009). The commitment and support of top management has also been found to be essential in terms of the success of the project (Ang, et al., 1995), (Holland & Light, 1999).

Sarker and Lee (Sarker & Lee, 2003) stated in their case study on ERP projects that strong and committed leadership is one of the most important factors behind the successful implementation of a project. In this context the term “strong leadership” must not be

understood as meaning “management by perkele” (“Perkele” is one of the Finnish names for the devil, shouted out loud when something has been done “wrong”), as it is often understood in Finnish management culture, but management by trust, support and commitment, treating colleagues and subordinates as adults. The other factors they found were open and honest communication and a balanced and empowered implementation team. They noted that all three may support ERP success but that only the first was found to be necessary.

Yetton et al. stated in their research analyzing surveys conducted in UK and in New Zealand that the support and commitment of top management and end-user participation particularly impacted the completion of the project (Yetton, et al., 2000). They also found that the more strategic the project, the more important the support of top management.

Kræmmergaard and Rose presented a list of competences required for a manager during the lifecycle of an ERP project, based partially on the literature and partially on their own findings (Kræmmergaard & Rose, 2002):

1. Organizational competence
2. Strategic competence
3. Business process competence
4. Project management competence
5. Technology competence
6. ERP system competence
7. Human resource competence
8. Leadership competence
9. Communication competence

Kræmmergaard and Rose grouped these competences into three groups: business competences, technical competences, and personal managerial competences, which in their opinion underpin the others (Table 27).

Table 27: Managerial competences required during the lifecycle of an ERP project according to Kraemmergaard and Rose

Business competences	**Technical competences**
1. Organizational competence	5. Technology competence
2. Strategic competence	6. ERP System competence
3. Business process competence	
4. Project management competence	
Personal managerial competences	
7. Human resource competence	
8. Leadership competence	
9. Communication competence	

Aloini notes, referring to the findings of Appleton, Cooke & Peterson, Stebel, and Stoddard & Jarvenpaa, that implementing information technology always modifies in one way or another the way that the organization operates. Changes are almost inevitable and this is why change management is an important part of the competences required in (project) management. To ignore the importance of change management may cause project failures or at least result in worse success (Aloini, et al., 2007).

The role of change management has also been highlighted by many other writers. T. Butler and D. Fitzgerald stated that "*change management issues must be addressed early on in the development process"* (Butler & Fitzgerald, 1999). Jones and Price found that good change management is very important for the success of ERP projects where a new system changes the processes and role of users totally (Jones & Price, 2005). These writers include Markus and Tanis, who noted that enterprise-wide IT projects raise questions about change management, training, user involvement, and communication, etc. (Markus & Tanis, 2000).

Ginzberg found that in projects where users were dissatisfied with the results of the project, the reports given by users and by system designers or suppliers' representatives differed from others, but, in contrast, in projects where users were found to be satisfied, no difference was found (Ginzberg, 1981). Ginzberg interpreted this to mean that in projects where dissatisfaction was found, the communication between participants might have failed. As a result of this communication failure, users had unrealistic or otherwise mistaken expectations of the project and its results. The critical misunderstanding that led to this situation had obviously occurred during the early analysis and design phases of the project. Ginzberg also stated that one of the mistaken expectations the user at grass-root level may have is how and with what metrics the results of the project should be evaluated.

Weiss and Andersson found in their survey that both the external and internal customers of an IT department (in other words "end users") do not believe that IT people understand their business, their organizational culture, and political pressures. The end users also believed that IT-oriented people fail to communicate with them, and that IT software, hardware, and solutions are too expensive (Weiss & Anderson Jr., 2003). The group of respondents of this survey consisted of eight CIOs, eleven IT VPs, and seventy-five IT staff members working in seven different Fortune 500 companies in the following industries: manufacturing, defense, financial services, biotechnology, and utilities. The respondents were also asked to identify the organizational and project environments they were involved in and their roles in these environments. In the answers, customers, end users, teams and decision makers were seen either as the partners or customers of an IT organization in contrast to stakeholders, vendors, suppliers and subcontractors, for example, who were seen as third parties. This is interesting because – when discussing IT projects – stakeholders often have a key role when setting up and funding the project.

The importance of communication between users and developers is supported by the finding made by T. Butler and B. Fitzgerald, who discovered that Information Systems managers had a positive impact on the degree and quality of user participation but the influence of business managers and labor unions was found to be negative (Butler & Fitzgerald, 1999). This finding may be at least partially explained by the effects of group learning reported by (Bondarouk, 2006). Butler and Fitzgerald also stated that placing a user representative in the development team improves the quality of the project. They also noted that the impact of the user in the development team depends on the quality of this representative.

G. Disterer builds a bridge between the terms user, developer, knowledge, participant, and involvement when he states that user participant and user involvement stand for ways to transfer knowledge, experiences, and information from end users and functional experts to developers (Disterer, 20002). Tolsby describes a situation where the implementation of new IT system at least partially failed due to the fact that the current organizational culture did not allow the team to listen to the end users (Tolsby, 1998).

T. V. Bondarouk recognized the importance of group learning in IT implementation and argued that those who are responsible for IT projects should be aware of this fact. If managers are trying to advance group learning, it may be a catalyst for the success of the project. Otherwise, uncontrolled group learning may lead to unpredictable and impulsive individual and organizational behavior that could damage the project (Bondarouk, 2006). Bondarouk recommends managers and leaders to accept that IT projects include complex interactions not just between the members of the project team or between the users but between all the persons involved in the adaptation of new technology. An acceptance of the fact that the group-learning processes among the members of organization can either support or kill the project is the primary precondition for steering group learning processes in the right direction (Bondarouk, 2006).

Napier et al. studied the competences of IT project managers (Napier, et al., 2009) and found nine skill categories that were common to successful IT project managers. These categories were client management, communication, general management, leadership, personal integrity, planning and control, problem solving, systems development, and team development (Napier, et al., 2009). They grouped project managers into four archetypes by the dominant skills of the managers and found that although not all the project managers had the same competence profile, the Leadership and Team Development skills were present in all four archetypes and Client Management skills in three out of four archetypes. The weight of each skill varied in each archetype.

M. Al-Mashari (Al-Mashari, et al., 2003) highlights the training of end users and notes that attention must be drawn to the costs of this training and change management when estimating the costs of implementing a new ERP system. Al-Mudimigh, for his part, says that installing an ERP software package without adequate end-user preparation could lead

to drastic consequences. Referring to writers like Kelly et al., Gupta, and Somers & Nelson, he notes that the failure of end-user training has been one of the most significant reasons for failures in implementing ERP systems (Al-Mudimigh, et al., 2001).

The important role of users, change management and management and leadership in general was also stated in research on the risk management of software and IT projects. In their Delphi-based research, Schmidt et al. listed 17 recognized risk factors ranked according to their evaluated importance.

1. Lack of top management commitment to the project
2. Misunderstanding the user requirements
3. Not managing change properly
4. Failure to gain user commitment
5. Lack of effective project management skills
6. Lack of adequate user involvement
7. Failure to manage end-user expectations
8. Lack of effective project management methodology
9. Unclear/misunderstood scope/objectives
10. Changing scope/objectives

Out of the ten top factors, four were linked to the user, one to top management and its commitment, one to change management, and two to project management knowledge and tools (Schmidt, et al., 2001), (Keil, et al., 1998). Unclear or changing goals could also be considered as linked to management (Holland & Light, 1999). Keil notes that the list shown above was obtained from answers of project managers. In his work (Keil, et al., 2002), Keil presents a list ranked by users that is quite different:

1. Lack of effective development process/methodology
2. Improper definition of roles and responsibilities
3. Lack of adequate user involvement
4. Lack of available skilled personnel
5. Poor team relationships
6. Misunderstanding the requirements
7. No planning or inadequate planning
8. Insufficient/inappropriate staffing
9. Lack of required knowledge/skills in the project personnel
10. Conflict between user departments

There are only two items that also occurred in the project managers' top ten list: *Lack of adequate user involvement* and *Misunderstanding the methods*. The *Lack of top management commitment* that was in first place in the project managers' list was not ranked at all in the users' list. The converse was also true: Project managers did not rank the lack of effective process / methodology which was in first place in the user rankings

(Keil, et al., 2002). The items connected to users can also be found in this list, but most of the items are linked to project and middle management, i.e.: Factors that are close to the users, but not the users themselves. However, there were seven items that both users and project managers ranked as important although the place in the ranking list varied (Keil, et al., 2002):

1. Improper definition of roles and responsibilities
2. Lack of adequate user involvement
3. Misunderstanding the requirements
4. Insufficient/inappropriate staffing
5. Lack of required knowledge/skills in the project personnel
6. Conflict between user departments
7. Changing scope/objectives

Keil notes that although both groups selected these seven items, the weight of each item may be different for each stakeholder. It must also be kept in mind that each stakeholder may find risks that other stakeholders do not agree with.

