Doing IT Project Alignment

– Adapting the DELTA Model using Design Science

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Abstract

Despite the perceived importance of IT, a majority of IT projects fail to deliver what was actually ordered (!). One main reason for failure is IT project management’s inability to adapt and react to a dynamic and changing project environment, instead, projects are run as if it is possible to predict all project variables before project start.

In reality, IT project workers live in a dynamic, political and commercial environment where it is difficult to predict and control the future. IT projects needs to be continually aligned with their environment to stay relevant and deliver utility.

Through a design science and action research approach, a model supporting IT project managers with IT project alignment is created and tested. The model is called DELTA and is designed to be easy to understand and use for IT project managers; it builds on a simplification of commonly available approaches in order to facilitate communication the different domains of expertise in IT projects. DELTA builds on four main constituents: Enterprise images, Stakeholders, Goals and Project. Guidelines for using the model is also presented.

Experiences from using the model indicates that the model is perceived as a useful complement to regular project management methods, specifically by merging different conceptual perceptions into a common view. Furthermore, results highlight the conflict between IT project alignment and the traditional project model. Finally, the results show the difference between IT project issues and underlying causes for these issues.
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1. Introduction

This thesis is in many respects the product of a strong feeling of frustration. As a project manager for IT projects, this frustration grew out of a personal inability to find appropriate methodological support for managing IT projects. Despite rigorously following contemporary IT project methodologies and working with experienced and competent colleagues, the projects continuously encountered surprises (the bad kind). Most of the surprises seemed to spring from the fact that the project plan was not being followed; instead, work seemed to be continuously renegotiated and planned for as the projects unfolded. These IT projects all involved people from several organizations, i.e. interorganizational projects.

The interorganizational collaboration as such was thoroughly investigated and reported in my licentiate thesis, Interorganizational Collaboration (Magnusson and Nilsson, 2005). The study presents three archetypes of collaborative settings and makes explicit how IT may be used in these settings as a management instrument supporting the collaboration.

As my understanding of interorganizational collaboration has increased, I have come to realize that the main problems and issues do not reside in the collaborative contracts between firms, the motives for collaborating or the collaborative strategy as
such. My experience is that a majority of the issues and problems associated with interorganizational collaboration reside in operative, human-related aspects occurring when people come together from different places to collaborate on non-trivial tasks.

Building on this realization, this PhD thesis further investigates the management of interorganizational IT projects with the ambition of providing useful insights for practitioners. By useful I mean taking into consideration the practical limitations of scope and complexity that result from the limited amount of time and resources that practitioners actually have to invest in new ways of carrying out tasks. Given this reality, useful insights cannot be packaged as “the new best complete methodology for IT project management” explained in a thick book: it will not be read. As a means to achieve usefulness, I have employed a combination of design science (Hevner and Chatterjee, 2010) and action research (Baskerville and Pries-Heje, 1996) as a methodological approach. These approaches are specifically built to conduct design-oriented, interventionist research in collaboration with practitioners with the explicit aim of designing useful and pragmatic artifacts that are put to the test in live settings.

This chapter is organized as follows. After an introduction to my personal motivation and the background for this PhD initiative follows a presentation of the research rationale and motivation. This is backed by a more specific formulation of the investigated problem and research motivation. The chapter concludes
with my contributions, clarifications of the key terms and delimitations of the study.

Research rationale
Information technology (IT) over the years has grown to be an integrated part of any modern organization (Langefors, 1966; Gupta, 1991; McAfee and Brynjolfsson, 2008). There has been a dramatic development of IT-related solutions during the last decades that has been matched by continuous innovative usage of the solutions. At the beginning of the IT era, solutions were developed internally by large IT departments or ordered as tailored systems from a single vendor. Today (2012), the situation is different. A wave of specialization has broken IT into small pieces of hardware and software that are put together into complex distributed infrastructures (Strong and Volkoff, 2010).

In order to remain competitive, companies are forced to make good use of IT (Carr, 2004). This means that any given organization is continuously involved in various initiatives aiming to improve their IT usage. IT-related initiatives are usually organized into IT projects (Kerzner, 2009).

The IT project scope has co-evolved with the industry from an internal product development affair to today’s service-oriented, interorganizational maze. A “normal” IT project (e.g. a company developing an app-based sales channel) includes representatives from several functions of the using organization, several vendors of solutions and experts in various domains, such as unit
managers, business controllers, process designers, systems analysts, requirement engineers, coders and testers. This makes IT projects *interorganizational* in essence.

However, despite a distributed, interorganizational and cross-functional *new normal* of IT projects, the ways in which to organize and run the projects have remained relatively unchanged for the past decade (Sauer and Reich, 2009). IT projects are still being organized according to traditional project management methods (such as PMI, *ibid.*), starting with the definition of the scope and goal of the project, followed by their decomposition into logically connected tasks with an allocated time and budget. A project is considered successful if it is completed according to the plan; incentive structures for the project workers involved also reward following the plan. Nevertheless, due to the interorganizational nature of IT projects, I argue that it is no longer possible to redefine and simply execute a plan. The dynamics following an interorganizational and cross-functional context will change the preconditions and basic assumptions of the project several times before the end of the project, making significant parts of the plan irrelevant (Kappelman et al, 2006).

Looking into some statistics related to IT project success confirms that something is wrong; more than 80 per cent of projects fail to deliver within time, scope or budget (Parr and Shanks, 2003; Nelson, 2007). For something that is considered strategically important for business (Xue et al, 2012), this is an alarmingly high number.
Large companies have met the increasingly complex IT environment and interorganizational nature of IT projects with investments in frameworks supporting the management of complex interorganizational settings. Examples of these frameworks can be found within enterprise architecture (e.g. Zachman Sowa), IT governance (e.g. COBIT) and project offices (e.g. PPM), to name a few. Additionally, large IT vendors have developed complete global delivery frameworks stipulating how to provide their customers with service-based IT delivery (e.g. ITIL). However, these frameworks do not support operative IT project management; they are developed for an IT governance perspective of single, large organizations. On an operative basis, there have been developments of agile approaches such as SCRUM (Schwaber, 2009) and extreme project management (DeCarlo, 2004). These have been developed in order to be adaptive to changing project and system requirements, but they lack an interorganizational focus.

In fact, most IT projects are still run according to traditional IT project methods, building on logic that is reluctant to change and external influences (Shwalbe, 2010). According to Bainey (2004), this may be the cause of several IT-related issues leading to project failure and low IT utility.

Problem formulation and research objective
Advanced frameworks have been developed for the strategic governance (COBIT, enterprise architecture) and alignment (SAM) of IT. These solutions support the selection of the right IT projects
and facilitate the definition of how the output of the IT projects relates to the surrounding environment, both in a technical (data flows, integration, etc.) and in an organizational (processes, governance) manner. They all highlight the specific importance of relating IT closely to the context it is to support (usually business). There is also a plethora of project and IT project management approaches for the successful treatment of easily discovered and defined project properties (such as resources, deliverables and time). These approaches are scalable and suitable for large projects, as long as the project environment is stable.

However, there is a gap between the IT frameworks (governance, architecture and alignment) and the operative IT project management. The gap relates to the softer, human aspects of IT project management. These are the “thing” performed by successful IT project managers that resides outside the formalia of the project but somehow results in perceived success of the project. The gap has been identified and to some extent explored by Peter Checkland, who describes it as a soft system of human perceptions and suggests a systematic approach to defining it, the soft system methodology (SSM; Checkland and Poulter, 2006). Researchers Jenkin and Chan (2010) even take a step further by coining the term IT project alignment. They (ibid.) argue for the need to align IT project stakeholders’ interests continually as a way of achieving strategic alignment.

Nonetheless, despite the general agreement on the importance of achieving alignment and taking the human, softer as-
pect into management consideration, there is a considerable gap in knowledge on how actually to *achieve alignment* from an operative perspective. The gap is evident in interorganizational IT projects.

This thesis bridges this gap by designing a model for IT project alignment in interorganizational IT projects. The model is to be used by IT project managers as a complement to the IT project management methodologies in use.

The design of the model builds on an adaptation of the DELTA model (Delta slutrapport). I was involved in the publication of the initial DELTA results. In this thesis, I individually adapt the DELTA model in the context of interorganizational IT project alignment.

**Research contribution**

This thesis contributes to the current level of knowledge in relation to IT project alignment by:

- Operative support (the design artifact) for project managers carrying out IT project alignment
- An increased understanding of problematic IT project issues and how these relate to IT project alignment

The first and main contribution of my thesis is a model for IT project managers that enables them to start aligning their IT projects. The model is to be used as a complement to existing IT project management methods and not as a replacement for them.

The second contribution relates to an increased understanding of common IT project issues and how these relate to IT
project alignment. In this sense, the contribution lies in an attempt to solve commonly occurring IT project issues through IT project alignment.

Clarification of key terms

**IT project management** – the operative responsibility of a predefined activity that is limited in scope, resources and time (the project), including novel usage of technology. Project management is commonly supported by a project management methodology describing the project in phases and prescriptive management guidelines and tools (Shwalbe, 2010; PMI, 2011).

**Alignment** – an arrangement of groups or forces in relation to one another (Merriam-Webster).

**Strategic alignment** – the process and result of linking an organization’s business strategy and objectives with supporting IT structures (Henderson and Venkatraman, 1989, 1999; Luftman et al, 2000; Luftman, 2005).

**IT project alignment** – the process of ensuring that key stakeholders share a common understanding of the project mission, goals, objectives, tactics, work processes and plans and have the required competences and skills (Jenkin and Chan, 2005; Jansson and Ljung, 2011).
I will expand the large company, intraproject view of IT project alignment with the complement of the dynamics following an interorganizational perspective.

**Interorganizational IT project** – a project involved with novel usage of IT in a context involving more than one organization (Boddy, 2010).

**Abbreviations**

AR: action research  
BMM: business model motivation  
DELTA: my design artifact  
DS: design science  
EA: enterprise architecture  
ERP: enterprise resource planning  
ICT: information communication technology  
IOC: interorganizational collaboration  
IT: information technology  
ITIL: Information Technology Infrastructure Library  
PM: project manager  
PMI: Project Management Institute  
PMO: project management office  
PPM: project portfolio management  
RUP: rational unified process  
SAM: strategic alignment framework
**SME**: small to medium-sized enterprise

**SOA**: service-oriented architecture

**SSM**: soft system methodology

**TOGAF**: The Open Group Architectural Framework

**UML**: Unified Modelling Language

**Structure of the thesis**

The thesis is initiated with an Introduction (1) presenting the research problem from a practical perspective summarized in a problem formulation. The research objective is then presented along with the contribution. These are followed by the Methodology (2), in which the research process is described and the choice of methodological approach is motivated. A description of Previous Research (3) then follows, presenting both the existing solutions and the theory that are relevant to the study. Subsequent to the presentation of the previous research, the Results (4) are presented; in this section, the design, testing and experiences from using the artifact are described. The Discussion section (5) concludes the thesis through a recapitulation of the research objectives and implications from the study for research and practice. The thesis concludes with a presentation of the limitations and a call for further research.
2. Research Methodology

This chapter presents the basic motivation behind the choice of methodology, along with a detailed description of the overall research process and underlying studies.

A design science perspective

Design is where science and art break even.

(Robin Mathew)

Design science (DS) springs from sciences of the artificial (Simon, 1996) and is a problem-solving method that addresses what are considered to be *wicked problems* (Rittel and Webber, 1984; Brooks, 1987). Wicked problems occur when people and technology are involved together in solving a common task. Chatterjee (2010) describe wicked problems as complex interactions between several components of the problem.

DS has roots in several fields, such as architecture, engineering, education, psychology and fine arts (Cross, 2001). Many researchers argue for the relevance of using DS in IS research (Hevner and Chatterjee, 2010), the reason being that DS directly addresses two of the key issues of the IS discipline, the role of the IT
artifact in IS research (Weber, 1997; Orlikowski and Iacono, 2001; Benbasat and Zmud, 2003) and the (perceived) lack of professional relevance of IS research (Benbasat and Zmud, 1999; Hirshheim and Klein, 2003).

However, the tradition of DS in IS research has been dominated by studies of the impacts of IT artifacts on the organization, teams and individuals (Hevner and Chatterjee, 2010). In the early 1990s, though, increased recognition of the importance of improving the effectiveness and utility of the IT artifact was conceived (ibid.). This recognition triggered a number of activities (Iivari, 1991; Walls et al, 1992; March and Smith, 1995). Based on the thoughts of Herbert Simon (1996), a team of researchers adapted the research traditions of other fields to the unique contexts of IS design research (Hevner et al., 2004). The authors (ibid.) highlight the need for both a natural (behavioural) science and a DS in order to achieve productive application of information technology in human organizations.

From a philosophical point of view, these are pragmatist arguments claiming that truth (justified theory) and utility (artifacts that are effective) are the same thing and that research should thus be evaluated according to its practical implications (Hevner and Chatterjee, 2010).

The reasons for using DS in this thesis are the close and natural relationship between theory and practice and the fact that the thesis investigates a context full of wicked problems.
Despite the work of Hevner and Chatterjee (2010) and others (Nunamaker et al, 1991; March and Smith, 1995; Vandenbosch and Higgins, 1995) legitimizing the use of design science in IS research, Peffers et al (2007) notice that the actual usage of DS even after 10 years remains low. Peffer et al (ibid.) argue that the reason for the relatively slow uptake of design science in IS research compared with engineering and computer science is the lack of an established design science methodology providing researchers, practitioners and reviewers with a common frame of reference and mental model.

An accepted common framework is necessary for DS research in IS and a mental model (Gentner and Stevens, 1983; Swaab et al, 2002; Vandenbosch and Higgins, 1995) or template for readers and reviewers to recognize and evaluate the results of such research. Every researcher trained in the culture of social science research has mental models for empirical and theory building research that allow the researcher to recognize and evaluate such work and perhaps one for interpretive research as well. Even if all of these mental models are not exactly the same, they provide contexts in which researchers can understand and evaluate the work of others.

(Peffer et al, 2007)

Motivated by this, Peffer et al (2007) continue by proposing a rigorous methodology for conducting DS research. The methodology comprises six steps: identify and motivate the problem, define the objectives of a solution, design and development, demonstration, evaluation and communication. Figure 1, below, depicts this methodology.
Figure 1. Design science research methodology according to Peffer et al (2007)

A concluding reason for choosing a design science approach is the ability to follow a well-defined, scientific research methodology that intimately combines creation and application in a pragmatic approach that is close to how people intuitively prefer to work.

An alternative to DS is a behavioural science approach focusing on the decision processes and communication strategies in the IT projects. However, this was dismissed primarily due to the need for me to prove my value to the IT project participants before they would accept me and open up by sharing their experiences. Simply setting up a series of interviews and analysing the data would probably have given less rich material and understanding of the problem at hand.
Action research and design science
As a complement to DS, I have also used action research (AR). Action research dates as far back as 1944 when MIT professor Kurt Lewin first coined the term. He described AR as “a comparative research on the conditions and effects of various forms of social action and research leading to social action” that uses “a spiral of steps, each of which is composed of a circle of planning, action and fact-finding about the result of the action” Lewin (1946, p. 34).

Another AR definition, by Rapoport (1970, p. 34), follows:

Action research aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework.

Since then, AR has evolved into a number of sub-disciplines all aiming to conduct research in collaboration with the context under study. Some of the more influential AR approaches are Argyris’s action science studying how humans design their own actions (Argyris, 1970), Heron’s cooperative inquiry arguing that all active participants are co-researchers (Heron, 1996), participatory action research arguing for intervention, development and change (Freire, 1970), Torbert’s developmental action inquiry arguing for the conducting of action and inquiry simultaneously in order to achieve self-transformation (Torbert, 1991), Whitehead’s living theory and McNiff’s action research approach, which connects living experi-
ences with educational influences and learning using action reflection cycles (McNiff and Whitehead, 2006).

There has been an ongoing debate within the IS field concerning the balance between the relevance and the rigour of the research being conducted. Applegate (1999) argues for increased relevance without abandoning rigour and Banbasat and Zmud (1999) illustrate how to reconsider topic selection, purpose and content. Davenport and Marcus (1999) challenge the very core academic values of academic outlets, Lyytinen (1999) encourages us to rethink the institutional policies influencing IS research and Lee (1999) highlights the need to move beyond the traditional positivistic research method. Mathiassen (2002) gives an overview of the debate and summarizes his own thoughts into a subfield of collaborative practice research (CPR). CPR has developed since the 1980s as a Scandinavian IS research tradition building on the three main steps of understanding, collaboration and pluralistic methodologies (Checkland and Scholes, 1990; Mingers, 2001; Mathiassen et al, 2002).

My motive for combining AR with an overall DS approach is my ambition to come close to the actual wicked problems as they occur in the everyday life of the IT project manager. As I wanted to understand how actually to help and support the IT project manager and it was not enough to conduct case studies and interviews, I had to live and work closely with them.

I chose to conduct my AR following not the Scandinavian school of CPR (Mathiassen, 2002), but instead the overall prin-
principles from Susman and Evered (Susman and Evered, 1978; Davison et al, 2004) of action research cycles later also adapted to the IS community by Baskerville and Wood-Harper (1996). The iterative, straightforward structures of action research cycles were easy to set up and communicate with practitioners and provided a solid ground on which to collaborate with practitioners.

The research process

The research presented in this thesis is an aggregate result from over eight years of research conducted in four different research programmes. Below follows an introduction to these programmes, their main contribution to the thesis and a summary of the empirical foundation.

The first research program is DELTA – a meta-architecture for proactive management of coordinated development in complex enterprises and information systems. In DELTA, the first version of the DELTA model was developed (the research programme and the model have the same name; when not explicitly stated otherwise, “DELTA” refers to the model). I was 50 per cent involved in the systematization and publication of the results to the academic community. The context of the project was large, single Swedish organizations. The DELTA programme was financed by the public agency NUTEK’s Complex Systems programme and was active between 1999 and 2001.

The second research programme is Plexus, an EU FP7 programme coordinated by the Austrian research institute Profac-
tor. In this programme, the interorganizational nature of IT projects was explored on a pan-European level; this gave an in-depth interorganizational perspective of the context that was added to the model. In Plexus, I was operationally responsible for the academic side, including leading a work package conducting a European study of current interorganizational practice. Plexus was fully financed by the EU and was active between 2002 and 2005.

The third research programme is DELTA II, a pure industry initiative aiming to transform the theoretical model from DELTA and Plexus into useful tools for IT project managers. I was the project leader of DELTA II and conducted the design science adaptation of the initial DELTA model individually to interorganizational IT project alignment. The DELTA II programme was financed by an industry consortium of both public and private organizations and was active between 2006 and 2008.

The fourth research context is Jeeves Apps Market (JAM), a Swedish ERP vendor development project aiming to develop and launch an ERP app store in which small customizations of ERP systems may be packaged, published and traded as apps. The JAM project was active during 2012 and included an ERP vendor and the surrounding ecosystems of implementation partners and end-users. In JAM, DELTA was used to support the generation of business models for an ERP app store. In addition, JAM adds to the contextual understanding of how a platform (the app store) facilitates the interorganizational collaboration surrounding an IT system (the ERP).
As can be seen (in Figure 2), the scope and setting are somewhat different in the three programmes, spanning from large to relatively small, national to international and intra- as well as interorganizational settings. This diversity provided a rich environment in which to design the artifact, but was also challenging as different contexts require different solutions. Despite this, a common denominator in all three programmes was a close relationship with IT project managers.

In parallel with these three research programmes, I have been continuously working as an IT project manager, as a consultant and as an entrepreneur in two start-up companies. My own IT project management experience is not directly used in the thesis (with the exception of the AR study), but it has helped me to gain access to research settings and provided me with a solid overall understanding of work in IT projects.

This thesis frames the research activities with a modified DS methodology grounded on Peffers et al.’s (2007) DS proposal. The modification is to replace the “evaluation” step with “experience” in order to have a heading that is more in line with the action research activity behind it. The DS approach brings clarity to the connection between the different research activities carried out. As is common in DS research, the process has been iterative, with several iterations in the DS steps design, demonstration and experience. Figure 2 provides an overview of the research programmes, the correlating DS step along with the empirical data and output in terms of a selection of publications. As can be seen, AR was used
in DS steps 4 and 5 in the DELTA II research programme (Study 6). Publications included in this thesis are marked in bold.

Study 7 adds experience using the DELTA model for business model development, complements the contextual description of IT projects and illustrates how interorganizational collaboration may be mediated by a platform. Study 7 is based on 20 semi-structured interviews with individuals representing the ERP system vendor, the ERP vendor partners and finally the ERP vendor customers.

<table>
<thead>
<tr>
<th>Research programme and Contribution</th>
<th>DELTA I</th>
<th>Basic Concept of the model</th>
<th>PLEXUS</th>
<th>Context of model</th>
<th>DELTA II</th>
<th>Test of model and method</th>
<th>JAM</th>
<th>Platform context expansion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope and setting</td>
<td>Coordinated development in large enterprises in Sweden</td>
<td>Interorganizational SME networks in the European Union</td>
<td>Public and private IT projects of varying sizes in Sweden</td>
<td>Private IT projects in SME ecosystems based on real solutions</td>
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<tr>
<td>Empirical data Scope [1-6]</td>
<td>STUDY 1: 2-day workshop with 20 practitioners</td>
<td>STUDY 2: Questionnaire with 154 respondents</td>
<td>STUDY 3: Questionnaire with 154 respondents</td>
<td>STUDY 4: 13 case studies, 22 interviews</td>
<td>STUDY 5: 568 hours of AB</td>
<td>STUDY 6: 20 semi-structured interviews</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Publications                       | Enquist et al., 2001  
Enquist and Nilsson, 2006 (P1)  
Enquist and Akerjord, 1998 | Magnussen and Hilmoe, 2005 (LocalBee) | Magnussen and Hilmoe, 2004 (P1)  
Nilsson, 2008 (P5) | Magnussen and Hilmoe, 2003 (P2)  
Magnussen and Hilmoe, 2003 (P3)  
Magnussen and Hilmoe, 2003a  

Figure 2. Overview of the research programmes, DS steps, empirical data and output

Steps 1–2: Problem identification and motivation

Define the specific research problem and justify the value of a solution.
The problem identification and motivation regarding IT project alignment are based on a 2-day workshop (Enquist and Makrygiannis, 1998) with 20 general and IT managers from 6 large Swedish organizations (Study 1). The result from the workshop was used as input when constructing a follow-up questionnaire (Study 2). The questionnaire was distributed in the managers’ respective organizations. A total of 618 questionnaires were distributed; 154 responses were received, giving a response rate of 25 per cent. The main result was an overview of the problems and challenges involved in IT project alignment from large Swedish organizations (intraorganizational).

As a theoretical reference point, a literary review following Arksy and O’Malley’s (2005) scoping study was carried out and resulted in a broad understanding of the various academic fields relating to the study.

The workshop and the literary review were complemented by a pan-European view provided through 49 semi-structured interviews with IT project managers in SMEs (Study 3; Enquist et al, 2003); these interviews were followed by a questionnaire answered by 121 respondents (Study 4). Due to local differences in the way in which the questionnaire was distributed, it was not possible to calculate the response rate.
Step 3: Design

Create the artifactal solution. This activity includes determining the artifact’s desired functionality and its architecture and then creating the actual artifact.

(Peppers et al, 2007)

The design of the model for IT project alignment is difficult to pin down in a stand-alone methodological step. A more accurate description is to say that this occurred in parallel with the problem formulation and motivation steps. As the problems and the need and motivation for “the” remedy were made explicit, possible solution concepts and ideas were created. As the design work proceeded, the product was gradually refined and simplified until it was sufficiently ready for demonstration. However, in order to follow the DS meta-methodological structure of the thesis, one may single out a description of the step as below (despite the messy reality that actually occurred).

During the design phase, input was taken from the previous step as guidelines for a broad literary review including the fields of management, IT management, strategic management, project management, alignment and enterprise architecture. This study was used as input for the researchers in a workshop with 20 participants from 6 organizations (Enquist et al, 2001; Enquist and Nilsson, 2006a). During this workshop, the majority of the design work of the model occurred (Study 5).

The majority of the design work for using the model was undertaken in an action research initiative in which the researcher
was onsite at a large public administration for half a year, working closely with IT managers on a day-to-day basis (Study 6). This study is described in more detail in the demonstration and experience steps.

**Steps 4–5: Demonstration and Experience**

Demonstrate the efficiency of the artifact to solve the problem.

(Peffer et al, 2007)

Demonstration and experience of the artifact were conducted on an informal basis continuously throughout the three research programmes. However, it was not until the DELTA II programme that the artifact was sufficiently ready to be demonstrated and evaluated in a commercial setting. Preceding demonstrations and tests were carried out in order to gain feedback on the design or to demonstrate value as a means to gain access to IT projects and practitioners.

The main demonstration and experience from testing the artifact were undertaken in the AR study (Study 6) conducted in an IT project in a public agency in Sweden. This study is extensively described in the section results, demonstration (p. 42) and my publication “Management of technochange in an interorganizational e-government project” (Nilsson, 2008). Additional experience was also gathered from Study 7, but the result from this is not reported further in this thesis.
The AR followed the AR cycles as defined by Baskerville (1999), namely diagnosing, action planning, action taking and evaluation. Below follows a brief description of each AR step that was taken in Study 6.

**Action research: Diagnosing**

Early in the project, I met the project team to discuss the challenges and obstacles in similar projects and presented the supporting artifact (the DELTA model). A research agreement for an action research study was formulated and agreed upon. I was included in the project team as an active member combining both research and “normal” project tasks.

**Action research: Action planning**

Gradually, the IT project management’s ability to use the model for specific issues increased. As a researcher, I played an active role in relating the issues to the model; once this was complete, the management team had few problems in elaborating by using the model in the search for a potential solution. This resulted in many in-depth discussions of the consequences of various potential scenarios dependent on the course of action. The scheduled times for discussion were gradually referred to (by the project participants) as management meetings; the output from the discussions consisted of concrete decisions on what to attempt and how to accomplish it.
Action research: Action taking
Based on the action plan, the management took action. I had an active part in executing and implementing decisions in close collaboration with the project team. The IT project management started to refer to the model without support from me, but when the stress level in the project increased, this stopped. Action planning and action taking were very intertwined activities with many small instances of planning and iterations.

Action research: Evaluation
Sessions were held on a monthly basis; during these sessions, experiences from the past month’s work and upcoming challenges were discussed. In addition, experiences from the support provided by the action researcher were discussed.

Selection of data collection
The selection of data collection was made following convenience sampling (Marshall, 1996). This is a non-probability sampling approach whereby selection is made based on accessibility for the researcher. Alternative approaches building on random selection would not have led to inclusion in IT project teams; for this reason, they were dismissed.
3. Previous research

My thesis informs the emerging field of IT project alignment by initially building on previous research from the fields of alignment, enterprise architecture, project management and project portfolio management (Figure 3).

Other fields were omitted after consideration. The field of science and technology studies (STS) treats technology as a change agent in itself. This interesting perspective is not in line with my focus on IT project alignment in which I treat IT as a technical artifact. Software engineering and more specifically software engineering methodologies are seen as a subset of project management, in which especially contributions related to agile approaches have been taken into consideration. The field of knowledge management was also considered, yet omitted on the basis of, in my view, a mechanistic perception of humans and a disregard for social reality. Change management is a broad and vague discourse that is used as a reference discipline for project management and enterprise architecture (both included). For this reason, it has not been explicitly included.
In this chapter, each field is presented with a definition, short description of how the field relates to the thesis and some examples of the tools and frameworks used within each field.

Each field presentation is concluded with the articulation of a few key assumptions taken from each field. The assumptions are used to support the motivation and positioning of my research and as input in the design of my artifact.

![Figure 3. Overview of the related fields investigated](image)

**Strategic alignment**

Business-IT alignment refers to applying Information Technology (IT) in an appropriate and timely way, in harmony with business strategies, goals and needs.

(Luftman, 2000)
Since the advent of technology, there has been a constant struggle to achieve goodness-of-fit between the technological and the social (Marcus, 2004). This struggle is based on a deterministic and highly instrumental view of technology, in which the value of a technology is directly dependent on how well it conforms to its intended use and the usage environment (Orlikowski, 2009). Evidence of this constant struggle can be seen within several strands of research, such as information systems (Langefors, 1966; DeLone and McLean, 1992), strategic management (Drucker, 1954; Chandler, 1962; Ansoff, 1965) and sociology (Latour, 1987; Weick, 1995; Czarniawska, 1997).