In an earlier work, Keil et al. presented 11 factors that experienced project managers in three different cultures had agreed to be more risky for a software development project (Keil, et al., 1998). The factors that were found to be significant in that paper in order of relative importance were:

1. Lack of top management commitment to the project
2. Failure to gain user commitment
3. Misunderstanding the requirements
4. Lack of adequate user involvement
5. Failure to manage end user expectations
6. Changing scope/objections
7. Lack of required knowledge/skills in the project personnel
8. Lack of frozen requirements
9. Introduction of new technology
10. Insufficient/inappropriate staffing
11. Conflict between user departments

Also in this list the majority of topics concern human aspects, users, and management. Only one of the named risks can be considered technological – the introduction of new technology. Furthermore, the first item, the lack of top management commitment, was seen to be so dangerous for the project that it overshadowed all the other risks (Keil, et al., 1998).

Tesch et al. listed six risk categories and top rated risks by category (Table 28) ranked by project management professionals (Tesch et al., 2007). Also in their list inadequate top management commitment and failure to satisfy end-user expectations were highlighted. It

is noteworthy that change management is in this case understood to mean "version management."

Table 28: Risk categories and top-rated risks according to Tesch et al.

Risk Category	**Top Rated Risks**
Sponsorship/Ownership	Project has inadequate top management commitment.
Funding and Scheduling	Entire project must be budgeted at the outset.
Personnel and staffing	Project lacks enough staff or those with the right skills.
Scope	Requirements are ignored for the sake of technology.
Requirements	Project changes are managed poorly.
Relationship Management	Project fails to satisfy end-user expectations.

Jesper Simonsen states that the responsibility for committing the top management to a planned IT project lies with the vendor, who should be able to convince management that a proposed IT solution meets the particular needs of the organization (Simonsen, 2007). He also writes that top management should be "present" from the early beginnings up to the training and use of the new technology to manifest their commitment and ensure the success of the project.

Edgar H. Schein noted (Schein, 1983) that increasing complexity in both the technical and socio-cultural environment makes organizations more dependent on the contributions from their employees (Mueller & Dyerson, 1999). A vendor of modern IT Technology may be operating in a very complex environment, in both the technical and organizational meaning. A big and unexpected surprise in this part of the literature review was to learn that – despite the dependency of organizations on their employees as stated above – the discussion approaching the grass-root workers' role in information technology projects seems to concentrate on involvement and participation of the customer's employees while there is almost no interest in the supplier's personnel. Those writers who have approached the knowledge, attitudes, involvement, participation, and commitment of the supplier's or subcontractor's employees have studied it in the context of outsourcing or subcontracting, not in the context of implementing an IT system. However, there are some exceptions that confirm the rule. Researchers with interest in software process improvement and agile methods have studied, among other things, the importance of employee commitment in both introducing agile methods and running projects utilizing agile methods. G. Asproni highlights the unified commitment of the team (Asproni, 2004) and notes that if this is lacking, the possibilities of success may be endangered. O´Connor et al. found in their research (O'Connor, et al., 2010) that especially in very small enterprises the commitment

and involvement of people and management had a positive impact on the following of SPI practices. K. Conboy concluded – based on the literature review he conducted (Conboy, 2000) – that employee commitment to agility enables flexibility and other attributes of agile methods. On the other hand, Brock et al. stated that a dictatorial requirement to use a certain method in managing projects does not cause the employee more problems – or benefits – than those included in that method (Brock, et al., 2003). Hefner states that when implementing a CMM model into the organization the role of top management is highlighted. If the leaders of an organization do not succeed in communicating their interest in new practices, the involvement and commitment of employees may remain superficial (Hefner, 2003).

Park et al. found that any subject endangering the success of the project was more likely to be reported if the person responsible for that was outside the organization, for example a subcontractor or vendor (Park, et al., 2008). People try to hide errors that would possibly cause difficulties for their own organization as long as possible, which often causes delays to the project.

Studies approaching the topic can also be found o Outside the IT sector. Greasley et al. researched empowerment and its impacts on employees in construction projects and states that empowerment increases satisfaction; employees felt that they were valuable members of the project team (Greasley, et al., 2005). This helped the employees to accept deeper involvement in the project.

As a brief summary of the findings from the literature, it can be noted that writers are quite unanimous on the point that the role of grass-root users and their involvement and commitment is important for the success of IT projects. From the literature concerning organizational culture it was learned that every member of an organization is both an actor and a target in an interactive process of forming, expressing, and changing organizational culture. This is also why the experiences of grass-root workers are important and must be listened to.

7.2 SURVEY

7.2.1 Profile of respondents

The questionnaire was opened by 396 visitors and 34 usable answers were filed. Out of these 34 respondents, 22 were representatives of a customer and 12 representatives of a supplier in IT projects. 9 of the respondents were involved with projects occasionally, 18 regularly and 7 had been involved in the role of manager. All of the latter group were customer's representatives. The complete profile of the respondents is shown in Table 29. The small response rate, i.e. the small number of those who completed the questionnaire compared to those who opened the web page, is a common problem among surveys that are mailed or otherwise distributed in an uncontrolled way where there is no extra

compensation for completing the questionnaire, e.g. a candy bar or possibility to take part in a prize draw (Nardi, 2003, pp. 111-112), (Edwards, et al., 2002). In this survey the aim was to collect experiences complementary to those of experts, thus every answer was valuable.

7.2.2 Evaluated project success and impacting factors

The respondents were asked to evaluate the success of the projects they had been involved with. Only two of the respondents had the opinion that they were not able to evaluate the success. The others evaluated the success of the projects in terms of staying on schedule, reaching operational goals and economic targets, supporting the business, and impacts on job satisfaction and work efficiency. On average slightly more of the respondents had experienced projects having bad or very bad success than good or excellent success (13 vs. 11) (Table 30). However, the number of bad or very bad projects was significantly greater if success was measured by schedules, satisfaction, and efficiency than measured by reaching operational and economic goals or supporting the business (Figure 44). 18 respondents had experienced that projects did not stay on schedule, 16 felt that projects did not improve job satisfaction and 14 felt that projects did not improve work efficiency.

On the other hand, the number of neutral opinions was the smallest for the same factors, and although the number of those who had experienced projects improving satisfaction and efficiency was smaller, the polarization in questions concerning satisfaction and efficiently was significant.

Concerning the three other factors, reaching operational goals and economic targets as well as supporting business, the answers were much closer to each other. The only exception in this group was that 15 respondents had experienced that goals in supporting the business had had good or very good success.

These answers reveal that goals, official or unofficial, are not always achieved in IT projects. But this was only one part of the research question. The aim of the whole research was to find out if the different business cultures of customer and supplier have an impact on common IT projects. To approach this, claims that were highlighted in the case study and experiences of experts, were included in the questionnaire. In the analysis phase, the reactions of respondents to these claims were cross-tabulated with the success of each success criteria. This produced 306 independent tables describing the impact of each attribute of both the respondent's and the opposite party's organization. These tables were put into groups by mirroring each criteria of success against each claim. The answers were read group by group and the combinations that were highlighted (i.e. were seen as deviating from the common line) either as a positive or a negative factor from the point of view of success, were selected for more detailed analysis.

Table 29: Profile of the respondents.

	Representative of		
Involved with projects	Customer	Supplier	Total
Randomly	7	2	9
Regularly	8	10	18
In Manager's role	7		7
Total	22	12	34

	Representative of		
Project was targeted at	Customer	Supplier	Total
IT systems in general	2	2	4
Other software	3		3
Other activities	1	4	5
CRM Software	1	2	3
Data Communication	1		1
ERP	14	4	18
Total	22	12	34

Ownership of participants	Respondent				
Opposite party	1-3 owners	Part of Corporation	4 or more owners	Large number of owners	Total
1-3 owners	9	1	1	1	12
Part of Corporation	1	2	1	1	5
4 or more owners	3	2		1	6
Large number of owners	5		1	5	11
Total	18	5	3	8	34

Size of participants	Opposite party				
Respondent	100-500 employees	50-100 employees	Less than 50 employees	Over 500 employees	Total
100-500 employees		1	2	3	6
50-100 employees	2		1		3
Less than 50 employees	1	2	6	3	12
Over 500 employees	2	2	3	6	13
Total	5	5	12	12	34

Table 31 presents an example of cross-tabulation. In this example, realized project success is cross-tabulated with the area the project was targeted at. It can be seen that both the worse and better success come in most of the success criteria from projects targeted at ERP software. This is what might be expected because most of the projects were ERP projects. There are, however, some exceptions that are worth noting: Half of the projects targeting IT systems in general as well as 2/3 of the other software projects were not seen as improving work efficiency whereas all the other software projects did not stay on schedule. A very interesting finding was that ERP projects achieved operational goals poorly according to six respondents and well or better according to seven respondents, but the target of

achieving economic goals failed twice as often as it succeeded and staying on schedule appeared to be very difficult for ERP projects.