Within information systems, the main category of research, focused on understanding and bridging this divide between the technological and the social (or IT and business), has been conducted under the heading of “strategic alignment” or simply alignment. Alignment is defined as the level of consistency between an organization’s business strategy and its IT strategy by Henderson and Venkatraman (1989). The perceived importance of alignment from a practitioner’s perspective is clear. Alignment has been ranked as one of the top three priorities by both business and IT executives for over two decades (Broadbent and Weill, 1993; Luftman et al, 1993; Chan et al, 1997; Papp, 2001; Van Der Zee and De Jong, 1999; Reich and Benbasat, 2000; Hirschheim and Sabherwal, 2001; Sabherwal and Chan, 2007; Chan and Reich, 2007; Luftman and Kempaiah, 2007).
Previous alignment studies have focused on the identification of performance indicators, enterprise modelling and administrative governance processes (Henderson and Venkatraman, 1989, 1999; Venkatraman et al, 1993). The dominant perspective in these studies has been that of a single, large organization. As an example, Luftman and Kempaiah (2007) gathered data from close to 400 global 1000 organizations to investigate the correlation between the degree of alignment and the organizational performance. According to Luftman (ibid.), there is a strong correlation between alignment and organizational performance. Another example of alignment research is Vargas, Ekstedt and Plazaola’s (2008) presentation of an extensive study of existing alignment frameworks summarized as a consolidated strategic business and IT alignment framework. Coming from a more management-oriented direction is the related notion of business–IT fusion arguing for a radical repositioning of the IT function in organizations and fusion with business, to stop treating IT as a separate entity (Evans and Hoole, 2005).

An interesting categorization of alignment is made by Reich and Banbasat (2000). They argue for a social and an intellectual dimension. According to the authors (ibid.), intellectual alignment is achieved when a high-quality set of interrelated business and IT plans exists; social alignment occurs when the IT and business executives understand each other’s missions, objectives and plans (Tan and Gallupe, 2006). According to Tan and Gallupe (2006), a majority of the alignment studies focus on the intellectual
dimension of alignment (Floyd and Wooldridge, 1997; Luftman et al 1993, 1999; Chan et al, 1997; Kearns and Lederer, 1997; Tan 1997), but only a few investigate the social dimensions. These studies focus on the conditions under which alignment is achieved and sustained (Henderson and Clark, 1990; Broadbent and Weill, 1993; Reich and Benbasat, 2000). The dominating component in the social dimension of alignment is the shared understanding between IT and business executives (Reich and Benbasat, 2000).

Shared understanding is introduced and explored by Tan and Gallupe (2006) through a cognitive approach using the term shared cognition. They (ibid.) explore shared cognition from a social alignment perspective by studying IT and business executives’ mental models, assumptions, expectations, values and beliefs. Their study (ibid.) concludes that shared cognition leads to social alignment.

There is also interesting work looking into more operative aspects of alignment. In an attempt to bridge strategic alignment with the increased use of the project form, Jenkin and Chan (2005, 2010) introduce the concept of IS project alignment, defined as “…the degree to which IT project deliverables are consistent with the project’s objectives, which are shaped by the organization’s IT strategy” (ibid.).

Other studies of the link between strategy and projects include those by Parker et al (1988) and more recently Benko and McFarland (2003). The importance of IT projects in realizing strategic alignment is also highlighted by Kearns and Sabherwal
(2006). With the exception of Jenkins and Chan, studies within IT project alignment are few and focus on a description of the process of alignment, comparing this with project management from an intraorganizational perspective (Jenkins and Chan, 2010) or how the degree of alignment affects the overall firm performance (Raymond and Bergeron, 2008).

Building on the arguments that alignment increases firm performance (Luftman, 2000), and that IT projects implement the IT strategy (Kearns and Sabherwal, 2006), I will further the body of knowledge related to alignment through exploring how to improve shared understanding in IT projects.

Below follows a summary of my alignment assumptions:

1. There is a strong correlation between the degree of alignment and the organizational performance (Luftman, 2007).
2. IT projects are used to realize strategic alignment (Kearns and Sabherwal, 2006).
3. Shared cognition leads to social alignment, which enables strategic alignment (Tan and Gallupe, 2006).

Project management

Project management is the planning, organizing, directing, and controlling of company resources for a relatively short-term objective that has been established to complete specific goals and objectives.

(Kerzner, 2009, p. 4)
Organizing tasks outside the “normal” work and calling them projects started 20 years ago and has become very common (Morris, 2011). The ability to manage projects has grown in importance and is now crucial for the very survival of many organizations (Söderlund, 2005; Crawford et al, 2006; Hanisch and Wald, 2011). More than 30 per cent of the turnover from European SMEs comes from work conducted in projects, according to Turner et al (2009).

The “traditional” project methodology is still by far the most commonly used (PMI, 2011), but is being challenged from several directions (Engwall, 1995; Andersen, 2006; Ljung, 2011). The reason for the widespread adoption of the classical approach, according to Ljung (2011), is that a few large organizations responsible for quality assurance and certification of project management, for example the PMI (Project Management Institute) and IPMA (International Project Management Association), have a firm grip on the market. The same holds true for education offerings in project management; according to Thomas and Mengel’s (2008) study, an absolute majority of the project management education offerings in 2007 were based on the same planning techniques as the ones held in the 1960s.

It is not possible to create one general project management theory due to the vast difference between project types and contexts (Engwall, 2003; Remington and Pollack, 2007). A majority of the project management research focuses on large infrastructure and development projects (Turner et al, 2010). SMEs have a low degree of standardization and specialization regarding project
management and prefer to use light versions of project management frameworks (Ghobadian and Gallear, 1997; Turner et al, 2009, 2010). Research in project management should distance itself from the traditional rationalistic and analytical path (Ivory and Alderman, 2005) that clearly has a major influence on the field (Ljung, 2011). The goal triangle, with project result, project time and project scope in the corners, has “put a spell” on project research that must be broken (Cicmil and Hodgson, 2006).

The perspective must be broadened to include factors such as leadership, cooperation stakeholder management and project context.

(Ljung, 2011)

A well-developed and solid theoretical ground is the marking of an established practice, such as law and medicine. Project management is now considered a profession and is criticized for lacking a solid and updated theoretical foundation (Koskela and Howell, 2002; Ljung, 2011). However, the criticism does not stop there; Winters et al (2006) and Blomquist et al (2010) highlight the criticism directed towards project management research regarding the lack of empirical grounding and understanding of what is really taking place in projects and the focus on the production of irrelevant management frameworks.

The field of project management provides valuable input regarding the dynamics of projects and how to manage projects successfully with regard to time, budget and scope. There are many traditional project management methods and tools, for instance the Project Management Institute (PMI), the Team Software
Process (TSP), the Guidelines for Quality Management in Projects (ISO 10006:2003), AACE International’s Methodology for Integrated Portfolio, Program and Project Management (Total Cost Management Framework), the International Association of Project & Program Management, the Guide to Project Auditing and Rescuing Troubled Projects (IAMPPM), Rationals (RUP) and the Global Alliance for Project Performance Standards (GAPPS), to name a few.

There are also several recent contributions with a more adaptive and a less administratively heavy view of how to run projects in general and software development projects in particular; some examples of these are Extreme Programming, SCRUM, the Dynamic Software Development Method (DSDM), Adaptive Software Development, Crystal, Feature-Driven Development and Pragmatic Programming, among others.

The traditional project methods work well in stable situations and environments in which the motives for the project remain relatively unchanged. They provide the project manager with support in managing large-scale resource tasks and deliverables in a controlled and structured manner. Predefined decision points for project steering committees are also a common feature. The more recent developments of agile approaches have been motivated mainly as a response to software development projects in which it is difficult to identify and define the system requirements. Instead of predefining the requirements at the beginning of the project, the agile methods use quick iterations of development and testing with
close collaboration between developers and users as a way of building the system. These approaches have become popular, especially in situations in which the future system users need help in opening their minds and thinking creatively of the system “to be”.

A more classical approach to fuzzy problems is soft systems methodology (SSM), coined by Peter Checkland and dating back to the 1960s (1981). SSM is a systematic approach of tackling situations that are perceived as problematic and messy (ibid.) due to intricate social settings. SSM comprises a seven-step root definition of the problem referred to as CATWOE. It is a suitable approach for collaborative iterative learning based on models, but SSM does not have an explicit project grounding.

Traditional project management tools and methods are constructed to box in a predefined project scope, break it down into manageable pieces and keep a systematic order of the pieces in order to keep track of the project’s progress. The usage of project management techniques and tools is explored and evaluated by White and Fortune (2002) with the conclusion that GANTT charts and project management software are the most commonly used. Changes in the outside environment that have an impact on the project are problematic and require a large amount of formal administration and documentation; they are generally ignored for as long as possible by project managers wearing blinkers. Issues identified in or by the project that may be of importance, but are not included in the project scope, are dropped without any action. In summary, traditional project management methods offer little or no
help for aligning interorganizational IT projects with their surroundings.

Agile IT project management methods may be described by four core values:

- Individuals and cooperation rather than processes and tools
- Working software rather than extensive documentation
- Customer involvement rather than contract negotiations
- React to change rather than stick to the plan

(Chow and Cao, 2008)

Agile methods define a new role for the project manager compared with the traditional one. Instead of extensive planning before and follow-up during the project, the project manager drives short development cycles resulting in useful results as the basis for new activities (Nerur et al, 2005; Fredriksson and Ljung, 2010; Gustavsson and Rönnlund, 2010).

The agile project management methods are developed to treat changing input from project participants regarding the definition of the output of the project; this is complemented by a loose structure and formalization of work tasks and a focus on quick and small deliverables. By this arrangement, agile methodologies support the alignment of the project output with the involved stakeholders. However, agile methods are not the solution for IT project alignment in general for three reasons: 1) they are designed and constructed for the limited purpose of software development, 2)
they are not designed to be used in an interorganizational setting and 3) the alignment only refers to one side aligning with the other (changes of the project output), not both.

This brief review of the research into project management can be summarized in four assumptions:

4. Research in project management lacks an understanding of what is really taking place in projects (Winters et al, 2006; Blomquist et al, 2010)

5. Research in project management should distance itself from the traditional rationalistic and analytical path (Ivory and Alderman, 2005)

6. SMEs prefer to use light versions of project management frameworks (Ghobadian and Gallear, 1997; Turner et al, 2009, 2010)

7. Iterative, collaborative modelling builds understanding and learning (Checkland, 1981)
Project portfolio management and project management offices

Definition: Project Portfolio Management (PMI) is a way for companies to analyze and collectively manage in a coordinated way a group of current and proposed projects to reap benefits not available if they were managed individually.

LaBrosse (2010)

Definition: Project Management Office (PMO) is an organizational body or entity assigned various responsibilities related to the centralized and coordinated management of those projects under its domain. The responsibilities of the PMO can range from providing project management support functions to actually being responsible for the direct management of a project.

(PMI, 2003)

Project portfolio management (PPM) aims to make individual IT projects comparable and measurable. The rationale for measuring and comparing projects is to have a central function that may choose and prioritize between a collection of projects (Martinsuo and Lehtonen, 2007). The priority is to follow guidelines derived from the formal overall strategy of the organization (ibid.). Thus, the goal of PPM is to increase the business value of IT by choosing to execute the “right” projects (ibid.). The assignment to conduct PPM is commonly placed in a corporate function called a project office. The project office also has a coordinating role between projects, but this coordinating function has to a large extent been overlooked by the academic community.
This goal of maximizing business value from IT is shared between PPM, alignment and IT project alignment. However, since PPM focuses on analyzing potential projects only until a go–no go decision is made, the alignment of running IT projects does not occur in PPM. The coordinating function of a project office is a partial solution for supporting IT project alignment; however, it does not address the alignment issues between the project and the surrounding organization, as the focus is mainly on resource allocation between projects.

My initial expectation was to find a great deal of insightful concepts and input into PPM to help me design my interorganizational IT project alignment model. To my surprise and disappointment, this was not the case. The PPM approaches were too mechanistic and high level to be of any operative support on the level of detail at which IT project alignment occurs. They build on the premise that the value of a specific IT project initiative may be “calculated” and compared with other initiatives; this view brings several challenges related to the value of IT and significantly delimits the usefulness of the comparison and selection criteria. As an example, what is the value of making it easier for customers to make in-app purchases? What is the value of providing mobile email access to employees? What is the value of documenting organizational processes following the same process standard? It quickly becomes apparent that a coordinating function must work beyond economic estimates and move much closer to operative issues in order to provide relevant support.
However, PMO and PPM are organizational entities positioned between the project and the surrounding organization; this position makes them a very attractive potential counterpart for the project managers if the mandate of the PMO/PPM is expanded to include operative issues as well. The usefulness and relevance of PPM and PMO are further limited by the fact that they are intraorganizational by definition and only exist in medium- to large-sized organizations.

This brief review of the research into PPM and project management offices can be summarized by two assumptions:

8. The goal of PPM is to increase the business value of IT (Martinsuo and Lehtonen, 2007)
9. PPM is developed to be used internally in large organizations (PMI, 2003)

Enterprise architecture and IT governance

A descriptive representation of the basic arrangements and connectivity of parts of an enterprise (such as data, information, systems, technologies, designs and business processes).


The fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution.

(ANSI/IEEE Standard 1471-2000)

Formal description of a system, or a detailed plan of the system at component level to guide its implementation, or as the structure of components, their interrelationships, and the principles and guidelines governing their design and evolution over time.
As the above definitions of enterprise architecture (EA) tell us, an EA may be described as a blueprint of an organization. EA frameworks are extensive since they take a holistic approach to the description of an organization ranging from the lowest level of technical items through databases, applications, integration layers, various levels of process descriptions all the way through business models to end up with strategic descriptions and definitions. Depending on the type of organization and where the organization is situated, there are several well-distributed enterprise architecture frameworks in use. One of the most well known is The Open Group Architecture Framework (TOGAF). TOGAF claims to provide a comprehensive approach to the design, planning, implementation and governance of an enterprise information system (TOGAF, 2011). It comprises the levels business, application, data and technology.

Other examples of EA frameworks are AGATE (French Délégation Générale pour l’Armement Atelier de Gestion de l’Architecte des systèmes d’information et de communication), ArchiMate (an open and independent modelling language for enterprise architecture building on TOGAF), DoDAF (United States Department of Defense Architectural Framework), DYA (Sogeti framework), EIF (European Interoperability Framework – Enterprise architecture at the level of EU member states), FEA (United States Office of Management and Budget Federal Enterprise Ar-
chitecture), IDABC (Interoperable Delivery of European eGovern-ernment Services to the Public), IAF (Integrated Architecture Framework created by Capgemini), MIKE2.0 (Method for an Integrated Knowledge Environment including an enterprise architecture framework called SAFE – Strategic Architecture for the Federated Enterprise), MODAF (United Kingdom Ministry of Defence Architectural Framework), SAP Enterprise Architecture Framework (an extension of TOGAF to provide better support for commercial off-the-shelf and service-oriented architecture) and of course the Zachman Framework (Zachman, 1987).

In order for an organization to use an EA framework, it must make a significant investment in human resources who are trained and certified in the EA framework, standardization of all the modelling activities in the organization in order to only use models that comply with the EA framework, and the inclusion of enterprise architects and the act of architecting at all levels of the organization involved in developing or changing the organization (usually projects and planning activities).

EAs supports the alignment of IT projects by the holistic conceptual view of how the result of the project will work in a larger frame of reference. This is a powerful and structured means to align large and complex organizations. The reasons that EA is not the answer to IT project alignment are several: EAs are developed primarily for a single large organization and lack an interorganizational perspective; they are very resource-consuming and therefore not a viable option for an SME. They are very time-
consuming and therefore often not a viable option for individual IT projects.

Related to EA is the associated control and management mechanisms that bridge the gap between business risks, control needs and technical issues through a clear framework for accountability related to IT decisions, namely IT governance. It has gained widespread adoption since the Sarbanes–Oxley Act (USA) and Basel II (Europe). The most widely accepted standard is COBIT (Control Objectives for Information and related Technology). COBIT comprises 34 identified IT processes grouped into 4 domains: planning and organizing, acquisition and implementation, delivery and support, and monitoring. The field of IT governance does not engage in IT project alignment issues, but suggests a framework in which alignment issues may be picked up and handled. Haes and Gremberger (2005) provide an illustrative case study in which an IT governance framework is implemented with the goal of achieving strategic alignment. This is an illustrative example of the intraorganizational focus of IT governance in practice.

A more pragmatic approach is the Business Motivation Model – business governance in a volatile world (BMM; Business Rules Group, 2010). BMM aims to provide governance for and guidance to the business policies and business rules. This is achieved by an ends, means and influencers model. BMM is developed for large organizations to be used in the planning phase.

IT service management (ITSM) relates to the field of service delivery. The ITIL (IT Infrastructure Library) is the most
widely accepted and adopted ITSM standard. The aim of ITSM is to create a comprehensive set of best practices for quality IT service management. ITSM is developed for large organizations in stable environments (Lankhorst, 2009).

This brief review of the research into enterprise architecture and IT governance can be summarized though four assumptions:

10. All human knowledge concerning change starts with the ambition to model the change object in question (Zachman, 1997)
11. Most EAs are developed to be used internally in large organizations in stable environments (Zachman, 1987, 1997)
12. EAs are enablers of alignment (Lankhorst, 2009)
13. IT governance defines accountability and decision owners (Haes and Gremberger, 2005)
Summary of previous research
This review of the previous research has been summarized into 13 assumptions. With these assumptions I aim to make explicit my position in relation to the existing work and also to bring out some key contributions that are reused in my design. Figure 4 below provides an aggregated view of my assumptions and the related tools and frameworks.

![Diagram showing assumptions and related tools and frameworks]

Figure 4. Summary of the previous research, my assumptions (A1–A13) and the related tools and frameworks
My IT project alignment perspective
Building on the definitions and assumptions presented, I choose to see IT project alignment as the management task dealing with the relationship between the IT project and the surrounding environment. This activity is of both a strategic and an operative nature and involves working within as well as outside the IT project. I do not consider the traditional strategic alignment categorization between “business” and “IT” to be helpful in the IT project context. Instead, in my results, I will introduce four other core elements to be aligned that are more suitable for the IT project context.
4. Results

In this section, I will present how my model for IT project alignment is designed according to the principles of design science as described by Peffers (2007). Starting with a description of the problem identification and motivation, I list seven problems as a consequence of a lack of IT project alignment. This list is followed by the definition of the objectives for the design artifact defined in order to meet the previously listed problems. Next follows a description of the design and development of the actual design artifact. After the presentation of the design and development follows a rich description of experiences gained using DELTA. This is accomplished by an extensive presentation of an action research study in which I work closely with an IT project manager of an interorganizational IT project.

Throughout the chapter, I continually relate to my previously stated assumptions (A1–A13). Each section is introduced with a suitable quote from design scientist Peffers.

Problem identification and motivation

Define the specific research problem and justify the value of a solution. Since the problem definition will be used to develop an effective artifactual solution, it may be useful to atomize the problem conceptually so that the solution can capture the problem’s complexity. Justifying the
value of a solution accomplishes two things: it motivates the researcher and the audience of the research to pursue the solution and to accept the results and it helps to understand the reasoning associated with the researcher’s understanding of the problem. Resources required for this activity include knowledge of the state of the problem and the importance of its solution.

(Peppers et al, 2007)

During 1998 and 2006, several activities were conducted by the IT Management Research Group at the University of Gothenburg, aiming to increase the understanding of the management of development. These activities included seminars, workshops, literary reviews, case studies and action research. Three large research projects provided the foundation for these activities, namely DELTA, a NUTEK-financed study regarding the management of coordinated development; Plexus, an EU FP5-financed project investigating the management of IOC; and DELTA II, industry-financed applied research regarding EA and the management of coordinated development. The findings from these initiatives have been continuously published in the academic community (see, for instance, Enquist and Makrygiannis, 1998; Magoulas and Pessi, 1998; Enquist et al, 2001 and 2003; Enquist and Nilsson, 2006; Magnusson and Nilsson, 2006; Nilsson, 2008).

Seven overall problems related to IT project alignment are identified. The relevance of these problems is further strengthened by my assumptions and by other researchers. Below follows a description of each of the seven problems as a response to the identification and motivation of the need for the new design artifact.
1 Lack of a shared understanding of the need for the IT project
People involved in an organization will have their own, individual opinion regarding the means to improve their situation and the organization. Their respective individual background, education and role will affect their ability to understand and agree with other interpretations of why and how the organization may change for the better (Enquist et al, 2001).

A challenge for the management of IT projects is the lack of a shared understanding of the needs to be addressed by the IT project among the project participants; this leads to seemingly irrational behaviour as different needs are continuously propagated (Magoulas and Pessi, 1998; Enquist and Nilsson, 2006).

The importance of acknowledging individual perceptions and interpretations and a methodology to do so is extensively covered by Peter Checkland in his ground-breaking contribution soft system methodology, or SSM (Checkland and Poulter, 2010). This is summarized as a lack of a shared understanding of the need for the IT project and supported by assumptions A3 and A7.

2 Lack of an overview of the project situation
A recurring aspect from the IT project manager’s viewpoint is the striving to gain an overview of the project situation (Magoulas and Pessi, 1998; Enquist and Nilsson, 2006). A project containing several parallel tasks involving many people and organizations generates a large amount of communication regarding thoughts, issues,
suggestions, opinions and results concerning the tasks between the project participants and the project manager. In some cases, the communication relates directly to the tasks within the project; in other cases, it relates to something that lies outside the boundaries of the project.

A significant part of the IT manager’s work is occupied with the handling of information and communication that may have an impact on the project (Enquist and Makrygiannis, 1998; Enquist et al, 2001). It is common for project work as such not to be considered challenging; the challenge lies in how the work relates to other parts of the organization (Zachman, 1987, 1997; Lankhorst, 2009).

This is summarized as a lack of overview of the project situation and supported by assumption A3, A7 and A10.

3 Lack of a shared understanding of the project situation
The management of IT projects in interorganizational settings involves working and coordinating many different professionals from different organizations (Enquist et al, 2004a). Most IT projects include to some extent working with unknown variables; these variables become known as the project’s progress (Enquist et al, 2001).

It is challenging to update the project participants continuously regarding the progress and implications from recent development in order to have a shared understanding of the project situation (Enquist and Makrygiannis, 1998; Magoulas and Pessi,
The lack of shared understanding is further enhanced by differences in the ability to understand the project situation and also supported by assumptions A3, A7 and A10.

4 Lack of a shared understanding of development goals
Contemporary organizations are to a large extent goal-oriented (Donzelli and Bresciani, 2003). Goals are formulated on all levels of the organization in order for the management to provide clear direction to the employees and have concrete measurable criteria for follow-up and reward systems (Marchewka, 2009). Goals are included in formal documents used for making decisions. Goals are also a key part in the formal IT project documentation.

The goals in one project or organization may be in conflict with the goals in another project or organization. Goals may be formulated poorly and open to interpretation; they may also be formulated so that only domain experts understand them (Kehr, 2003).

A lack of a shared understanding among project participants regarding the goals within and around the IT project is considered a problem by the IT project managers (Enquist and Makrygiannis, 1998; Magoulas and Pessi, 1998; Enquist and Nilsson, 2006) and also supported by assumptions A3, A7 and A13.
5 Lack of a shared language between stakeholders
As stated many times before in the thesis, the stakeholders in an IT project come from different parts of the organization and from different organizations. Thus, they represent different parts of organizations or different organizations along with different personal areas of expertise, training, education and profession. Consequently, they do not naturally share a common language for expressing themselves in the IT project. Within one field of expertise, experts use similar formal and informal models to define clearly what they mean when they communicate; this is not the case between different fields (Checkland and Poulter, 2010).

The lack of a shared language between stakeholders bridging the understanding between fields of expertise has a severe negative impact on their communication (Enquist and Makrygiannis, 1998; Magoulas and Pessi, 1998). This is further strengthened for example by Pikkarainen et al (2008) in their investigation into communication in agile IOC contexts and supported by assumptions A3 and A7.

6 Lack of coordination between projects
IT projects are commonly run in parallel with other organizational development activities and projects. All IT projects have numerous relationships with their surroundings; the most basic relationship is the project delivery of something to somewhere at the end of the project (Bocij et al, 2008). This delivery is commonly a starting
point for other projects or activities. More common is continuous interdependence between several IT projects and the surrounding organizations concerning resources, investigations, materials, specifications, integrations and not leased decisions.

It is perceived by the IT project managers as a big challenge to coordinate work with activities outside the project due to a lack of mandate, time and insight into these activities (Magoulas and Pessi, 1998; Enquist et al., 2001; Enquist and Nilsson, 2006). This need is further emphasized by Blichfeldt and Eskerod (2008), who describe how large enterprises organize the coordination of projects into portfolios and project offices and supported by assumption A8.

7 Difficulty in meeting both technical- and business-oriented goals
The connection between business and IT is close to classical and has been studied from several perspectives since the beginning of IT usage in organizations. There seem to be good reasons for this as it is also elicited by the IT project managers studied in this thesis as a challenge.

Most IT projects aim to buy or build smart IT artifacts and implement these in one or several processes in order to enjoy better, smarter, faster or cheaper “something” (Lankhorst, 2009). Usually, the affected process and its people will have to be modified as well in order for the solution to work (Langenberg and
Wegmann, 2004). This means that IT projects must always meet technically oriented as well as business-oriented goals in order to be considered successful (Magoulas and Pessi, 1998; Enquist et al, 2001).

This becomes increasingly apparent as it is now (almost always) the business units that are responsible for defining their own requirements for the IT solutions.

The link between technology and business is still perceived as challenging; this is increasingly apparent for the IT project managers when it comes to meeting the corresponding goals. This issue is extensively highlighted in the field of alignment; see, for instance, Henderson and Venkatraman (1999) and assumptions A10 and A12.

Concluding remarks regarding problem identification and motivation

The identified problems and challenges are not unique, but rather found, at least to some extent, in any “normal” IT project. The problems are also identified by other researchers (see, for instance, Drucker, 2007; Emam and Koru, 2008; Chen et al, 2009; Hidding and Nicholas, 2009). The natural tension between people, organizations and work tools such as IT in combination with change has been around for as long as tools, people and change have been around. The fact that the problems are not new or unique underlines their gravity and the fact that they are not easily solved.
Objectives for the solution

Infer the objectives of a solution from the problem definition. The objectives can be quantitative, e.g., terms in which a desirable solution would be better than current ones, or qualitative, e.g., where a new artifact is expected to support solutions to problems not hitherto addressed. The objectives should be inferred rationally from the problem specification. Resources required for this include knowledge of the state of problems and current solutions and their efficacy, if any.

(Peffer et al, 2007)

In this section, the objectives for the solution are derived from the problem definition. Each problem has a correlating (same number) objective.

1 Lack of a shared understanding of the IT project needs
The solution should facilitate a direct and easily understandable view of the project needs that may be shared and discussed amongst the project participants.

2 Lack of an overview of the IT project situation
The solution should provide the project participants involved with a quick, clear and easy-to-grasp overview of the current project situation.

3 Lack of a shared understanding of the IT project situation
The solution should facilitate a direct and easily understandable view of the current project situation that may be shared and discussed with others.
4 Lack of a shared understanding of the IT project goals
The solution should facilitate a direct and easily understandable view of the IT project’s goals in relation to other relevant goals that may be shared and discussed with others.

5 Lack of a shared language between stakeholders
The solution should provide a framework for supporting direct and exact communication between stakeholders.

6 Lack of coordination between projects
The solution should support IT project managers with the coordination and alignment with surrounding related initiatives.

7 Difficulty in meeting both technical- and business-oriented goals
The solution should support the alignment of business- and technology-related aspects.

Design and development

Create the artifactual solution. Such artifacts are potentially, with each defined broadly, constructs, models, methods, or instantiations (Hevner et al. 2004). This activity includes determining the artifact’s desired functionality and its architecture and then creating the actual artifact. Resources required moving from objectives to design and development include knowledge of theory that can be brought to bear as a solution.

(Peffer et al, 2007)

Based on the identified problems and their motivation followed by the definition of objectives for a future artifact, the design of a so-
lution could start. In addition to the identified needs from empirical investigations, my 13 assumptions were also used as input to the foundation of and motivation for the design work. Table 1 is a summary of the assumptions from the section on previous research (p. 16).

Table 1. Summary of my assumptions

<table>
<thead>
<tr>
<th>A#</th>
<th>Assumption</th>
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<tbody>
<tr>
<td>1</td>
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<tr>
<td>2</td>
<td>IT projects are used to realize strategic alignment (Kearns and Sabherwal, 2006).</td>
</tr>
<tr>
<td>3</td>
<td>Shared cognition leads to social alignment, which enables strategic alignment (Tan and Gallupe, 2006).</td>
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<tr>
<td>4</td>
<td>Research in project management lacks an understanding of what is really taking place in projects (Winters et al, 2006; Blomquist et al, 2010).</td>
</tr>
<tr>
<td>5</td>
<td>Research in project management should distance itself from the traditional rationalistic and analytical path (Ivory and Alderman, 2005).</td>
</tr>
<tr>
<td>6</td>
<td>SMEs prefer to use light versions of project management frameworks (Ghobadian and Gallear, 1997; Turner et al, 2009, 2010).</td>
</tr>
<tr>
<td>7</td>
<td>Iterative, collaborative modelling builds understanding and learning (Checkland, 1981).</td>
</tr>
<tr>
<td>8</td>
<td>The goal of PPM is to increase the business value of IT (Martinsuo and Lehtonen, 2007).</td>
</tr>
<tr>
<td>9</td>
<td>PPM is developed to be used internally in large organizations (PMI, 2011).</td>
</tr>
<tr>
<td>10</td>
<td>All human knowledge concerning change starts with the ambition to model the change object in question (Zachman, 1997).</td>
</tr>
<tr>
<td>11</td>
<td>Most EAs are developed to be used internally in large organizations in stable environments (Zachman, 1987, 1997).</td>
</tr>
</tbody>
</table>
As many of the problems were perceived as a consequence of an inability to communicate complex content amongst a diverse group of people, simplicity of the future design was a key aspect. This instantly ruled out any design of a computer-based solution. The type of artifact to be developed naturally moved towards a model despite any explicit choice or decision being made. It seemed a natural choice given the overall objective of reaching a shared understanding of IT projects.