Table 30: The experienced project success

	Schedule	Operational goals	Economic targets	Improves Support to the business	Improves job satisfaction	Improves work efficiency	Average
No answer	2	2	2	2	2	2	2
Very poor	6	1	2	1	6	6	4
Poor	12	10	10	7	10	8	9
Satisfactory	7	9	12	9	5	5	8
Good	5	8	5	13	10	9	8
Excellent	2	4	3	2	1	4	3
Total	34	34	34	34	34	34	34

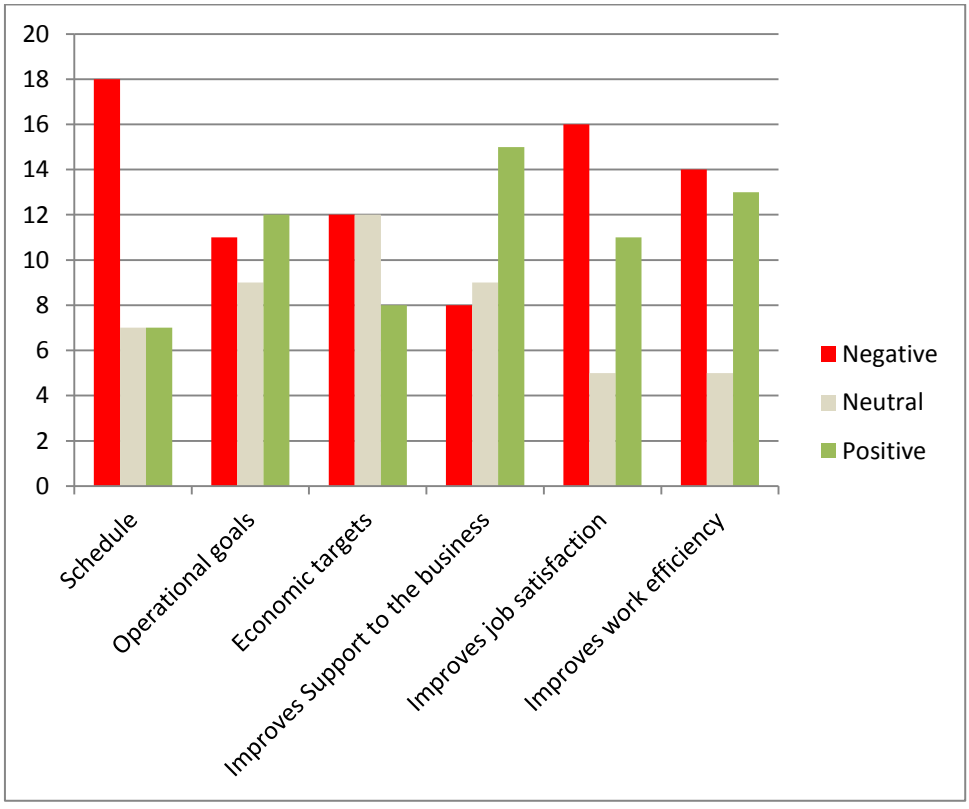

Figure 44: Experienced success

Table 31: An example of cross-tabulating

	The project achieved operational goals						
Target of the project	**n/a**	**Very Poor**	**Poor**	**Satisfactory**	**Good**	**Excellent**	**Total**
IT systems in general			2		1	1	4
Other software			1	1	1		3
Other activity				4		1	5
Sales Support (e.g. CRM)		1		1	1		3
Data communication			1				1
ERP	2		6	3	5	2	18
Total	2	1	10	9	8	4	34
	The project achieved economic targets						
Target of the project	n/a	Very Poor	Poor	Satisfactory	Good	Excellent	Total
IT systems in general			1	2	1		4
Other software				2	1		3
Other activity			2	1	1	1	5
Sales Support (e.g. CRM)		1		2			3
Data communication				1			1
ERP	2	1	7	4	2	2	18
Total	2	2	10	12	5	3	34
	The results of the project improved support for the business						
Target of the project	n/a	Very Poor	Poor	Satisfactory	Good	Excellent	Total
IT systems in general			2		2		4
Other software				2	1		3
Other activity			1	2	2		5
Sales Support (e.g. CRM)		1		1	1		3
Data communication				1			1
ERP	2		4	3	7	2	18
Total	2	1	7	9	13	2	34
	The results of the project improved job satisfaction						
Target of the project	n/a	Very Poor	Poor	Satisfactory	Good	Excellent	Total
IT systems in general		2			2		4
Other software			2	1			3
Other activity			2		3		5
Sales Support (e.g. CRM)		1	1		1		3
Data communication			1				1
ERP	2	3	4	4	4	1	18
Total	2	6	10	5	10	1	34
	The results of the project improved work efficiency						
Target of the project	n/a	Very Poor	Poor	Satisfactory	Good	Excellent	Total
IT systems in general			2		1	1	4
Other software			2		1		3
Other activity			1	1	2	1	5
Sales Support (e.g. CRM)		1	1	1			3
Data communication			1				1
ERP	2	5	1	3	5	2	18
Total	2	6	8	5	9	4	34
	The project stayed on schedule						
Target of the project	n/a	Very Poor	Poor	Satisfactory	Good	Excellent	Total
IT systems in general		1		1	1	1	4
Other software			3				3
Other activity		1	1	2	1		5
Sales Support (e.g. CRM)		1	1		1		3
Data communication			1				1
ERP	2	3	6	4	2	1	18
Total	2	6	12	7	5	2	34

Although it was neither possible nor reasonable to present all of the cross-tabulations in this publication due to the large amount of material, they gave valuable information and new ideas utilized in the more detailed analysis, the results of which are presented in the following chapters

7.2.2.1 Experienced success in general

To calculate average project success the evaluated project success was transformed into numerical form so that very poor equaled 1, poor was 2, satisfactory 3, good 4 and excellent corresponded to 5. The average project success was 2.7, i.e. almost satisfactory. However, the success varied from project to project and inside different groups. Suppliers regularly evaluated their projects as succeeding better than customer's representatives (Table 32). Inside both groups those who were regularly involved with projects evaluated success as being better than those who were involved with projects randomly. The managers' evaluation was between that of customer and supplier (Table 33).

Table 32: Average of evaluated success

	Success	**Count**
Customer	2.4	22
Supplier	3.4	12
Total	2.7	34

Table 33: Occupational role of respondent and average of evaluated project success

Success	**Respondent's role**			**Count of respondents**		
Involved in projects	**Customer**	**Supplier**	**Total**	**Customer**	**Supplier**	**Total**
Randomly	1.2	2.6	1.5	7	2	**9**
Regularly	3.2	3.5	3.4	8	10	**18**
as manager	2.7		2.7	7		**7**
Total	**2.4**	**3.4**	**2.7**	**22**	**12**	**34**

In this survey, size also seems to be one of the significant factors in terms of success. The worst average success was found in the group where both the customer and the supplier were companies with less than 50 employees (5 respondents). The second finding found from Table 34 was that in general a project will have better success if the supplier is bigger than the customer.

Table 34: The size of participants in project and average success

Success	Opposite party					Number of respondents				
Respondent	Less than 50 employ-ees	50-100 employ-ees	100-500 employ-ees	Over 500 employ-ees	Total	Less than 50 employ-ees	50-100 employ-ees	100-500 employ-ees	Over 500 employ-ees	Total
Less than 50 employees	**1.8**	**3.2**	**4.3**	**3.3**	**2.6**	**6**	**2**	**1**	**3**	**12**
Customer	1.4	3.5			1.8	5	1			6
Supplier	3.7	2.8	4.3	3.3	3.4	1	1	1	3	6
50-100 employees	**2.7**		**3.1**		**2.9**	**1**		**2**		**3**
Customer	2.7		3.1		2.9	1		2		3
100-500 employees	**2.4**	**1.7**		**3.3**	**2.8**	**2**	**1**		**3**	**6**
Customer	2.4	1.7		2.9	2.5	2	1		2	5
Supplier				4.2	4.2				1	1
Over 500 employees	**2.3**	**3.3**	**2.4**	**3.0**	**2.8**	**3**	**2**	**2**	**6**	**13**
Customer	2.3	3.3	1.5	2.8	2.6	3	2	1	2	8
Supplier			3.3	3.1	3.1			1	4	5
Total	**2.1**	**2.9**	**3.1**	**3.2**	**2.7**	**12**	**5**	**5**	**12**	**34**

Also the sector in which the company, and especially the customer, is operating seems to have an impact on success. The combination where the customer is in the public sector and the supplier in the private sector seems to have more risks than those where both are operating in the private sector or both are in the public sector. In the last mentioned case, it must be noted that the number of respondents was small, one where both were in the public sector and three private sector suppliers as respondents with a customer in the public sector. It is also worth noting that the average of success evaluated by both the private customer and the public customer was the same when the supplier was operating in the private sector (Table 35).