As the design progressed and a model gradually emerged, the need for some instructions became apparent. Starting off as a dream of a new method, the instructions ended up being a set of open suggestions for how to use the model.

The model in itself may be seen as a type of rudimentary architecture for IT project alignment, a simplification of the available tools or a “common denominator model” to be shared in IT projects.

When designing the model, some distinct characteristics from two fields heavily influenced the design.

From the field of EA came the inspiration for using a holistic model for the conceptual representation of the problems at hand. Also, as-is and to-be models were used (Zachman, 1997).

Based on Peter Checkland’s (1981) contributions around soft systems came the inspiration to build a model that welcomes
and treats individual perceptions of the world as individual and thus makes the model completely open to differences in perspectives. This is contrary to most models and the usage of models treating model instantiations as accepted and understood facts.

The design artifact is an adaptation of the DELTA model (Enquist et al, 2001; Enquist and Nilsson, 2006) for IT project alignment in interorganizational IT projects and a set of open suggestions (Startup 1–4 and SitQ 1–6) for using the model (Nilsson and Enquist, 2006; Nilsson, 2008).

Below follows a description of the constituent parts of the model.

**The DELTA model**
The DELTA model builds on four basic elements and their six relationships.

![Diagram](image)

*Figure 5. The DELTA model*
A presentation of the four elements and their six relationships is given below.

**Enterprise images**

Nearly all initiatives related to the development and change of an organization are involved with the usage of conceptual representations, models, of what is to be changed (Zachman, 1987). The main reason to use models is to support communication and shared understanding. In addition, in IT projects, there is extensive usage of models. Models may be used to illustrate system functionality, process follows, monetary flows, system interactions, data and information structures, business models, contextual descriptions and scenarios, to give a few examples.

In many cases, models refer to the context in which an IT artifact produced in an IT project is to operate. It is also common for the IT artifact to be designed in a way that will upset the existing order in a social system and promote a new order (Checkland, 1981). For this reason, enterprise images are used to describe contexts as perceived today, but also desirable future states (as-is, to-be).

An IT project will be modelled from several perspectives by several stakeholders at different times during the project. Some models are compatible with each other and designed to describe different analytical “layers” of an organization; these models are bound together with linkages showing how to move between different layers. The linkages between different models making up a structure for a complete model of models representa-
tion of an enterprise are called enterprise architectures (Ross, 2003; Ross et al, 2006; Lankhorst, 2009).

Formal models may be produced according to clearly defined guidelines and notations (such as UML or RUP), but it is also common for informal models to be produced as a result of the modeller’s sheer intuition regarding what to communicate. SMEs tend to use less formal modelling approaches (Turner et al, 2009, 2010).

The DELTA model element *enterprise images* refers to formal and informal conceptual representations (models and drawings) of the IT project and its surroundings. The models are categorized as either as-is or to-be enterprise images, each representing a perspective of the IT project. The IT project manager must have the ability to work with different conceptual representations of the IT project and continually merge and communicate these into something that is understandable and acceptable for the project.

**Stakeholders**

IT projects involve participants from several parts of the organization, and usually also from other organizations. There are typically representatives both for the task of producing the IT artifact and the roadmaps for organizational changes and for the context in which the IT artifact is to operate once the project is finished.

In addition to the project team, there are also several other people of whom the project manager must be aware, such as steering committees, decision boards, competing project teams,
managers and executives, suppliers to the project and future customers, to name a few.

These people are all stakeholders in the IT project with the ability to influence. They all have different backgrounds, education, jobs, responsibilities, agendas and personal goals and ambitions. Accordingly, they naturally have different frames of reference regarding what the IT project is and should achieve.


The DELTA element stakeholder refers to any person, group or organization that may participate, influence or be influenced by the IT project. The IT project manager must be aware of who the stakeholders are.

**Goals**

Goals are used in organizations to articulate the specific purpose towards which an endeavour is directed. It is common for organizations to have goals ranging from strategic, through operative, all the way down to personal goals of its employees. Additionally, projects and IT projects have goals. The goals may be in line with each other or in conflict.
The articulation of goals is fundamental to managerial practice and included as a major component in nearly all project management methodologies (Kerzner, 2009). The importance of goal consideration is well documented, for instance by Schwalbe (2010) or Liang’s (2010) study of goal conflicts and uncertainty.

The DELTA element goals refers to all the goals that may be related to or have an impact on the IT project. These goals include of course the IT project goals, but also the surrounding organizational goals, competing projects’ goals and goals in partner companies, to name a few.

**Project**

As stated earlier in the section on previous research, the organization of tasks that reside beside the “normal” functions of the organization and referring to them as projects have become very popular (Morris, 2011). Organizations typically run several projects simultaneously, which compete for the same resources and managerial attention.

Projects may be conducted following traditional project management methods, or be organized according to looser, more agile forms (Ljung, 2011). Marchewka (2009) summarizes the literature regarding the specifics of IT projects.

Some projects are run with a complete absence of formal structure; as pointed out by Turner et al (2009, 2010), SMEs have a much lower degree of standardization and formalization in their project management compared with large organizations.
The DELTA element project refers to the specific IT project that is to transform the enterprise from its current state into a more desirable future state.

**Relationships between the elements**

In addition to the four basic elements, the DELTA model comprises six relationships between the elements (R1–R6).

![Diagram of DELTA model relationships](image)

*Figure 6. The DELTA model including the relationships between the elements*

**R1**

R1 acknowledges that each stakeholder has an individual view of and ability to understand various enterprise images. There are always multiple views and interpretations of as-is and to-be enterprise images. In addition, the acceptance of enterprise images will vary among different stakeholders.

**R2**

Each stakeholder has his or her individual view and interpretation of the goals surrounding the IT project. These goals may be per-
ceived by the stakeholder as in harmony or in conflict with other, relevant to the stakeholder, goals. R2 acknowledges that there are multiple goals competing for stakeholder acceptance.

R3
Some goals may be in line with and support the development of the enterprise from the as-is state to the to-be state. Other goals may be in conflict with the enterprise transition from the as-is to the to-be state. R3 acknowledges that the fulfilment of different goals leads to different to-be states of the enterprise.

R4
The work and result from the IT project should be carried out in such a way that it transforms the enterprise from the as-is to the to-be state. In many cases, there are many activities in several projects involved in accomplishing the sought-after transformation.

R5
Each stakeholder has a personal view of, role in and understanding of the IT project and the way in which it is organized. Different stakeholders will accept the IT project and work accordingly; others will not accept the project, or work items in the project, and use their available means of power and influence in order to change it towards their preference.

R5 acknowledges that IT projects are sensitive and that multiple competing interests exist among the involved stakeholders.
R6
There are many goals surrounding IT projects, both internal goals that are directly related but also other goals related to surrounding organizations. Some of the goals may be in line with the IT project; some may be in direct conflict.

R6 acknowledges that there are multiple goals influencing the IT project.

Getting started
In order to provide support for the initial application of the model, a set of open suggestions on starting is formulated. They are made up of four instructions that when followed lead to a DELTA model with the initial project setting broadly defined within the elements of the model. The four suggestions (Start 1–4) are:

Start 1. Draw a basic picture of how you (the project manager) perceive the current enterprise; draw a similar picture of how you see the future enterprise after the successful completion of your project.

Start 2. Make a table, each column representing a stakeholder organization; list all the types of stakeholders within each stakeholder organization. Use column A/1 for the stakeholders in your project.

Start 3. Make a table, each column representing the (same as 2) stakeholders; use column 1/A for your project. Insert the goals per stakeholder (formal and informal) that may have an impact on the project.
Start 4. Visualize your project in a basic process view showing the main steps that are planned.

After completion of the start-up instructions, it is possible to conduct a specific situation analysis of the current project challenges. The situation analysis is conducted with the help of the Situation Analysis Guide, made up of six questions. These questions probe into the relationship between the DELTA elements. By systematically reviewing the answers to these questions, it is possible to search for explanations and solutions to project challenges that are related to project alignment. The six questions (SitQ 1–6) are:

SitQ 1. Do the stakeholders of the project understand and accept the present and future design of the enterprise?

SitQ 2. Do the stakeholders understand, accept and work towards the same goals?

SitQ 3. Do the enterprises’ goals support the future enterprise design?

SitQ 4. Will the project deliver future enterprise design?

SitQ 5. Do the stakeholders understand, accept and work towards the fulfilment of the project?

SitQ 6. Are the goals of the enterprises in line with the project?

These seemingly basic instructions and questions aim to identify how the project is aligned internally, but more importantly also the external alignment with surrounding entities.
Design comments on assumptions from previous research
In order to clarify how my 13 assumptions (previous research, p. 16) have influenced the design of DELTA, I comment on each assumption below.

Assumption 1. There is a strong correlation between the degree of alignment and the organizational performance.

Assumption 2. IT projects are used to realize strategic alignment.

The DELTA model is designed to support IT project managers with the operative task of achieving IT project alignment, thereby enhancing the organizational performance and increasing the strategic alignment.

Assumption 3. Shared cognition leads to social alignment that enables strategic alignment.
The DELTA model is designed to be easy to understand, building on a few, well-known and carefully selected concepts; this facilitates the shared understanding of the model. In addition, the model makes explicit the different world views that each stakeholder has. The combination of an easy-to-understand model with the built-in acknowledgement of multiple perceptions of the world (the stakeholder element) leads to the design of DELTA that includes the facilitation of shared cognition as one of the top design priorities.

Assumption 4. Research in project management lacks an understanding of what is really taking place in projects.

Assumption 5. Research in project management should distance itself from the traditional rationalistic and analytical path.

My research has been carried out as design science and action research in close collaboration with practitioners in order to come as close the “real” problems and issues of IT projects as possible. The approach is qualitative and focuses on how to deal with the messy reality of working with people. I do not distance myself from the fact that people are irrational, emotional and political; instead, the DELTA model is designed as a means to deal with these facts of life rather than deliberately excluding them.

Assumption 6. SMEs prefer to use light versions of project management frameworks.
IT workers in IT projects are used to working with conceptual models and illustrations of various kinds; however, they are reluctant to spend time learning new concepts. The DELTA model is designed to be similar to what they are already familiar with and not to be perceived as heavy and time-consuming.

Assumption 7. Iterative, collaborative modelling builds understanding and learning.

The DELTA model is designed to stimulate the IT project manager to capture issues as they are perceived and position them in the DELTA model in order for other stakeholders to react to them, thus following the core principles of iterative, collaborative modelling.

Assumption 8. The goal of PPM is to increase the business value of IT.

The DELTA model is designed to acknowledge and adapt to impacts from the surrounding project environments.

Assumption 9. PPM is developed to be used internally in large organizations.
The DELTA model is designed to fill the void regarding the lack of easy-to-use tools for the alignment of interorganizational IT projects.

Assumption 10. All human knowledge concerning change starts with the ambition to model the change object in question.

This assumption is the main motivation behind the overall design choice of a model as a foundation for IT project alignment.

Assumption 11. Most EAs are developed to be used internally in large organizations in stable environments.

Assumption 12. EAs are enablers of alignment.

Successful implementation of an EA approach will significantly enable strategic as well as IT project alignment. This is unfortunately not a feasible option for most organizations due to their massive resource consumption. DELTA is designed to provide some of the support also found in EAs, but with a realistic threshold for implementation.

Assumption 13. IT governance defines accountability and decisions owners.
The DELTA model is designed to correlate the formal goals surrounding an IT project with its stakeholders and intended future organization, thereby opening up for a mapping of what the decision owners are working towards, with which specific goal and which specific purpose. This mapping is useful in understanding why IT project participants behave in a certain way.
Demonstration

Demonstrate the efficacy of the artifact to solve the problem. This could involve its use in experimentation, simulation, a case study, proof, or other appropriate activity. Resources required for the demonstration include effective knowledge of how to use the artifact to solve the problem. (Peffer et al, 2007)

In order to establish the usefulness of the model, several tests and demonstrations have been carried out; DELTA is tested for the management of development in IOC reported by Enquist et al (2004a); DELTA is used in an e-government context and expanded with a neo-institutional theory presented by Magnusson and Nilsson (2006); and DELTA is extensively used and tested in an inter-organizational IT project reported by Nilsson (2008). In order to provide a comprehensive view of the DELTA model, the following section includes a case presentation of the action research I conducted aiming to test and evaluate the model.

The project in which the action research took place was situated at Tillväxtverket, a 200-employee government agency in Sweden. Throughout the case presentation, I refer to myself as the action researcher (AR). The AR was part of the project team with the purpose of supporting the project management. The AR was present full time for 6 months during the autumn of 2007 and had an office next to the project manager (PM). Over 500 hours of action research was conducted. The project used the AR for regular project tasks in addition to the project management support; thus, the AR was also accepted as a “doer” in the project. For more in-
formation, also read the chapter on the methodology, research process and action research (p. 14).

During project meetings with partners present, the AR was in the background to capture and document the situation. Project meetings were followed by internal (Tillväxtverket) project meetings with the project manager, and sometimes the whole project team at Tillväxtverket. On these occasions, the AR supported the PM with the modelling of the current project situation following the DELTA open suggestions. This was followed by a discussion regarding the current project management challenges with the ongoing support from the DELTA model. This will be described in more detail later in this chapter. In addition to the scheduled meetings, there were several spontaneous project meetings and discussions each day; in these discussions, the AR was treated as a regular project member.

By continually referring to the DELTA model, I aim to demonstrate the role of the model as a supporting and sometimes enabling artifact in the interplay between the AR and the IT project.

The project took place during 2006–2009 at the headquarters of the Swedish Agency for Economic and Regional Growth (Tillväxtverket, TV). At the time, a clear goal for the politicians in Sweden was to make it easier to start and run your own company in Sweden. Owners of small companies complained about the necessity to allocate a significant amount of time to paperwork, “the administrative burden”, and the many rules and reg-
ulations that must be followed, valuable time that would be better spent on developing the business. “More and growing companies” was a slogan used by many politicians at the time.

As a response to the need for a simplification of the everyday life of a small business owner, one of the public agencies took the initiative to run a project aiming to collect and channel all the government e-services to companies. The guiding vision was to create a one-stop shop for business owners in which they could find “all public e-services relevant to them”. The project was initially called Mitt företag (Eng. My Company), but was later changed to Verksamt.se (Eng. a wordplay combining efficiency and operating).

Verksamt.se was initiated by the Swedish Agency for Economic and Regional Growth (previously called NUTEK, now called Tillväxtverket), a relatively small agency in terms of staff (250 people), but with the important assignment of creating jobs and economic growth in Sweden. Three large public agencies were partners in the project: the Swedish National Tax Agency (Skatteverket); the Swedish companies Registration Office (Bolagsverket); and Statistics Sweden (Statistiska centralbyrå). In addition, Göteborg University (the employer of the AR at the time) was the research partner in the project with the role of supporting the project management. The project was 50 per cent financed through public funding and the remaining 50 per cent was financed by the participating public agencies. The total project budget was 4M SEK.
As a starting point in the case, the DELTA open suggestions are followed: Start 1: Draw a basic picture of how you (the project manager) perceive the current enterprise; draw a similar picture of how you see the future enterprise after the successful completion of your project.

Currently, each agency has its own Internet channel towards the business owners. In this channel, the agency delivers its current e-service offerings. After the project, there will be a portal solution in between the respective agency and the business owners. The solution will enable a single point of contact for the business owners, a one-stop shop.

![Diagram](image)

*Figure 8. DELTA model element enterprise images, Start 1 for project Verksamt.se*
The next instruction is Start 2: Make a table, each column representing a stakeholder organization; list all the types of stakeholders within each stakeholder organization. Use column A/1 for the stakeholders in your project.

There are many stakeholders involved in and around the project. These stakeholders belong to different organizations in addition to their mutual (interorganizational) project.

![Figure 9. DELTA model element stakeholders, Start 2 for project Verksam.se](image)
Start 3: Make a table with columns representing the (same as 2) stakeholders; use column 1/A for your project. Insert the goals (formal and informal) that may be of relevance.

There are several goals within and around the project.

<table>
<thead>
<tr>
<th>Verksam.se (the project)</th>
<th>Tillväxtverket</th>
<th>Skatteverket</th>
<th>Bolagsverket</th>
<th>Politik/policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-stop-shop</td>
<td>More and growing enterprises</td>
<td>Make it easy for people to “do what is right”, give everybody the opportunity to do so</td>
<td>Offer easy-to-use and effective systems for registration of company and improve entrepreneurship by qualitative information services</td>
<td>Economic growth Jobs Entrepreneurship Simplification of rules</td>
</tr>
<tr>
<td>Single sign-on</td>
<td>Strengthen regional growth</td>
<td>Focus resources on areas with high likelihood of tax-mistakes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counseling services</td>
<td>Easier to start and develop companies</td>
<td>Intensified collaboration with other public agencies at a national and international level</td>
<td>The “zero-vision” (no ques)</td>
<td></td>
</tr>
<tr>
<td>Cases/services</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interactive businessplan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 10. DELTA model element goals, Start 3 for project Verksam.se*

Start 4. Visualize your project in a basic process view showing the main steps that are planned.

The project (Verksam.se) is planned according to a traditional “waterfall” model.
When combining the four elements, showing the aggregated result of the open suggestions, the following model emerges (Figure 12, complete DELTA). Now we have an overview of the project on the basis of the four elements.

The next step will be to articulate the specific challenges and issues in the project and search for potential solutions to these challenges by investigating the relationship between the elements.
Project issue 1: Start-up problems

The project plan was written as part of an application for project funding. All the project participants contributed to the writing and received internal acceptance in their respective organizations. After the positive decision to grant 50 per cent cost coverage through external funding was received, formal start-up activities were conducted. A steering committee with representatives from the partner organizations was put together, the project plan was revised, people were recruited to the project and everything was set to go.

The PL initiated the project by inviting the project participants to a meeting with the purpose of going through the project
plan in order to add more details and plan the work to collect the system requirements of the system to be. The participating organizations sent a large amount of people to the meetings, but for some reason, the work did not pick up.

Meeting after meeting was backed by intensive mail correspondence with avoiding answers like “this must be further investigated” and “I think we may have something similar, let me get back regarding this” from the partners. It was clear to the PL that something was obstructing the work, but not what it was.

The PL did not find any support from the formal project plan or the project management methodology that was applied (PPS developed by Tieto) in finding a means to resolve the situation. The project partners simply did not start any actual work and did not communicate the reason for their (lack of) actions.

This was perceived as very frustrating for the PL and an obvious threat to the whole project. The identification and explanation of the start-up problem were the first challenge for DELTA situation analysis one.

Working through the questions (SitQ 1–6) with the PL and the project team at TV resulted in a deeper understanding of the respective project team workers’ individual understanding and interpretation of the current project situation. The majority of the discussion was built starting from the stakeholder element and an opinion of how that element related to the others (SitQ 1, 2 and 5).

It was clear that the key stakeholders, the project workers from the partner organizations, were not achieving anything,
but to the surprise of the PL, the reason for this was not to be found in (1, 2 or 5). Instead, it was SitQ 3 (Do the enterprise goals support the future enterprise design?) that opened the way for an explanation.

Figure 13. DELTA model showing project issue 1

Despite the fact that the partnering organizations had agreed to participate in the project, they had not planned for how the project results may impact on the existing organization after the completion of the project. The project was to develop a portal solution towards citizens running their own business; this was perceived as a threat to the current existing web fronts that each partner already had towards the business owners. It was very unclear to the project workers whether this was to be a complement, competition or replacement of the existing channels. The project workers had leading positions in maintaining their current web fronts and were thus quite uninterested in developing the replacement of their own do-
main. For this reason, they had a very difficult time starting working and contributing to the project. This may be explained in DELTA terms as a conflict between the individual goals found in the partner organizations and those found in the future enterprise (SitQ 3), resulting in problems manifesting themselves in SitQ 1, 2 and 5.

Once the issue was clear to the PL, it was directly taken to the steering committee and explained (with support from the DELTA model). The PL did not see this as an issue for the project, but rather as something that would be better managed elsewhere. The steering committee was assigned the “homework” of harmonizing its channel strategy with the future output of the project and communicating the result of its efforts to the project workers. However, the steering committee members failed to obtain an internal agreement around a decision on how to treat the future output of the project. This resulted in the problem ending up back in the lap of the PL with clarification that no decision to implement/go live with the future project result had been taken.

What happened next was a little surprising. The PL described the failed attempt that had been made towards the steering committee as he perceived it. Despite not presenting a solution to the problem, but rather explaining it by presenting the attempted solution through escalation and expressing understanding of the project workers’ dilemma, the PL actually “won them over”.

To the surprise of the PL, work started to progress and things started to happen. The PL suspected that the “failed” steer-
ing committee attempt had initiated informal discussions locally in the respective partner organizations’ IT departments and that this resulted in a working protocol for the project members.

This is an example of how a DELTA situation analysis can help identify and make explicit a project issue, when the issue lies outside the project but manifests in actions by the stakeholders in the project. The issue is a good example of a lack of alignment between the project and the surrounding organizations.

Project issue 2: Difficulties agreeing on an interpretation of the requirements

After sorting out the general and high-level issues in the project, it was time to move into more detail regarding the concrete requirements of the future system. The PL was under the initial impression that the overall system functionality was described well in the project plan that was written when applying for external funding, and that the only unknown requirements had to do with integration and interoperability issues with surrounding systems. This was not a generally shared view of the requirements in the project group. As the initial cramp (issue 1) was released, all of a sudden the participants started to become more and more active and creative: a little too creative from the viewpoint of the PL. During the meetings, functions and “cool features” were suggested continuously, regardless of the agenda. The project had become an unfortunate target for “any good idea hard to fit anywhere else”.

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There was a clear need to focus the discussion on the project-relevant requirements in order to narrow them down and reach decisions on what to include and what to exclude. There were no reference points to use when arguing for or against specific features and functions. Ownership of the project and the mandate to make operative decisions were unclear. The participating organizations financed their own participation, and the majority of the other project funding was from a public financer, not TV. The PL attempted to refer to the formal documentation as a way to take control of the meetings, but this did not help. Going to the steering committee was not an option since the PL considered the issue far too operative.

The action researcher assisted the PL in describing the problem with the DELTA model through usage of the SitQ 1–6. The problem was clearly manifesting in the DELTA element project, in which work did not progress due to the many “good suggestions” from project stakeholders (SitQ 5) regarding the future view of the enterprise image (SitQ 1).
Given the DELTA overview of the situation, and some potential areas in which to search for a solution, the PL decided to drop the attempts to find a solution building on formal documentation or escalation of the issue (SitQ 5). This was partly based on previous experience from such an attempt during issue 1. Instead, the PL focused the discussions on more detailed descriptions of future enterprise images, probing into detailed likely use-case scenarios. The project partners were asked to back function suggestions with the estimated need for the function in question (based on experience from their already existing channels, i.e. current enterprise images). By making the project participants articulate proof, references or arguments for specific functionality, the discussion came back on track as mere personal dreams of functions were kept private. The main reason that this issue occurred in the first place was that several participants did not have experience of early phases of
software development-related projects and did not understand the natural boundaries for discussing requirements.

This is an example of how an unknown variance of experience leads to significant time loss in the project as a result of irrelevant discussions. DELTA supported the PL in gaining an overview of the problem and identifying a possible cause. Furthermore, DELTA helped the PL in discussing several solution attempts and finally making the decision to focus the discussion on solution-related descriptions as opposed to pursuing a formal attempt to resolve the situation.

Project issue 3: Difficulties working according to the project plan

After working through issues 1 and 2, the project was now well on its way with participants working more or less together towards a more or less agreed upon solution. However, it became increasingly apparent to the PL that the formal documentation for the project was becoming operatively irrelevant. The project plan that was used to sell the project to financers and partners described something that was completely different from the solution that was pursued by the project workers. There were some common keywords and overlaps, but the result from issue 1 (how the future solution was to co-exist with other Internet-based channels between respective agency and business owner) remained unsolved, resulting in a drift of scope as described in issue 2 (difficul-
ties agreeing on requirements). As a consequence, the PL ended up with two projects: one formal project following the formal plan, reporting progress according to plan and receiving funding according to plan; and one informal project in which the actual work was conducted, building a compromised solution that was formally unsanctioned. The informal project did (of course) not have a project plan or any other formalized structures to follow; it simply happened as work occurred. The PL felt he was missing all means of project control.

The action researcher assisted the PL in capturing the situation in the DELTA model as a first step in finding a way forward. Put in DELTA terms, the PL perceived that he had two separate projects instead of one. The formal project had formal agreement from the participating partners and was “on paper” aligned with the partner organizations’ goals (SitQ 6). However, the stakeholders refused to work according to this project due to the many uncertainties regarding how the solution would affect the existing channels (SitQ 4 and issue 1). On the other hand, the informal project was not aligned “on paper” with the partner organizations’ goals (Sit Q6), but was perceived as acceptable by the active project stakeholders; the project result was perceived as fairly unclear but still acceptable (SitQ 4).
Figures 15 and 16. DELTA models showing project issue 3

Combining the two situations in an aggregated DELTA model gives an almost comical view of the situation.

Aggregated project situation

Figure 17. DELTA model showing aggregated project issue 3

Given a better overview of the situation by modelling according to DELTA, the PL took a number of actions in order to take back the
initiative and control of the project. First of all, the PL made an informal formalization of the informal project, a project plan for the informal project that was not shown to anyone. In this plan, the PL wrote down and structured the project in order to capture, collect and structure various thoughts and actions made by the project participants into something that is possible to follow up. This action was taken as a response to the SitQ 6 issue.

Another action was to make full use of the fact that TV owned the formal project budget. This fact was used by the PL in choosing the external consultants and specifying their assignments and at the same time minimizing the budgetary support for all the other “great ideas”. This action was an internal project action in the DELTA element project.

The PL also started to meet the participants on a more individual basis as opposed to larger gatherings. In these meetings, the PL steered the discussions towards the integration issues with the surrounding organizations and systems. The PL took the liberty of explaining his “interpretation” of the surroundings in a way that caused the partner in question to conform to the formal project plan. In DELTA terms, the PL used his “interpretation” of the future enterprise images in order to steer a specific stakeholder from informal project activities towards the pre-agreed formal project (SitQ 4).

These actions resulted in (the PL having) an increased feeling of being in control of the project(s) as the work to an increasing degree started to relate to the formal plan.
Project issue 4: Difficulties managing power imbalances between project partners

The partner constellation in the project included very big and fairly small public agencies. The big agencies (BV, SkV and SCB) were at the time all recognized as the forerunners in the e-government race to launch a steady stream of innovative e-services to the citizens, especially SkV. The small agency (TV) did not have the same reputation and e-government service track record, but it was TV that was formally the project manager of the project and thus was operatively responsible for the project. The “weakest” stakeholder in the constellation was “in charge” of the project. The size asymmetry affected the project in, for the PL, unexpected manners.

The bigger partners did not use their superior size and accompanying power to push issues directly (which would have been easy for them to do on a number of occasions); on the contrary, their representatives almost went out of their way not to step on any toes. This, however, only relates to the toes of the PL and other representatives of TV. Towards each other, the tone was somewhat different. Approximately halfway through the project, differences of opinion escalated between the larger partners, causing hold-ups due to a lack of decisions.

Using the DELTA model, the PL and the AR identified a number of collaborative issues in which the two large agencies failed to agree on fairly simple matters, causing hold-ups and delays in the work (SitQ 5). The hold-ups and problems came from
an excessive focus on details regarding how the system was to operate through continuous requests for more information (SitQ 4).

The PL was unable to find rational explanations for the hold-ups and a more careful investigation led to the insight of other projects in which the two agencies were in disagreement. Their behaviour in this project was simply another arena for conflicts residing elsewhere regarding opinions on how the government was to support the overall transition to an “e-government” (goals and enterprise images).

As a solution, the PL deliberately expanded the scope of the discussions within the project constellation to include a wider perspective of what was happening in the surroundings. This naturally brought up projects and initiatives in which conflicts resided as project partners gave their explanation of other relevant initiatives. As project partners naturally could speak more directly regarding the other projects and what was taking place there, a mutual con-
sensus of compromise emerged regarding how the project was to view the other projects.