Table 35: Public vs. private sector

Respondent	Opposite party Public sector	Private sector	Total	Number of respon-dents Public sector	Private sector	Total
Public sector	**3.3**	**2.4**	**2.5**	**1**	**7**	**8**
Customer		2.4	2.4		7	7
Supplier	3.3		3.3	1		1
Private sector	**3.3**	**2.7**	**2.8**	**3**	**23**	**26**
Customer		2.4	2.4		15	15
Supplier	3.3	3.4	3.4	3	8	11
Total	**3.3**	**2.7**	**2.7**	**4**	**30**	**34**

The customer owned by from one to three owners had experienced poor success in projects with a partner with the same number of owners or a partner owned by a corporation. If the supplier in such cases was owned by four or more owners, the success was significantly better. Both the customer and supplier as respondents with a large

number of owners had experienced the best success with a partner equal to them, i.e. the opposite partner was owned by a corporation or large number of owners (Table 36).

Table 36: Number of owners vs. success

	Opposite party					Number of respondents				
Respondent	**1-3 owners**	**Corpo-ration**	**4 or more owners**	**Large number of owners**	**Total**	**1-3 owners**	**Corpo-ration**	**4 or more owners**	**Large number of owners**	**Total**
1-3 owners	**2.1**	**1.5**	**3.7**	**3.3**	**2.7**	**9**	**1**	**3**	**5**	**18**
Customer	1.3	1.5	3.8	3.0	2.0	6	1	1	3	11
Supplier	3.7		3.6	3.8	3.7	3		2	2	7
Corporation	**3.5**	**3.1**	**2.7**		**3.0**	**1**	**2**	**2**		**5**
Customer	3.5	3.1	2.7		3.0	1	2	2		5
4 or more owners	**2.3**	**2.5**		**2.7**	**2.5**	**1**	**1**		**1**	**3**
Customer		2.5		2.7	2.6		1		1	2
Supplier	2.3				2.3	1				1
Large number of owners	**2.3**	**3.5**	**1.7**	**3.0**	**2.8**	**1**	**1**	**1**	**5**	**8**
Customer	2.3		1.7	3.1	2.5	1		1	2	4
Supplier		3.5		2.9	3.1		1		3	4
Total	**2.3**	**2.7**	**3.0**	**3.1**	**2.7**	**12**	**5**	**6**	**11**	**34**

7.2.2.2 Claims presented to respondents

The main target of this survey was to compare the experiences of ordinary users and personnel temporarily involved in IT projects to the experiences of those experts who are experienced professionals in IT projects. To achieve this target, some claims presented to panelists in the earlier Delphi study, as well as some findings of that study reformulated as claims, were written in a questionnaire and respondents were asked to evaluate the impact of the features these claims described on the co-operation between the supplier and customer and the success of the project. The scale used was: No impact / Negative impact on co-operation / Very negative impact on co- operation / Positive impact on co-operation / Very positive impact on co-operation. In this phase there were 44 claims. All the claims and findings concerning the answers are presented in the next section. Here the cognate claims are combined together.

1. **Opposite party used specialized terminology and strange terms**: 9 out of 19 customers who answered this thought that the impact had been negative or very negative, whereas 10 had seen no impact at all. On the suppliers' side, 7 found no impacts, 2 had found positive impacts, and only one thought that the impacts had been negative. Comparing the average success it was found that projects where no impact was seen were evaluated as having better success than those where an impact was seen.

2. **Opposite party used known terms for a different purpose or with a meaning than is habitual:** 14 customers and 5 suppliers found this to have a negative or very negative impact on success. However, the average of evaluated success on the customer's side was at the same level as those having no impact and those having negative impact. On the supplier's side, the differences in success were more significant, but in this material these were individual cases.
3. **The flow of information in the opposite organization differs from ours:** Both customer and supplier had experienced this as having a negative impact on co-operation, with only 5 customers and 1 supplier having seen no impact at all. In replies from customers the average of success was 2.2 in answers with a negative impact and 3.8 in those where no impact had been found. The answers given by supplier's representatives were more complicated, the only one with no impact had evaluated the success to be 2.5, and the average success of the others was 3.5.
4. **The opposite party could not be reached apart from at a certain time:** Nine customers and seven suppliers said this had no impact. 8 customers and one supplier, however, had experienced negative impacts, which could also be seen in average success.
5. **Contact was supposed to be taken via a predetermined route, e.g. via a certain person:** This divided the customers into three parties, 7 said "no impact," 6 thought the impact had been negative, and 7 had found this to have a positive impact on success. The average of success follows the results above logically: Those who had found negative impacts evaluated success at 1.7 and those who had found no impact or positive impact had 2.9. Four of the suppliers said they had found no impact and 5 had found negative impacts. The average success in both groups was 3.5.
6. **Contact was supposed to be taken in a specified form, e.g. by filling out a form:** In this claim, ten customers and 8 suppliers had experienced no impact, 4 customers and 2 suppliers found negative impacts, and 5 customers said the impacts had been positive. The average success was in line with the experiences.
7. **The values of the opposite party differed from ours:** 8 customers and 6 suppliers found this had no impact, but 8 customers and 3 suppliers had experienced negative impacts. Those who had experienced negative impacts had weaker success on average than those who found no impact.
8. **The opposite party place the matters involved in the project in a different order of importance than we did:** The majority of both customers and suppliers had experienced this as having a negative impact on co-operation. The average of success was weaker in those answers where impact was found than in those with no impact.
9. **The opposite party understood responsibility and being responsible differently than we did:** Representatives of both customers (14) and suppliers (5) had experienced this as having a negative impact on co-operation. Customers also found

that the average of success was weaker in those answers where an impact was found than in those with no impact.

10. **Opposite party was more conservative than us / We were more conservative than the opposite party:** In this pair of questions the respondents were first asked to evaluate the impact of the more conservative opponent on co-operation and then vice versa. In both alternatives most respondents had found no impact although also positive and negative impacts had been experienced. The average success proved no significant differences between these groups, with one exception: The success of two respondents who had considered conservativeness as having positive impacts was very poor.
11. **Tasks and functions were appreciated by the opposite party in a different way to us:** The opinions “no impact” and “negative impact” are in balance, and the average of success for the former group is 3.3, with 2.5 for the group of negative impacts.
12. **The connection between occupation and gender was more significant in the opposite side than on our side / The idea of equality on the opposite side differed from ours:** The aim of these two questions was to test one of the results of the case study reported in chapter X. The target of both questions was the same phenomenon, inequality in organizations. The claims or questions seemed to be very sensitive; one third of respondents preferred not to answer the question at all, and the majority of those who answered chose the alternative “no impact.”
13. **The opposite party was more open-minded in their personnel policy than we were:** This belongs to the same category as the questions above, but the distribution of the answer is more interesting. Ten of the respondents refrained from answering, 16 considered that an open-minded personnel policy had no impact and three had experienced a negative influence. The Interesting exception is that 5 customers had experienced that a supplier’s open-minded personnel policy had a good impact on co-operation. The average success of these five cases was 3.0 whereas the average of all of the respondents was 2.7.
14. **On the opposite side the management of the company was involved in the project more visibly than on our side / Our management was committed to the project more visibly than the opposite side:** These two claims measured the impact of management commitment on the success of the project. Unfortunately, one third of the respondents did not answer this question. The majority of those who answered had found no impact, but the most interesting finding is that those who had found there to be an impact had experienced the same, despite whether they were in the role of customer or supplier; the supplier’s management should be more involved in the project than the customer’s management. The average success of the cases supports this finding.
15. **The height and width of the organization:** The impacts of the height and width of opposite organizations was asked about with a group of four questions in which respondents compared the impacts of one party having a higher or wider

organization than the other on co-operation. 8 respondents had experienced a higher opposite organization as being harmful for co-operation, and 9 had experienced the same with the width. This was confirmed by the average of success, but the differences in the average between “no impact“ and “negative impact” were not significant. Five respondents had experienced that a wider opposite organization was advantageous to co-operation although the success of these projects was worse. If one’s own organization was higher, 6 respondents (5 customer, 1 supplier) had experienced negative impacts, 15 said “no impacts,” ten refused to say anything, and three had only seen positive impacts. Only two thought that if one’s own organization was wider it was an advantage and four had regarded it as being harmful. On the other hand, the experiences of these minorities were confirmed by the averages of success.

16. **A person in the opposite organization / in our organization may belong to more than one sub-organization:** This pair of claims is based on the phenomenon that is typical of matrix or other types of hybrid organizations. Concerning the opposite organization, 17 had found no impacts, 5 had experienced negative impacts and 4 positive impacts. When it was a questin of one’s own organization, 13 said “no impact,” 8 said “negative impact” and 7 “said positive impact.” In this pair of questions the significant exception to the general trend that the average of success follows the experienced impact was that although four customers had found that someone in the opposite organization belonging to many sub-organizations had a detrimental impact, the average of success was the same as in cases where the impact was found to be positive.
17. **Parts of the opposite organization did not know each other’s habits and needs / Parts of our organization did not know each other’s habits and needs:** In this pair of claims the distribution of answers was relatively consistent. 15 respondents had experienced negative impacts regarding the first and 17 regarding the second claim, and only one had experienced positive impacts. What is interesting is that the majority (7 of 12) of suppliers had experienced that when parts of their own organization did not know each other’s habits and needs, it had a negative impact. The second finding is that although the distribution of averages of success follows the common line, there are some singular exceptions where the impact is said to be very negative, but the success seems to be the best.
18. **Some of the opposite party barricaded themselves into competing or arguing cliques:** Most respondents (15) had not experienced any impact, but 9 said they had seen negative impacts. 10 respondents did not answer this question.
19. **Distance of power – how easy it is to approach the management and impacts of this:** The results of this group of four questions reveal that if the management of an organization, be it one’s own or the opposite party’s, customer or supplier, is felt to be difficult to approach, this has a negative impact on co-operation. This also works

conversely: If the management is felt to be easy to approach, this was experienced as having a positive impact on co-operation.

20. **The opposite side lacked knowledge of change management / We lacked knowledge of change management:** This pair of questions is exceptional because the common trend in answers has been that a feature of the opposite party has been regarded as causing more problems than a feature of the respondent's own side, but in this group, customers found that their lack of knowledge of change management impacted the co-operation negatively. Five of the customers and two of the suppliers said that the opposite party's lack of knowledge had a negative impact, but 11 customers and three suppliers had experienced that their own lack of knowledge had a negative impact. In the first claim, 15 had experienced no impacts and 10 respondents did not answer, in the second 13 said "no impact" and 7 did not answer.
21. **The opposite party did not know our branch / We did not know the branch of the opposite party:** The experiences of customers were very clear: 13 of them said that the impact was negative, and 7 out of these 13 stressed that it was very negative. Only four respondents had the opinion that there was no impact at all and four did not answer this question. One individual respondent had experienced this as having a very positive impact. Also the average success was in the same line. Those with "No impacts" had a success of 3.4 vs. 2.4 in "negative impacts" and 2.1 in "very negative impacts." On the other hand, most of both customers and suppliers seemed to have the opinion that the customer did not need to know the supplier's branch and also the average success in this case correlated only weakly if at all to the experienced impact.
22. **The opposite side lacked knowledge of project management / We lacked knowledge of project management:** In this pair, one third of respondents had not experienced any impacts, half of the respondents had found impacts to be negative and a single respondent said the impacts were very positive. Five respondents did not answer the first claim at all and 9 the second claim. The distribution of success was non-uniform.
23. **The schedule was just a formality for the opposite party:** 12 customers had experienced that this had a negative impact, four found this to have no impact and four did not answer the question. On the suppliers' side, two said "negative," two "positive impacts," four did not answer, and four had found no impacts at all. On the customers' side, the average success was in line with the answers.
24. **We were not used to tight schedules:** 18 of the respondents had experienced no impacts at all, 9 had found negative impacts, and two respondents said this had positive impacts. Five respondents had not given an answer and both customers and suppliers had the same distribution in their answers. Regarding the averages of success, the cases with no impacts were evaluated to be 0.3 units better than those with negative impacts.

25. **Flexibility in working hours did not belong to the culture of the opposite organization / Flexibility in working hours did not belong to our culture:** 6 respondents in first and 7 out of 34 regarding the second claim had experienced that if the culture valued fixed working hours with no flexibility, the impacts on co-operation were negative. The rest of the respondents either said “no impacts” or did not answer at all, except one individual who had seen positive impacts. The distribution of the averages of success was non-uniform.
26. **The free time of the personnel of the opposite organization was dedicated to the project / The free time of our personnel is dedicated:** Most of the respondents either did not answer these questions or answered that these had no impact on co-operation. Only one customer regarding the first claim and four customers regarding the second claim had found some negative impacts. On the other hand, for both claims one customer and one supplier found positive impacts. The averages of success show that the impacts on co-operation – if there are any – are more negative than positive.

7.2.2.3 Say it in your own words

In the last three questions the respondents were asked to answer in their own words

1) What they had felt to be the most disturbing in the operating practices of the opposite organization:

   The attitude of the supplier, especially towards service, the lack of understanding of the customer’s business, strange terminology and odd ways to communicate or not to communicate at all, and unwillingness or inability to be responsible for fulfilling the contract were common themes of the answers given by customers. In addition to these, one of them said that the supplier was OK, but the problems were in their own organization, especially in the management’s role and lack of support for the project, and one respondent highlighted the role of project managers. In this case the supplier’s project manager was young and inexperienced, and did not know the business of the customer.

   Suppliers, for their part, had found the biggest problems be the lack of flexibility of the customer, the disregard of another subcontractor for the schedule set by the customer, the political games occurring in a big organization, the inability of the customers to define their own needs and requirements, lack of trust in the supplier and resultant checking for checking’s sake, and problems in being able to contact anyone.

2) What they would like to praise the opposite organization for

In addition to ironic answers like “Task was accepted with willingness,” the customers were appreciative of flexibility, good communication, assertiveness in cases where a project was in danger of failing due to the customer, discipline in project tasks, and possibilities to discuss the problems.

The suppliers appreciated the resources that the customer had allocated, communication and feedback, commitment to the goals of the project, patience and – in one case – the fact that the project manager of the customer acted as a filter and allowed the personnel involved in the project to work undisturbed.

3) Would they like to give some other feedback either on the research itself or on the topics of the research?

In this part some of the comments concentrated on the problems Kauppalehti had with the links when the invitation to the research was first published, the linguistic forms of the questions, or the settings and technical problems of Webropol’s program which was updated during the survey. These problems were corrected either by Kauppalehti, by Webropol or by the researcher himself, if possible. Someone felt that the alternatives in questions were negative and positive alternatives were missing, another respondent said that there could have been even more claims and questions about knowing the branch and listening to the customer. In common, the critical comments concerning the questions and imagined attitudes behind them were given by representatives of suppliers, while more questions were requested and comments on the actual topic were given by representatives of customers. This distribution may at least partly be due to the fact that the invitation to participate in the research was published at the same time as newspapers were discussing problems in the IT projects of Finnish Railways and Finnish Military Personnel Administration and suppliers were – consistently or inconsistently – on the defensive.

The comments approaching the topics of the research highlighted the importance of testing before implementing, needs for the supplier to know more about the business of the customer, listening to the customer, the ability of the customer’s own organization to manage an IT project, schedule it realistically and train the users, the role of the customer’s management, and especially their commitment to the project, the importance of project management, and the diversity of reasons for problems.

7.2.2.4 Revisiting the experienced success

In the questionnaire the project success was evaluated in six independent aspects:

1. How the project achieved the operational goals
2. How the project achieved the economic targets
3. How the results of the project supported the business
4. How the results of the project improved job satisfaction
5. How the results of the project improved work efficiency
6. How the project stayed on schedule

This division was thought to present the kind of attributes that ordinary employees would be able to or even bound to grasp during the project even if they were not involved with the project. The researcher was also interested in differences between the evaluated successes in each of the criteria. Figure 45 shows that staying on schedule was felt to have failed the most, and close to this was improving job satisfaction. Supporting the business and achieving operational goals were felt to have the best success of these criteria. The red line describes the overall average success.

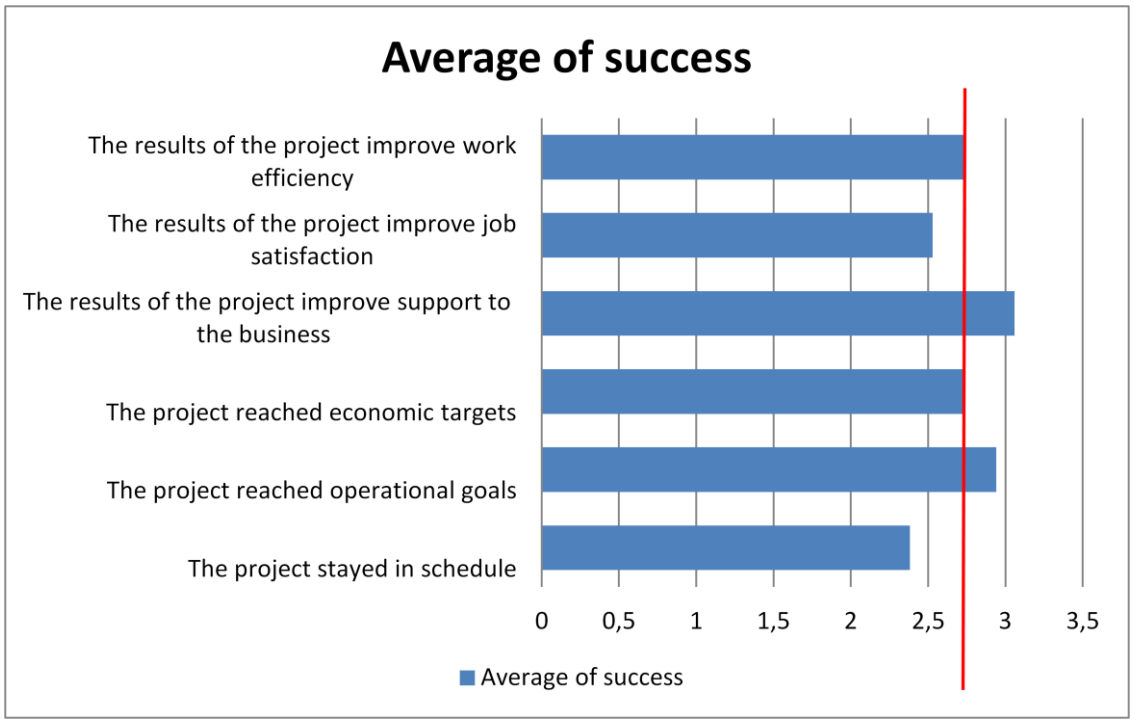

Figure 45: Average success of each individual criterion.