This is another example of how DELTA may be used to track and analyse project issues that reside well outside the boundaries of the collaboration and by doing so lead to project actions for pushing forward.
Experience

Observe and measure how well the artifact supports a solution to the problem. This activity involves comparing the objectives of a solution to actual observed results from use of the artifact in the demonstration.

(Peffer et al, 2007)

The DELTA model has been used on several occasions (see Enquist et al, 2004a; Magnusson and Nilsson, 2006; Nilsson, 2008), providing rich descriptions of experiences from practitioners. In this thesis, the experiences presented are based on the case from the demonstration section and from the DELTA II project following the AR cycle guidelines for the demonstration and experiences step as described in the research process.

The experiences are divided into two sections, mid-term and final. The mid-term experiences build from project DELTA II with project managers/consultants from defence contractor Saab Combitech (www.combitech.se) and Saab Systems (www.saabgroup.se) conducted during the spring of 2007. These experiences led to three concrete design actions. This design is implemented in the final presentation of experiences that is conducted in the case presented in the demonstration section.

Mid-term experiences
Demonstration of the artifact in a defence industry SME revealed a set of flaws regarding what the model was actually to be called, but also, more importantly, how to use it. At the time, the model was called “DELTA – a meta-architecture for proactive management of
complex IT- and organizational development”. The elements were the same except the goals were called development goals and the projects were called development processes. There were no supporting structures for using the model, only “funny-looking” researchers. The research had a slightly different focus, attempting to encompass a complete grip on the complexity surrounding IT-facilitated organizational development.

As the model was presented, demonstrated and used, it was clear that most practitioners perceived the activity as very valuable for generating interesting content but there were some key flaws that inhibited practitioners from using the model themselves without support. The practitioners were unable to fill the model with content. It was perceived as easy to follow when a researcher led the discussions, continually updating the model, but once left to the practitioners, there was no progress.

Illustrative statements:

It is difficult to get started.

(Per Winroth, senior consultant, Saab Combitech)

It is difficult to know the right level of detail in the boxes.

DELTA gives me a quick diagnosis of the current situation. In many cases, it is the identification of what I do not know that is most valuable, a perspective of existing foundation to base decisions on.

(Per Göran (PG) Nilsson, Saab Combitech)

It is so big, there are so many things … I don’t know where to start.
However, there seemed to be a genuine interest in the model and in discussions based on the model and willingness to pursue the development. This was most noticeable in a concrete request to repackage a ready version of the model into a consultancy service offering towards the defence industry based on the model.

At the time, though, it was clear that the artifact was not easy to use or pragmatic; this triggered the following redesign:

**Change of scope from “support of coordinated IT-facilitated development” to IT project alignment**
This decision is motivated by the fact that the practitioners instantly fell into talking about development in the form of active concrete projects, and that once a project was the focus, all of a sudden, a great deal of concrete modelling and discussions took place.

**Expansion of scope from intra- to interorganizational**
This decision is motivated by the fact that discussions regarding stakeholders outside the organization occupied a lot of attention and seemed to be a cause of a lot of frustration and lack of structure.

**The design on open suggestions to get started**
This decision is motivated by the fact that it only required a small amount of engagement from the researcher in order to trigger discussions and analysis based on the model. A set of open suggestions starting up the process on the way was seen as an easy solution. The design of a rigorous method for using DELTA was not an option since this would add to rather than reduce the burden of the IT project managers (having to learn yet another method).

**Final experiences**

The experiences from using DELTA are structured according to the previously defined objective. This is followed by a presentation of experiences of the complete artifact along with a summarizing table.

Experiences related to Objective 1: The solution should facilitate a direct and easily understandable view of the project needs that may be shared and discussed amongst the project participants

DELTA enables IT managers to reason regarding the needs and motives for the IT project from several perspectives. This was perceived as a distinct advantage compared with other approaches that treat statements as absolute.

The project managers were quickly able to identify formerly hidden aspects of conflict due to differences of opinion regarding how the enterprise is run today.
Through a systematic process of reviewing the needs from several perspectives, an increased overall understanding of the needs is shared; this leads to balanced and accepted compromises.

Experiences related to Objective 2: The solution should provide the project participants involved with a quick, clear and easy-to-grasp overview of the current project situation

By quickly “drawing the project in the DELTA boxes”, as one project manager expressed it, an instant helicopter view was given that was perceived as very helpful.

DELTA was thought of as basic, but still able to capture complex, non-apparent lock-ups. The project leaders appreciated the ability to move between internal and external issues that had an impact on the project in a broad sense.

By using DELTA, the managers felt that they were provided with a systematic update of external factors that may potentially have a negative impact on the development work.

Experiences related to Objective 3: The solution should facilitate a direct and easily understandable view of the current project situation that may be shared and discussed with others

The IT project managers were able to collect multiple input from several sources regarding the current situations and
aggregate these into the DELTA model. The model was then presented to the involved stakeholders when planning and following up work. This was perceived as helpful when explaining the project situation to less experienced participants.

It was not possible to document any details regarding domain-specific issues in the model, but on a high level, the managers appreciated the ability to show and explain related activities and their interdependence to involved stakeholders.

In many cases, the IT project managers used the DELTA model in their progress reports to their steering committees.

Experiences related to Objective 4: The solution should facilitate a direct and easily understandable view of the IT project’s goals in relation to other relevant goals that may be shared and discussed with others

The simple inventory of goals surrounding an IT project is seen as helpful and on many occasions generated a surprising number of goals to be taken into consideration. The identified goal conflicts were perceived as highly sensitive and political.

In the interorganizational IT projects, the project managers were under the impression that goal conflicts are seldom unknown to all, but sometimes kept hidden due to political reasons. When using the DELTA approach, goal conflicts were identified and apparent to all. This received both positive and negative reactions from the managers due to the sensitive nature of the conflicts.
In summary, DELTA is perceived to support the identification and correlation of the relevant goals surrounding the IT projects, but fails to provide a means to share and discuss the identified goals.

Experiences related to Objective 5: The solution should provide a framework for supporting direct and exact communication between stakeholders.

With the use of DELTA, IT project managers were able to put their individual mental models and notations regarding the project into a context that made them understandable to other participants in the project, mainly non-technical decision makers. This was perceived as very positive. The result was that stakeholders were able to understand and contribute to the discussion with almost no knowledge or training in the DELTA model (as long as the discussion was led by someone experienced in DELTA), and could instead focus directly on the issues at hand.

One challenge with using the DELTA model was that since it builds on four key elements with names that are also very common in other IT-related areas, in many cases, first-time users of DELTA thought that they understood the model (since they recognized the names of the elements), and did not pay attention to the necessary short instructions and open suggestions.

In order to use DELTA, the managers noticed the importance of first notifying, planning and preparing the audience.
Experiences related to Objective 6: The solution should support IT project managers with the coordination and alignment with surrounding related initiatives

DELTA provided good support in the identification of external initiatives that had an influence on the project. Furthermore, DELTA supported the IT project managers in taking actions within the project based on identified external initiatives, aligning the project in accordance with external influences.

However, the alignment taking place was almost exclusively a one-way adaptation of the IT project to the environment; few examples exist of the external surrounding initiatives being adapted and aligned to the IT project.

This may in some part be explained by the fact that only IT project managers were testing DELTA; given different roles and functions of the testers from other parts and functions of the organization may have given a different result.

Experiences related to Objective 7: The solution should support the alignment of business- and technology-related aspects

The IT project managers appreciated the seamless and natural capability of the DELTA model to treat business- and technically oriented areas together. The model makes no difference
between the two, and was perceived as a bridge between “the engineers and the business people”.

The challenge of combining business and technology content is perceived as a continuous challenge for managers from both camps. DELTA was seen as a (surprisingly) fresh, new piece in the puzzle of managing IT projects and actually delivering the intended result.

Experiences related to the complete artifact:
The overall impression of DELTA is positive. IT project managers have especially appreciated the ability to gain a quick view or picture of the current project situation regarding aspects that are not captured by the traditional project management methodology. The main strength of the model comes from the ability to treat all stakeholders, with their respective perspective, individually. This provides a nuanced view of project tensions that is considered relevant for the IT project managers. Below are quotes from Kalevi Pitkanen, project manager at Verksam.se and head of unit business information at Tillväxtverket (previously called NUTEK), made during the autumn of 2007.

A model building on the fact that people think and understand differently seems attractive.

Most parts of these projects are still just politics, but with this [the DELTA model] you can get a view of the politics.

DELTA helps me to quickly get an overview of the project and its surroundings.
DELTA is easy to understand, but also easy to misunderstand due to the commonly occurring names of the DELTA elements. The question of whether DELTA is easy to use is difficult to answer. During the research programmes, DELTA’s IT project managers relied on the researcher to lead the DELTA analysis; it is difficult to estimate DELTA usage once the researcher has left.

I like the fact that the model is simple, but actually not so simple … easy to misunderstand and run ahead instead of taking it nice and easy. You need help taking it nice and easy, to systematically tick things off.

When you [the researcher] are gone, the question is if we really will use this … It is good to have someone to talk to.

A negative aspect of DELTA is the tendency to “overcontemplate” and search for issues that are not there; this may even provoke new issues. IT project managers agree that DELTA is to be used regularly, but not “too regularly”. Others argue that DELTA is better suited to be a back-up tool to be used in projects that are already astray.
5. Discussion

In this chapter, I will recapitulate the research objective, show how the DELTA model can be used to position other intellectual instruments and present and discuss three main findings.

At the beginning of the thesis, I formulated my research objective as follows:

… designing a useful model for IT project alignment in interorganizational IT projects. The model is to be used by IT project managers as a complement to the IT project management methodologies in use.

(p. 6)

Building on previous research primarily from the fields of strategic alignment, enterprise architecture, project management and project portfolio management (see figure 4, p. 23), the DELTA model has been adapted to the specific context of IT project alignment.

It is possible to position other frameworks within the DELTA model. This illustrates where other intellectual instruments may provide support for a specific issue positioned in the DELTA model. Portfolio management deals with the DELTA relationship between the projects and enterprise images elements; goal modelling is concerned with the relationship between the DELTA elements goals and projects, to give two examples.
DELTA itself is made up of four basic elements that enable the positioning of IT project alignment issues. By using the DELTA model, IT project managers are provided with a means to visualize and position alignment issues in a larger frame of reference. The larger frame of reference facilitates communication regarding the issue between the stakeholders involved in the project.

By facilitating the communication related to the issues, possible solutions to the issues follow as a natural consequence. Thus, the usage of DELTA is an enabler of IT project alignment.

Below follow three key findings explained in combination with associated implications for research and practice. These are followed by an account of the limitations of the study and a call for further research.
Finding 1: IT project alignment is supported by conceptual integration

As new methods, models and frameworks for organizational development emerge, so does the potential for producing increasingly accurate and clear expert descriptions of complex environments. The descriptions work well inside one area of expertise, but as the precision in models and frameworks increases within a domain, the models’ usefulness outside this domain decreases due to their natural increase in complexity. The relationship between models and degree of complexity is a well-known phenomenon within systems theory (Magoulas and Pessi, 1998).

My thesis presents a model aiming to capture a useful simplification of the complex interorganizational IT project context. The model builds on the notion that people have different perceptions of the world that need to be taken into consideration in order for collaboration to run smoothly. This need increases together with the number of people collaborating and with the complexity of the collaboration as such.

The appetite for complex, IT-mediated collaboration is ever-increasing as organizations strive to increase their specialization, streamlining and internationalization. In order to meet this situation, there is a need for a tool facilitating conceptual integration between people.

My thesis shows the benefit of conceptually integrating different world views using a common, easy-to-understand set of
basic principles. This is a prerequisite for trying to discuss and solve the issues as such.

The implications for management of finding 1:

- Reduction of the complexity between IT project activities and their surrounding environment can be aided through a systematic approach supported by a basic model.
- Misunderstandings and misinterpretation of models are commonly occurring due to similar semantics in different models.

The implications for research of finding 1:

- There is a need to pay increased research attention to the utility of models in practice and how they may be combined in a design science approach.

Finding 2: IT project alignment is not naturally occurring and difficult to achieve

IT development initiatives are to a large extent organized and carried out in IT projects. Traditional measurements for determining whether a project is successful or not are based on time, budget and scope. One way of seeing these success criteria is that they are solely focused on the internal, i.e. the efficiency of the projects as such. IT projects seem to have a natural tendency to minimize external interaction, or to formalize it, and focus solely on an agreed project plan. The reasons underlying this have been discussed previously in the literature (Ljung, 2011).

Due to the uncertain, dynamic, interorganizational and complex nature of most IT projects, a lack of continuous communication between the project and its surroundings leads to the risk
of the end-result not being aligned with its surroundings. This is the core of the necessity for IT project alignment.

As long as the traditional project model is in use, IT project alignment initiatives run the risk of being seen as counteracting the efficiency of the very projects they aim to align. This indicates a potential conflict in the models used for managing IT projects and IT project alignment.

**The implications for management of finding 2:**

- Remove any incentives for not communicating operational project issues in the current project model.
- IT project alignment will not happen without a particular focus being directed towards achieving it.
- IT projects run particular risks of not being aligned with the business objectives and goals.
- IT projects run particular risks of being attributed badwill due to unintended and unexpected effects on business.
- Where possible, establish functions above projects with a top management mandate to “do IT project alignment”; it may be a natural expansion of a project office/project portfolio management function. For alignment with interorganizational issues, the collaborative arrangements as such (partnership agreements, etc.) could be assigned the mandate described above.

**The implications for research of finding 2:**

- Direct research attention to the conflict between operational (internal efficiency) management and external efficiency directed management.
- Treat IT project alignment as a potential enabler of strategic alignment.
- Integrate IT project alignment tools with strategic alignment measures in order to make IT project alignment part of larger alignment studies.
Finding 3: There is a gap between project issue manifestation and actual project problems

IT project managers are constantly receiving input regarding project participants’ behaviour and actions. However, my results show that there is a significant gap between how issues manifest themselves in the project and what the actual problem is. IT project managers who focus solely on resolving the issues as they are manifested, without attempting to trace the underlying reasons for the issues, run the risk of sub-optimizing their management efforts by resolving symptoms instead of actual problems.

The implications for management of finding 3:

- There is a difference between project issues and project problem symptoms that IT project managers must be aware of and learn how to separate.
- Project problem symptoms become real project issues if they are treated as such; this leads to the unfortunate creation of new problems and significant sub-optimization of project work.

The implications for research of finding 3:

- Investigate the correlation between project symptoms and project issues.