Staying on schedule was felt to have failed by customers and those representatives of suppliers involved in ERP projects. The least success was gained by customers with less than 50 employees, customers belonging to the public sector, and customers owned by four or more owners. On the suppliers' side, only a few cases of poor or very poor success in staying on schedule were found, and these were in the groups of 4 or more owners and ERP projects. The worst co-operative combinations were found to be companies with 1-3 owners vs. companies belonging to some corporation, and companies with 4 or more

owners vs. companies with 1-3 owners or with a large number of owners, companies in the public sector vs. companies in the private sector, and companies with less than 100 employees on both sides.

On the other hand, it was very difficult to find combinations that were better than satisfactory. Those with success more than 3.5 were single suppliers in ERP projects and in the class of 100-500 employees, owned by 1-3 owners with the opposite party owned by 4 or more owners, and employing more than 500 employees with the opposite partner employing 50 – 100 employees.

Improving job satisfaction succeeded worst for the customers with 1 – 3 owners, or with a large number of owners and customers with less than 50 or more than 500 employees, and in projects concerning IT systems in general and sales support. For suppliers, the worst projects were realized for companies with 4 or more owners. Concerning project targets, sales support and other activities seemed to be more risky than other areas. A company with 1 – 3 owners and a part of a corporation as the other partner, or a part of a corporation with a company of 4 or more owners as the opposite party, public sector vs. private sector, a company with 100-500 employees vs. a company with 50 to 100 employees, and a company with more than 500 employees co-operating with a company with less than 50 employees proved to be the most risky combinations in terms of improved job satisfaction as the result of the project.

The best success in improving job satisfaction was found in projects targeting other activities, suppliers with 100 – 500 employees, suppliers in the public sector, and suppliers owned by 1 – 3 owners.

Achieving the economic targets was more likely to fail if the subject of the project was sales support, the customer had less than 50 employees with an opposite partner of the same size, or when the customer was owned by 1-3 owners, especially if the opponent was also owned by 1-3 owners. Economic targets were achieved the best in projects targeting other activities or with customers having 50 – 100 employees, located in the public sector or being a part of a corporation.

The operative goals were achieved worst if the project was targeted at sales support, the customer had less than 50 employees and from 1 to 3 owners, especially if the other partner was of the same size measured in terms of the number of personnel or owners. Goals were achieved best in projects targeting other software or other activities, or with a customer having 50 - 100 employees, the supplier located in the private sector, the customer being part of a corporation or the supplier owned by 1 – 3 owners.

The business was worst supported by the results of the projects concerning sales support or if the customer had less than 50 employees, the customer was owned by 1 – 3 owners, or the supplier was owned by 4 or more owners. The best results were gained by projects where the target was other software, the customer had 50 – 100 employees, the supplier

had 100 – 500 employees, the supplier was in the public sector, the supplier was owed by 1 – 3 owners, or the customer was owned by 4 or more owners.

From the point of view of work efficiency, the most risky factors seem to be projects targeting sales support or IT systems in general, a customer with more than 500 employees, a customer in the public sector and a customer owned by either 1-3 owners or a large number of owners. On the other hand, key factors for success seemed to be customers with 50 – 100 employees, suppliers with either less than 50 employees or with 100 to 500 employees, suppliers in the public sector, suppliers owned by 1 – 3 owners, and a customer owned by a corporation.

7.3 DISCUSSION AND CONCLUSIONS

An open survey for people who had been involved with IT projects in their work, but who instead of belonging to a project organization were in the position of grass-root level users, was conducted and managed using the web-based survey tool "Webropol." An invitation to participate in the survey was distributed via the web pages of Kauppalehti and IT-viikko, and also by e-mail. The questionnaire was opened by 396 visitors and 34 usable answers were filed. Out of these 34 respondents, 22 were representatives of a customer and 12 representatives of a supplier in IT projects. 9 of the respondents were involved with projects occasionally, 18 regularly, and 7 had been in the manager's role.

7.3.1 Reliability and validity

Evaluating reliability in surveys requires answers to the following question: If the respondent answered the same questions twice in the same conditions and with the same experience and knowledge, would the answers be the same (Metsämuuronen, 2003, pp. 42-48)? In this survey, the questionnaire was constructed so that the same phenomenon was approached in at least two different questions. In general, the answers were consistent. Validity will need more discussion. Firstly, it must be ensured that the results of the survey answer the questions for which the survey was designed (Metsämuuronen, 2003, pp. 42-48). In this study, the aim was to capture the experiences of such employees who 1) were users of IT systems, 2) did not belong to project organizations but 3) were involved with IT projects randomly or regularly. Out of 34 respondents, 27 satisfied all three demands, but with seven managers completing the questionnaire, it is worth discussing if they can be included as grass-root level users. If they were not project managers in the projects they reported on, they may be considered to belong to the target group. However, all 34 respondents answered the questions and related their experiences. The second question when evaluating validity is the generalizability of results (Metsämuuronen, 2003, p. 35). To evaluate this one needs to examine the sample, consider how representative it is, whether it is randomized or selected by some other criteria, etc. In this case, the invitation was distributed via channels that restrict the population to those who are in one way or

another interested in either business or information technology or both. The size of the population is not known exactly, thus it makes no sense to evaluate the validity by statistical methods. What is known is that 396 persons were interested in the survey and 34 of them completed the questionnaire. A small response rate is a common problem and a possible source of bias in mailed surveys or those distributed in some other uncontrolled way (Edwards, et al., 2002). On the other hand, we can also think that those who completed the questionnaire had some experiences they wanted to tell the researcher.

The sample is relatively small thus the generalizability of the results may be challenged. However, the aim of this study was to collect the experiences of grass-root employees concerning the cultural differences between the customer and supplier of an information technology project, and these experiences were related in the answers, which is also an answer to the third question when assessing validity: Do the results answer the research question (Metsämuuronen, 2003, p. 35)? The classification of success, size, and other factors based on the exact answers given by respondents and the results were interpreted by the researcher. The major possibility for bias, in addition to the small response rate, is in the interpretation of the results into words.

7.3.2 Summary of the findings

The success of the IT projects the respondents were involved with was evaluated through six factors. The worst average success was evaluated to be in “staying on schedule” and “improving job satisfaction.” The best success was achieved in the factors regarding “supporting the business” and “achieving operational goals.” Factors regarding “improving work efficiency” and “reaching economic targets” remained on an average level. However, the average success experienced was 2.7, which is less than satisfactory. Those who were involved with projects randomly had experienced worse success than those who were involved regularly. Differences in size, sector (public vs. private), and ownership also seemed to have an impact on success. These findings were confirmed in the literature e.g. (Geeraerts, 1984), (Corwin, 1969), (Das & Teng, 2001).

The grass-root level users and employees who were involved with an IT project, had experienced that the impact of jargon and strange terms used by the opposite party was mainly negative, particularly if the success of the project he/she was involved with, was evaluated to be poor. In the literature, similar findings have been presented, e.g. (Butler & Fitzgerald, 1999). The respondents also highlighted the importance of informal, regular, and transparent communication that can be compared to the findings of (Ginzberg, 1981). The impact of different values was evaluated to be slightly negative and differences in the width of two organizations were considered to be slightly more harmful than differences in the their height. In the literature, the same phenomenon has been approached by e.g. (Carzo Jr & Yanouzas, 1969) or (Corwin, 1969). The importance of knowledge in change management, commitment and the support of top management and the supplier’s need to know the customer’s branch as well as his own organization became very clear. Problems

regarding these issues had been experienced as having a negative impact on the success of the project. In the literature, these issues have been highlighted by e.g. (Weiss & Anderson Jr., 2003), (Sarker & Lee, 2003), (Ang, et al., 1995), (Holland & Light, 1999).

Although the capabilities and properties required for project managers or other persons responsible for projects were not among the topics of this research, some important attributes were highlighted in the answers. Firstly, they should have experience of working in different types of companies to be able to recognize and reconcile different habits and ways to work. Secondly, they should have enough knowledge of their own business if they are working on the customer's side, or they should know the customer's business if they are a supplier's representative, to be able to recognize and filter the essential problems and complaints out of all the background noise caused by resistance to change born in the organization. And thirdly, they should have enough knowledge of change management to be able to redirect the energy spent resisting change into energy to work for the changes needed to fulfill the project. These findings can be compared to the discussion of how project managers must adjust their communication and strategies depending on the culture of the base organization (Elmes & Wilemon, 1988).

As mentioned above, some of the respondents highlighted the skills of project managers in change management. The same topic was noted by some of the participants of the Delphi-based study too. It is evident that a contemporary information technology project does not just implement new technology, but also changes processes and common ways of doing things. Thus, impacts between an IT project and organizational culture are bidirectional. Organizational culture affects projects and projects affect the organizational culture.

7.3.3 Conclusions

The results of this study were consistent with the results of the case study (Chapter 4) and with the results of the Delphi-based study (Chapter 6). The results of each study highlighted not only the same issues as the others but also different topics. In this study, the impact of language and other communication between supplier and customer, the importance of knowing one's own organization and – for a supplier – of knowing the customer's branch, and attitudes to schedules, were also highlighted.

8. DISCUSSION

8.1 SUMMARY OF THE FINDINGS

An organization is a system of activities that consists of two or more persons, organizations or both. An organization has certain goals it is aiming to achieve. An organization is continuously and mostly consciously coordinated by the officially nominated or informally emerged leader and the organization itself can be legally constituted or informal (Ichiishi, 1993), (Sicilia, et al., 2006). The goals of an organization can be social, economic, political or a combination. The activities can be either social or productive (Dietz, 2003). There are always certain relationships between the members of an organization (Sicilia, et al., 2006). The cooperative nature of the organization means that its survival depends both on the willingness and the ability of members to cooperate and communicate (Barnard, 1968). Inside an organization, with the exception of a very small one, there are always sub-organizations, both formal and informal (Ferber, et al., 2004). The activities and interactions that build the visible part of an organization are maintained by different roles (Wooldridge, et al., 2000). These roles are played by members (also called agents) who manifest behavior according to their role (Ferber, et al., 2004). An organization may be born "by itself" if two potential members find it useful to cooperate, or it can be established by a certain founder or founders.

An organization is a small society with its own particular culture that affects the behavior of the members (Litwinenko & Cooper, 1994). This inherent value system, known as organizational culture, can be designed for a certain purpose or it may have grown up unconsciously (Atkinson, 1990). Visible signs of organizational culture are e.g. organizational design, dress codes, graphic layouts, or status symbols (Buch & Wetzel, 2001). The invisible side of organizational culture consists of values and beliefs to which members of an organization conform, often unconscious of the impacts of this commitment (Acs, et al., 2010). The invisible part of culture gives a form to the visible or audible manifestations of organizational culture (Al-Alawi, et al., 2007). Organizational culture can be managed but the impacts of forming and changing organizational culture have not been addressed (Lewis, 1996).

To classify organizational culture, researchers have mostly used a taxonomy of their own. This taxonomy may have been based on the work of some other researcher, or created ad hoc, to respond to a certain need.

The assessment tool used depends on the needs, aims of the study, target organization and researcher's' own knowledge. However, different types of questionnaires have commonly been used by researchers approaching organizational culture. Other tools mentioned in the

literature are forms and diaries for observations and interviews and forms for classifying documents and other artifacts.

Project success has mostly been defined with traditional “hard” and objective measures like schedules, budget, project goals, and cancellation has been seen as failure. However, soft and more subjective measures can also be used. Examples of these are the satisfaction of different stakeholders, acceptance, degree of usage, organizational payoff, or commercial success.

The culture of an organization is built on a macrocultural base that can be described by e.g. cultural dimensions (Hofstede & Hofstede, 2005) or cultural types (Lewis, 2006). These factors, like the degree of masculinity or femininity, short-term time dimension, long power distance, or reactive behavior can be seen in each organizational culture. However, each organization differs from others, and so does the culture. Founders and members bring their own backgrounds, knowledge, experiences, expectations, values, and assumptions, represented by individual symbols and creating particular artifacts (Hatch, 1993). As do other interest groups too. Organizational culture is in continuous interaction with both the internal and external forces impacting on it. Furthermore, every organization has its own collective history and tales born from it or created to describe and direct the values of organization, telling what kind of behavior is desirable and what is not. Figure 2 at the beginning of chapter 2 could be completed with these factors to present the interactions which are continuously forming the organizational culture (Figure 46). These interactions also mean that even if two organizations have the same macrocultural background, their organizational cultures may differ and in most cases differ from each other, measured both in cultural types and in cultural dimensions like masculinity-femininity, degree of tolerance of uncertainty, or power distance, etc. This also means that in the co-operation between these two organizations the same kinds of conflicts may occur as reported in the co-operation between organizations having different macrocultural backgrounds.

According to the case study, differences in the size and structure of the organization, different juridical forms or form of ownership and differences in corporate relationships or in the styles of using power have their impacts on co-operation: the longer the distance between the partners in the dimensions mentioned above, the more likely it is that some kind of difficulties will occur during the project. But the really unexpected result gathered from the case study was that the most significant attribute indicating problems in co-operation was the customer’s “masculinity.” The masculinity-femininity dimension declared by Geert Hofstede to measure the societal culture of countries and ethnic groups (Hofstede & Hofstede, 2005) seemed to be applicable in the business culture of organizations. Also, the other findings listed above can be seen as parameters of Hofstede’s dimensions, particularly of the “Power distance”.

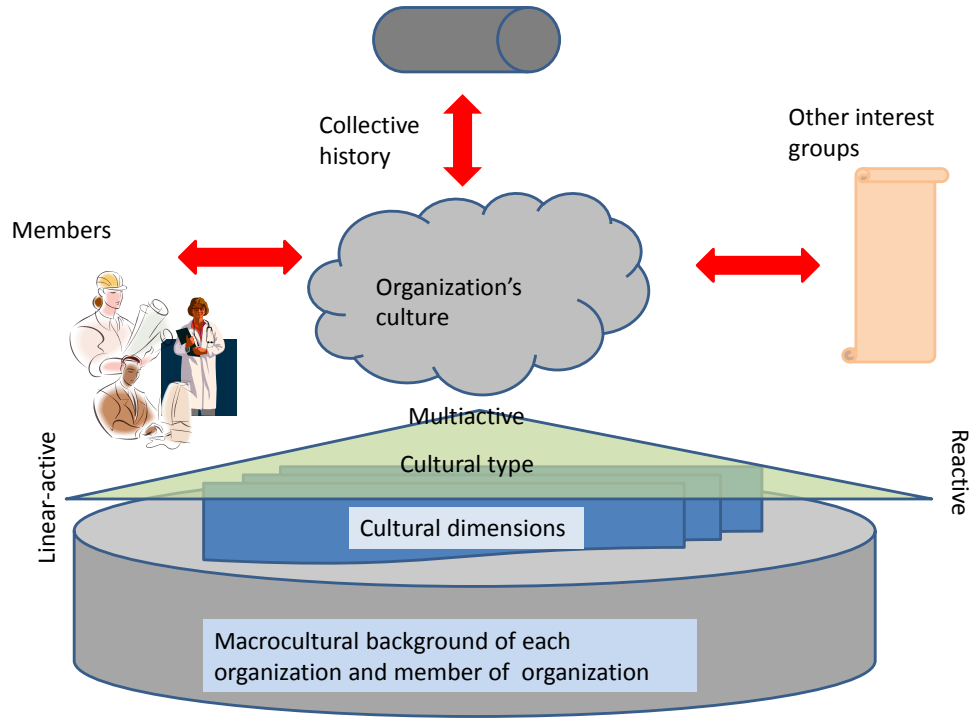

Figure 46: Factors of organizational culture

The unexpected finding of the case study that dividing the tasks according to gender could be a risk factor highlighted a need to study the equality policy and situation in firms included in the case study. In a complementary study, a weak correlation between the organization's official equality policy and the success of an IT project was found. However, it must be emphasized that official policy does not guarantee real equality inside organizations.

The Delphi survey conducted in 2010 highlighted, in addition to the themes listed above, two other themes: differences in understanding time, and the importance of a common language (Lilja, et al., 2011b; Lilja & Palomäki, 2012; Lilja & Linden, 2012a; Lilja & Linden, 2012b). The dimension of time was also recognized by Hofstede, but it seemed as if the need for a common language and terms, truism or not, had not been noted in this sense.

An open survey, conducted in 2011 among the end users and grass-root workers involved in IT projects, confirmed the earlier findings and highlighted the importance of prompt and understandable communication, management's involvement in the project, respect of common goals and timetables, and a clear and transparent hierarchy and command chain on both sides.