Limitations of the study

As with the very IT projects I have described, my PhD may also be seen as a form of IT project with many of the same issues and challenges. The fact that the research builds on three separate research programmes spanning a long period of time and involving different types of organizations makes it difficult to conduct de-
tailed comparisons between the programmes; as a result, my arte-
fact is tailored only to the last research programme, DELTA II.

The choice of research programmes and scope has also been influenced by the availability of research funding and grants. The relatively long period of time has also resulted in a change of supervisors and university, which has added to the dynamics of external influences on the PhD project’s scope and methodological framing.

Throughout my research, I have followed a qualitative research approach; it would be interesting to complement my studies with a more quantifiable, positivistic approach, in order to determine whether it is possible to strengthen the validity of my findings further. This has, however, not been included in the thesis.

The action research only entailed collaboration with IT project managers; however, many of the issues discovered when using DELTA would potentially be of value for other stakeholders surrounding IT projects, such as managers of project offices. These have not been included in the study, but are a suitable target audience for continuation.

Call for further research
My research results open up a number of interesting future research opportunities. These are summarized into three suggested future research projects:

**Project 1: Linking operational with strategic alignment**
This project aims to further the context-specific understanding of IT project alignment issues and relate these to the body of knowledge regarding strategic alignment. The extensive strategic alignment measurement approach and maturity model development carried out by Luftman (2000) will be complemented by an operative understanding from the project perspective. The project will result in:

A suggested expansion of the strategic alignment maturity model (Luftman, 2000).

Context-specific guidelines for using the DELTA model.

**Project 2: DELTA + SCRUM**

The benefit of agile approaches in software development has gained massive popularity during recent years (Chow and Cao, 2008). However, agile approaches to project management outside the domain of software development have not received the same impact (Gustavsson and Rönnlund, 2010). This design science project aims to integrate the DELTA model with agile principles in order to combine the benefits from shared cognitive understanding (Tan and Gallupe, 2006) and an iterative, quick-delivery low-administration approach. The project will result in agile guidelines or methodology for DELTA.

**Project 3: Further the understanding of misunderstandings**

The perceived understanding and repeated misunderstandings among stakeholders in IT projects are continuously one of the
main causes of IT project failure (Holtzblatt and Hugh, 1995). This project will continue the work initiated by Enquist and Makrygiannis (1998) exploring the underlying reasons for misunderstandings. The project will result in a deeper understanding of when and why misunderstandings occur and how they may be avoided, or at least minimized, in the future.

**Project 4: Validating the DELTA model**

My thesis proposes a model for IT project alignment based on an adaption of an initial model. This project proposal aims to validate this model by conducting an extensive action research study on two comparable sites: one site using the DELTA model and the other relying on traditional IT project management tools. The project will complement my presented experiences with a solid validation of the model without the interference of continuous redesign.
6. References


Benko, C. and McFarland, F. (2003) Reducing the risk by managing chunks: Breaking projects into smaller, more manageable chunks reduces the risk of failure and allows companies to better align their project portfolios with corporate strategies. CIO, 16 (12), 1.


projects and to do them right. Project Management Journal, 37 (2), 38–50.


ITIL. (2011)


Liang, T. (2010) Applying fuzzy goal programming to project management decisions with multiple goals in uncertain


Appendix 1. Position of DELTA in relation to existing frameworks

The table below makes explicit the position of DELTA in comparison with the existing frameworks. As can be seen, no other framework has the configuration to focus on project managers of interorganizational projects with a low level of complexity in the model leading to a low barrier to usage.
<table>
<thead>
<tr>
<th>Tool</th>
<th>Aspect</th>
<th>TOGAF (EA)</th>
<th>COBIT (IT Governance)</th>
<th>PMI (Proj. Man.)</th>
<th>BMM (Business Motivation Model)</th>
<th>My Artifact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational context</td>
<td>Large intraorg.</td>
<td>Large intraorg.</td>
<td>Intraorg.</td>
<td>Large intraorg.</td>
<td>Interorg.</td>
<td></td>
</tr>
<tr>
<td>Audience</td>
<td>Enterprise architects</td>
<td>Top management</td>
<td>Project managers</td>
<td>Business developers/analysts</td>
<td>Project managers</td>
<td></td>
</tr>
<tr>
<td>Complexity of model</td>
<td>Very high</td>
<td>Very high</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Cost for using</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Situation when used</td>
<td>Continuous in operations</td>
<td>Continuous in operations</td>
<td>Continuous in project</td>
<td>Planning of business development</td>
<td>Continuous in project</td>
<td></td>
</tr>
<tr>
<td>What is it?</td>
<td>“Complete”, layered blueprint or meta-model of an enterprise showing how different models relate to one another</td>
<td>Framework for management and accountability of decisions</td>
<td>Framework for how to organize resources according to time, budget and deliverables towards a predefined scope</td>
<td>Static planning tool for modelling the motivation of business development activities from a business rules and governance perspective</td>
<td>Pragmatic model for aligning inter-org projects with dynamic external environment</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 2. Presentation of the papers

In appendix 2 follows an introduction to the papers included in the thesis. The introduction comprises a brief description of how the results from the paper have been used and further developed in the thesis. Below, Figure 21 gives an overview of the papers’ relationship to one another and my thesis as a whole.

Figure 21. Papers included in the thesis and their contribution
## References to included publications

**Table 3. Papers included in the thesis**

<table>
<thead>
<tr>
<th>Paper #</th>
<th>Reference</th>
</tr>
</thead>
</table>
Paper 1 Title: DELTA – An architecture for management of enterprise development


Position in the thesis:

The paper presents the first scientific publication of the DELTA model. My thesis builds on a continuation and delineation of design work around the model presented in the paper. For this reason, the paper provides a valuable introduction to the main building blocks of the model and a description of the research leading up to these.

The empirical results point to the shortcomings in existing management instruments to address the large variety of issues that are possible causes of development failure. The results also identify a variety of issues and their interdependence. The interdependence aspect of issues is something that I use and elaborate on extensively in my thesis.

Abstract:

Management of enterprise development refers to the complex task of transforming an enterprise from one state to another (desirable) state in a controlled manner. This paper presents a framework that enables the systematization of empirical as well
as theoretical knowledge contributions relevant to the management of enterprise development. The framework is validated theoretically as well as empirically. The framework has proved effective to systemize and relate this variety of issues and provide a tool for comprehensibility for practitioners trying to grasp the development situation in which they are engaged. The framework is a valid foundation for elaborating a knowledge base supporting the management of enterprise and IS development in complex organizations.

Keywords: Management, Development, Architecture

My contribution to the paper:
I wrote 50 per cent of the paper with a focus on the introduction, method and discussion sections.
Paper 2 Title: SME network practice – A qualitative study of network management practice and design implications for ICT support


Position in the thesis:
This paper expands the context of IT projects from something performed within one single large organization bridging business and IT departments into an interorganizational context. IT projects are conducted in collaboration between several organizations bringing their unique resources into the collaboration. The paper introduces three different ways to arrange IT-mediated collaboration between SME companies within the European Union. In my thesis, I further the thoughts regarding multi-stakeholders and political perspectives introduced in the paper.

Abstract:
This paper presents the results of an investigation of network practice among European small and medium-sized enterprises (SMEs). The purpose is to assess network management practice and design implications for information communication technology (ICT) support. The investigation consisted of 49 inter-
views with individuals employed by 19 SMEs that either were or had been involved in a network co-operation with another separate juridical entity. These were complemented by a questionnaire answered by 121 respondents fitting the same criteria as the individuals interviewed. We provide a rich description of the vast diversity in SME network management practice and ICT use. From the collected data, three generic network profiles are identified (“supply-chain networks” (SN), “R&D networks” (RN) and “business networks” (BN)). The three network profiles are structured and analysed through the use of an established IS architecture framework. This provides a holistic view of ICT design implications for the network profiles structured in three architectural levels, namely the scope, enterprise and systems level.

My contribution to the paper:

I wrote one-third of the paper with a focus on data collection, analysis and the introduction and results sections in the paper.
Paper 3 Title: Change management implications for network organizations


Position in the thesis:
The paper illustrates how the DELTA model can be used in order to move from general to specific management actions. The notion of using the DELTA model as a guide to specific management actions is further refined in the thesis as the model is redesigned towards IT projects.

Abstract:
The purpose of this paper is to investigate possible change management implications for networks organizations. This is achieved through applying six critical management issues (CMIs) from the change management framework DELTA to a taxonomy consisting of three generic types of network organizations. The paper is built on an empirical base comprising over 150 expert interviews and 121 questionnaire respondents. The questionnaire respondents and interviewed experts represent the middle to top management of companies of all sizes involved in networks.
The results show that the framework applied to the change management in the different networks highlights and addresses different management activities per CMI. Given this, we discuss the differences in managerial implications that the framework identifies for the different types of networks.

My contribution to the paper:
I wrote one-third of the paper with a focus on the literature review and the method and results sections in the paper.
Paper 4 Title: Infusing an architectural framework with neo-institutional theory – Reports from recent change management initiatives within the Swedish public administration


Position in the thesis:
This paper contributes two things to my thesis, by i) investigating the possible inclusion of neo-institutional theory in the DELTA model, thereby illustrating how new theory may expand the perspective of the model, and ii) expanding the inter-organizational scope to include the public sector as well. The public sector perspective is further developed in the thesis, mainly through a large action research study conducted in an interorganizational IT project driven by an agency in the public sector.

Abstract:
The Swedish public administration is currently undergoing radical change towards dynamic models of governance relying on a high level of intergovernmental collaboration. This high level of interoperability between governmental organizations and the subsequent quality of service for citizens and companies depending
on the services provided by the Government is summarized in the vision statement of the 24-hour government (24-timmarsmyndigheten). According to the primary actor’s (Statskontoret) recommendation, this vision is to be realized through the application of web-service-based technology, resulting in a service-oriented architecture (SOA). The purpose of this paper is to investigate the possible infusion of a previously developed architectural framework for change management with neo-institutional theory. The results show that neo-institutional theory could be used to infuse the architectural framework with aspects regarding primarily history and legitimacy, but also with an overall contradictory perception of change. Given the vast differences in fundamental assumptions underlying the architectural framework and neo-institutional theory, the paper concludes that these results are however somewhat problematic.

My contribution to the paper:
I wrote 50 per cent of the paper with a focus on the introduction and results sections.
Paper 5 Title: Management of technochrome in an interorganizational e-government project


Position in the thesis:
This paper presents the action research study also presented in the results section in my thesis. It provides one of my main empirical foundations, illustrating in practice how DELTA works as support for interorganizational IT project managers. The kappa in my thesis is a continuation and further elaboration of the results presented in this paper with a change from technochrome towards IT project alignment.

Abstract:
This paper explores if and how enterprise architecture knowledge may support the management of interorganizational technochrome. An action research study on an e-government technochrome project provides empirical data. Four issues of technochrome are identified from the research site and presented: solution concept communication, stakeholder competencies, goal ambiguity and finally the collaborative form as such. The results indi-
cate that enterprise architecture may support the management of interorganizational e-government technochange. In addition, collaborative competences must be developed by respective partners as new collaborative arrangements grow. These collaborative competencies could be part of a future enterprise architecture for interorganizational technochange.

My contribution to the paper:

I alone conducted the entire work and writing of the paper.
Paper 6 Title: Interorganizational collaboration in small and medium-sized enterprises – A pan-European study of the influence of type of collaboration on SME practice


Position in the thesis:
This publication is my licentiate thesis. By expanding the view of different interorganizational collaborative arrangements, the thesis lays the foundation of the IT project context that is further analysed in this thesis. The publication summarizes a wide variety of collaborative arrangements into three categories: supply chain, business and research network. The publication highlights the different collaborative and managerial instruments used in order to facilitate the different needs of the network types. My thesis further elaborates on how to derive specific managerial support from general interorganizational issues.

Abstract:
Interorganizational collaboration among small and medium-sized enterprises (SMEs) is a phenomenon surrounded by both ambiguity and cumbersome managerial difficulties. Despite
this, the SME constitutes the primus motor of the European economy, and the organizational practice of interorganizational collaboration is increasingly considered a necessity for companies today. With the SMEs’ competitive ability being restricted by the size and amount of resources available, interorganizational collaboration as a mode of organizing offers a means for SMEs to expand their resource base. The development and diffusion of IT-based infrastructures decreases the costs of interorganizational collaboration, hence steadily pushing the envelope further in regard to what is economically feasible when it comes to collaborative constellations. This thesis presents a categorization of types of interorganizational collaboration among SMEs, and on the basis of this investigates the influence of the collaborative setting on three underlying areas of practice. By addressing the influence of the collaborative setting on practice within the usage and value of IT, knowledge management and change management, the ambition is to aid SME managers in their everyday work. The fieldwork underlying this thesis consists of the research conducted within the PLEXUS project, a three-year project within the EU-funded IST programme spanning from 2001 to 2004. The project aimed to create management techniques and decision support tools for the successful management and assessment of intellectual assets in interorganizational collaborations between SMEs.
Keywords: Interorganizational Collaboration, Small- and Medium-sized Enterprises, Collaborative Settings, IT, Value, Usage, Change Management, Knowledge Management

My contribution to the paper:
I wrote 50 per cent of the thesis with a focus on the method, results and conclusions sections.
Paper 7 Title: Introducing app stores into packaged software ecosystems: A negotiated order perspective


Position in the thesis:
This paper gives an updated view of a contemporary, interorganizational IT project collaboration. The collaboration is built around an ERP vendor’s platform for development, marketing and sales of ERP apps. The paper illustrates how a carefully designed platform may be used to build scalable collaborative arrangements regarding complex IT artifacts such as ERP apps. In addition, the paper presents a wide range of challenges for launching a business model for the platform that is to be acceptable for different type of stakeholders. I use the paper as an example of the future role of the IT project manager as a changing role that is increasingly integrated into ongoing interorganizational collaborations and moving away from the notion of “projects”.

Abstract:

This study addresses the emerging phenomena of app stores for packaged software such as ERP and CRM systems. Through employing the technology of app stores, ERP and CRM
vendors shift from delivering software as a service (SaaS) to delivering platform as a service (PaaS). Through an in-depth field study of one ERP vendor’s app store initiative, the study identifies and discusses relational issues affected by the new business model. The results show that the introduction of an app store brings the threat of restructuring the business model and power relationships nested in the ecosystem. This is discussed from a platform governance perspective.

Keywords: ERP, App Store, PaaS, Business Model, Governance.

My contribution to the paper:
I am responsible for 50 per cent of the paper with a focus on the introduction, method and results sections.
Appendix 3. My publications


design implications for ICT support. Proceedings of the 11th ECIS Conference.


Appendix 4. The papers