Although the key words found from each survey were not exactly the same, they were around the same topics: the structure and hierarchy of the organization, power and how to use it in the organization and in the opposite organization, and how to value the personnel

of one's own and those of the opposite partner. These findings, consistent with the findings of the literature review, not only corroborated the hypothesis but also confirmed that the criteria defined when planning the literature review were well justified.

It is worth noting that although the differences between partners of an IT project in understanding the importance of time and respecting schedules were not discussed more widely in this thesis, they should not be underestimated. Staying on schedule is one of the most commonly used criteria for project success; it is visible and easily observed.

8.2 EVALUATION OF VALIDITY AND RELIABILITY

This thesis consists of five studies conducted with different methods. The reliability and validity issues of each study have been discussed in more detail in the chapter that presented the study and its results. The results are consistent with each other, with minor exceptions. The consistency of results gained with different methods or with the same method in repeated studies has been seen as strong evidence of external validity (Silverman, 2004). The differences between the results of these five studies are mostly differences in the issues each party has emphasized. For example, the panel of experts highlighted the importance of common terminology whereas the grass-root level users rated open communication to be at least as important as a common vocabulary. This is understandable; experts normally have all the required information available whereas it is often thought that the grass-root level employees are told only what it is thought they need to know to manage their daily duties.

In pragmatic and constructive approaches the product or artifact of research and its usability or functionality is said to be evidence of validity (Järvinen & Järvinen, 2000). The list of proposed questions presented in the chapter "Implications for practitioners" can be seen to be an artifact, although the list has not yet been tested in practice.

The generalizability of results, which is one proof of external validity (Silverman, 2004, p. 91), cannot be evaluated by statistical methods in this case partially due to the research methods used (case study, Delphi-based study), and partially due to the small sample sizes. Thus, when evaluating the validity through generalizability, there are two points to be taken into account: Firstly, it is not argued in this thesis that the cultural differences found would always have a negative or positive impact on the success of an IT project. Instead, it is noted that the results of the case study and literature reviews and the experiences of respondents in other studies show that differences in business cultures between customer and supplier are either an opportunity or risk that may impact the success of an IT project. Secondly, the list of questions presented in chapter 8.4 is not designed for a certain situation, project or company but to be used in general, for purposes such as warning of possible risks and opening discourse between a customer and supplier. Thus the artifact of the research can be generalized.

Internal validity, which is the second form of validity, refers to the degree to which the findings are able to map and describe the phenomenon in question (Silverman, 2004, p. 91). The aim of the case study was to find out whether there were cultural differences between customer and supplier affecting the success of an IT project. These differences were found. A Delphi-based study and open survey were designed to collect experiences of participants to confirm or reject the findings of the first study. Furthermore, the second aim of the Delphi-based study was to build a list of questions recommended by experienced experts for use in testing the risk of cultural differences. The results of the studies include both the experiences and the list of proposed questions.

The reliability of research refers to the degree to which the respondents who answered the questions or completed the questionnaire would give the same answers to the same questions under the same circumstances (Metsämuuronen, 2003). In this thesis the question is relevant in the open survey. However, the aim of the survey was to collect experiences. Experiences are under continuous change and the answers will vary as time passes. The Delphi-based study is an expert method with interactivity and iterativity as internal properties. In Delphi-based methods, it is preferred to change, correct, and complete answers. As a matter of fact, this is seen as guaranteeing the reliability of a Delphi-based study. In the case study, the results were accumulated from several sources and written documents. The question of reliability can also be assessed in another form: How well has the researcher coded, interpreted, and analyzed the data? If the researcher later analyzes the same material again, what is the probability that the results will be alike? To avoid the bias caused by analyses and to ensure reliability, the analyses were designed to be as simple as possible. However, the constructive nature of knowledge must be borne in mind. After having made these classifications and analyses, the researcher has obtained a lot of new information and ideas. Repeated classification, analysis, and interpretation may give the same kind of results or not.

8.3 CONCLUSIONS

Five different studies were conducted to approach the impact of differences in business cultures between customer and supplier on the success of an IT project: a literature review, a case study, a complementary study to the case study, a Delphi-based study for experienced experts, and an open survey for grass-root users. The results of each study were consistent with each other and proved that differing organizational cultures must be taken into account when setting up, planning, and managing an IT project. The impacts of differences can be either positive or negative. Special attention should be paid to those differences and organizational characteristics that have been experienced as having mostly negative effects. These characteristics were:

- Lack of a common language
- Lack of managerial support and commitment to the project
- Differences in organizational structures of the parties involved
- Substantial differences in size, ownership, and corporate form of the parties.

In addition to these, the literature review highlighted the risks of matrix organizational structures:

- Ambiguous distribution of authority and responsibility
- Ambiguous command chains
- Giving up the principle of one superior
- Competition for resources

To find out if there are differences that should be paid more attention to during different phases of a project, a list of questions to be asked and activities to take part in was produced during the Delphi process. This list is presented in chapter 8.4.

The main research question in this research was:

> Are there such kinds of cultural differences between firms originating from the same macrocultural area that could endanger the success of an ongoing IT project, where one firm is the supplier of the system and the other is the customer?

The sub-questions derived from the main question according to the opinions of the experienced experts as well as of the ordinary employees involved in the projects were:

1. What kind of differences in the opposite partner's culture might cause a risk to the project?
2. Could these risky characteristics be seen in advance?
3. Is it possible to create a brief set of questions that could indicate the risks and help open up discussion between the participants of a project?

The findings of the conducted research proved that there are several cultural characteristics in which differences between participants might jeopardize the success of an IT project. The most risky of these characteristics were the lack of a common language, the lack of top management support and commitment, and differences in organizational structures. The risky characteristics can be seen in advance and the list of proposed questions is shown in chapter 8.4. It was also found that the interaction between project and organizational culture could be bidirectional: The organizational culture affects the success of the project but the project may also have impacts on the organizational culture.

8.4 IMPLICATIONS FOR PRACTITIONERS

Below is a checklist of questions and actions it is proposed to ask a new partner in an IT project. The answers to these questions should be discussed with the partner's representative to be able to agree on what kind of actions both parties will take to avoid conflicts and what shall be done if conflicts are arise.

The recommended questions were:

1. Do you understand the content of our request / offer?
2. What kind of reporting and meeting practices do you suggest using during our project?
3. Do you use terms or words that differ in meaning from common usage / usage in the industry?
4. Do you know our industry / branch?
5. Are you able to create a glossary of terms used in your business / in your organization?
6. Has the highest management of the firm understood the goals of the project and the changes it will bring to business processes?
7. Is the Board of Directors behind the project?
8. Will the highest management of the firm allow the project to change business processes – or does it insist on that?
9. At what level of the organization were the decisions concerning this project made – or will they be made?
10. How many levels are there in your organization including ordinary employees and the Board of Directors?
11. How many units are there maximum at the same level?
12. What is the practice in your company if there is something that has to be done just in time?
13. How much is your organization ready to commit to staying on schedule?
14. How are you controlling the project?
15. How are you going to react to anomalies and possible negligence in the project?
16. How do you treat timetables and schedules?
17. Describe the strategy of your company and say how this project will support it.
18. What kind of incidents might override our project?
19. What is the normal working-hours practice in your company?
20. What is the relationship between knowledge and suitability when you are hiring a new person?

The actions recommended were:

1. List the keywords linked to your business, product and the system you are going to purchase / sell and explain these words.
2. Create a project glossary from the terms and words used by the customer and supplier that might be unfamiliar to other participants.
3. Describe your business briefly – products, materials and equipment, customers and suppliers, as well as processes, functions, organization.
4. Describe your reporting and meeting practices.
5. Make sure that people understand the customer's branch / business. If not, find out about it.
6. Make sure that each participant understands both their own requirements and needs and those of the opposite party, the latter especially if the opposite party is the customer.
7. Make sure that each participant understands the documents and notes regardless of who created them.
8. Set and agree common practices and forms for agendas, meetings, protocols, reports, and other documents produced and required during the project.

It is worth bearing in mind that the lists presented above are neither complete nor exclusive but examples of questions and actions each party can ask and suggest to open a discussion concerning organizational differences and their risks in a project at hand.

8.5 SUGGESTIONS FOR FUTURE RESEARCH

This thesis covered only some of the findings gained from the conducted research. It would be very interesting to continue with such topics like "understanding time" or "public organization as customer". In addition, topics connected to equality and feminine vs. masculine characteristics of organizations require more attention and a neutral approach. Contemporary research approaching these topics is mainly conducted in a feminist context. Other ways to approach issues might offer a broader understanding. The list presented in chapter 8.4 could also be a good foundation for further research: Suggested questions and actions could be applied in practice and their applicability and usability observed, as well as the potential impact of utilizing these lists.

Outside the original scope of this research, the results brought up two issues which require further examination: the role of change management in information systems projects and the bidirectional interplay between business culture and an information technology project.

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ISBN 978-952-15-2968-9
ISSN 1459-2045